

Hazardous Materials Guide

for

First Responders



**Federal Emergency Management Agency
United States Fire Administration**



How to Use this Guide

If you know the Chemical/Material Name:

1. Go to the Specific Material Guides 
 - locate the chemical in the alphabetical listing
2. If you are unable to locate the chemical in the Specific Material Guide:
 - Go the Alphabetical Material Name Index 
 - locate the chemical in the alphabetical listing
 - go to the page listed for guidance information
3. If the chemical is not found in the index, go to the HAZMAT General Response Scheme 

If you have only the UN Number for the Chemical/Material:

1. Go to the UN/NA Number Index 
 - locate the UN/NA number in the numerical listing
 - go to the page listed for guidance information
2. If material UN number is not found in the index go to the HAZMAT General Response Scheme 

If you have only NFPA Placard Information:

1. Go to the guidance information for using the NFPA 704 Placard 

If you have only DOT Placard information:

1. Go the HAZMAT General Response Scheme 

WARNING!

The best time to learn how to use this book is BEFORE you need it. Train with this book the way you would train with any new piece of equipment - in advance!

Hazardous Materials Guide for First Responders

The information in this book was collected from a variety of sources which were reviewed by the Firefighters' Safety Study Technical Committee and are believed to be accurate. However, the Federal Emergency Management Agency makes no claim that these data and recommendations are either correct or sufficient and assumes no liability for any adverse consequences arising from their use.

The action recommendations in this book should be considered as suggestions only. Specific circumstances at the scene of an incident as well as the number and training of first responders will dictate what actions are actually appropriate. Final decisions are the responsibility of the Incident Commander.

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Introduction

I. Objectives

This book is the result of an extensive study of available hazardous materials response resources for first responders undertaken by the United States Fire Administration (USFA) as part of the Firefighters' Safety Study Act of 1990 (P.L. 101-446). The study concluded that, while several excellent and technically accurate resources are available, none are directed to the specific needs of the first responder trained at the Awareness or Operational Levels of Training; the training levels of most first responders. It is the hope and the intent of the USFA that this book will be that much needed resource.

This book provides important information for the initial response to both transportation and fixed facility incidents. It has been designed to present the first responder with a maximum amount of useful key information in a limited amount of space. As with any reference, it cannot include all information that might be useful or discuss all situations which might occur; nor can it replace the training and experience of individual responders. The information contained in this book has been reviewed by several sources and is as technically accurate as possible. For major incidents it will be necessary to obtain more detailed information from other resources as well as more advanced expertise from those with more extensive training.

It is assumed that those using this book will have had some training in hazardous materials response. Because most first responders are trained at the Awareness or Operational levels, this book is directed at appropriate responses for these levels of training. These levels are defined below as published by the National Fire Protection Association (NFPA 472, 1992) and the Occupational Safety and Health Administration (OSHA 1910.120).

OSHA 1910.120

First Responder At Awareness Level: First responders at the **Awareness Level** are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release. First responders at the **Awareness Level** shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- (A) An understanding of what hazardous substances are, and the risks associated with them in an incident.
- (B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- (C) The ability to recognize the presence of hazardous substances in an emergency.
- (D) The ability to identify the hazardous substances, if possible.

- (E) An understanding of the role of the first responder awareness individual in the employers emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.
- (F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

First Responder Operations Level: First responders at the **Operations Level** are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the **Operations Level** shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the **Awareness Level** and the employer shall so certify:

- (A) Knowledge of the basic hazard and risk assessment techniques.
- (B) Know how to select and use proper personal protective equipment provided to the first responder operational level.
- (C) An understanding of basic hazardous materials terms.
- (D) Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- (E) Know how to implement basic decontamination procedures.
- (F) An understanding of the relevant standard operating procedures and termination procedures.

II. How The Book is Organized

The body of this book is divided into seven sections:

- **Indexes:** *ALPHABETICAL MATERIAL NAME INDEX* followed by a *UN/NA NUMBER INDEX*.
- **SPECIFIC MATERIAL GUIDES:** specific recommendations for 430 commonly encountered materials.
- **MATERIALS SUMMARY RESPONSE TABLE:** summary information for 1,422 less commonly encountered materials.
- **DOT PLACARDS - CHART 10.**
- **SILHOUETTES OF RAIL CARS, TANK TRUCKS AND CHEMICAL TANKS.**

- *GENERAL APPROACH TO A HAZMAT INCIDENT.*
- *GLOSSARY OF TERMS AND ABBREVIATIONS* used in the book.

The main body of the book provides information on about 1750 different materials. The materials included in these sections include most of those which have been reported to have been involved in hazardous materials incidents. Most drugs have been excluded. Materials were assigned to the *SPECIFIC MATERIAL GUIDE* section or the *MATERIALS SUMMARY RESPONSE TABLE* based upon the likelihood that they would be encountered and the magnitude of the hazards they represent, using a formula designed for this project. The information in these two sections is intended to be used during an actual incident.

The *GENERAL APPROACH TO A HAZMAT INCIDENT* section provides specific information about a number of different response scenarios. It also provides useful information and techniques for assisting in the identification of materials. This section should be studied as part of training for Hazmat response. It is not intended for use during an actual incident.

Following the General Approach section is a Glossary of the technical terms and abbreviations used throughout the book. While the authors have tried to use simple and straightforward language, some terms may not be familiar to all users. Also included in this last section are several Appendices providing reference information mentioned in the text.

This book has been extensively indexed using all of the material names and synonyms (other names for the same chemical) found in the book. There is a separate index for UN and NA numbers which are commonly found on shipping papers when materials are in transport. While the *SPECIFIC MATERIAL GUIDES* section is arranged in alphabetical order by the most widely used name of the material, the index should be used as the most rapid way of locating information about a specific material.

This book does not contain specific recommendations about isolation or evacuation distances. Because this book is designed to be used in a wide range of scenarios involving different container sizes, it was felt that the calculation of such distances could be misleading and perhaps dangerous. Isolation distances are best determined by those trained above the operations level, taking into account the amount of material involved, the weather conditions and the specific circumstances of the release.

III. How to Use The Specific Material Guides (Chemical Specific) Pages

The *SPECIFIC MATERIAL GUIDES* (**RED TAB**) provides detailed response information for 430 materials. These materials were systematically selected based on their likelihood of being encountered and the magnitude of the hazard they pose to the first responder. An example of a specific material guide is shown in Figure 1 on page 4.

The most widely accepted chemical name for the material is

found in the top center of each page. Underneath the primary name is the UN (United Nations) number or the NA (North American) number. The UN number is commonly used for materials in commerce and can be found on shipping papers. A few materials in this section do not have an assigned UN number. This may mean either that the material is not considered a hazard, or that it is not found in transport in a sizeable amount. The shipping name of the material appears directly under the chemical name. Finally, other less commonly used names for the material are listed.

In the upper right hand corner of the page are the DOT placard(s)/label(s) assigned to the material when transported within the United States. A complete list of current DOT placards is found in Chart 10 on page 521. For a few materials, no specific DOT placard designation has been made in 49CFR and this area is left blank.

In the upper left corner of the page is the NFPA 704 placard providing summary information on acute health, fire and reactivity hazards plus any special concerns such as water reactivity which apply to the material. An explanation of the number designations used in the NFPA placard taken from / NFPA 704 is found on page 550. The placard is commonly found on storage containers or is posted at fixed facilities. When posted on fixed facilities each designation represents the worst hazard in that category within the building or facility. The placard is not found on materials in transport.

NFPA 704 designations were taken, when available, from the 1994 editions of NFPA 49 and NFPA 325. If the material was not rated in these references, values were determined and assigned from published data, where available, or were based on reasonable estimation from data published on structurally similar materials, using the definitions for these designations from NFPA 49. If the information in the placard is from the NFPA 49 or NFPA 325, the designation "NFPA" appears along the right edge of the placard. If there is no such designation, the content of the NFPA 704 placard was determined by the authors.

Below the list of synonyms may appear a section printed in red entitled **WARNING**. This section is vitally important. It provides crucial information about hazards that are **immediately life threatening** to the first responder. A **WARNING** indicates a very dangerous material because of the health risk or because of the extreme fire, explosion or reactivity risk(s). Most materials will not have a **WARNING** section. This does not mean that they are not dangerous and cannot injure or kill, only that they are not likely to do so if they are handled properly.

Below the **WARNING** section is a section entitled **HAZARDS**. This section describes the physical, chemical, or toxic properties of the material which create risks for the first responder. This section includes such things as explosion hazard, flammability risk and acute health hazards. Hazards are arranged in the approximate order of their importance to the first responder.

Next to the **Hazards** is a section entitled **Description**. This section describes what the material looks and smells like, along with some important information about the physical properties of the material, such as whether it floats or sinks in water or whether it is heavier or lighter than air (if it is a gas). The information in this section may be useful in verifying the identity of a hazardous material and in anticipating some of its actions.

In the middle of the page are sections entitled **Awareness and Operational Level Training Response** and **Operational Level Training Response**. These sections list the appropriate actions for the first responder trained to each of these two levels of expertise. Not all of the statements listed may be appropriate for every situation, but actions should not be more aggressive than those listed. The most important recommendations are given first. Remember that these are initial recommendations for the first responder. They may be modified by the on-scene Hazmat Incident Commander. **Awareness Level Response** actions are all defensive in nature. **Operational Level Response** actions are divided into two general situations, those involving releases of material without an accompanying fire and those where a fire is involved, whether or not the material itself is burning. **Operational Level Responders** must remember that actions listed under **Awareness and Operational Level Response** should be completed before beginning the more definitive **Operational Level Response** actions.

At the bottom of the page is a **First Aid** section. These recommendations should be used in caring for victims who are out of the Hot zone. Rescue of victims from within a Hot zone should only be performed by trained personnel wearing appropriate chemical resistant gear and is not generally a first responder action.

Removal of hazardous material from the skin, eyes or clothing of a victim (decontamination) is usually the most important first aid action that can be initiated. It should be performed only by appropriately trained and equipped individuals. Rapid removal of the material may be the difference between a minor injury and a serious injury. The details of decontamination techniques are beyond the scope of this book. In general, using large quantities of water to rinse off materials is almost always the first choice for decontamination in the field. Materials which are so toxic that first aid should not be performed on contaminated victims because of the risk of serious injury to the responder are clearly labeled. There are very few antidotes for treating victims exposed to chemicals and they are listed in this section for the benefit of hospital personnel who may care for these victims. Other **First Aid** information is also provided.

Finally, at the middle of the page below the first aid section is a **CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER** (CAS: ___-___-__). This is a specific identifying number given to each chemical by the Chemical Abstract Service. Mixtures are usually not assigned CAS numbers. While not commonly used in shipping, the CAS number may be found on containers and Material Safety Data Sheets (MSDS) and is used by many

more detailed references as an indexing number. It is provided as another positive identifier and to allow quick reference to other data bases.

IV. How to Use the Materials Summary Response Table

The *MATERIALS SUMMARY RESPONSE TABLE* (YELLOW TAB) provides summary information on 1,422 additional materials. These materials are either less likely to be encountered by the first responder. This table is arranged in alphabetic order using the most common chemical name of the material. For each material the UN number and DOT placard designation are provided, if available. NFPA designations are provided for all materials. In the case where NFPA designations were not available from NFPA 49 or 325, values were assigned by the authors using NFPA 49 definitions along with available data on the material or on structurally similar materials. NFPA 704 designations taken from NFPA sources are shown in green while the those assigned by the authors are in black.

Figure 1.

HYDROGEN CYANIDE

(STABILIZED)

UN 1051

Shipping Name: Hydrogen cyanide, stabilized with less than 3 percent water
 Other Names: AC Hydrocyanic acid solution
 HCN Prussic acid
 Hydrocyanic acid

WARNING! ● **POISON! BREATHING THE VAPORS OR SKIN CONTACT CAN KILL YOU!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **EXTREMELY FLAMMABLE!**

<p>Hazards:</p> <ul style="list-style-type: none"> ● Odor is not a reliable indicator of the presence of toxic amounts of vapor ● May react with itself without warning with explosive violence ● Container may BLEVE or explode when exposed to fire ● Vapors may travel long distances to ignition sources and flashback ● Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire ● Vapors are slightly lighter than air but will collect and stay in low areas ● Combustion products are less toxic than the material itself <p>Awareness and Operational Level Training Response:</p> <ul style="list-style-type: none"> ● DO NOT ATTEMPT RESCUE! ● Stay upwind and uphill ● Determine the extent of the problem ● BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help ● Remove all ignition sources ● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion ● Evacuate the immediate area and downwind for a large release ● Notify local health and fire officials and pollution control agencies ● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water 	<p>Description:</p> <ul style="list-style-type: none"> ● Colorless liquid that boils at 78° F ● Sweet odor like bitter almonds; many people cannot smell it ● Dissolves slowly in water but is soluble in water ● Extremely flammable ● Vapors are slightly lighter than air but will collect and stay in low areas ● Transported in red and white candy striped containers ● Produces large amounts of vapor ● Freezes at 8° F <p>Operational Level Training Response:</p> <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none"> ● Stop the release if it can be done safely from a distance ● Use large amounts of water well away from the material to disperse vapors - contain runoff ● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none"> ● If material is on fire and conditions permit, DO NOT EXTINGUISH; combustion products are less toxic than the original material. Cool exposures using unattended monitors. ● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Do not direct straight streams into the liquid. ● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely ● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location
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First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 74-90-8

References

1. North American Emergency Response Guide, 1996 Edition, U.S. Department of Transportation, Washington, DC.
2. The Merck Index, 12th Edition (1996), Merck and Co., Inc., Rahway, NJ.
3. Emergency Handling of Hazardous Materials in Surface Transportation (1992), American Association of Railroads, Washington, DC.
4. Emergency Action Guide (1995), American Association of Railroads, Washington, DC.
5. Chemical Hazards Response Information System, Hazardous Chemical Data Manual, Vol. II (1993), U.S. Department of Transportation, U.S. Coast Guard, Washington, DC.
6. NIOSH Pocket Guide to Chemical Hazards (1990), U.S. Department of Health and Human Services, Washington, DC.
7. L. Bretherick, Bretherick's Handbook of Reactive Chemical Hazards, 4th Edition (1990), Butterworth-Heinemann, Ltd., Boston, MA.
8. Tomes Plus (1995), Micromedex, Denver, CO.
9. CAMEO (1990), U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, National Safety Council, Washington, DC.
10. Fire Protection Guide to Hazardous Materials; 10th Edition (1991), National Fire Protection Association, Quincy, MA.
11. Responding to Hazardous Materials Incidents, ANSI/NFPA 473 (1992), National Fire Protective Association, Quincy, MA.
12. Responders to Hazardous Materials Incidents, ANSI/NFPA 472 (1992), National Fire Protective Association, Quincy, MA.
13. Identification of the Fire Hazards of Materials, ANSI/NFPA 704 (1990), National Fire Protective Association, Quincy, MA.
14. Field Guide to Tank Car Identification (1992), Association of American Railroads, Washington, D.C.
15. Hazardous Materials Response Handbook, 2nd Edition (1993), National Fire Protective Association, Quincy, MA.
16. R.J. Lewis, SAX's Dangerous Properties of Industrial Materials, 8th Edition (1992), Van Nostrand Reinhold, New York, NY.
17. R.J. Lewis, Hazardous Chemicals Desk Reference, 3rd Edition (1993), Van Nostrand Reinhold, New York, NY.
18. A Guide to Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids, ANSI/NFPA 325 (1994), National Fire Protective Association, Quincy, MA.
19. Hazardous Chemicals Data, ANSI/NFPA 49 (1994), National Fire Protective Association, Quincy, MA.
20. Code of Federal Regulations 49 Transportation (1996), Office of Federal Register National Archives and Records Administration, Washington, DC.
21. Chemical/Biological Incident Handbook, (1995), The Director of Central Intelligence Committee on Terrorism/Community Counterterrorism Board.

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Specific Material Guides



ACETAL

UN 1088

Shipping Name: Acetal
Other Names: Acetaldehyde ethylacetal
Acetol
1,1-Diethoxyethane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent, woody odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support /CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 105-57-7



ACETALDEHYDE

UN 1089

Shipping Name: Acetaldehyde
Other Names: Acetic aldehyde
Ethanal
Ethylaldehyde



WARNING! ● **EXTREMELY FLAMMABLE!**
● **MAY EXPLODE WITHOUT WARNING WHEN EXPOSED TO HEAT, DUST OR CORROSIVE OR OXIDIZING AGENTS!**

Hazards:

- Very irritating to skin and eyes, prolonged contact can cause burns
- Container may BLEVE when exposed to fire
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent fruity odor
- Soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support /CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 75-07-0



ACETIC ACID

UN 2789 (More than 80%)

UN 2790 (Solution in water 1-80%)

Shipping Name: UN 2789 Acetic acid, glacial

UN 2790 Acetic Acid, solution, more than 10%
but not more than 80% acid.

Other Names: Ethanoic acid
Ethylic acid

Glacial acetic acid
Methane carboxylic acid



Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Will attack many forms of rubber or plastic

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sour, pungent odor like vinegar
- Soluble in water and produces heat when mixed with water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 64-19-7



ACETIC ANHYDRIDE

UN 1715

Shipping Name: Acetic Anhydride
Other Names: Acetic acid anhydride
Acetyl anhydride
Acetyl ether
Acetyl oxide
Ethanoic anhydride



Hazards: <ul style="list-style-type: none">● Vapors and liquid are extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness● Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Reacts explosively with a large number of chemicals	Description: <ul style="list-style-type: none">● Colorless liquid● Strong vinegar-like smell● Dissolves in water and reacts with water to form acetic acid (vinegar) and heat● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Remove all ignition sources● Isolate the area of release or fire and deny entry● Evacuate or shelter in place the immediate area and downwind for a large release● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water well away from the release to disperse vapors - contain runoff● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Use alcohol foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 108-24-7



ACETONE

UN 1090

Shipping Name: Acetone

Other Names: Dimethyl ketone
Methyl ketone
2-Propanone



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors may travel long distances to ignition sources and flashback
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Smells like fingernail polish remover
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 67-64-1



ACETONE CYANOHYDRIN

(STABILIZED)

UN 1541

Shipping Name: Acetone cyanohydrin, stabilized

Other Names: Acetocyanohydrin 2-Cyano-2-propanol

2-Hydroxyisobutyronitrile Isopropylcyanohydrin

2-Methyl lactonitrile



- WARNING!**
- **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! PRODUCES CYANIDE IN THE BODY!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXPOSURE TO HEAT WILL PRODUCE CYANIDE GAS!**

Hazards:

- Decomposes in water to form hydrogen cyanide
- Combustion products include the toxic gases hydrogen cyanide and nitrogen oxides
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Almond-like odor
- Soluble in water
- Decomposes in water to form hydrogen cyanide
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of fog to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform mouth to mouth resuscitation; use a bag/mask apparatus**
- **Note to physician: can produce cyanide toxicity, if symptoms indicate, initial treatment includes the cyanide antidote kit**

CAS: 75-86-5



ACETONITRILE

UN 1648

Shipping Name: Acetonitrile

Other Names: Cyanomethane
Ethanenitrile
Ethyl nitrile

Methanecarbonitrile

Methyl cyanide



Hazards:

- Breathing the vapors, skin contact or swallowing the liquid can kill you! Converted to cyanide in the body!
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Combustion products include toxic hydrogen cyanide and nitrogen oxides

Description:

- Colorless liquid
- Sweet, ether-like smell
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, specially trained personnel can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: can cause cyanide poisoning; if symptoms indicate, treat with the cyanide antidote kit

CAS: 75-05-8



ACETYL BROMIDE

UN 1716

Shipping Name: Acetyl Bromide
Other Names: Acetic acid bromide
Ethanoyl bromide



- WARNING!** ● **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN BROMIDE GAS!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic and corrosive hydrogen bromide

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, unpleasant acrid smell
- Sinks in water and reacts violently with water to produce acetic acid and toxic and corrosive hydrogen bromide
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Attacks and corrodes wood and most metals in the presence of moisture

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Do not allow water to come in contact with the material; if material is on fire, use dry chemical to extinguish. If water must be used, use in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 506-96-7



ACETYL CHLORIDE

UN 1717

Shipping Name: Acetyl Chloride
Other Names: Acetic acid chloride
Acetic chloride
Ethanoyl chloride



- WARNING!** • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER DIRECTLY ON MATERIAL! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE AND ACETIC ACID!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride
- Corrosive to most metals particularly in the presence of moisture producing flammable hydrogen gas

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow fuming liquid
- Pungent, irritating odor
- Sinks in water and reacts violently with water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not allow water to come in contact with material; if material is on fire, use dry chemical to extinguish; if water must be used, use in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 75-36-5



ACETYLENE

(Dissolved)

UN 1001

Shipping Name: Acetylene, dissolved

Other Names: Ethine
Ethyne



WARNING! ● EXTREMELY FLAMMABLE!
● CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE!

Hazards:

- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Reacts explosively with many materials
- Exposure of cylinders to fire and flame or elevated temperatures may cause cylinder to rupture or frangible disc to burst, releasing entire contents of cylinder. Ruptured or venting cylinders may rocket through buildings and/or travel a considerable distance

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Garlic or ether-like odor
- Soluble in water
- Extremely flammable
- Vapors are lighter than air
- Often shipped and stored dissolved in acetone
- Not shipped by rail tank cars
- Cylinders have a fusible plug not a relief valve

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention

CAS: 74-86-2



ACROLEIN

(INHIBITED)

UN 1092

Shipping Name: Acrolein, inhibited

Other Names: Acrylaldehyde 2-Propenal

Allyl aldehyde

Biocide



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Irritating to eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Reacts with acids, alkalis and air producing a violent reaction with itself
- Prolonged contact with skin will cause burns

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Sharp pungent odor
- Floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-02-8



ACRYLAMIDE

UN 2074

Shipping Name: Acrylamide
Other Names: Acrylic amide
Propenamide
Vinyl amide



WARNING! • MAY DECOMPOSE WITH HEAT AND REACT EXPLOSIVELY WITH ITSELF AT TEMPERATURES ABOVE 184° F RELEASING TOXIC AMMONIA GAS!

Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- No odor
- Initially sinks in water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 79-06-1



ACRYLIC ACID

(INHIBITED)

UN 2218

Shipping Name: Acrylic acid, inhibited

Other Names: Acroleic acid
Ethylene carboxylic acid
GAA
Glacial acrylic acid

Propene acid
Propenoic acid
2-Propenoic acid
Vinyl formic acid



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!

Hazards:

- Vapors or liquid can cause burns to eyes, nose, skin and lungs
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- May react with itself without warning with explosive violence
- Vapors may travel long distances to ignition sources and flash back

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Shipped as a colorless liquid
- Sharp rancid odor
- Initially sinks in water and is soluble in water
- Very flammable
- Freezes at 56° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-10-7



ACRYLONITRILE

(INHIBITED)

UN 1093

Shipping Name: Acrylonitrile, inhibited
Other Names: Carbacryl 2-Propenenitrile
Cyanoethylene Vinyl cyanide
Propenenitrile



- WARNING!** ● **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! PRODUCES CYANIDE IN THE BODY!**
- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Prolonged contact with skin will cause burns
- Combustion products include toxic cyanide gas and nitrogen oxide

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Evacuate the immediate area and downwind for a large release
- Remove all ignition sources
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Strong, pungent smell like onions or garlic
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

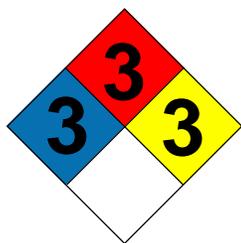
FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a risk to the responder. Decontaminate the victim from a safe distance with a stream of water. Provide Basic Life Support/CPR as needed, then further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Note to physician: can produce cyanide toxicity, if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 107-13-1



ACRYLYL CHLORIDE

NA 9188

Other Names: Acrylic acid chloride
Acryloyl chloride
Propenoyl chloride

- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **HEATED MATERIAL MAY REACT WITH ITSELF LEADING TO CONTAINER EXPLOSION!**

Hazards: <ul style="list-style-type: none">● Highly flammable● Container may BLEVE when exposed to fire● Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin may cause burns● Combustion products include toxic hydrogen chloride	Description: <ul style="list-style-type: none">● A liquid● Irritating odor● Sinks in water and decomposes in water to hydrochloric acid● Highly flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● Remove all ignition sources● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 814-68-6



ADIPONITRILE

UN 2205

Shipping Name: Adiponitrile
Other Names: Adipic acid dinitrile
1,4-Dicyanobutane
Hexanedinitrile
Tetramethylene cyanide



- WARNING!** ● **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! PRODUCES CYANIDE IN THE BODY!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXPOSURE TO HEAT WILL PRODUCE TOXIC CYANIDE GAS!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion or decomposition products upon heating include toxic hydrogen cyanide and nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Practically odorless
- Floats on the surface of water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 34° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors

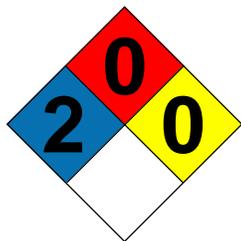
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 111-69-3



ALDICARB

UN 2757

Shipping Name: Carbamate pesticides, solid, toxic

Other Names: Carbaryl
Temik



Hazards:

- Container may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Decomposition products upon heating include toxic sulfur oxides

Description:

- White solid
- Slight sulfur-like odor
- Sinks in water and is insoluble in water
- Nonflammable
- A carbamate insecticide

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: a carbamate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 116-06-3



ALLYL ALCOHOL

UN 1098

Shipping Name: Allyl Alcohol

Other Names: AA

Allyl al

Allylic alcohol

Orvinylecarbinol

2-Propenol

Propenol

Propenyl alcohol

Vinylcarbinol



WARNING! • **POISON! BREATHING THE VAPORS OR SKIN CONTACT CAN KILL YOU!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Pungent, mustard-like smell
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors and dilute standing pools of water
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-18-6



ALLYLAMINE

UN 2334

Shipping Name: Allylamine

Other Names: 3-Aminopropene 2-Propenamine
3-Aminopropylene 2-Propen-1-amine
Monoallylamine



- WARNING!** • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- When heated may react with itself without warning with explosive violence
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release.
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Ammonia-like odor
- Completely soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-11-9



ALLYL BROMIDE

UN 1099

Shipping Name: Allyl Bromide
Other Names: Bromoallylene
3-Bromo-1-propene
3-Bromopropylene
2-Propenyl bromide



WARNING! • POISON! BREATHING THE VAPOR CAN KILL YOU!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Highly flammable
- Container may BLEVE when exposed to fire
- When heated may react with itself without warning with explosive violence
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion produces toxic hydrogen bromide gas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Pungent, unpleasant smell
- Sinks in water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use foam or dry chemical if available in sufficient amounts; under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely.
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 106-95-6



ALLYL CHLORIDE

UN 1100

Shipping Name: Allyl Chloride

Other Names: Chlorallylene Chloropropylene
Chloropropene Propenyl chloride
3-Chloropropene



WARNING! • POISON! BREATHING THE VAPOR CAN KILL YOU!

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Highly flammable
- Container may BLEVE when exposed to fire
- When heated, may react with itself without warning with explosive violence
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion produces the toxic gas hydrogen chloride and phosgene

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow-brown or red liquid
- Sharp and irritating odor
- Floats on water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use foam or dry chemical if available in sufficient amounts; under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely.
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-05-1



ALLYL CHLOROFORMATE

UN 1722

Shipping Name: Allyl Chloroformate
Other Names: Allyl chlorocarbonate
2-Propenyl chloroformate



Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- When heated may react with itself without warning with explosive violence
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Extremely irritating smell
- Sinks in water and is insoluble in water and reacts with water to form allyl alcohol and chloroformic acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 2937-50-0



ALLYLTRICHLOROSILANE

(STABILIZED)

UN 1724

Shipping Name: Allyltrichlorosilane, stabilized

Other Names: Acetylsilicon trichloride

Propene-3-yltrichlorosilane

Trichloroallysilane



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER ON MATERIAL! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent smell
- Reacts vigorously with water to form hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-37-9



AMINOPYRIDINES

UN 2671

Shipping Name: Aminopyridines

Other Names: 4-Aminopyridine Avitrol

m-Aminopyridine 4-Pyridinamine

o-Aminopyridine 4-Pyridylamine

p-Aminopyridine



WARNING! • **POISON! BREATHING THE DUST, SWALLOWING THE MATERIAL OR SKIN CONTACT WILL KILL YOU!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White powder
- No odor
- Sinks in water and is moderately soluble in water
- Flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Cover material to protect from wind, rain or spray

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed

CAS: 504-24-5 (para, p-); 504-59-0 (ortho, o-); 462-08-8 (meta, m-)



AMMONIA (ANHYDROUS)

UN 1005

Shipping Name: Ammonia, anhydrous
Other Names: AM-FOL
Ammonia, anhydrous
Anhydrous ammonia

Refrigerant R717
Nitro-Sil



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SKIN CONTACT CAN KILL YOU!**
 - Fire fighting gear including SCBA does not provide adequate protection. If exposure to the chemical occurs, remove and isolate gear immediately and thoroughly decontaminate personnel.
 - **DO NOT ADD WATER TO LIQUID AMMONIA! WILL INCREASE EVAPORATION!**

Hazards:

- Contact with liquid may cause frostbite
- Severely irritating to skin, eyes, nose, throat and lungs, may cause burns
- May burn or explode in closed spaces (e.g., tanks, sewers, buildings)
- Produces a toxic, visible or invisible gas cloud which may hug the ground when cool
- Containers may BLEVE or explode when exposed to fire
- Corrosive to metals

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- May be shipped or stored as a compressed gas or cryogenic liquid
- Strong, pungent odor
- Soluble in water
- Flammable
- Gas is lighter than air but may hug the ground when cool

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if you can do it safely from a distance
- DO NOT PUT WATER ON LIQUID AMMONIA
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7664-41-7



AMMONIUM BENZOATE

NA 9080

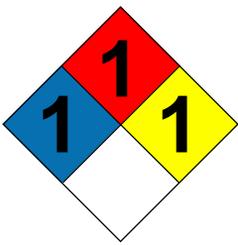
Other Names: Vulnoc AB

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may explode when exposed to fire● Combustion or decomposition products upon heating include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless solid● Odorless● Sinks in water and is moderately soluble in water● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 1863-63-4



AMMONIUM CARBAMATE

NA 9083

Other Names: Ammonium aminofornate
Carbamic acid, ammonium salt

Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic nitrogen oxides and ammonia

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White crystals
- Ammonia-like smell
- Soluble in water
- Flammable
- Slowly releases ammonia upon contact with air

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 1111-78-0



AMMONIUM HYDROXIDE

UN 2672 (10 to 35% Ammonia in water)

UN 2073 (35 to 50% Ammonia in water)

Shipping Name: Ammonia Solutions

Other Names: Ammonia monohydrate
Ammonia solution

Ammonia water

Aqueous ammonia



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- May burn or explode in closed spaces (e.g., tanks, sewers, buildings)
- Decomposes upon heating to produce toxic ammonia and nitrogen oxide gases
- Vapors are lighter than air but may hug the ground when cool

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to milky white colored liquid
- Ammonia-like odor
- Soluble in water
- Flammable
- Vapors are lighter than air but may hug the ground when cool

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1336-21-6



AMMONIUM PERCHLORATE

UN 1442

UN 0402

Shipping Name: Ammonium perchlorate

Other Names: Ammonium perchlorate high explosive

Ammonium perchlorate oxidizer



WARNING! • HIGHLY EXPLOSIVE! HEAT, FRICTION OR SHOCK MAY CAUSE MATERIAL TO EXPLODE!
• STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE; MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!

Hazards:

- Irritating to skin and eyes
- Decomposition products upon heating include toxic nitrogen oxides and ammonia

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire deny entry and call for expert help
- For container exposed to fire evacuate a wide area in all directions because of the high risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- Odorless
- Sinks in water and dissolves slowly in water
- Nonflammable but may cause combustibles to ignite

Operational Level Training Response:

RELEASE, NO FIRE:

- Keep released material wet
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

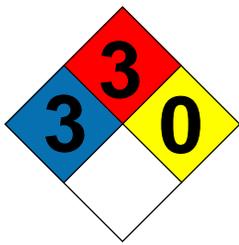
FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not burn, fight surrounding fire with an agent appropriate for the material burning
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 7790-98-9



AMMONIUM SULFIDE

(SOLUTION)

UN 2683

Shipping Name: Ammonium Sulfide, solution

Other Names: Ammonium monosulfide

Diammonium sulfide



WARNING! • **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! RELEASES TOXIC HYDROGEN SULFIDE IN THE BODY! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- When heated or mixed with acid, the solution produces toxic hydrogen sulfide gas
- Combustion products include toxic sulfur and nitrogen oxides

Awareness and Operational Training Level

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow solid; usually shipped and stored as a water solution (40 to 44%)
- Rotten egg and ammonia-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 0°F
- Produces large amounts of vapor

Operational Level Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause hydrogen sulfide poisoning; if symptoms indicate, amyl nitrite is the initial antidote

CAS: 12135-76-1



AMMONIUM SULFITE

NA 9090

Other Names: Ammonium sulphite
Diammonium sulfite
Sulfurous acid, diammonium salt

Hazards:

- Irritating to skin, eyes, nose and lungs
- Decomposition products upon heating include toxic nitrogen and sulfur oxides and ammonia

Awareness and Operational Level Training**Response:**

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White crystalline solid, like sand or sugar
- Odorless
- Initially sinks in water and is soluble in water
- Nonflammable

Operational Level Training Response:**RELEASE, NO FIRE:**

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are not effective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 10196-04-0



AMMONIUM THIOCYANATE

NA 9092

Other Names: Ammonium rhodanate
Ammonium sulfocyanide
Amthio

Hazards:

- Irritating to skin, eyes, nose and lungs
- Combustion and decomposition products upon heating include toxic ammonia, nitrogen oxide, sulfur oxide and cyanide gases
- Corrosive to iron, copper and brass

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Consider evacuating or sheltering in place the immediate area and downwind if material is involved in a fire
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Odorless
- Initially sinks in water and is soluble in water
- May be shipped and stored as a solid or in a water solution
- Flammable except in water solution

Operational Level Training Response:

RELEASE, NO FIRE:

- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Cover material to protect from blowing, rain or spray

FIRE:

- Solid material burns only with difficulty; as a water solution material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 1762-95-4



AMYL ALCOHOL

UN 1105

Shipping Name: Amyl alcohols

Other Names: Amylol
n-Amyl alcohol
n-Butyl carbinol

1-Pentanol

1-Pentyl alcohol



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Very irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, pleasant odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 71-41-0



AMYLTRICHLORSILANE

UN 1728

Shipping Name: Amyltrichlorosilane
Other Names: Pentyltrichlorosilane
Trichloroamylsilane



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE VAPOR!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic hydrogen chloride
- Corrosive to metals

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Pungent odor
- Sinks in water and reacts vigorously with water to form hydrochloric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire, and conditions permit, DO NOT EXTINGUISH
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-72-2



AN/FO

NA 0331 (Contains only prilled ammonium nitrate)

Shipping Name: Ammonium nitrate/fuel oil mixtures
Other Names: AMFO
Ammonium nitrate: fuel oil



WARNING! • EXPLOSIVE! MAY DETONATE IF INVOLVED IN A FIRE!

Hazards:

- Potentially explosive mixture, but is difficult to detonate
- May interfere with the body's ability to use oxygen
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A slurry of ammonium nitrate in fuel oil
- Odor like fuel oil
- Flammable
- No information on water solubility
- Used as an explosive

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the antidote



ANILINE

UN 1547

Shipping Name: Aniline
Other Names: Aminobenzene Benzenamine
Aminophen Blue oil
Aniline oil Phenylamine



Hazards: <ul style="list-style-type: none">● Inhalation of vapors, ingestion of liquid or skin contact with liquid can cause severe illness● May interfere with the body's ability to use oxygen● Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire● Combustion or decomposition products upon heating include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless to light brown oily liquid● Musty, fishy odor● Sinks slowly in water and is slightly soluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay uphill and upwind● Determine the extent of the problem● Isolate the area of release and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Symptoms may be delayed for up to 48 hours
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the antidote

CAS: 62-53-3



ARSENIC TRICHLORIDE

UN 1560

Shipping Name: Arsenic trichloride
Other Names: Arsenic butter
Arsenic chloride
Arsenous chloride
Arsenous trichloride



- WARNING!** ● **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin and eyes can cause burns
- Upon contact with water generates toxic hydrochloric acid
- Will react with most metals to produce explosive hydrogen gas
- Vapors are heavier than air and will collect and stay in low areas
- Decomposition products upon heating include toxic hydrogen chloride and arsenic fumes
- Known to cause cancer in humans following long term exposure: contact should be avoided

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow oily liquid
- Pungent odor
- Decomposes in water to form toxic hydrochloric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn, fight surrounding fire with an agent appropriate for the material burning
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7784-34-1



ARSINE

UN 2188

Shipping Name: Arsine

Other Names: Arsenic hydride
Arsenic trihydride
Hydrogen arsenic



- WARNING!**
- **POISON! BREATHING THE GAS OR SKIN CONTACT CAN KILLYOU!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Exposure of cylinders to fire and flame or elevated temperatures may cause cylinder to rupture or frangible disc to burst, releasing entire contents of cylinder. Ruptured or venting cylinders may rocket through buildings and/or travel a considerable distance
- Vapors may travel long distances to ignition sources and flashback
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode
- Combustion products include toxic arsenic oxides
- Known to cause cancer in humans following long term exposure: contact should be avoided

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Garlic-like odor
- Slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Symptoms may be delayed
- Note to physician: causes hemolysis; chelating agents are not effective-if symptoms indicate, use exchange transfusion

CAS: 7784-42-1

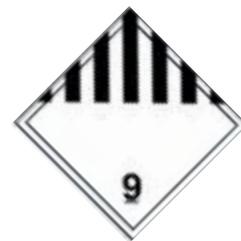


BENZALDEHYDE

UN 1990

Shipping Name: Benzaldehyde

Other Names: Benzenecarbonal
Benzene methylal
Benzoic aldehyde



Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Almond-like odor
- Sinks in water and is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -14°F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

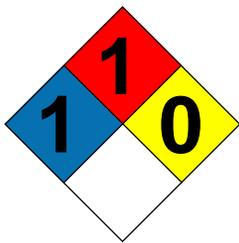
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 100-52-7



BENZAMIDE

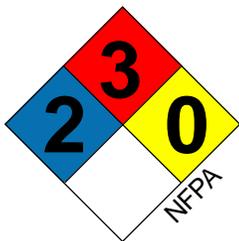
Other Names: Benzoic acid amide
Benzoylamide
Phenylcarboxamide

Hazards: <ul style="list-style-type: none">● Mildly irritating to skin, eyes, nose and lungs● Combustion products include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless solid crystals● Odorless● Sinks in water and is slightly soluble in water● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material burns with difficulty, fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 55-21-0 and 27208-38-4



BENZENE

UN 1114

Shipping Name: Benzene

Other Names: Benzol
Coal naphtha
Cyclohexatriene
Mineral naphtha



Hazards:

- Highly flammable
- Vapors may travel long distances to ignition sources and flash back
- Container may BLEVE when exposed to fire
- Vapors in confined areas (e.g., tanks, sewers buildings) may explode when exposed to fire
- Irritating to eyes, moderately irritating to skin and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Known to cause cancer in humans following long term exposure: contact should be avoided
- Corrosive to most rubber products

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pleasant aromatic odor
- Floats on water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 71-43-2



BENZONITRILE

UN 2224

Shipping Name: Benzonitrile
Other Names: Benzenenitrile
Cyanobenzene
Phenylcyanide



- WARNING!** • **POISON! BREATHING THE VAPOR, SWALLOWING THE LIQUID OR SKIN CONTACT CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs even at low concentrations
- Combustion products include toxic nitrogen oxides
- Corrosive to some plastics

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Almond-like odor
- Sinks in water and is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 9° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity, if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 100-47-0



BENZOQUINONE

UN 2587

Shipping Name: Benzoquinone

Other Names: 1,4-Benzoquinone
p-Benzoquinone
1,4-Cyclohexadiene dioxide
Quinone

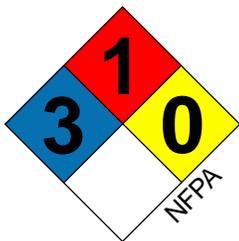


Hazards: <ul style="list-style-type: none">● Container may explode when exposed to fire● Irritating to skin, eyes, nose and lungs● Vapors are heavier than air and will collect and stay in low areas	Description: <ul style="list-style-type: none">● Greenish-yellow solid● Chlorine-like odor● Sinks in water and is slightly soluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Use water or foam to extinguish● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 106-51-4



BENZOTRICHLORIDE

UN 2226

Shipping Name: Benzotrìchloride

Other Names: Benzoic trichloride

Benzyl trichloride

Phenyl trichloromethane

Trichloromethyl benzene

Trichlorortoluene



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Reacts with water to produce hydrochloric acid
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow, oily fuming liquid
- Pungent odor
- Sinks in water and reacts with water to form hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material, avoid using water if possible
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 98-07-7



BENZOYL CHLORIDE

UN 1736

Shipping Name: Benzoyl chloride
Other Names: Benzenecarbonyl chloride
alpha-Chlorobenzaldehyde



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride and phosgene gas

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly brown liquid
- Pungent odor
- Sinks in water and reacts violently with water to produce toxic hydrochloric acid
- Very flammable
- Fumes in moist air to form hydrogen chloride
- Freezes at 30° F
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not allow water to come in contact with the material; if material is on fire, use dry chemical to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 98-88-4



BENZYL BROMIDE

UN 1737

Shipping Name: Benzyl bromide
Other Names: alpha-Bromotoluene
Bromophenylmethane



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- In the presence of metals may react violently with itself without warning
- Combustion products include toxic hydrogen bromide

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Irritating odor like tear gas
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 25° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 100-39-0



BENZYL CHLORIDE

(USUALLY STABILIZED)

UN 1738

Shipping Name: Benzyl chloride

Other Names: alpha-Chlorotoluene
(Chloromethyl) benzene
Chlorophenyl methane



Hazards:

- May react with itself vigorously in the presence of metals releasing heat and hydrogen chloride
- Severely irritating to skin, eyes, nose and lungs
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow liquid
- Irritating, pungent odor
- Sinks in water and is insoluble in water
- Reacts slowly with water releasing hydrochloric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors -contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 100-44-7



BENZYL CHLOROFORMATE

UN 1739

Shipping Name: Benzyl chloroformate
Other Names: Benzyl carbonyl chloride
Benzyl chlorocarbonate
BZCF



Hazards: <ul style="list-style-type: none">● Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion and decomposition products upon heating include toxic hydrogen chloride● Reacts vigorously with hot water or steam to form hydrochloric acid	Description: <ul style="list-style-type: none">● Colorless to pale yellow oily liquid● Acrid odor● Sinks in water and reacts slowly with cold water forming hydrochloric acid; reacts vigorously with hot water or steam● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● If possible, DO NOT allow water to come in contact with material; if material is on fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 501-53-1



BENZYLIDENE CHLORIDE

UN 1886

Shipping Name: Benzylidene chloride
Other Names: Benzal chloride
Benzyl dichloride
Benzylene chloride
Dichloromethyl benzene



Hazards: <ul style="list-style-type: none">● Severely irritating to skin, eyes, nose and lungs● Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic hydrogen chloride● Reacts with water to produce toxic hydrochloric acid	Description: <ul style="list-style-type: none">● Colorless to brown oily liquid● Pungent odor● Sinks in water and is insoluble in water● Very flammable● Reacts with water to produce hydrochloric acid● Vapors are heavier than air and will collect and stay in low areas● Freezes at 3° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water well away from the release to disperse vapors - contain runoff● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 98-87-3



BORON TRIBROMIDE

UN 2692

Shipping Name: Boron Tribromide

Other Names: Boron bromide

Tribromoborane

Trona

- WARNING!** • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROBROMIC ACID FUMES!**

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Strongly corrosive to metal, wood and rubber

Awareness and Operational Training Level

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, fuming liquid
- Sharp, irritating odor
- Reacts violently with water to form toxic hydrobromic acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Do not allow material to come in contact with the material; if material is on fire, use dry chemical to extinguish; fight surrounding fire with agent other than water or foam
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10294-33-4



BORON TRICHLORIDE

UN 1741

Shipping Name: Boron trichloride
Other Names: Boron chloride
Trichloroborane
Trichloroboron



- WARNING!** ● **POISON! BREATHING THE GAS CAN KILL YOU! PROLONGED SKIN CONTACT CAN CAUSE SEVERE BURNS OR BLINDNESS!**
- Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE**

Hazards:

- Severely irritating to nose and lungs
- Container may explode when exposed to fire
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Contact with liquid can cause frostbite
- Decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Container may BLEVE or explode when exposed to fire
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas or liquid
- Shipped and stored as a compressed liquefied gas
- Sharp, choking acrid odor
- Reacts vigorously with water to produce hydrochloric acid
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Liquid boils at 54° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material - **DO NOT ALLOW WATER TO COME IN CONTACT WITH MATERIAL**
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10294-34-5



BORON TRIFLUORIDE

UN 1008

Shipping Name: Boron trifluoride

Other Names: Boron fluoride

Trifluoroboron



- WARNING!** • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Container may explode when exposed to fire
- Reacts with water or moist air to produce hydrofluoric acid
- Combustion and decomposition products upon heating include the toxic gases hydrogen fluoride and fluorine
- Will attack some plastics and rubber coatings
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless compressed gas
- Pungent and irritating odor, may be considered pleasant at low concentrations
- Forms a dense white aerosol mist upon contact with moist air
- Reacts with water to form toxic hydrofluoric acid
- Soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- May be stored as an ethyl ether complex that will increase flammability

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Victims should be examined by a physician as soon as possible
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7637-07-2



BROMINE

UN 1744

Shipping Name: Bromine or Bromine, solution

Other Names: Brom



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- When heated will react with water or steam to produce toxic and corrosive fumes

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water
- Notify local health and fire officials and pollution control agencies

Description:

- Fuming red crystals at low temperatures
- A reddish brown fuming liquid above 19° F
- Sharp penetrating odor
- Sinks in water forming hydrobromic acid and is soluble in water
- Nonflammable
- Strong oxidizing agent
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate the building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7726-95-6



BROMINE PENTAFLUORIDE

UN 1745

Shipping Name: Bromine pentafluoride

Other Names: Bromide fluoride



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER RELEASING TOXIC HYDROFLUORIC ACID!**
 - **STRONG OXIDIZER - WILL INCREASE THE INTENSITY OF A FIRE; MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Reacts violently with many metals, glass, wood and some plastics
- Decomposes upon heating to produce highly toxic hydrogen fluoride and hydrogen bromide gas

Awareness and Operational Level Training

Response

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow fuming liquid
- Pungent, highly irritating odor
- Reacts violently with water forming highly toxic hydrofluoric acid
- Nonflammable, but may ignite other flammable materials
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7789-30-2



BROMINE TRIFLUORIDE

UN 1746

Shipping Name: Bromine trifluoride

Other Names: Bromine fluoride



- WARNING!**
- **POISON! BREATHING THE GAS OR SWALLOWING THE LIQUID CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER EVEN AT VERY LOW TEMPERATURES PRODUCING TOXIC HYDROGEN FLUORIDE VAPORS!**
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE AND MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors and fumes are heavier than air and will collect and stay in low areas
- Exposure of cylinders to fire and flame or elevated temperatures may cause cylinders to rupture or frangible disc to burst, releasing entire contents of cylinder. Ruptured or venting cylinders may rocket through buildings and/or travel a considerable distance
- Reacts with acids to produce toxic bromine and fluorine fumes
- Decomposes upon heating to produce toxic hydrogen bromide and hydrogen fluoride fumes
- Reacts violently with many metals, glass, wood and some plastics
- Corrosive to many common metals and glass

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow fuming liquid
- Pungent irritating odor
- Reacts violently with water to produce toxic hydrogen fluoride fumes
- Nonflammable but may cause combustibles to ignite
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 48° F
- Produces large amounts of vapors

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- If possible do not allow water to come in contact with the material. Material does not burn; fight surrounding fire with an appropriate agent, if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Ingestion - do not induce vomiting
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 7787-71-5



BROMOACETYL BROMIDE

UN 2513

Shipping Name: Bromoacetyl bromide

Other Names: Bromoethanoyl bromide



WARNING! • AVOID THE USE OF WATER! REACTS VIGOROUSLY WITH WATER PRODUCING TOXIC HYDROGEN BROMIDE VAPORS!

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; can cause burns and blindness.
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposes upon heating to produce toxic hydrogen bromide vapors

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Sharp, pungent extremely irritating odor
- Sinks in water and reacts vigorously with water to form toxic hydrobromic acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If possible do not allow water to come in contact with the material. Material does not burn; fight surrounding fire with an appropriate agent. If water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 598-21-0



BROMOBENZENE

UN 2514

Shipping Name: Bromobenzene

Other Names: Phenyl bromide



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Vapors may travel long distances to ignition sources and flashback● Combustion products include toxic hydrogen bromide vapors	Description: <ul style="list-style-type: none">● Colorless liquid● Aromatic odor● Sinks in water and is insoluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS 108-86-1



1-BROMOBUTANE

UN 1126

Shipping Name: n-Butyl bromide

Other Names: Butyl bromide



<p>Hazards:</p> <ul style="list-style-type: none">● Highly flammable● Vapors are heavier than air and will collect and stay in low areas● Vapors may travel long distances to ignition sources and flashback● Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Combustion products include toxic hydrogen bromide vapors	<p>Description:</p> <ul style="list-style-type: none">● Colorless to pale straw colored liquid● No odor found● Sinks in water and is insoluble in water● Highly flammable● Vapors are heavier than air and will collect and stay in low areas
<p>Awareness and Operational Level Training Response:</p> <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Remove all ignition sources● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	<p>Operational Level Training Response:</p> <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Use foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 109-65-9



2-BROMOPROPANE

UN 2344

Shipping Name: 2-Bromopropane
Other Names: Isopropyl bromide
Propyl bromide



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen bromide gas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 75-26-3



3-BROMOPROPYNE

UN 2345

Shipping Name: 3-Bromopropyne

Other Names: Bromopropyne
Propargyl bromide



WARNING! • **EXPLOSIVE! MATERIAL IS PRESSURE AND SHOCK SENSITIVE AND WILL EXPLODE!**

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen bromide

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate a wide area around the release and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Sharp, pungent odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 106-96-7



BUTADIENE

(INHIBITED)

UN 1010

Shipping Name: Butadienes, inhibited

Other Names: BD Divinyl
Biethylene Erythrene
Bivinyll Vinylethylene
1,3-Butadiene



WARNING! ● EXTREMELY FLAMMABLE!
● MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE or explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless liquefied gas
- Pleasant gasoline-like odor
- Floats and boils on water and is insoluble in water
- Gas is heavier than air and will collect and stay in low areas
- Extremely flammable
- Becomes a liquid below 21° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If venting sound suddenly increases and/or unexpectedly stops, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 106-99-0



BUTANE

UN 1011

Shipping Name: Butane or Butane mixture

Other Names: Diethyl
n-Butane



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings)
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas
- Odor of natural gas
- The liquid floats on water and boils; the gas is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Liquid below 30° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 106-97-8



n-BUTYL ACETATE

UN 1123

Shipping Name: Butyl acetates

Other Names: Acetic acid, n-butyl ester

1-Butyl acetate

Butyl ethanoate



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Slightly irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Strong, fruity odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 123-86-4



BUTYL ACRYLATE

(INHIBITED)

UN 2348

Other Names: Acrylic acid, butyl ester
n-Butylacrylate
Butyl-2-propenoate



WARNING! • MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES
LEADING TO CONTAINER EXPLOSION!

Hazards:

- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White water-like liquid
- Biting, sharp odor
- Floats on the surface of water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS 141-32-2



t-BUTYL ALCOHOL

UN 1120

Shipping Name: Butanols

Other Names: t-Butanol
Butyl alcohol



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless liquid
- Camphor-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes below 75° F

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 75-65-0



n-BUTYLAMINE

UN 1125

Shipping Name: n-Butylamine
Other Names: 1-Aminobutane
Butylamine
Monobutylamine



Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin or eyes can cause burns
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Fish-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from rain or fire fighting from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 109-73-9



t-BUTYLAMINE

UN 2734

Shipping Name: Amines, liquid, corrosive, flammable, n.o.s.

Other Names: 2-Aminoisobutane

tert-Butylamine

1,1 Dimethyl ethylamine



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides
- Corrosive to some plastics

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Ammonia-like odor
- Soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 75-64-9



BUTYLENE

UN 1012

Shipping Name: Butylene

Other Names: Butene n-Butylene
cis-Butene trans-Butene
n-Butene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed liquefied gas
- Faint petroleum-like odor
- Boils on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 25167-67-3



1,2-BUTYLENE OXIDE

(STABILIZED)

UN 3022

Shipping Name: 1,2-Butylene oxide, stabilized

Other Names: 1-Butene oxide

1-Butylene oxide

1,2-Epoxybutane



Hazards:

- May react with itself without warning blocking relief valves leading to container explosion
- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- May react violently with acids and certain other metal catalysts

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Disagreeable odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 106-88-7



tert-BUTYL HYDROPEROXIDE

UN 2093 or 2094

Shipping Name: tert-Butyl hydroperoxide

Other Names: CADOXTHB

1,1-Dimethylethyl hydroperoxide

2-Hydroperoxy-2-methylpropene

- WARNING!**
- **EXTREMELY FLAMMABLE!**
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**
 - **CONTAINER MAY BLEVE OR EXPLODE WHEN EXPOSED TO FIRE!**
 - **MAY EXPLODE IF SHOCKED OR EXPOSED TO FRICTION!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Remove all ignition sources
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow liquid
- Somewhat sweet odor
- Moderately soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 17° F and boils at 95° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 75-91-2



n-BUTYL ISOCYANATE

UN 2485

Shipping Name: n-Butyl isocyanate

Other Names: BIC
Butyl isocyanate
1-Isocyanobutane



Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin or eyes can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- No odor found
- Floats on the surface of water and is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 111-36-4



BUTYL MERCAPTAN

UN 2347

Shipping Name: Butyl mercaptans

Other Names: 1-Butanethiol
Butanethiol
n-Butyl mercaptan
Thiobutyl alcohol



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) May explode when exposed to fire
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition source
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Obnoxious garlic-like odor
- Insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding) withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 109-79-5



BUTYLTRICHLOROSILANE

UN 1747

Shipping Name: Butyltrichlorosilane
Other Names: Butylsilicon trichloride
Trichlorobutylsilane



Hazards:

- Severely irritating to skin and eyes; can cause severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Reacts vigorously with water to form toxic hydrogen chloride
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent odor
- Sinks in water and reacts vigorously with water to form toxic hydrochloric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH.
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 7521-80-4



1,4-BUTYNEEDIOL

UN 2716

Shipping Name: 1,4-Butynediol

Other Names: 2-Butyne-1,4-diol

2-Butynediol

Butynediol

1,4-Dihydroxy-2-butyne



Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White to light yellow solid
- No odor found
- Initially floats on the surface of water and is soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding) withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS 110-65-6



BUTYRALDEHYDE

UN 1129

Shipping Name: Butyraldehyde

Other Names: Butal Butyl aldehyde
Butaldehyde Butyral
Butanal Butyric aldehyde



Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Pungent, suffocating odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Forms explosive peroxides upon exposure to air and excessive heat
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

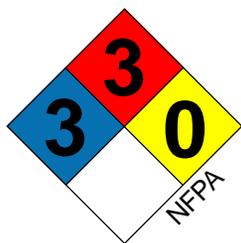
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 123-72-8



BUTYRONITRILE

UN 2411

Shipping Name: Butyronitrile
Other Names: Butane nitrile
Butyric acid nitrile
Propyl cyanide



- WARNING!** • **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE LIQUID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Reacts with acids producing toxic hydrogen cyanide
- Combustion products include toxic nitrogen oxides and cyanide

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, suffocating odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn - produces cyanide gas under fire conditions
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- For skin burns decontaminate with water and apply a clean dry dressing
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity, if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS 109-74-0



BUTYRYL CHLORIDE

UN 2353

Shipping Name: Butyryl chloride
Other Names: Butanoyl chloride
Butyric acid chloride
Butyric chloride



Hazards:

- Severely irritating to skin, eyes, nose and lungs - can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, irritating odor
- Sinks in water and dissolves slowly in water
- Decomposes in water to form toxic hydrogen chloride gas
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 141-75-3



CALCIUM CARBIDE

UN 1402

Shipping Name: Calcium carbide
Other Names: Acetylenogen
Calcium acetylide
Carbide



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO PRODUCE EXPLOSIVE ACETYLENE GAS!

Hazards:

- Highly flammable
- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Gray to black powder or solid
- Faint garlic-like odor
- Reacts violently with water to form explosive acetylene gas and toxic calcium hydroxide
- Highly flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not allow water to come in contact with the material; if material is on fire, use dry chemical to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS 75-20-7



CAPROIC ACID

UN 2829

Shipping Name: Caproic acid
Other Names: Butylacetic acid
Capronic acid
Hexanoic acid



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas	Description: <ul style="list-style-type: none">● Colorless to light yellow oily liquid● Goat or Limburger cheese-like odor● Floats on the surface of water and is slightly soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 26° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS 142-62-1



CARBACHOL CHLORIDE

Other Names: Carbachol
Carbacholin
Carbacholine dichloride
Carbamiotin
Choline chloride carbamate
Doryl
Lentin
Miostat

Hazards:

- Inhalation of the dust, absorption through the skin or swallowing the material can lead to severe illness
- Irritating to skin, eyes, nose and lungs
- Combustion products and decomposition products upon heating include toxic hydrogen chloride and nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- White to yellow powder or crystals
- Slight ammonia-like odor
- Soluble in water
- Flammable
- Usually shipped in a water solution

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Stop the release if it can be done safely from a distance
- Prevent material or contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: a cholinergic receptor agonist; if symptoms indicate, atropine is the initial antidote

CAS 51-83-2



CARBOFURAN

UN 2757

Shipping Name: Carbamate, pesticides, solid, toxic

Other Names: Furadan
Furadan 3G
Furodan



- WARNING!**
- **POISON! PROLONGED SKIN CONTACT, SWALLOWING THE MATERIAL OR BREATHING THE DUST CAN KILL YOU!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- No odor
- Sinks in water and is insoluble in water
- Flammable
- May also be shipped and stored as a paste or a suspension in water
- A carbamate insecticide

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

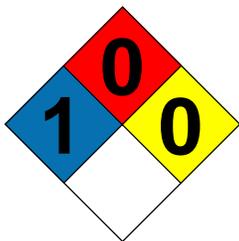
FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: is a carbamate insecticide: if symptoms indicate the initial antidote is atropine

CAS 1563-66-2



CARBON DIOXIDE

UN 1013

UN 2187

UN 1845



Shipping Name: UN 1013 Carbon dioxide
UN 2187 Carbon dioxide, refrigerated liquid
UN 1845 Carbon dioxide, solid or Dry ice

Other Names: Carbonic acid anhydride Carbonic anhydride
Carbonic acid gas Dry ice

Hazards:

- Replaces oxygen in enclosed areas leading to possible asphyxiation
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Container may BLEVE when exposed to fire
- Contact with solid may cause frostbite
- Gas is heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas, white solid (dry ice) or cryogenic liquid
- Odorless
- Solid sinks in water, liquid floats on the surface of water; is insoluble in water
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Solid or liquid form will produce large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- DO NOT APPLY WATER to cryogenic liquid containers; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water

CAS: 124-38-9



CARBON DISULFIDE

UN 1131

Shipping Name: Carbon disulfide
Other Names: Carbon bisulfide
Carbon disulphide
Carbon sulfide



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Inhalation of vapors, absorption through the skin or swallowing the liquid can cause severe illness
- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin will cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Combustion products include toxic sulfur oxides
- Corrosive to plastics and rubber

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to faint yellow liquid
- Rotten egg to sweet smell
- Sinks in water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 116° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-15-0



CARBON MONOXIDE

UN 1016

UN 9202

Shipping Name: UN 1016 Carbon monoxide
UN 9202 Carbon monoxide,
refrigerated liquid (cryogenic liquid)

Other Names: Carbon oxide CO
Carbonic oxide Flue gas



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU!**
• **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Under some conditions the gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE or explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas or cryogenic liquid
- No odor
- Floats and boils on the surface of water and is slightly soluble in water
- Extremely flammable; flame has very little color
- Under some conditions the gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- **DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS;** if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location
- If material is not in cryogenic form, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 630-08-0



CARBON TETRACHLORIDE

UN 1846

Shipping Name: Carbon tetrachloride

Other Names: Carbona Freon 10
Carbon chloride Tetrachloromethane
Carbon tet Tetrasol



Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Decomposition products upon heating include toxic hydrogen chloride and phosgene

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, ether-like smell
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors for a large release
- Ventilate confined area if it can be done without placing personnel at risk

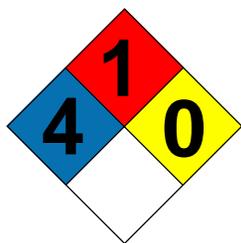
FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 56-23-5



CARBONYL FLUORIDE

UN 2417

Shipping Name: Carbonyl fluoride
Other Names: Carbon difluoride
Carbonic difluoride oxide

Carbon oxyfluoride
Fluorophosgene



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
• Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Extremely irritating to nose and lungs
- Contact with liquid may cause frostbite
- Gas is heavier than air and will collect and stay in low areas
- Container may explode or BLEVE when exposed to fire
- Decomposition products upon heating include toxic carbon monoxide and hydrogen fluoride
- Reacts with water releasing toxic hydrogen fluoride

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas or cryogenic liquid
- Slightly pungent odor, nearly odorless
- Decomposes in water to form toxic hydrofluoric acid
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff which may contain toxic hydrofluoric acid
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- **DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS;** if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ♦ Inhalation - remove the victim to fresh air and give oxygen if available
 - ♦ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ♦ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ♦ Swallowed - do not make the victim vomit
- Seek medical attention
- **Do not perform mouth to mouth resuscitation; use a bag/mask apparatus**
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 353-50-4



CARBONYL SULFIDE

UN 2204

Shipping Name: Carbonyl sulfide
Other Names: Carbon oxide sulfide
Carbon oxysulfide



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE or explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite
- Combustion or decomposition products upon heating include toxic hydrogen sulfide and carbon monoxide

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- May be shipped as a compressed gas or cryogenic liquid
- Rotten egg-like odor
- Insoluble in water and decomposes in water to form toxic hydrogen sulfide
- Extremely flammable
- Burns with a bluish flame
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location
- If material is not in cryogenic form, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 463-58-1



CHLORAL

(ANHYDROUS, INHIBITED)

UN 2075

Shipping Name: Chloral, anhydrous, inhibited

Other Names: Grasex
Trichloroacetaldehyde
Trichloroethanal



Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Chemical reaction of compound may plug release vents causing a violent explosion
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, oily liquid
- Irritating odor
- Soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed

CAS: 75-87-6



CHLORINE

UN 1017

Shipping Name: Chlorine

Other Names: Liquid chlorine



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Gas is heavier than air and will collect and stay in low areas
- Container may explode when exposed to fire
- Reacts with water to form toxic hypochlorous acid
- Contact with liquid may cause frostbite
- Corrosive to some rubbers and plastics

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire, evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Greenish-yellow gas
- Shipped as a pressurized liquefied gas
- Pungent bleach-like odor
- Reacts with water to form toxic hypochlorous acid and is slightly soluble in water
- Nonflammable but may cause combustibles to ignite
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7782-50-5



CHLORINE DIOXIDE HYDRATE

NA 9191

Shipping Name: Chlorine dioxide, hydrate, frozen

Other Names: Alcide
Chlorine dioxide
Chlorine dioxide hydrate (frozen)
Chlorine peroxide



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- When heated, vapors in closed spaces (e.g., tanks, sewers, buildings) in the presence of combustible materials may explode
- Reacts with water or steam to produce hydrochloric acid
- Decomposes upon heating releasing toxic chlorine gas

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Orange to red gas
- Shipped frozen, appearing like a solid block of ice
- Faint bleach-like odor
- Flammable and a strong oxidizer which may cause other combustible materials to burn
- Vapors are heavier than air and will collect and stay in low areas
- A liquid below 52° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Keep material frozen if possible
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; if surrounding materials are on fire and conditions permit, do not extinguish. Cool exposures using unattended monitors. If fire must be fought, use an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10049-04-4



CHLORINE TRIFLUORIDE

UN 1749

Shipping Name: Chlorine trifluoride

Other Names: Chlorine fluoride
Chlorotrifluoride
Trifluorochlorine



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! GAS EXPLODES UPON CONTACT WITH COMBUSTIBLE MATERIAL OR WATER!**

Hazards:

- Container may explode or BLEVE when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Reacts with water to form toxic chlorine gas and hydrofluoric acid
- Corrosive to metals and rubber; reacts vigorously with sand, glass and concrete

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas above 53° F
- Greenish-yellow fuming liquid below 53° F
- Pungent, sweet odor
- Reacts violently with water producing toxic chlorine gas and hydrofluoric acid
- Nonflammable but may cause combustibles to ignite
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Do not allow water to come in contact with the material; material does not burn, fight surrounding fire with an agent appropriate (not water or foam) for the material burning
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7790-91-2



CHLOROACETALDEHYDE

UN 2232

Shipping Name: 2-Chloroethanal
Other Names: 2-Chloroacetaldehyde
Chloroacetaldehyde monomer
Chloroaldehyde
Chloroethanal



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid
- Pungent odor
- Initially sinks in water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 3° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-20-0



CHLOROACETONITRILE

UN 2668

Shipping Name: Chloroacetonitrile
Other Names: Chloroethanenitrile
Chloromethyl cyanide



WARNING! • **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE LIQUID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Low concentrations are very irritating to skin, eyes, nose and lungs
- Vapors may travel long distances to ignition sources and flashback
- Combustion or decomposition products upon heating include toxic nitrogen oxides and hydrogen chloride

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent odor
- Sinks in water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- **APPROACH FIRE WITH EXTREME CAUTION;** consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 107-14-2



2-CHLORO- ACETOPHENONE



UN 1697

Other Names: CAF CN
CAP Mace
Chloroacetaphenone Tear gas

Hazards:

- Swallowing the material may be harmful
- Severely irritating to the eyes; also irritating to the skin, nose and lungs; prolonged contact can cause burns
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to gray solid
- Flower-like smell at low concentrations; irritating smell at high concentrations
- Sinks in water and is insoluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Used as a crowd control agent

Operational Level Training Response:

RELEASE, NO FIRE:

- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use water to extinguish fire
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location
- Use unattended equipment whenever possible

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 532-27-4



2-CHLORO- BENZALMALONOITRILE

Other Names: o-Chlorobenzylidene malononitrile
CS

Hazards: <ul style="list-style-type: none">● Extremely irritating to skin, eyes and nose; prolonged contact can cause burns● Container may explode when exposed to fire● Combustion and decomposition products upon heating include toxic hydrogen cyanide	Description: <ul style="list-style-type: none">● White solid● Pepper-like smell● Insoluble in water● Flammable● Used as a tear gas and riot control agent
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay uphill and upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Use water to extinguish fire● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 2698-41-1



CHLOROACETYL CHLORIDE

UN 1752

Shipping Name: Chloroacetyl chloride
Other Names: Chloroacetic acid chloride
Chloroacetic chloride



WARNING! • DO NOT USE WATER! REACTS WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE AND CHLOROACETIC ACID!

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Fire fighting gear (including SCBA) does not provide enough protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Combustion or decomposition products upon heating include toxic hydrogen chloride and phosgene
- Corrosive to metals

Awareness and Operational Training Level

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Pungent odor
- Reacts with water to form toxic hydrogen chloride and is soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -8° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If possible do not allow water to come in contact with the material. Material does not burn; fight surrounding fire with an appropriate agent: avoid using water or foam
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely.
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-04-9



CHLOROBENZENE

UN 1134

Shipping Name: Chlorobenzene
Other Names: Benzene chloride
MCB
Monochlorobenzene
Phenyl chloride



Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Combustion products include toxic hydrogen chloride and phosgene

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet almond-like smell
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use foam or dry chemical if available in sufficient amounts; under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-90-7



CHLOROBUTANE

UN 1127

Shipping Name: Chlorobutanes
Other Names: Butyl chloride
n-Butylchloride
1-Chlorobutane



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Unpleasant odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-69-3



CHLOROETHYL CHLOROFORMATE

UN 2742

Shipping Name: Chloroformates, toxic, corrosive, n.o.s.

Other Names: 2-Chloroethyl chlorocarbonate



Hazards:

- Extremely irritating to nose and lungs; skin and eye contact can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent odor
- Sinks in water; reacts slowly with water to form toxic hydrochloric acid and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 627-11-2



CHLOROFORM

UN 1888

Shipping Name: Chloroform

Other Names: Formyl trichloride TCM
Freon 20 Trichloroform
Methane trichloride Trichloromethane
R 20 (refrigerant)



Hazards:

- Irritating to skin, eyes, nose and lungs
- Containers may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Decomposes upon exposure to high temperatures to highly toxic phosgene and hydrogen chloride

Description:

- Clear colorless liquid
- Sweet odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of a thin layer of water or foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 67-66-3



CHLORONITROBENZENE

UN 1578

Shipping Name: Chloronitrobenzene, ortho, liquid

Chloronitrobenzene, meta, para, solid

Other Names: 1-Chloro-2-nitrobenzene

p-Chloronitrobenzene

m-Chloronitrobenzene

Nitrochlorobenzene

o-Chloronitrobenzene



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may explode when exposed to fire
- Combustion or decomposition products upon heating include toxic nitrogen oxides and hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Yellow solid
- Aromatic odor
- Sinks in water and is insoluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Melts at 90° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

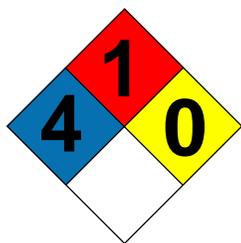
FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 88-73-3 (ortho, o-), 121-73-3 (meta, m-), 100-00-5 (para, p-)



2-CHLOROPHENYLTHIOUREA

Other Names: N-(2-chlorophenylthiourea)
Thiourea (2-chlorophenyl)

- WARNING!**
- **POISON! BREATHING OR SWALLOWING THE POWDER OR ABSORPTION THROUGH THE SKIN CAN KILL YOU!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Combustion and decomposition products upon heating include toxic hydrogen chloride, and nitrogen oxides and sulfur oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- No odor
- Soluble in water
- Flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 5344-82-1



CHLOROPICRIN

UN 1580

Shipping Name: Chloropicrin

Other Names: Nitrochloroform
Picfume
Tri-clor
Pic-chlor

PS
Picride
Trichloronitromethane



- WARNING!**
- **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Decomposes explosively when heated above 234° F
- Vapors are heavier than air and will collect and stay in low areas
- Decomposition products upon heating include toxic phosgene, chlorine gas and nitrogen oxides
- Corrosive to rubber and some plastics

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of fire or release and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Pale yellow oily liquid
- Intensely irritating odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Used as a choking agent

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn, fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 76-06-2



CHLOROPRENE

(INHIBITED)

UN 1991

Shipping Name: Chloroprene, inhibited

Other Names: beta-Chloroprene

Chlorobutadiene

2-Chloro-1,3-butadiene

2-Chlorobuta -1,3-diene

Neoprene



WARNING! • MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from rain or firefighting from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting suddenly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 126-99-8



alpha-CHLOROPROPIONIC ACID

UN 2511

Shipping Name: 2-Chloropropionic acid



Hazards: <ul style="list-style-type: none">● Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic hydrogen chloride● Corrosive to many metals	Description: <ul style="list-style-type: none">● A liquid● Pungent odor● Sinks in water and is soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 10° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 598-78-7



3-CHLOROPROPIONITRILE

UN 3275

Shipping Name: Nitriles, toxic, flammable, n.o.s.

Other Names: 1-Chloro-2-cyanoethane

3-Chloropropanenitrile



- WARNING!**
- **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may BLEVE when exposed to fire
- Irritating to eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides and hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Irritating odor
- Sinks in water and is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 542-76-7



CHLOROSULFONIC ACID

UN 1754

Shipping Name: Chlorosulfonic acid
Other Names: Chlorosulfuric acid
Sulfuric chlorohydrin



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SWALLOWING THE LIQUID CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROCHLORIC AND SULFURIC ACIDS!**
 - **EXTREMELY STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Reacts with metals in the presence of moisture to form highly flammable hydrogen gas
- Decomposition products upon heating include toxic sulfur oxides and hydrogen chloride
- Corrosive to most metals

Description:

- Colorless to slightly yellow liquid
- Pungent odor
- Reacts violently with water to form toxic hydrochloric acid and sulfuric acid and sinks in water
- Vapors are heavier than air and will collect and stay in low areas
- Nonflammable but may cause combustibles to ignite
- Produces large amounts of vapor when exposed to water

Awareness and Operational Training Level

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- **DO NOT USE WATER DIRECTLY ON PRODUCT** - reacts violently with water
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with dry chemical - if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding) withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7790-94-5



CHLOROTOLUENE

UN 2238

Shipping Name: Chlorotoluene

Other Names: 1-Chloro-4-methylbenzene
4-Chloro-1-methylbenzene
4-Chlorotoluene
p-Chlorotoluene
p-Tolyl chloride



Hazards:

- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Insoluble in water
- Aromatic odor
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 46° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 106-43-4



CHLORPYRIFOS

UN 2783

Shipping Name: Organophosphorous pesticides, solid, toxic

Other Names: Dursban
Lorsban



Hazards:

- Ingestion, skin absorption or inhalation of the dust can cause illness
- Container may explode when exposed to fire
- Combustion products include toxic hydrogen chloride and sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- Often shipped as a liquid in water or petroleum products
- Mild sulfur-like odor
- Insoluble in water
- Very flammable
- Melts at 108° F
- An organophosphate insecticide

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Use water or foam to extinguish
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: is an organophosphate insecticide; if symptoms indicate, the initial antidote is atropine

CAS: 2921-88-2



CROTONALDEHYDE

(STABILIZED)

UN 1143

Shipping Name: Crotonaldehyde, stabilized

Other Names: 2-Butenal Crotonaldehyde (E)
trans-2-Butenal Diproanoate
Crotonal beta-Methyl acrolein



WARNING! • **POISON! BREATHING THE VAPORS CAN KILL YOU!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Severely irritating to skin, nose, eyes and lungs; skin and eye contact can cause severe burns and blindness
- May react with itself with explosive violence when heated or exposed to alkalis
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Forms explosive peroxides upon exposure to air
- Vapors are heavier than air will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear to yellow liquid
- Pungent suffocating tar-like odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 4170-30-3



CUMENE HYDROPEROXIDE

UN 2116

Other Names: CHP
alpha-Cumene hydroperoxide
Cumyl hydroperoxide
Dimethylbenzyl hydroperoxide

WARNING! ● MAY SPONTANEOUSLY EXPLODE IF EXPOSED TO HEAT OR FIRE!
● STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- If the material is involved in or exposed to fire EVACUATE THE AREA IN ALL DIRECTIONS AND CALL FOR EXPERT HELP; THE PROBABILITY OF EXPLOSION IS VERY HIGH IN THIS SITUATION
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow liquid
- Sharp irritating aromatic odor
- Slightly soluble in water
- Very flammable
- Highly explosive
- Freezes at 16° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support /CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 80-15-9



CYANOACETIC ACID

UN 3275

Shipping Name: Nitriles, toxic, flammable, n.o.s.
Other Names: Malonic mononitrile



WARNING! • **POISON! BREATHING THE VAPORS OR SWALLOWING THE LIQUID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness• Container may explode when exposed to fire• Vapors are heavier than air and will collect and stay in low areas• Combustion or decomposition products upon heating include toxic nitrogen oxides and hydrogen cyanide and flammable acetonitrile	Description: <ul style="list-style-type: none">• White crystalline solid• No odor found• Soluble in water• Flammable• Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Stay upwind and uphill• Determine the extent of the problem• Isolate the area of release or fire and deny entry• For container exposed to fire evacuate the area in all directions because of the risk of explosion• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Cover material to protect from wind, rain or spray• Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release• Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">• Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause cyanide toxicity; if symptoms indicate, the initial treatment is the cyanide antidote kit

CAS: 372-09-8



CYANOGEN

UN 1026

Shipping Name: Cyanogen, liquefied

Other Names: Carbon nitride Oxalonitrile
Dicyan Oxalyl cyanide
Dicyanogen Prussite
Ethane dinitrate



- WARNING!** • **POISON! CONTACT WITH SKIN OR BREATHING THE GAS CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Containers may BLEVE or explode when exposed to fire
- Severely irritating to skin, eyes, nose and lungs
- Contact with liquid can cause frostbite
- Reacts with acids to produce toxic cyanides and nitrogen oxide
- Combustion products include toxic cyanides and nitrogen oxides

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquefied compressed gas
- Almond-like odor which may not be present at toxic levels
- Slightly soluble in water and boils on the surface of water forming toxic hydrogen cyanide
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors.
- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of deforming) withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ♦ Inhalation - remove the victim to fresh air and give oxygen if available
 - ♦ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ♦ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Victims should be examined by a physician as soon as possible
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 460-19-5



CYANOGEN BROMIDE

UN 1889

Shipping Name: Cyanogen bromide

Other Names: Bromine cyanide
Bromocyan
Cyanobromide



- WARNING!** • **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE SOLID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Decomposes rapidly in acid or slowly in water to produce toxic hydrogen cyanide, bromine gas and hydrogen bromide; decomposes in fire to produce nitrogen oxides and hydrogen bromide
- Container may explode when exposed to fire

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release and call for expert help
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Pungent, unpleasant odor
- Soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Solid produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If material is involved in a fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors. If fire must be extinguished use an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 506-68-3



CYANOGEN CHLORIDE

(INHIBITED)

UN 1589

Shipping Name: Cyanogen chloride, inhibited

Other Names: Chlorine cyanide Chlorocyanogen
Chlorocyan CK



WARNING! ● **POISON! BREATHING THE GAS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
● Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Containers may BLEVE or explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite
- Decomposition products upon heating include toxic chlorine gas, cyanide and nitrogen oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Sharp pungent odor
- Shipped and stored as a compressed gas
- Slightly soluble in water and react slowly with water to form toxic hydrogen cyanide
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below 56° F
- Has been used as a war gas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 506-77-4



CYANOGEN IODIDE

Other Names: Cyanogen monoiodide
Iodine cyanide

- WARNING!** ● **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Decomposition products upon heating include toxic cyanide gas, iodide gas and nitrogen oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- Pungent odor
- Soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 506-78-5



CYANURIC CHLORIDE

UN 2670

Shipping Name: Cyanuric chloride

Other Names: 2,4,6-Trichloro-s-triazine



WARNING! • DO NOT USE WATER! MAY REACT VIOLENTLY WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may explode when exposed to fire
- Combustion products include toxic hydrogen chloride and nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Pungent odor
- Insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT USE WATER DIRECTLY ON THE MATERIAL
- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Do not allow water to come in contact with the material; fight fire with dry chemical if possible - if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-77-0



CYCLOHEPTANE

UN 2241

Shipping Name: Cycloheptane
Other Names: Heptamethylene
Suberane



Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless, oily liquid
- Hydrocarbon-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 10° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 291-64-5



CYCLOHEXANE

UN 1145

Shipping Name: Cyclohexane
Other Names: Benzenehexahydride
Hexahydrobenzene
Hexamethylene



Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Petroleum-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 44° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-82-7



CYCLOHEXANONE

UN 1915



Shipping Name: Cyclohexanone

Other Names: Anone
Cyclohexylketone
Hexanon

Madone
Pimelic ketone
Sextone

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact will cause skin, eye and lung burns

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear to pale yellow oily liquid
- Peppermint-like odor
- Floats on the surface of water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-94-1



CYCLOHEXIMIDE

Other Names: Actidione
Actidone
Naramycin

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Forms a fragrant vapor upon contact with alkalis
- Slightly soluble in water
- Flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 66-81-9



CYCLOHEXYLAMINE

UN 2357

Shipping Name: Cyclohexylamine
Other Names: Aminocyclohexane
Aminohexahydrobenzene
CHA
Hexahydroaniline



Hazards:

- Highly flammable
- Extremely irritating to skin, eyes, nose and lungs; prolonged contact can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE when exposed to fire
- Combustion or decomposition upon heating produces toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Ammonia or strong fish-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-91-8



CYCLOPENTANE

UN 1146

Shipping Name: Cyclopentane

Other Names: Pentamethylene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 287-92-3



CYCLOPENTENE

UN 2246

Shipping Name: Cyclopentene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact with skin will cause burns

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 111° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 142-29-0



CYCLOPROPANE

UN 1027

Shipping Name: Cyclopropane, liquefied

Other Names: Trimethylene



WARNING! ● **EXTREMELY FLAMMABLE!**
● **FOR CONTAINERS EXPOSED TO FIRE EVACUATE THE AREA IN ALL DIRECTIONS BECAUSE OF THE RISK OF BLEVE OR EXPLOSION!**

Hazards:

- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- May be shipped and stored as a cryogenic liquid
- Mild sweet odor
- Floats and boils on the surface of water producing a visible flammable vapor cloud; is moderately soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- **DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS;** if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location
- If material is not leaking, cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-19-4



2,4-D

UN 2765

Shipping Name: Phenoxy pesticides, solid, toxic

Other Names: 2,4-Dichlorophenoxyacetic acid
Dichlorophenoxyacetic acid
Weedone



Hazards:

- Swallowing or inhaling the dust can cause illness
- Container may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Description:

- White to yellow solid
- No odor
- Sinks in water and is insoluble in water
- Flammable
- An herbicide

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 94-75-7



DECABORANE

UN 1868

Shipping Name: Decaborane
Other Names: Boron hydride
Decaborane (14)
Decaborane tetrahydride



WARNING! • **POISON! BREATHING THE DUST OR SKIN CONTACT CAN KILL YOU!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Skin and eye contact causes severe burns and blindness
- Container may explode when exposed to fire
- Reacts explosively with halogenated hydrocarbons (Halon) or oxidizers
- Vapors are heavier than air and will collect and stay in low areas
- Releases flammable hydrogen gas upon contact with hot water
- Combustion products include toxic borane oxides
- Will attack some plastics and rubbers

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White to colorless solid
- Sharp, pungent chocolate-like odor
- Floats on the surface of water and is slightly soluble in water
- Very flammable; burns with a green colored flame
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use water spray using unattended monitors to extinguish fire. Dry sand or dry chemical may be used if available in sufficient amounts. Avoid the use of carbon dioxide, Halon or Halocarbon extinguishers
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 17702-41-9



DIBENZYL ETHER

UN 3271

Shipping Name: Ethers, n.o.s.

Other Names: Benzyl ether
Benzyl oxide



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas	Description: <ul style="list-style-type: none">● Colorless to pale yellow liquid● Almond-like odor● Floats on the surface of water and is insoluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 38° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 103-50-4



DIBORANE

UN 1911

Shipping Name: Diborane
Other Names: Boroethane
Boron hydride
Diboron hexahydride



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE! WILL IGNITE WITHOUT WARNING IN MOIST AIR AT ROOM TEMPERATURE!**
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO PRODUCE FLAMMABLE HYDROGEN GAS!**

Hazards:

- Reacts violently with halogenated hydrocarbons (Halon)
- Gas may travel long distances to ignition sources and flash back
- Gas is heavier than air and will collect and stay in low areas
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Containers may explode when exposed to heat or fire
- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas
- Sweet, repulsive odor
- Decomposes in water rapidly to form flammable hydrogen gas
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 19287-45-7



DIBROMOMETHANE

UN 2664

Shipping Name: Dibromomethane
Other Names: Methylene bromide
Methylene dibromide



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Decomposition products upon heating include toxic hydrogen bromide	Description: <ul style="list-style-type: none">● Colorless liquid● Sweet chloroform-like odor● Sinks in water and is slightly soluble in water● Nonflammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 74-95-3



1,3-DICHLOROACETONE

UN 2649

Shipping Name: 1,3-Dichloroacetone
Other Names: Bis (chloromethyl) ketone
1,3-Dichloro-2-propanone



Hazards:

- Highly irritating to skin, eyes, nose and lungs; can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Crystalline solid
- No odor found
- Sinks in water and is moderately soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Melts at 113° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 534-07-6



p-DICHLOROBENZENE

UN 1592

Other Names: 1,4-Dichlorobenzene PDB
Dichloricide Parazene
Paramoth Paradichlorobenzene

Hazards: <ul style="list-style-type: none">● Vapors are irritating to skin, eyes, nose and lungs● Container may explode when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic hydrogen chloride	Description: <ul style="list-style-type: none">● White solid● Mothball-like odor● Sinks in water and is insoluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Use water or foam to extinguish fire● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 106-46-7



DICHLOROBUTENE

UN 2924

UN 2920

Shipping Name: Dichlorobutene

Other Names: 1,4-Dichlorobutene

1,4-Dichloro-2-butene



Hazards:

- Irritating to skin, eyes, nose and lungs; prolonged contact will cause burns
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to straw colored liquid
- Sweet odor
- Sinks slowly in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes between 33° F and 38° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-57-6



2,2'-DICHLORODIETHYL ETHER

UN 1916

Shipping Name: 2,2'-Dichlorodiethyl

Other Names: Bis-(2-chloroethyl) ether

Chlorex

DCEE

Dichloroether

Dichloroethyl ether

1,1-Oxy-bis-(2-chloroethane)



Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride
- Explosive peroxides may form in open containers upon standing

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid
- Sweet nauseating odor
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Symptoms may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 111-44-4



1,1-DICHLOROETHANE

UN 2362

Shipping Name: 1,1-Dichloroethane

Other Names: 1,1-DCE
Ethylidene chloride
Ethylidene dichloride



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion or decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Chloroform-like odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-34-3



1,2-DICHLOROETHYLENE

UN 1150

Shipping Name: Dichloroethylene
Other Names: Acetylene dichloride
1,2-DCE
Dioform
Ethylene dichloride



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, pleasant odor
- Sinks in water and is insoluble in water
- Highly flammable
- Produces large amounts of vapor
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 119° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 540-59-0



DICHLOROMETHANE

UN 1593

Shipping Name: Dichloromethane
Other Names: Methylene bichloride
Methylene chloride
Methylene dichloride



Hazards: <ul style="list-style-type: none">● Harmful or fatal if swallowed; produces carbon monoxide in the body● Combustion and decomposition products upon heating include toxic hydrogen chloride which is more toxic than the material itself● Vapors are heavier than air and will collect and stay in low areas	Description: <ul style="list-style-type: none">● Colorless liquid● Sweet odor● Sinks in water and is slightly soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Produces large amounts of vapor
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk● If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: converted to carbon monoxide in the body; if symptoms indicate; the initial treatment is oxygen

CAS: 75-09-2



DICHLOROMETHYL ETHER

UN 2249

Shipping Name: Dichloromethyl ether, symmetrical

Other Names: BCME

Bis(chloromethyl) ether

Chloro(chloromethoxy) methane

Chloromethyl ether



WARNING! • POISON! BREATHING THE VAPORS CAN KILL YOU!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Extremely irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Reacts with water to produce hydrochloric acid and formaldehyde
- Combustion products include toxic hydrogen chloride
- May form peroxides upon standing which will detonate with heat or shock
- Known to cause cancer in humans following long term exposure: contact should be avoided

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Suffocating odor
- Sinks in water and decomposes in water to form toxic hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 542-88-1



DICHLOROPHENYL TRICHLOROSILANE



UN 1766

Shipping Name: Dichlorophenyltrichlorosilane

- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!**

Hazards: <ul style="list-style-type: none">● Containers may BLEVE when exposed to fire● Decomposition products upon heating include toxic hydrogen chloride● Corrosive to common metals in the presence of moisture releasing flammable hydrogen gas	Description: <ul style="list-style-type: none">● Straw colored liquid● Pungent odor● Sinks in water and reacts vigorously with water to form toxic hydrochloric acid● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay uphill and upwind● Determine the extent of the problem● Isolate a wide area around the release and call for expert help● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● If material is on fire and conditions permit, DO NOT EXTINGUISH.● Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 27137-85-5



DICHLOROPROPENE

UN 2047

Shipping Name: Dichloropropenes

Other Names: 1,3-D

1,3-Dichloropropene

Dichloropropylene

Dorlone

Nemex

Telone C

Vidden D



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Chloroform-like odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 542-75-6



DICHLOROSILANE

UN 2189

Shipping Name: Dichlorosilane

Other Names: Dichlorosilicone



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE! MAY IGNITE SPONTANEOUSLY IN AIR!**
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM HYDROCHLORIC ACID AND EXPLOSIVE HYDROGEN GAS!**

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas which reacts with moisture to form a white cloud
- Shipped and stored as a compressed gas
- Very irritating odor
- Reacts violently with water to form hydrochloric acid and explosive hydrogen gas
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- **REACTS WITH WATER TO PRODUCE HIGHLY EXPLOSIVE HYDROGEN GAS;** if fire must be fought medium expansion AFFF alcohol resistant foam can be used
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 4109-96-0



DICYCLOPENTADIENE

UN 2048

Shipping Name: Dicyclopentadiene
Other Names: Bicyclopentadiene
1,3-CPD
1,3-Cyclopentadiene dimer
DCP



Hazards:

- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release of liquid
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless crystalline solid or liquid
- Sweet, sharp camphor-like odor
- Liquid floats on the surface of water; the solid sinks in water; is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Melts at 90° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover solid material to protect from wind, rain or spray
- Prevent liquid material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid or solid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 77-73-6



DIEPOXYBUTANE

Other Names: Bioxirane
Butadiene diepoxide
Butadiene dioxide
1,2,3,4-Diepoxybutane

Hazards:

- Severely irritating to skin, eyes, nose and lungs
- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas

Description:

- Colorless liquid
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -2° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed

CAS: 1464-53-5



DIESEL FUEL

NA 1993

UN 1202

Shipping Name: Diesel fuel

Other Names: Diesel

Fuel oil #2



Hazards:

- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow to dark brown liquid
- Gasoline-like odor
- Floats on water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention



DIETHYLAMINE

UN 1154

Shipping Name: Diethylamine
Other Names: 2-Aminopentane
DEA
DEN



Hazards:

- Very irritating to nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fishy, ammonia-like odor
- Initially floats on the surface of water and dissolves in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-89-7



DIETHYLAMINOETHANOL

UN 2686

Shipping Name: Diethylaminoethanol
Other Names: DEAE
2-Diethylaminoethanol
Diethylethanolamine
2-Hydroxytriethylamine



Hazards:

- Severely irritating to skin, eyes, nose and lungs; can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Ammonia-like odor
- Floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 100-37-8



DIETHYL CARBONATE

UN 2366

Shipping Name: Diethyl carbonate

Other Names: Carbonic acid, diethyl ester
Carbonic ether
Diatol

Ethyl carbonate
Eufin



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pleasant, sweet odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 105-58-8



DIETHYLENETRIAMINE

UN 2079

Shipping Name: Diethylenetriamine
Other Names: Aminoethylethandiamine
Bis-(2-aminoethyl) amine
DETA
2,2'-Diaminodiethylamine



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion or decomposition products upon heating include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Ammonia-like odor
- Soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn, if liquid is on fire, specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 111-40-0



DIETHYL ETHER

UN 1155

Shipping Name: Diethyl ether
Other Names: Diethyl oxide
Ether
Ethyl ether
Ethyl oxide



WARNING! ● **EXTREMELY FLAMMABLE!**
● **CONTAINERS THAT HAVE BEEN STORED OR OPENED MAY CONTAIN PEROXIDES THAT MAY EXPLODE WITH FRICTION, IMPACT OR HEAT!**

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid
- Sweet pungent odor
- Floats on the surface of water and is moderately soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapors
- Boils at 94° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

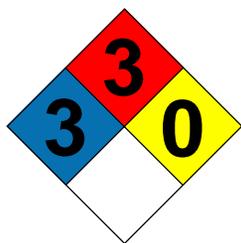
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 60-29-7



1,2-DIETHYLHYDRAZINE

Hazards:

- Severely irritating to skin, eyes, nose and lungs; can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A liquid
- Fish-like odor at low concentrations; ammonia-like odor at high concentrations
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1615-80-1



DIETHYL KETONE

UN 1156

Shipping Name: Diethyl ketone

Other Names: DEK

Dimethylacetone

Ethyl ketone

Methacetone

3-Pentanone



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless clear liquid
- Acetone-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 96-22-0



DIFLUOROETHANE

UN 1030

Shipping Name: 1,1-Difluoroethane, R152a

Other Names: 1,1,-Difluoroethane

Ethylene fluoride

Freon 152



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite
- Combustion products include the toxic gases hydrogen fluoride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- No odor
- Shipped and stored as a liquefied compressed gas
- May boil on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- A liquid below -13° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic liquid containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- **DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS;** if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-37-6



DIISOPROPYLAMINE

UN 1158

Shipping Name: Diisopropylamine
Other Names: DIPA



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fish-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-18-9



DIKETENE

(INHIBITED)

UN 2521

Shipping Name: Diketene, inhibited

Other Names: Acetyl ketene 4-Methylene
3-Buteno-beta-lactone Oxetanone
Ketene dimer



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!**

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Pungent odor
- Reacts with water releasing heat and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 20° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly stops, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 674-82-8



1,2-DIMETHOXYETHANE

UN 2252

Shipping Name: 1,2-Dimethoxyethane

Other Names: Ansul ether 121

Dimethyl cellosolve

2,5-Dioxahexane

Ethanediol dimethyl ether

Ethylene glycol dimethyl ether

GDME

Glycol dimethyl ether

Glyme



Hazards:

- Highly flammable
- Irritating to lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, ether-like smell
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-71-4



DIMETHYLACETAMIDE

Other Names: Acetic acid dimethylamide
Dimethylamide acetate
N,N-Dimethylacetamide
DMA
DMAC

Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, oily liquid
- Weak fishy or ammonia-like odor
- Initially floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -4° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 127-19-5



DIMETHYLAMINE

(ANHYDROUS)

UN 1032

Shipping Name: Dimethylamine, anhydrous

Other Names: DMA

N-methyl-methanamine



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Containers or gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid can cause frostbite
- Combustion products include highly toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Shipped or stored as a compressed liquefied gas or in water solution
- Fishy, ammonia-like odor
- Soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below 44° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control gas
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 124-40-3



N,N-DIMETHYLANILINE

UN 2253

Shipping Name: N,N-Dimethylaniline
Other Names: Dimethyl aminobenzene
Dimethylaniline
Dimethyl phenylamine



<p>Hazards:</p> <ul style="list-style-type: none">● May interfere with the body's ability to use oxygen● Irritating to skin, eyes, nose and lungs; prolonged contact will cause burns● Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion or decomposition products upon heating include toxic nitrogen oxides	<p>Description:</p> <ul style="list-style-type: none">● Pale yellow oily liquid● No odor found● Floats on the surface of water and is insoluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 37° F
<p>Awareness and Operational Level Training Response:</p> <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	<p>Operational Level Training Response:</p> <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 121-69-7



DIMETHYLCARBAMOYL CHLORIDE



UN 2262

Shipping Name: Dimethylcarbamoyl chloride

Other Names: Carbamoyl dimethyl chloride

Dimethylcarbamic chloride

DDC

DMCC

WARNING! • REACTS VIGOROUSLY WITH WATER PRODUCING HIGHLY FLAMMABLE DIMETHYLAMINE AND CORROSIVE HYDROCHLORIC ACID!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic nitrogen oxide and hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Irritating smell
- Sinks in water and rapidly decomposes to extremely flammable dimethylamine and corrosive hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -27° F

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT use water directly on product - reacts with water to form dimethylamine and hydrochloric acid
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid consider water decomposition products before using water. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-44-7



DIMETHYLDICHLOROSILANE

UN 1162

Shipping Name: Dimethyldichlorosilane
Other Names: Dichlorodimethylsilane
Dichlorodimethylsilicon
Inerton-DMCS
Inerton DW-DMC



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Corrosive to metals when exposed to moisture producing highly flammable hydrogen gas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless fuming liquid
- Sharp, pungent irritating smell like hydrochloric acid
- Sinks in water and decomposes in water to release hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH.**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-78-5



DIMETHYL DISULFIDE

UN 2381

Shipping Name: Dimethyl disulfide

Other Names: Dithiabutane

Methyl disulfide



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A liquid
- Odor like human waste
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 624-92-0



DIMETHYL ETHER

UN 1033

Shipping Name: Dimethyl ether

Other Names: Methyl ether
Methyl oxide
Wood ether



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Exposure of cylinders to fire and flame or elevated temperatures may cause cylinder to rupture or frangible disc to burst, releasing entire contents of cylinder. Ruptured or venting cylinders may rocket through buildings and/or travel a considerable distance
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin and eyes
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas
- Sweet, ether-like odor
- Liquid floats on water and dissolves slowly in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below -12° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 115-10-6



DIMETHYLFORMAMIDE

UN 2265

Shipping Name: Dimethylformamide

Other Names: DMF

DMFA

N,N-Dimethyl formamide

N-Formyldimethylamine



Hazards:

- Container may BLEVE or explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow liquid
- Fish-like odor
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 68-12-2



1,1-DIMETHYLHYDRAZINE

UN 1163

Shipping Name: Dimethylhydrazine, unsymmetrical
Other Names: asym-Dimethylhydrazine
UDMH
DMH
unsym-Dimethylhydrazine



- WARNING!** • **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- May interfere with the body's ability to use oxygen
- Severely irritating to skin, eyes, nose and lungs; can cause burns
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and thermal decomposition products upon heating include toxic nitrogen oxides
- Corrosive to plastics

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Turns yellow and fumes upon contact with air
- Fishy ammonia-like odor
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Used as a high energy propellant for liquid fueled rockets

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 57-14-7



N,N-DIMETHYL-p-PHENYLENEDIAMINE

Other Names: 4-Amino-N,N-dimethylaniline
DMPD

- WARNING!** ● **POISON! BREATHING THE DUST, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">● Irritating to skin and eyes● May interfere with the body's ability to use oxygen● Combustion and decomposition products upon heating include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless to reddish-violet solid● No odor● Initially sinks in water and is soluble in water● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 99-98-9



DIMETHYLPHOSPHORO CHLORIDOTHIOATE

UN 2267

Other Names: Dimethyl thiophosphoryl chloride
Methyl PCT
Phosphorochloridothioic acid, O,O-dimethyl ester



Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin causes burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride and sulfur oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light amber liquid
- Insoluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- An organophosphate insecticide

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, atropine is the initial antidote

CAS: 2524-03-0



DIMETHYL SULFATE

UN 1595

Shipping Name: Dimethyl sulfate

Other Names: Methyl sulfate

Sulfuric acid, dimethyl ester



WARNING! • **POISON! BREATHING THE VAPOR OR SWALLOWING THE LIQUID CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor and irritation are not reliable indicators of the presence of toxic amounts of gas
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, oily liquid
- Faint onion-like odor
- Decomposes in water to form toxic sulfuric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -25° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 77-78-1



DIMETHYL SULFIDE

UN 1164

Shipping Name: Dimethyl sulfide
Other Names: Dimethyl monosulfide
DMS
Methyl sulfide
2-Thiopropene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow liquid
- Cabbage-like odor
- Floats on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 100° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-18-3



DIMETHYL ZINC

UN 1370

Shipping Name: Dimethylzinc

Other Names: Methyl zinc

Zinc methyl



WARNING! ● **EXTREMELY FLAMMABLE! MAY IGNITE SPONTANEOUSLY IN AIR!**
● **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM EXPLOSIVE METHANE GAS!**

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic zinc oxide gas

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Liquid is odorless but burns with a garlic odor
- Reacts violently with water producing explosive methane gas
- Extremely flammable
- Autoignites at temperatures less than 0° F
- Boils at 115° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; if possible let fire burn - there is a good chance of explosive re-ignition
- **DO NOT USE WATER!** Use dry soda ash, dry graphite or other inert powder to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 544-97-8



2,4-DINITROANILINE

UN 1596

Shipping Name: Dinitroanilines

Other Names: 1-Amino-2,4-dinitrobenzene
2,4-Dinitro-1-aminobenzamine
2,4-Dinitrobenzamine
DNA



- WARNING!**
- **POISON! BREATHING THE VAPORS OR DUST CAN KILL YOU!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXPLOSIVE! CONTAINER OR MATERIAL MAY EXPLODE WHEN EXPOSED TO HEAT OR FLAMES!**

Hazards:

- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Can affect the body's ability to use oxygen
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow solid
- Musty odor
- Sinks in water and is insoluble in water
- Flammable and explosive when exposed to heat or flame
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 97-02-9



DINITROBENZENES

UN 1597

Shipping Name: Dinitrobenzenes

Other Names: 1,2-Dinitrobenzene
1,3-Dinitrobenzene
1,4-Dinitrobenzene
m-Dinitrobenzene
o-Dinitrobenzene
p-Dinitrobenzene
Dithane A-4



- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **CONTAINER MAY EXPLODE WHEN EXPOSED TO HEAT OR SHOCK!**

Hazards:

- May interfere with the body's ability to use oxygen
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- If containers are exposed to heat or flame **BACK OFF! MATERIAL WILL EXPLODE!** Isolate a wide area around release deny entry and call for expert help
- Stay uphill and upwind
- Determine the extent of the problem
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White to pale yellow solid
- Sinks and dissolves slowly in water and is insoluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material or contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If containers are exposed to direct flame or elevated temperatures, **BACK OFF** to a secure location; consider letting fire burn
- Material does not readily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 100-25-4 (para, p-) 528-29-0 (ortho, o-) 99-65-0 (meta, m-)



DINITRO-o-CRESOL

UN 1598

Shipping Name: Dinitro-o-cresol
Other Names: Capsine
2,4-Dinitro-o-cresol
Dinitrocresol
Nitrador
Nitrofan
Sincox



WARNING! • DILUTE MATERIAL WITH WATER! PURE MATERIAL (less than 10% water) MAY SPONTANEOUSLY EXPLODE IF HEATED OR IF SHOCKED!

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs; prolonged contact will cause burns● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Yellow solid● No odor● Insoluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Dilute material with foam or water● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Approach fire with extreme caution; consider letting fire burn● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 534-52-1



DINITROPHENOL

UN 1320 (Wet with more than 15% water)

UN 1599 (Solution)

UN 0076 (Dry)



Shipping Names: UN 1599 Dinitrophenol solutions
UN 1320 Dinitrophenol, wetted with not less than 15% water
UN 0076 Dinitrophenol, dry or wetted with less than 15% water

Other Names: Aldifen Dinofan 2,4-DNP
2,4-Dinitrophenol Nitrophen

WARNING! • KEEP MATERIAL WET! DRY MATERIAL (less than 15% water added) WILL SPONTANEOUSLY EXPLODE IF HEATED OR SHOCKED!

Hazards:

- Very irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow crystalline solid
- Sweet musty odor
- Sinks in water and is insoluble in water
- Flammable
- May be shipped or stored dry, as a wetted solid or in water solution

Operational Level Training Response:

RELEASE, NO FIRE:

- Dilute material with foam or water
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 51-28-5



1,4-DIOXANE

UN 1165

Shipping Name: Dioxane

Other Names: 1,4-Diethylenedioxiide
Diethylene ether
Diethylene oxide
p-Dioxane

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Faint ether-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 53° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 123-91-1



DIPROPYLAMINE

UN 2383

Shipping Name: Dipropylamine
Other Names: Di-n-propylamine
N-Dipropylamine



Hazards:

- Severely irritating to skin, eyes, nose and lungs; can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fish-like odor at low concentrations; ammonia-like odor at high concentrations
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to knock down vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 142-84-7



DITHIAZANINE IODIDE

Other Names: Diazan
3,3'-Diethylthiadicyanone iodide
Telmicid
Telmid

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may explode when exposed to fire● Combustion or decomposition products upon heating include toxic sulfur oxides, nitrogen oxides and hydrogen iodide	Description: <ul style="list-style-type: none">● Dark green or blue violet solid or tablets● No odor● Insoluble in water● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from blowing, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material does not readily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 514-73-8



EPICHLORHYDRIN

UN 2023

Shipping Name: Epichlorhydrin
Other Names: 1-Chloro-2,3-epoxypropane ECH
Chloromethyloxirane EPI
Chloropropylene oxide



Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- May react with itself at high temperatures blocking relief valves leading to tank explosion
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode if ignited
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Irritating, chloroform-like odor
- Sinks in water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 106-89-8



ETHANE

UN 1035 (Compressed gas)

UN 1961 (Refrigerated liquid)

Shipping Names: UN 1035 Ethane, compressed
UN 1961 Ethane, refrigerated liquid

Other Names: Bimethyl Methylmethane
Dimethyl



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode with or without ignition
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless, odorless gas
- Shipped and stored as a compressed gas or cryogenic liquid
- Boils on the surface of water and is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- May produce a visible vapor cloud

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-84-0



ETHANOLAMINE

UN 2491



Shipping Name: Ethanolamine or Ethanolamine solutions

Other Names: 2-Aminoethanol

Glycinol

Monoethanolamine

MEA

Olamine

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless thick liquid
- Fish-like odor
- Initially sinks in water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 51° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 141-43-5



ETHYL ACETATE

UN 1173

Shipping Name: Ethyl acetate
Other Names: Acetic ester
Acetic ether
Ethyl ethanoate



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pleasant, fruity odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 141-78-6



ETHYL ACRYLATE

(INHIBITED)

UN 1917

Shipping Name: Ethyl acrylate, inhibited
Other Names: Acrylic acid, ethyl ester
Ethyl propenoate
Ethyl 2-propenoate
Propenoic acid, ethyl ester



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!

Hazards:

- Highly flammable
- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Acrid, penetrating odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If venting sound suddenly increases and/or unexpectedly stops, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 140-88-5



ETHYL ALCOHOL

UN 1170

Shipping Name: Ethyl alcohol or Ethanol

Other Names: Algrain Ethanol
Anhydrol ETOH
Anhydrous ethanol Grain alcohol
Denatured alcohol Methylcarbinol



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin and eyes

Description:

- Colorless liquid
- Wine or whiskey-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Denatured alcohol contains small amounts of toxic materials

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 64-17-5



ETHYLAMINE

UN 1036



Shipping Name: Ethylamine
Other Names: Aminoethane MEA
 Ethanamine Monoethylamine
 ETN

WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Severely irritating to skin, eyes, nose and lungs; can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode with or without ignition
- Corrosive to aluminum, copper, tin, zinc and most of their alloys including brass
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas which becomes a liquid below 62° F
- Pungent ammonia-like odor
- Soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- May be shipped in a water solution

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-04-7



ETHYLBENZENE

UN 1175

Shipping Name: Ethylbenzene

Other Names: EB
Phenylethane



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g.. tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 100-41-4



ETHYL-BIS- (2-CHLOROETHYL)AMINE

UN 2734

Shipping Name: Amines, liquid, corrosive, flammable, n.o.s.

Other Names: 1,2'-Dichlorotriethylamine

Ethyl-S

HN1



- WARNING!** • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion or decomposition products upon heating include toxic nitrogen oxides and hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A liquid
- Fish-like odor at low concentrations
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 538-07-8



ETHYL BUTYLAMINE

UN 2733

Shipping Name: Amines, liquid, corrosive, flammable, n.o.s.

Other Names: Butylethylamine
N-ethylbutylamine



WARNING! • **POISON! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Severely irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Ammonia-like odor
- Floats on the surface of water and may dissolve in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 13360-63-9



ETHYL BUTYRATE

UN 1180

Shipping Name: Ethyl butyrate
Other Names: Butyric acid, ethyl ester
Ethyl butanoate



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fruity, pineapple-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 105-54-4



ETHYL CHLORIDE

UN 1037

Shipping Name: Ethyl chloride
Other Names: Chloroethane
Hydrochloric ether
Monochlorethane
Muriatic ether



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A colorless gas shipped and stored as a colorless liquid stored under pressure
- Pungent to pleasant ether-like odor
- Floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 54° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-00-3



ETHYL CHLOROACETATE

UN 1181

Shipping Name: Ethyl chloroacetate
Other Names: Chloroacetic acid, ethyl ester
Ethyl monochloroacetate



Hazards:

- Severely irritating to skin, eyes, nose and lungs; produces tearing
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless or white liquid
- Fruity, pungent odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -15° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 105-39-5



ETHYL CHLOROFORMATE

UN 1182

Shipping Name: Ethyl chloroformate
Other Names: Carbonochloride acid, ethyl ester
Chlorocarbonic acid, ethyl ester
Ethyl chlorocarbonate
Ethyl chloromethanoate



WARNING! • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
• Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Light yellow to water white liquid
- Distinct pungent odor like hydrochloric acid
- Sinks in water and reacts with water to form ethyl alcohol and chloroformic acid; is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 541-41-3



ETHYLDICHLOROARSINE

UN 1892

Shipping Name: Ethyldichloroarsine
Other Names: Arsenic dichloroethane
Dichloroethylarsine
TL 214
ED



WARNING! • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
• Firefighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Reacts with steam or acids producing highly toxic fumes

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire and call for expert help
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid which may become yellow upon exposure to air or light
- Biting, irritating fruit-like odor
- Sinks in water and reacts with water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Used as a military poison gas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

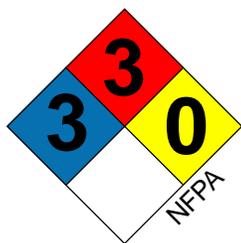
FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician; treat as an arsine gas exposure

CAS: 598-14-1



ETHYL DICHLOROSILANE

UN 1183

Shipping Name: Ethyldichlorosilane
Other Names: Dichloroethylsilane
Monoethyldichlorosilane



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS WITH WATER TO FORM TOXIC HYDROCHLORIC ACID AND EXPLOSIVE HYDROGEN GAS!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Irritating odor, similar to hydrochloric acid
- Sinks in water and reacts with water to form toxic hydrochloric acid and explosive hydrogen gas
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors.
- Material reacts with water but fire can be extinguished with medium expansion AFFF alcohol resistant foam
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1789-58-8



ETHYLENE

UN 1038 (Cryogenic liquid)

UN 1962 (Compressed gas)

Shipping Names: UN 1962 Ethylene, compressed

UN 1038 Ethylene, refrigerated liquid (cryogenic liquid)

Other Names: Acetene Ethene
Etherin



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Containers may BLEVE or explode when exposed to fire
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Cold gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas which may appear white
- Shipped and stored as a gas, a liquefied compressed gas or a cryogenic liquid
- Faint slightly sweet odor
- Liquefied gas floats and boils on water
- Extremely flammable
- Cold gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely
- Use large amounts of water well away from the release to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-85-1



ETHYLENE CHLOROHYDRIN

UN 1135

Shipping Name: Ethylene chlorohydrin

Other Names: 2-Chloroethanol
2-Chloro-1-ethanol
Chloroethanol



- WARNING!** • **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU!**
- Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Irritating to skin, eyes, nose and lungs at low concentrations
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include the toxic phosgene gas and hydrogen chloride gas

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, ether-like odor
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed

CAS: 107-07-3



ETHYLENE CYANOHYDRIN

Other Names: 2-Cyanoethyl alcohol
2-Cyanohydrin
Glycol cyanohydrin
Hydracrylonitrile
3-Hydroxypropionitrile

Hazards:

- Combustion and decomposition products upon heating include toxic hydrogen cyanide and nitrogen oxides
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- May react with itself when heated blocking relief valves leading to container explosion

Description:

- Colorless to light yellow liquid
- No odor
- Soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution because heated material releases highly toxic hydrogen cyanide. Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: fumes from heated material contain hydrogen cyanide; can produce cyanide toxicity - if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 109-78-4



ETHYLENEDIAMINE

UN 1604

Shipping Name: Ethylenediamine
Other Names: 1,2- Diaminoethane
Dimethylene diamine



Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless thick liquid
- Ammonia-like odor
- Initially floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 47° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-15-3



ETHYLENE DIBROMIDE

UN 1605

Shipping Name: Ethylene dibromide

Other Names: Bromofume EDB
1,2-Dibromoethane Ethylene bromide
Dibromoethane Unifume
Dowfume W-85



Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin will cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen bromide
- Corrosive to some plastics and rubber

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless heavy liquid
- Sweet odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 50° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 106-93-4



ETHYLENE DICHLORIDE

UN 1184

Shipping Name: Ethylene dichloride
Other Names: 1,2-Dichloroethane
Dichloroethane
Dutch oil

Ethylene chloride
1,2-Ethylene dichloride
Freon 150



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-06-2



ETHYLENE FLUOROHYDRIN

Other Names: 2-Fluoroethanol

WARNING! • POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU!

- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion and decomposition products upon heating include toxic hydrogen fluoride gas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A liquid
- Color and odor not found
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -15° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Toxic effects may be delayed

CAS: 371-62-0



ETHYLENE GLYCOL DIETHYL ETHER



UN 1153

Shipping Name: Ethylene glycol diethyl ether

Other Names: 1,2-Diethoxyethane 2-Ethoxyethyl ethyl ether
Diethyl cellosolve Ethyl glyme
Diethyl glycol Glyme-1

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless liquid
- Sweet odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 629-14-1



ETHYLENE GLYCOL MONOETHYL ETHER



UN 1171

Shipping Name: Ethylene glycol monoethyl ether

Other Names: 2-Ethoxyethanol Ethylene glycol ethyl ether
Ethyl cellosolve Ethyl glycol

Hazards:

- Container may BLEVE when exposed to fire
- Irritating to eyes and nose
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Ether-like odor
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 110-80-5



ETHYLENE GLYCOL MONOMETHYL ETHER



UN 1188

Shipping Name: Ethylene glycol monomethyl ether

Other Names: EGM 2-Methoxyethanol
EGME Ethylene glycol methyl ether
Methyl cellosolve Glycol methyl ether

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flash back
- Slightly irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Mild, sweet, ether-like smell
- Initially floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 109-86-4



ETHYLENEIMINE

(INHIBITED)

UN 1185

Shipping Name: Ethyleneimine, inhibited

Other Names: Azacyclopropane Dimethylenimine
Azirane Ethylimine
Aziridine



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Containers may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic oxides of nitrogen

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless clear liquid
- Ammonia-like odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff water from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If venting sound suddenly increases and/or unexpectedly stops, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 151-56-4



ETHYLENE OXIDE

UN 1040

Other Names: Dihydrooxirene Ethyloxide
Dimethylene oxide Oxane
1,2-Epoxyethane Oxidoethane
Epoxyethane Oxirane
Ethenoxide Oxyacetylopropane



WARNING! ● EXTREMELY FLAMMABLE!
● MAY REACT WITH ITSELF WITHOUT WARNING WITH EXPLOSIVE VIOLENCE!

Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Sweet ether-like odor
- Soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Shipped and stored as a liquefied gas
- Becomes a liquid below 51° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-21-8



ETHYL FORMATE

UN 1190

Shipping Name: Ethyl formate
Other Names: Ethyl methanoate
Formic acid, ethyl ester
Formic ether



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose; very irritating to lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Rum-like odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-94-4



ETHYL ISOCYANATE

UN 2481

Shipping Name: Ethyl isocyanate
Other Names: Isocyanic acid, ethyl ester
Isocyanatoethane



Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A liquid
- No color or odor found
- Floats on the surface of water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 109-90-0



ETHYL MERCAPTAN

UN 2363

Shipping Name: Ethyl mercaptan

Other Names: Ethanethiol Thioethanol
Ethyl hydrosulfide Thioethylalcohol
Ethyl sulfhydrate



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Skunk-like odor; smells like garlic at low concentrations
- Moderately soluble and floats on the surface of water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 94° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-08-1



ETHYL NITRITE

(SOLUTIONS)

UN 1194

Shipping Name: Ethyl nitrite solutions
Other Names: Hyponitrous ether
Nitrous acid, ethyl ester
Sweet spirit of nitre



- WARNING!**
- **EXTREMELY FLAMMABLE!**
 - **EXPLOSIVE! DECOMPOSES EXPLOSIVELY AT 194°F!**
 - **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Extremely irritating to skin, eyes, nose and lungs
- Containers may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- May interfere with the body's ability to use oxygen
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas above 63° F; colorless to pale yellow liquid below 63° F
- Sweet rum-like odor
- May be shipped and stored dissolved in ethyl alcohol
- Floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 109-95-5



ETHYLPHENYL DICHLOROSILANE



UN 2435

Shipping Name: Ethylphenyldichlorosilane

Other Names: Dichloroethylphenylsilane

- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE!**

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp unpleasant odor
- Reacts with water producing toxic hydrochloric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH.**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1125-27-5



ETHYL THIOCYANATE

Other Names: Ethyl rhodanate
Ethyl sulfocyanate
Thiocyanic acid, ethyl ester

Hazards:

- Very irritating to skin, eyes, nose and lungs
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic nitrogen and sulfur oxides

Description:

- Colorless to yellow liquid
- No odor found
- Floats or sinks in water depending upon the temperature and is insoluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 542-90-5



ETHYLTRICHLOROSILANE

UN 1196

Shipping Name: Ethyltrichlorosilane
Other Names: Trichloroethylsilane
Trichloroethyl silicon



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU ! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM HYDROCHLORIC ACID AND HEAT!**

Hazards:

- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explode
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Intolerable pungent odor
- Reacts vigorously with water to form hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH.**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 115-21-9



FLUORINE

UN 1045 (Compressed gas)

NA 9192 (Cryogenic liquid)

Shipping Name: UN 1045 Fluorine, compressed

UN 9192 Fluorine, refrigerated liquid
(cryogenic liquid)

Other Names: Difluorine



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! FORMS EXPLOSIVE OR COMBUSTIBLE MIXTURES WITH MOST MATERIALS INCLUDING ALL FUELS AND MOST METALS!**
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROFLUORIC ACID!**

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Gas may explode in closed spaces (e.g., tanks, sewers, buildings) without an ignition source
- Contact with liquid may cause frostbite
- Corrosive to most metals

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Pale yellow or greenish yellow gas
- Pungent, irritating choking odor
- Stored and shipped as a compressed gas or cryogenic liquid in special cylinders without relief valves
- Reacts violently with water forming toxic hydrofluoric acid
- Nonflammable but may cause combustible materials to ignite
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

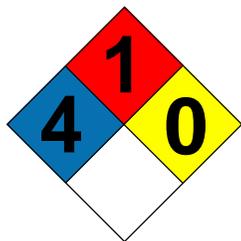
- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting it burn.
- Material does not burn; fight surrounding fire with an agent appropriate for burning material; avoid water, if water must be used, use it in flooding quantities
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location
- **DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS;** if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Toxic effects may be delayed
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: burns can be treated with calcium gluconate gel



FLUOROACETIC ACID

UN 2642

Shipping Name: Fluoroacetic acid

Other Names: FAA
2-Fluoroacetic acid
Fluoroethanoic acid

Monofluoroacetate
MFA



- WARNING!** • **POISON! BREATHING THE POWDER OR VAPOR, OR SWALLOWING THE POWDER CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Combustion or decomposition products upon heating include toxic hydrogen fluoride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- No odor
- Moderately soluble in water
- Flammable and burns with a green flame
- Melts at 95° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 144-49-0



FLUOROBENZENE

UN 2387

Shipping Name: Fluorobenzene
Other Names: Benzene fluoride
MFB
Monofluorobenzene
Phenyl fluoride



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen fluoride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, watery liquid
- Benzene-like odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

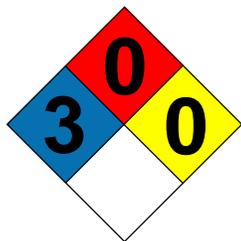
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 462-06-6



FLUOROSILICIC ACID

UN 1778

Shipping Name: Fluorosilicic acid

Other Names: FKS
Fluosilicic acid
Hexafluosilicic Acid

Silicofluoric acid
Sand acid
Hydrogen hexafluorosilicate



- WARNING!** • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic hydrogen fluoride
- Corrosive to glass and stoneware

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to straw colored liquid
- Unpleasant sour odor
- Soluble in water with the release of heat
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 63° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 16961-83-4



FLUOROSULFONIC ACID

UN 1777

Shipping Name: Fluorosulfonic acid

Other Names: Fluorosulfuric acid



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN FLUORIDE AND SULFURIC ACID MIST!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Reacts with metals generating flammable hydrogen gas
- Decomposition products upon heating include toxic hydrogen fluoride and sulfur oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Acrid odor
- Reacts violently with water forming toxic hydrofluoric and sulfuric acids
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor when exposed to water or moisture

Operational Level Training Response:

RELEASE, NO FIRE:

- **DO NOT USE WATER DIRECTLY ON THE PRODUCT.** Reacts violently with water to form toxic hydrofluoric and sulfuric acids
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material - if possible, do not allow water to come in contact with material; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7789-21-1



FORMALDEHYDE

(SOLUTION)

UN 1198 (Solutions, flammable)

UN 2209 (Solution)



Shipping Name: UN 1198 Formaldehyde, solutions, flammable

UN 2209 Formaldehyde, solutions with not less than 25% formaldehyde

Other Names: Formalin Methylaldehyde

Methaldehyde Methylene Oxide

Methanal Oxymethylene

WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Severely irritating; can cause burns of skin, eyes, nose and lungs
- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless or cloudy liquid
- Usually shipped as a solution in water (30 to 40%) or methanol (0 to 15%)
- Pungent and irritating odor
- Soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 50-00-0



FORMALDEHYDE CYANOHYDRIN

Other Names: Cyanomethanol Hydroxyacetonitrile
Glycolonitrile Methylene cyanohydrin
Glyconitrile

- WARNING!** ● **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
- Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen cyanide and nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless oily liquid
- Shipped as 70% water solution stabilized with phosphoric acid
- No odor
- Soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

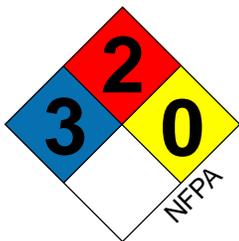
FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a risk to the responder
- Decontaminate the victim from a distance, provide Basic Life Support/CPR as needed and further decontaminate as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible; Toxic effects may be delayed
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 107-16-4



FORMIC ACID

UN 1779

Shipping Name: Formic acid
Other Names: Aminic acid
Formylic acid
Hydrogen carboxylic acid
Methanoic acid



Hazards:

- Very irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Very flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- May deteriorate upon normal storage causing pressure buildup and container failure

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, fuming liquid
- Irritating odor
- Sinks in water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 47° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 64-18-6



FURAN

UN 2389

Shipping Name: Furan

Other Names: Divinylene Oxide
Oxacyclopentadiene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact can cause burns to eyes
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid that turns brown upon standing
- Mild pleasant odor
- Floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 90° F
- Produces large amounts of vapors

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-00-9



FURFURAL

UN 1199

Shipping Name: Furfural

Other Names: 2-Formylfuran
Furaldehyde
2-Furaldehyde
2-Furfural



Hazards:

- Extremely irritating to skin, eyes, nose and lungs
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Reacts violently upon contact with acids

Awareness and Operational Level Training Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Almond-like odor
- Sinks in water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed

CAS: 98-01-1



GASOLINE

UN 1203

Shipping Name: Gasoline

Other Names: Casing head gasoline
JP-4
Motor fuel

Motor spirit
Petrol



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid which may be dyed to a range of colors
- Characteristic odor
- Floats on water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Blended (oxygenated) gasolines may require higher foam application rates
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 8006-61-9



GLYPHOSATE

Other Names: Muster
N-phosphonomethylglycine
Rodeo
Roundup

Hazards: <ul style="list-style-type: none">● Moderately irritating to eyes, nose and lungs● Container may explode when exposed to fire● Combustion and decomposition products upon heating include toxic phosphoric acid and nitrogen oxides	Description: <ul style="list-style-type: none">● White solid● Shipped and stored in solution containing at least 48% water● No odor● Floats on water and is slightly soluble in water● Flammable● An herbicide
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 1071-83-6



HEPTANES

UN 1206

Shipping Name: Heptanes
Other Names: n-Heptane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 142-82-5



n-HEPTENE

UN 2278

Shipping Name: n-Heptene

Other Names: 1-Heptene
Heptylene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Mildly irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 592-76-7



HEXANE

UN 1208

Shipping Name: Hexanes

Other Names: Gettysolve B
n-Hexane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-54-3



HEXENE

UN 2370

Shipping Name: 1-Hexene
Other Names: Butyl ethylene
1-Hexene
Hexylene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 592-41-6



HYDRAZINE

UN 2029 (more than 64% or anhydrous)

UN 2030 (37% to 64%)

UN 3293 (not more than 37% hydrazine by mass)

Shipping Name: Hydrazine

Other Names: Diamide Diamine
Diamine hydrate Hydrazine hydrate



- WARNING!** • **POISON! BREATHING THE VAPOR, SKIN CONTACT OR SWALLOWING THE LIQUID CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **HIGHLY REACTIVE! IGNITES SPONTANEOUSLY UPON CONTACT WITH POROUS MATERIALS SUCH AS WOOD, CLOTH, RUSTING METAL OR SOIL!**

Hazards:

- Highly flammable; may continue to burn in the absence of air
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides
- Very corrosive to glass and rubber

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow oily fuming liquid
- Ammonia-like fishy odor
- Soluble in water
- Highly flammable; will ignite most porous material such as wood, cloth or rusting metal
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 35° F
- Commonly used as rocket fuel

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 302-01-2



HYDRAZINE SULFATE

Other Names: Diamine sulfate
Hydrazine hydrogen sulfate
Hydrazine monosulfate
Hydrazinium sulfate

Hazards: <ul style="list-style-type: none">● Extremely irritating to skin, eyes, nose and lungs● May interfere with the body's ability to use oxygen	Description: <ul style="list-style-type: none">● White solid● Weak ammonia-like odor● Sinks in water and is slightly soluble in water● Nonflammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray <p>FIRE:</p> <ul style="list-style-type: none">● Material does not burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 10034-93-2



HYDROCHLORIC ACID

(SOLUTION GREATER THAN 25%)

UN 1789

Shipping Name: Hydrochloric acid, solution

Other Names: Hydrogen chloride solution

Muriatic acid



- WARNING!** • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Reacts with common metals to produce flammable hydrogen gas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area around the release and deny
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Depending upon concentration may fume upon release
- Sharp pungent irritating odor
- Soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7647-01-0



HYDROFLUORIC ACID

UN 1790

Shipping Name: Hydrofluoric acid, solution
Other Names: Hydrogen fluoride, solution



- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE LIQUID OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may BLEVE when exposed to fire
- Reacts with most metals to form flammable and explosive hydrogen gas
- Corrosive to most metals

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated run off enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Shipped and stored as a 40% to 70% solution of hydrogen fluoride in water
- Irritating odor
- Soluble in water
- Nonflammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7664-39-3



HYDROGEN

UN 1049 (Compressed gas)

UN 1966 (Cryogenic liquid)

Shipping Name: UN 2029 Hydrogen, compressed
UN 1966 Hydrogen, refrigerated liquid
(cryogenic liquid)



WARNING! ● EXTREMELY FLAMMABLE! BURNS WITH AN INVISIBLE FLAME EVEN IN THE DARK!
● CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE!

Hazards:

- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- High pressure releases often ignite without any apparent source of ignition
- Exposure to the liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials

Description:

- Colorless compressed gas or cryogenic liquid
- No odor
- Insoluble in water
- Extremely flammable
- Gas is lighter than air

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Ventilate confined area if it can be done without placing personnel at risk

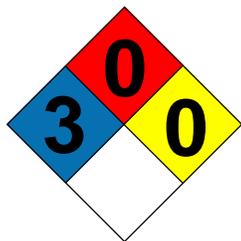
FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1333-74-0



HYDROGEN BROMIDE

UN 1048

Shipping Name: Hydrogen bromide, anhydrous
Other Names: Anhydrous hydrobromic acid



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) does not provide adequate protection. If exposure to the chemical occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Containers may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Reacts with water to produce toxic hydrobromic acid
- Reacts with metals to produce highly flammable hydrogen gas
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate and deny entry into the area of release or fire
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- May be shipped as a pale yellow liquid under pressure
- Irritating odor
- Liquid sinks in water and dissolves in water with the production of heat and toxic hydrobromic acid
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Boiling liquid may produce white vapor cloud

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10035-10-6



HYDROGEN CHLORIDE

(ANHYDROUS)

UN 1050 (gas)

UN 2186 (refrigerated liquid)

Shipping Name: UN 1050 Hydrogen chloride, gas

UN 2186 Hydrogen chloride, refrigerated liquid

Other Names: HCl



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Reacts with water to produce heat and hydrochloric acid
- Corrosive to common metals especially in the presence of moisture to form flammable hydrogen gas
- Contact with liquid may cause frostbite

Description:

- Colorless gas
- Shipped and stored as a cryogenic liquid
- Sharp pungent odor
- Initially sinks in water and is soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area around the release and deny
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

Perform Awareness Level Actions and:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting suddenly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS, if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7647-01-0



HYDROGEN CYANIDE

(STABILIZED)

UN 1051

Shipping Name: Hydrogen cyanide, stabilized with less than 3 percent water

Other Names: AC Hydrocyanic acid solution

HCN Prussic acid

Hydrocyanic acid



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SKIN CONTACT CAN KILL YOU!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- May react with itself without warning with explosive violence
- Container may BLEVE or explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Vapors are slightly lighter than air but will collect and stay in low areas
- Combustion products are less toxic than the material itself

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid that boils at 78° F
- Sweet odor like bitter almonds; many people cannot smell it
- Dissolves slowly in water but is soluble in water
- Extremely flammable
- Vapors are slightly lighter than air but will collect and stay in low areas
- Transported in red and white candy striped containers
- Produces large amounts of vapor
- Freezes at 8° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**; combustion products are less toxic than the original material. Cool exposures using unattended monitors.
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 74-90-8



HYDROGEN FLUORIDE

(ANHYDROUS)

UN 1052

Shipping Name: Hydrogen fluoride, anhydrous

Other Names: Anhydrous hydrofluoric acid

Fluoric acid

HF

Hydrofluoric acid



WARNING! • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES BLINDNESS AND SEVERE BURNS WHICH MAY NOT BE IMMEDIATELY PAINFUL !**

- Fire fighting gear including SCBA provides NO protection. If exposure to the chemical occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may BLEVE when exposed to fire
- Reacts with some metals to produce flammable and explosive hydrogen gas
- Highly corrosive attacking rubber, leather, glass and other materials
- Gas is slightly lighter than air

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid which boils at 67° F
- Sharp, irritating odor
- Initially sinks in water and is soluble in water producing toxic hydrofluoric acid and heat
- Nonflammable
- Gas is slightly lighter than air
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff and from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7664-39-3



HYDROGEN PEROXIDE

(STABILIZED, GREATER THAN 60%)

UN 2015

Shipping Name: Hydrogen peroxidestabilized, greater than 60%

Other Names: Dihydrogen dioxide

Hydrogen dioxide

Hydrogen oxide



- WARNING!**
- **CORROSIVE! MAY CAUSE SEVERE EYE AND SKIN BURNS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Containers may BLEVE when exposed to heat
- Reacts with iron, copper, brass and many other metals

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Shipped and stored in water solution
- Sharp irritating odor
- Soluble in water
- Nonflammable but may cause combustible materials to ignite

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7722-84-1



HYDROGEN SELENIDE (ANHYDROUS)

UN 2202

Shipping Name: hydrogen selenide, anhydrous

Other Names: Dihydrogen selenide

Selenium dihydride



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Very irritating to skin, eyes, nose and lungs
- Containers may explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Offensive odor
- Soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7783-07-5



HYDROGEN SULFIDE

UN 1053

Shipping Name: Hydrogen sulfide, liquefied
Other Names: Hydrosulfuric acid
Sewer gas
Sulfureted hydrogen
Sulfur hydride



- WARNING!** ● **POISON! BREATHING THE GAS WILL KILL YOU!**
- Fire fighting gear including SCBA does not provide adequate protection. If exposure to the chemical occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Containers may BLEVE or explode when exposed to fire
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers buildings) may explode when exposed to fire
- Contact with liquid can cause frostbite
- Combustion products include toxic sulfur oxides
- Will burn or explode in the presence of metal oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas that produces a visible cloud
- Shipped and stored as liquefied compressed gas
- Rotten egg odor
- Insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: if symptoms indicate, initial treatment includes amyl nitrite

CAS: 7783-06-4



HYDROXYLAMINE

Other Names: Oxammonium

WARNING! • **EXPLOSIVE! CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE OR HEATED ABOVE 265°F! MAY EXPLODE AT LOWER TEMPERATURES IF MATERIAL IS EXPOSED TO AIR!**

Hazards:

- May interfere with the body's ability to use oxygen
- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Combustion or decomposition products upon heating include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the area of release or fire and deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- No odor found
- Melts at 90° F forming a colorless liquid
- Initially sinks in water and is soluble in water
- Nonflammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Use extreme caution in approaching fire because material may explode without warning; no attempt should be made to fight fires except with unattended monitors using an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 7803-49-8



HYDROXYPROPYL METHACRYLATE

Other Names: 1,2-Propanediol-1-methacrylate
Propylene glycol monomethacrylate

Hazards: <ul style="list-style-type: none">● Container may BLEVE when exposed to fire● Irritating to skin, eyes, nose and lungs● Vapors are heavier than air and will collect and stay in low areas● At elevated temperatures, may react with itself blocking relief valves leading to container explosion	Description: <ul style="list-style-type: none">● Colorless, clear liquid● Pungent odor● Sinks slowly in water and is slightly soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 27813-02-1



IRON PENTACARBONYL

UN 1994

Shipping Name: Iron pentacarbonyl

Other Names: Iron carbonyl
Pentacarbonyliron



WARNING! • HIGHLY FLAMMABLE! MAY IGNITE SPONTANEOUSLY IN AIR!

Hazards:

- Container may BLEVE when exposed to fire
- Severely irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion or decomposition products upon heating include toxic carbon monoxide

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Yellow to dark red oily liquid
- No odor found
- Sinks in water and reacts slowly with water; insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -4° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns rinse with water and apply a clean dry dressing

CAS: 13463-40-6



ISOBUTANE

UN 1969

Shipping Name: Isobutane

Other Names: 1,1-Dimethylethane
2-Methylpropane
Trimethylmethane



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Containers may explode or BLEVE when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Description:

- Colorless gas
- Gasoline-like odor
- Liquid floats on the surface of water and boils forming a visible vapor cloud; is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- A liquid below 10° F

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-28-5



ISOBUTYLENE

UN 1055

Shipping Name: Isobutylene

Other Names: 2-Methylpropene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Exposure to the liquid may cause frostbite

Description:

- Colorless gas
- Mild odor similar to gasoline
- Liquid floats on the surface of water and boils; is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below 20° F

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 115-11-7



ISOBUTYRONITRILE

UN 2284

Shipping Name: Isobutyronitrile
Other Names: 2-Cyanopropane
Isopropyl cyanide
Isopropyl nitrile



WARNING! • **POISON! BREATHING THE VAPOR, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
• Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Containers may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors may explode in confined areas (e.g., tanks, sewers, buildings)
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless clear liquid
- Almond-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 78-82-0



ISOPRENE

(INHIBITED)

UN 1218

Shipping Name: Isoprene, inhibited
Other Names: Isopentadiene
2-Methyl-1,3-butadiene
2-Methylbutadiene



WARNING! ● **EXTREMELY FLAMMABLE!**
● **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) or containers may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Mild petroleum-like odor
- Floats on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Liquid boils at 93° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases and/or unexpedely stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 78-79-5



ISOPROPANOL

UN 1219

Shipping Name: Isopropanol

Other Names: Dimethylcarbinol 2-Propanol
Isopropyl alcohol sec-Propyl alcohol
1-Methyl ethyl alcohol Rubbing alcohol



Hazards: <ul style="list-style-type: none">● Highly flammable● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Vapors may travel long distances to ignition sources and flashback● Vapors may explode in closed spaces (e.g., tanks, sewers, buildings) if exposed to fire● Irritating to skin and eyes	Description: <ul style="list-style-type: none">● Clear, colorless liquid● Odor like rubbing alcohol● Soluble in water● Highly flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 67-63-0



ISOPROPANOLAMINE

UN 2734

Shipping Name: Amines, liquid, corrosive, flammable, n.o.s.

Other Names: 1-Amino-2-propanol
2-Hydroxypropylamine
1-Methyl-2-aminoethanol
Monoisopropanolamine



Hazards:

- Irritating to skin, eyes, nose and lungs; prolonged contact with skin will cause burns
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, thick liquid
- Ammonia-like odor
- Initially floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 35° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 78-96-6



ISOPROPENYLBENZENE

UN 2303

Shipping Name: Isopropenylbenzene
Other Names: AMS
alpha-Methyl styrene
1-Methyl-1-phenylethene
2-Phenylpropylene



Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- At high temperatures may react with itself without warning blocking relief valves leading to container explosion
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, aromatic odor
- Floats on the surface of water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -9° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 98-83-9



ISOPROPYLAMINE

UN 1221

Shipping Name: Isopropylamine
Other Names: 2-Aminopropane
1-Methylethylamine
2-Propylamine



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Ammonia-like odor
- Soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 92° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-31-0



ISOPROPYLBENZENE

UN 1918

Shipping Name: Isopropylbenzene

Other Names: Cumene

Curmol

2-Phenylpropane



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs; prolonged contact will cause burns
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, aromatic odor
- Insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 98-82-8



ISOPROPYL CHLOROFORMATE

UN 2407

Shipping Name: Isopropylchloroformate

Other Names: Chloroformic acid, isopropyl ester

Isopropyl chlorocarbonate

2-Propyl chloroformate



WARNING! • EXPLOSIVE! CONTAINERS HAVE EXPLODED EVEN WHEN REFRIGERATED!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; may cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Decomposes upon heating to form toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate a wide area around the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent irritating odor
- Sinks in water and is insoluble in water
- Reacts slowly with water to form toxic hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-23-6



ISOPROPYL FORMATE

UN 1281

Shipping Name: Propyl formates

Other Names: Formic acid isopropyl ester



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless liquid
- Pleasant smell
- Floats on the surface of water; is slightly soluble in water
- Slowly decomposes in water to form formic acid and isopropyl alcohol
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 625-55-8



KEROSENE

UN 1223

Shipping Name: Kerosene

Other Names: Coal oil
Fuel oil #1
Jet A
JP-1, JP-4
JP-8
Kerosine
Range oil



Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Irritating to skin and eyes

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light brown-amber liquid
- Petroleum-like odor
- Floats on water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 8008-20-6



LACTONITRILE

UN 3275

Shipping Name: Nitriles, toxic, flammable, n.o.s.
Other Names: Acetaldehyde cyanohydrin
Hydroxypropionitrile
Acetocyanohydrin
2-Hydroxypropionitrile



- WARNING!**
- **POISON! SKIN CONTACT, BREATHING THE VAPORS OR SWALLOWING THE LIQUID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">● Vapors are heavier than air and will collect and stay in low areas● Container may BLEVE when exposed to fire● Combustion products include toxic cyanide gas● Irritating to skin, eyes, nose and lungs	Description: <ul style="list-style-type: none">● Colorless to straw colored liquid● No odor found● Initially floats on water and is soluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● Remove all ignition sources● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 78-97-7



LEWISITE

UN 1556

Other Names: Chlorovinylidichloroarsine
Chlorovinylarsine dichloride
Dichloro (2-chlorovinyl) arsine
L
M-1



WARNING! • **POISON! BREATHING THE VAPOR, OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Odor is not a reliable indicator of the presence toxic amounts of vapor• Container may BLEVE or explode when exposed to fire• Vapors are heavier than air and will collect and stay in low areas• Combustion products include toxic hydrogen chloride and arsenic compounds	Description: <ul style="list-style-type: none">• Colorless liquid if pure; turns violet to black or green with age• Faint geranium-like odor• Sinks in water and insoluble in water• Flammable• Vapors are heavier than air and will collect and stay in low areas• Freezes at 9° F• Has been used as a blister-type war gas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim• Stay uphill and upwind• Determine the extent of the problem• BACK OFF! - Isolate a wide area of release or fire, deny entry and call for expert help• Evacuate or shelter in place the immediate area and downwind for a large release• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• BACK OFF! - Isolate a wide area around the release and call for expert help• If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location• Use unattended equipment whenever possible

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 541-25-3



LIQUEFIED NATURAL GAS

(LNG)

UN 1972

Shipping Name: Liquefied natural gas

Other Names: LNG

Natural gas



WARNING! ● **EXTREMELY FLAMMABLE!**
● **CYLINDERS EXPOSED TO FIRE OR FLAME MAY RUPTURE AND ROCKET THROUGH BUILDING!**

Hazards:

- Gas may travel long distances to ignition sources and flashback
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Gas is lighter than air but will collect and stay in low areas
- Contact with liquid may cause frostbite

Description:

- Colorless gas
- No odor or with weak skunk-like odor
- Shipped and stored as a compressed gas or cryogenic liquid
- Liquid floats and boils on the surface of water; is insoluble in water
- Extremely flammable
- Gas is lighter than air but will collect and stay in low areas

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-82-8



LIQUEFIED PETROLEUM GAS

(LPG)
UN 1075



Shipping Name: Liquefied petroleum gas

Other Names: Bottled gas LPG
Petroleum gas, liquefied

WARNING! • EXTREMELY FLAMMABLE!
• CONTAINERS MAY BLEVE OR EXPLODE WHEN EXPOSED TO HEAT OR FLAMES!

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- May be shipped and stored as a compressed liquefied gas
- Extremely flammable
- No odor unless treated with an odorant
- Floats and boils on the surface of water and is insoluble in water
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 68476-85-7



LITHIUM

UN 1415

Shipping Name: Lithium

Other Names: Li
Lithium metal



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM FLAMMABLE HYDROGEN GAS AND A CAUSTIC SOLUTION!
• METAL POWDER OR SHAVINGS MAY IGNITE SPONTANEOUSLY IN AIR!

Hazards:

- Skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Fumes from burning metal are highly irritating to skin, eyes, nose and lungs

Description:

- Silvery white solid - turns yellow upon exposure to moisture
- No odor
- Shipped and stored under inert gas, mineral oil or kerosene
- Floats on the surface of water and reacts with water to form highly flammable hydrogen gas and a caustic solution
- Very flammable

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- DO NOT allow water to come in contact with the material; if material is on fire, use Class D extinguisher to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7439-93-2



MALONONITRILE

UN 2647

Shipping Name: Malononitrile
Other Names: Cyanoacetonitrile
Dicyanomethane
Malonic acid dinitrile

Malonic dinitrile
Methylene cyanide



- WARNING!**
- **POISON! BREATHING THE DUST OR THE FUMES FROM COMBUSTION OR DECOMPOSITION UPON HEATING CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Combustion and decomposition products upon heating include toxic nitrogen oxides and cyanide
- May react with itself violently at elevated temperatures or upon contact with acids
- Container may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- Sinks in water and is moderately soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Melts at 93° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause cyanide toxicity; if symptoms indicate, the initial treatment includes the cyanide antidote kit

CAS: 109-77-3



MECHLORETHANAMINE

UN 1955

Other Names: Bis(2-chloroethyl) methylamine
HN₂
MBA
Mustargen

Mustine
Nitrogen mustard
N-lost



WARNING! • POISON! BREATHING THE VAPOR OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN OR EYE CONTACT CAUSES SEVERE BURNS OR BLINDNESS!
• Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Odor is not a reliable indicator of the presence of toxic amounts of vapor• Container may BLEVE or explode when exposed to fire• Vapors are heavier than air and will collect and stay in low areas• Combustion products include toxic nitrogen oxides and hydrogen chloride	Description: <ul style="list-style-type: none">• A liquid• Faint fish-like odor• Sinks in water and is insoluble in water• Flammable• Vapors are heavier than air and will collect and stay in low areas• Used as a blister-type war gas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim• Stay uphill and upwind• Determine the extent of the problem• BACK OFF! - Isolate a wide area of release or fire, deny entry and call for expert help• Evacuate or shelter in place the immediate area and downwind for a large release• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• BACK OFF! - Isolate a wide area around the release and call for expert help• If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely.• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location• Use unattended equipment whenever possible

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 51-75-2



MESITYL OXIDE

UN 1229

Shipping Name: Mesityl oxide
Other Names: Isobutenyl methyl ketone
Isopropylidene acetone
Methyl isobutenyl ketone

MIBK
4-Methyl-3-penten-2-one



Hazards: <ul style="list-style-type: none">● Highly flammable● Container may BLEVE when exposed to fire● Irritating to skin, eyes, nose and lungs; can cause burns to eyes● Vapors are heavier than air and will collect and stay in low areas● Vapors may travel long distances to ignition sources and flashback● Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire	Description: <ul style="list-style-type: none">● Colorless, oily liquid● Spearmint or honey-like odor● Floats on the surface of water and is moderately soluble in water● Highly flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 141-79-7



METHACRYLIC ACID

(INHIBITED)

UN 2531

Shipping Name: Methacrylic acid, inhibited

Other Names: alpha-Methacrylic acid

2-Methyl-2-propenoic acid



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO CONTAINER EXPLOSION!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Corrosive to metals

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Acrid, repulsive odor
- Sinks slowly in water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 61° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly or unexpectedly increases or stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-41-4



METHACRYLOYL CHLORIDE

Other Names: Methacrylic acid chloride
Methylacryl chloride

Hazards: <ul style="list-style-type: none">● Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness● Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion and decomposition products include toxic hydrogen chloride	Description: <ul style="list-style-type: none">● A liquid● Pungent, irritating odor● Sinks slowly in water and is insoluble in water● Reacts with water to form toxic hydrogen chloride● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 920-46-7



METHANE



UN 1971 (Compressed gas)

UN 1972 (Cryogenic liquid)

Shipping Name: UN 1971 Methane, compressed

UN 1972 Methane, refrigerated liquid (cryogenic liquid)

Other Names: Biogas Methyl hydride

Fire damp Natural gas

Marsh gas R50

WARNING! • **EXTREMELY FLAMMABLE!**
• **CYLINDERS EXPOSED TO FIRE OR FLAME MAY RUPTURE AND ROCKET THROUGH BUILDING!**

Hazards:

- Gas may travel long distances to ignition sources and flash back
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Gas is lighter than air but will collect and stay in low areas
- Contact with liquid may cause frostbite

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- No odor, or with a weak skunk-like odor
- Shipped and stored as a compressed gas or cryogenic liquid
- Liquid floats and boils on the surface of water; is insoluble in water
- Extremely flammable
- Gas is lighter than air but will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-82-8



METHANESULFONYL CHLORIDE

UN 3246

Shipping Name: Methanesulfonyl chloride

Other Names: Chloro methyl sulfane
Mesyl chloride
Methanesulfonic acid chloride
Methane sulfonyl chloride



Hazards:

- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion and decomposition products upon heating include toxic sulfur oxides and hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Pale yellow liquid
- Pungent sharp odor
- Reacts slowly with water to form toxic hydrochloric acid and is slightly soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -26° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 124-63-0



METHANESULFONYL FLUORIDE

Other Names: Fumette
MSF

WARNING! • **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Irritating to skin, eyes, nose and lungs even at low concentrations
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen fluoride and sulfur oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid
- No odor found
- Slightly soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: material is a cholinesterase inhibitor; if symptoms indicate, initial antidote is atropine. Hydrofluoric acid burns can be treated with calcium gluconate gel

CAS: 558-25-8



METHANOL

UN 1230

Shipping Name: Methyl alcohol
Other Names: Carbinol
Methyl hydroxide
Methylol
Wood alcohol



Hazards:

- Highly flammable, burns with invisible flame
- Containers may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin and eyes

Description:

- Colorless liquid
- Sweet alcohol odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 67-56-1



METHYL ACETATE

UN 1231



Shipping Name: Methyl acetate
Other Names: Acetic acid, methyl ester
Methyl acetic ester

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fruity odor
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-20-9



METHYL ACETYLENE, PROPADIENE MIXTURE

(STABILIZED)

UN 1060

Shipping Name: Methyl acetylene, propadiene mixture, stabilized

Other Names: Allene-methyl acetylene mixture

MAPP gas

Methyl acetylene-allene mixture



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Moderately irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless liquefied compressed gas
- Garlic-like odor
- Liquid floats on water and boils
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: none



METHYL ACRYLATE (INHIBITED)

UN 1919

Shipping Name: Methyl acrylate, inhibited
Other Names: Acrylic acid, methyl ester
Methoxycarbonylethylene
Methyl propenoate
Propenoic acid, methyl ester



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!

Hazards:

- Highly irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Acrid odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent and material runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 96-33-3



METHYL ACRYLONITRILE

(INHIBITED)

UN 3079

Shipping Name: Methyl acrylonitrile, inhibited

Other Names: 2-Cyanpropene Methacrylonitrile

2-Methylpropenenitrile USAFST-40

Isopropene cyanide



- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF WITHOUT WARNING WITH EXPLOSIVE VIOLENCE!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides and cyanide

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Bitter almond-like odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 126-98-7



METHYLAMINE (ANHYDROUS)

UN 1061

Shipping Name: Methylamine, anhydrous

Other Names: Aminomethane

Monomethylamine



- WARNING!**
- **EXTREMELY FLAMMABLE!**
 - **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with the liquefied gas may cause frostbite
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- May be shipped or stored as a refrigerated liquefied gas
- Ammonia-like odor
- Soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- A liquid below 21° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-89-5



METHYLAMINE

(AQUEOUS SOLUTION)

UN 1235

Shipping Name: Methylamine, aqueous solution

Other Names: Aminomethane

MMA



- WARNING!**
- **EXTREMELY FLAMMABLE!**
 - **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fish-like odor at low concentrations, ammonia-like odor at higher concentrations
- Soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Shipped as a 30% to 40% solution in water
- Produces large volumes of vapor
- Boils between 86° F and 106° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support (CPR) as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-89-5



METHYL AMYL KETONE

UN 1110

Shipping Name: Amyl methyl ketone
Other Names: Butylacetone
2-Heptanone
Methyl pentyl ketone



Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Banana-like odor
- Floats on water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 110-43-0



METHYL BROMIDE

UN 1062

Shipping Name: Methyl bromide
Other Names: Brom-O-Gas
Bromomethane
Dowfume MC-2

Halon 1001
MB



WARNING! • POISON! BREATHING THE GAS CAN KILL YOU!

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Very irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Gas is heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Exposure to the liquid may cause frostbite
- Reacts with aluminum to produce spontaneously combustible compounds
- Combustion products include toxic hydrogen bromide

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Shipped and stored as a liquefied gas
- Sweet chloroform-like odor
- Sinks in water and is slightly soluble in water
- Flammable
- Gas is heavier than air and will collect and stay in low areas
- A liquid below 38° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-83-9



3-METHYL-2-BUTANONE

UN 2397

Shipping Name: 3-Methylbutan-2-one

Other Names: Isopropyl methyl ketone
3-Methylbutan-2-one
Methyl isopropyl ketone
MIPK



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet acetone-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

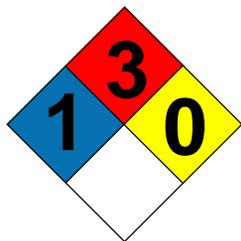
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 563-80-4



METHYL tert-BUTYL ETHER

UN 2398

Shipping Name: Methyl tert-butyl ether

Other Names: t-Butyl methyl ether

2-Methoxy-2-methylpropane

MTBE



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Sharp, turpentine-like odor
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1634-04-4



METHYL BUTYL KETONE

UN 1224

Shipping Name: Ketones, n.o.s.

Other Names: 2-Hexanone

MBK

MNBK

Propylacetone



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Finger nail polish remover (acetone)-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 591-78-6



METHYL BUTYRATE

UN 1237

Shipping Name: Methyl butyrate
Other Names: Butyric acid, methyl ester
Methyl-n-butanoate
Methyl-n-butyrate



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Apple-like odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 623-42-7



METHYL CHLORIDE

UN 1063

Shipping Name: Methyl chloride
Other Names: Arctic
Chloromethane
Freon 40

Monochloromethane
R40



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may explode or BLEVE when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Mildly irritating to skin, eyes, nose and lungs
- Exposure to the liquid may cause frostbite
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- May be shipped and stored as a liquefied compressed gas
- Faint sweet odor
- Liquid floats on the surface of water and boils; gas is slightly soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below -11° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-87-3



METHYL CHLOROACETATE

UN 2295

Shipping Name: Methyl chloroacetate

Other Names: Chloroacetic acid, methyl ester

Methyl monochloroacetate



Hazards:

- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Description:

- Colorless liquid
- Sweet, pungent odor
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -28° F

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 96-34-4



METHYL 2-CHLOROACRYLATE

Other Names: 2-Chloroacrylic acid, methyl ester
Methyl 2-chloropropenoate

- WARNING!** ● **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- At elevated temperatures may react with itself without warning blocking relief valves leading to container explosion
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Acrid odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound suddenly increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 80-63-7



METHYLCYCLOHEXANE

UN 2296

Shipping Name: Methylcyclohexane

Other Names: Cyclohexylmethane

Hexahydrotoluene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Slight benzene-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-87-2



METHYLCYCLOPENTANE

UN 2298

Shipping Name: Methylcyclopentane

Other Names: Methylpentamethylene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 96-37-7



METHYL DICHLOROACETATE

UN 2299

Shipping Name: Methyl dichloroacetate

Other Names: Dichloroacetic acid, methyl ester

Methyl dichloroethanoate



Hazards:

- Severely irritating to skin, eyes, nose and lungs; even brief contact can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion or decomposition products upon heating include toxic hydrogen chloride

Description:

- Colorless liquid
- Sweet, ether-like odor
- Sinks and reacts slowly with water to form toxic hydrochloric acid; is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training Response:

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 116-54-1



METHYLDICHLOROSILANE

UN 1242

Shipping Name: Methyldichlorosilane
Other Names: Dichloromethylsilane



- WARNING!** ● **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM HYDROGEN CHLORIDE AND EXPLOSIVE HYDROGEN GAS!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- When combined with surface moisture is corrosive to most common metals
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, fuming liquid
- Pungent, irritating odor
- Sinks in water and reacts violently with water to form hydrochloric acid and explosive hydrogen gas
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 107° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH.**
- Reacts violently with water producing explosive hydrogen gas and hydrochloric acid. Fight fire with medium expansion AFFF alcohol resistant foam or dry chemical
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-54-7



METHYL ETHYL KETONE

UN 1193

Shipping Name: Methyl ethyl ketone or Ethyl methyl ketone

Other Names: 2-Butanone
MEK



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet odor like fingernail polish (acetone)
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 78-93-3



METHYL FORMATE

UN 1243

Shipping Name: Methyl formate
Other Names: Formic acid, methyl ester
Methyl methanoate



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pleasant fruity odor
- Initially floats on the surface of water and is soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 89° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-31-3



METHYLHYDRAZINE

UN 1244

Shipping Name: Methylhydrazine
Other Names: Hydrazomethane
1-Methylhydrazine
MMH
Monomethylhydrazine



- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR CONTACT WITH SKIN CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **HIGHLY FLAMMABLE! MAY IGNITE SPONTANEOUSLY UPON CONTACT WITH POROUS MATERIALS LIKE EARTH, WOOD OR CLOTH!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Material may burn in the absence of air
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- May interfere with the body's ability to use oxygen
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Fishy ammonia-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Used as rocket fuel

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 60-34-4



METHYL IODIDE

UN 2644

Shipping Name: Methyl iodide

Other Names: Halon 10001
Iodomethane



WARNING! • POISON! BREATHING THE VAPORS CAN KILL YOU!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Prolonged contact with eyes can cause burns
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen iodide

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid that turns brown upon exposure to light
- Sweet odor
- Sinks in water and slowly decomposes in water; is slightly soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 108° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material or runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the material burning
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-88-4



METHYL ISOBUTYL CARBINOL



UN 2053

Shipping Name: Methyl isobutyl carbinol

Other Names: Isobutyl methyl carbinol

MAOH

MIBC

3-MIC

Methyl amyl alcohol

4-Methyl-2-pentanol

Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp, irritating odor
- Floats on the surface of water and is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 108-11-2



METHYL ISOBUTYL KETONE

UN 1245

Shipping Name: Methyl isobutyl ketone
Other Names: Hexone
Isobutyl methyl ketone
2-Methyl-4-pentanone

MIBK
MIK



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Mild pleasant odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-10-1



METHYL ISOCYANATE

UN 2480

Shipping Name: Methyl isocyanate
Other Names: Isocyanic acid, methyl ester
Methylcarbylamine
MIC



- WARNING!** ● **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER OR STEAM!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Vapors are heavier than air and will collect and stay in low areas
- Highly flammable
- May react with itself without warning blocking relief valves leading to violent tank explosion
- Container may explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include hydrogen cyanide and nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sharp pungent odor
- Reacts violently with water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 104° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact or if venting sound suddenly increases and/or unexpectedly stops, withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 624-83-9



METHYL ISOPROPENYL KETONE

(INHIBITED)

UN 1246

Shipping Name: Methyl isopropenyl ketone, inhibited

Other Names: Isopropenyl methyl ketone

2-Methyl-1-butenone

3-Methyl-3-butene-2-one



Hazards:

- Highly flammable
- May react with itself without warning blocking relief valves leading to container explosion
- Extremely irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Pleasant odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 814-78-8



METHYL ISOTHIOCYANATE

UN 2477

Shipping Name: Methyl isothiocyanate

Other Names: MITC

Methyl mustard

Isothiocyanic acid, methyl ester

Vorlex

MIT



WARNING! • **POISON! BREATHING THE VAPOR OR DUST OR SWALLOWING THE DUST CAN KILL YOU!**

• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Highly flammable
- Severely irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic cyanides and sulfur oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Horseradish-like odor
- Sinks in water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Melts at 95° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning material. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 556-61-6



METHYL MERCAPTAN

UN 1064

Other Names: Mercaptomethane
Methanethiol
Methyl sulfhydrylate
Thiomethyl alcohol



- WARNING!**
- **POISON! BREATHING THE GAS CAN KILL YOU!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE!**

Hazards: <ul style="list-style-type: none">● Gas is heavier than air and will collect and stay in low areas● Container may BLEVE or explode when exposed to fire● Gas may travel long distances to ignition sources and flashback● Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire● Irritating to skin, eyes, nose and lungs● May interfere with the body's ability to use oxygen● Combustion products include toxic sulfur oxides	Description: <ul style="list-style-type: none">● Colorless gas● Shipped and stored as a liquefied gas under its own vapor pressure● Rotten cabbage-like very disagreeable odor● Slightly soluble in water● Extremely flammable● Gas is heavier than air and will collect and stay in low areas● Becomes a liquid below 43° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse gas - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 74-93-1



METHYL METHACRYLATE

(INHIBITED)

UN 1247

Shipping Name: Methyl methacrylate monomer, inhibited

Other Names: Diakon

2-Methylacrylic acid, methyl ester

Methyl 2-methyl-2-propenoate

MMA

MME



WARNING! • MAY REACT WITH ITSELF WITHOUT WARNING LEADING TO CONTAINER EXPLOSION!

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Very irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fruity odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 80-62-6



METHYL PARATHION

UN 2783

Other Names: Azophos
Bladan-M
Dimethyl-p-nitrophenyl thiophosphate
Metaphos



WARNING! • **POISON! BREATHING THE VAPOR, SKIN OR EYE CONTACT, OR SWALLOWING THE MATERIAL CAN KILL YOU!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Container may BLEVE or explode when exposed to fire• Combustion products include toxic sulfur and phosphorous oxides	Description: <ul style="list-style-type: none">• A white solid• Faint garlic-like odor• Sinks in water and is insoluble in water• Flammable• Melts at 99° F• An organophosphate insecticide
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim!• Stay uphill and upwind• Determine the extent of the problem• Isolate the area of release or fire or release and deny entry• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Stop the release if it can be done safely from a distance• Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release• Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim!
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 298-00-0



4-METHYL-1-PENTENE

UN 2288

Shipping Name: Isohexenes
Other Names: Isobutylethene
Isohexene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 691-37-2



N-(2-METHYLPHENYL)- THIOUREA

Other Names: o-Tolyl thiourea
1-(2-Tolyl)thiourea

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Combustion and decomposition products upon heating include toxic nitrogen and sulfur oxides	Description: <ul style="list-style-type: none">● Colorless solid● No odor● Soluble in water● Flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 614-78-8



METHYL PHOSPHONIC DICHLORIDE

NA 9206

Shipping Name: Methyl phosphonic dichloride

Other Names: Methanephosphonyl chloride



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO PRODUCE TOXIC HYDROGEN CHLORIDE VAPOR!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent irritating odor
- Sinks in water and reacts violently with water to form toxic hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT USE WATER DIRECTLY ON PRODUCT; reacts violently with to form toxic hydrochloric acid
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- DO NOT allow water to come in contact with the material; if material is on fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 676-97-1



METHYL PHOSPHONOTHIOIC DICHLORIDE

UN 1760

Shipping Name: Methyl phosphonothioic dichloride, anhydrous

Other Names: Methyl phosphorous dichloride
MPTD

WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO PRODUCE HYDROGEN CHLORIDE VAPOR!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with the skin will cause burns
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride and sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear liquid
- Sharp, acrid irritating smell
- Sinks in water and reacts with water producing hydrogen chloride vapor and hydrochloric acid
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -14° F

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT USE WATER DIRECTLY ON PRODUCT; reacts with water to form toxic hydrochloric acid
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

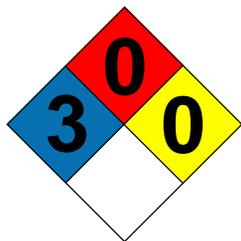
FIRE:

- DO NOT ALLOW WATER TO COME IN CONTACT WITH MATERIAL; if material is on fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 676-98-2



METHYL THIOCYANATE

Other Names: Methyl rhodanate
Methyl sulfocyanate
Thiocyanomethane

- WARNING!**
- **POISON! BREATHING THE VAPOR, SWALLOWING THE MATERIAL OR SKIN CONTACT WITH LIQUID CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic nitrogen and sulfur oxides and hydrogen cyanide

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate a wide area around the release and deny entry
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Onion-like odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material or runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn, fight surrounding fire with an agent appropriate for the material burning
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 556-64-9



METHYLTRICHLORO SILANE

UN 1250

Shipping Name: Methyltrichlorosilane
Other Names: Trichloromethylsilane
Trichloromethylsilicon



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU ! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM HYDROCHLORIC ACID!**

Hazards:

- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Sharp acrid odor
- Reacts violently with water to form hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Skin and eye contact causes severe burns and blindness

CAS: 75-79-6



METHYL VINYL KETONE

UN 1251

Shipping Name: Methyl vinyl ketone

Other Names: 3-Buten-2-one

Methylene acetone

MVK

Vinyl methyl ketone



- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Description:

- Colorless to light yellow liquid at room temperature
- Strong irritating odor
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 20° F

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting sound increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 78-94-4



MORPHOLINE

UN 2054

Shipping Name: Morpholine

Other Names: Diethylene oximide
Diethylenimide oxide
2-H-1,4-oxazine
Tetrahydro-1,4-oxazine



Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fishy or ammonia-like odor
- Soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 23° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-91-8



NAPHTHA

UN 1255
UN 1256
UN 1268
UN 2553



Shipping Name: Petroleum distillate, n.o.s.

Other Names: Benzin Petroleum ether
Mineral spirits Petroleum naphtha
Petroleum Petroleum solvent
Stoddard solvent

WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless to light yellow liquid
- Gasoline-like odor
- Floats on water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils between 95° F and 140° F

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 8030-30-6



NEOHEXANE

UN 1208

Shipping Name: Hexanes

Other Names: 2,2-Dimethylbutane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Petroleum-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-83-2



NICKEL CARBONYL

UN 1259

Shipping Name: Nickel carbonyl
Other Names: Nickel tetracarbonyl
Tetracarbonyl nickel



WARNING! • **POISON! BREATHING THE VAPOR OR SWALLOWING THE MATERIAL CAN KILL YOU! RELEASES CARBON MONOXIDE IN THE BODY!**

- Fire fighting gear (including SCBA) provides **NO** protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **EXPLOSIVE! MATERIAL MAY EXPLODE WHEN MIXED WITH AIR AT TEMPERATURES AS LOW AS 68°F EVEN WITHOUT AN IGNITION SOURCE!**

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Musty or sooty odor
- Sinks in water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -2° F and boils at 109° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: converted to carbon monoxide in the body; if symptoms indicate, initial treatment includes 100% oxygen



NITRIC ACID



UN 1760 (40% or less)
UN 2031 (Nonfuming greater than 40%)
UN 2032 (Fuming)

Shipping Name: UN 1760 Corrosive liquid, n.o.s.
UN 2031 Nitric acid other than red fuming, with more than 70% Nitric acid
UN 2032 Nitric acid, red fuming
Other Names: Aqua fortis
Hydrogen nitrate

- WARNING!**
- **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Corrosive to almost all metals releasing highly flammable hydrogen gas
- Reacts violently with water
- Decomposes upon heating to form highly toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A pale yellow to reddish brown liquid
- Choking odor
- Soluble in water giving off heat
- Nonflammable but may cause combustibles to ignite
- Vapors are heavier than air and will collect and stay in low areas
- Gives off a reddish brown vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7697-37-2



NITRIC OXIDE

UN 1660

UN 1975 (Mixture with Dinitrogen Tetroxide)

Shipping Name: UN 1660 Nitric oxide

UN 1975 Nitric oxide and dinitrogen tetroxide mixtures or Nitric oxide and nitrogen dioxide mixture

Other Names: Nitrogen monoxide Nitrogen oxide NO



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards: <ul style="list-style-type: none">• Odor is not a reliable indicator of the presence of toxic amounts of gas• Gas is heavier than air and will collect and stay in low areas• Container may explode or BLEVE when exposed to heat or fire• Reacts with steam or water to produce corrosive nitric acid and nitrous acid• Contact with liquid may cause frostbite• May interfere with the body's ability to use oxygen	Description: <ul style="list-style-type: none">• Colorless gas• Shipped and stored as liquefied compressed gas• Sharp unpleasant odor• Moderately soluble in water• Reacts with water to produce corrosive nitric acid and nitrous acid• Nonflammable but may cause combustibles to ignite• Gas is heavier than air and will collect and stay in low areas• A liquid below 43°F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim• Stay upwind• Determine the extent of the problem• Isolate the area of release or fire and deny entry• For container exposed to fire evacuate the area in all directions because of the risk of explosion• Evacuate or shelter in place the immediate area and down wind for a large release• Notify local health and fire officials and pollution control agencies	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Stop the release if it can be done safely from a distance• Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release• Use large amounts of water well away from the material to disperse gas - contain runoff• Ventilate confined area if it can be done without placing personnel at risk• If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems <p>FIRE:</p> <ul style="list-style-type: none">• Material does not burn; fight surrounding fire with an agent appropriate for the burning material• Cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely• If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location• If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 10102-43-9



NITROBENZENE

UN 1662

Shipping Name: Nitrobenzene

Other Names: Benzene nitro
Nitrobenzol
p-Nitrobenzene

Mirbane oil
o-Nitrobenzene
Oil of bitter almonds



WARNING! • **POISON! BREATHING THE VAPOR, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides
- Attacks some rubbers, plastics and coatings
- May interfere with the body's ability to use oxygen

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow to brownish oily liquid
- Odor like almonds or bitter almonds (some may not be able to smell it)
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

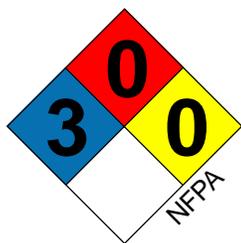
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 98-95-3



NITROGEN



UN 1066 (Compressed gas)
UN 1977 (Refrigerated liquid, Cryogenic Liquid)
Shipping Name: UN 1066 Nitrogen, compressed
UN 1977 Nitrogen, refrigerated liquid (cryogenic liquid)
Other Names: Nitrogen gas
Nitrogen liquid

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Cold vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials

Description:

- Colorless gas or faint yellow liquid
- Shipped and stored as a compressed gas or cryogenic liquid
- No odor
- Liquid floats on the surface of water and boils; gas is insoluble in water
- Nonflammable
- Cold vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed

CAS: 7727-37-9



NITROGEN DIOXIDE

UN 1067

Shipping Name: Dinitrogen tetroxide, liquefied

Other Names: Dinitrogen tetroxide

Nitrogen oxide

Nitrogen tetroxide

Oxides of nitrogen



WARNING! • POISON! BREATHING THE VAPOR CAN KILL YOU!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Vapors are heavier than air and will collect and stay in low areas
- Irritating to skin, eyes, nose and lungs; can cause burns of the skin, eyes and nose
- Container may BLEVE or explode when exposed to fire
- Use water with caution - reacts with water to form nitric acid and nitrous acid
- May interfere with the body's ability to use oxygen

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow liquid or red-brown gas
- Pungent, irritating odor
- Reacts with water to form toxic nitric acid
- Nonflammable but may cause combustibles to ignite
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 70° F; Freezes at 17° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 10102-44-0



NITROGLYCERIN

UN 0143 (Desensitized)
UN 0144 (1 to 10% Solution in alcohol)
UN 1204 (Not more than 1% Solution in alcohol)
UN 3064 (1 to 5% Solution in alcohol)

Shipping Name: Nitroglycerin
Other Names: Blasting oil
Glycerol trinitrate
Trinitroglycerin



WARNING! • EXPLOSIVE! SHOCK AND HEAT SENSITIVE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Pale yellow oily liquid
- No odor
- Sinks in water and is slightly soluble in water
- Very flammable
- May be dissolved in flammable or water soluble solvents
- Freezes at 56° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 55-63-0



NITROMETHANE

UN 1261

Shipping Name: Nitromethane

Other Names: Nitrocarbol



WARNING! • EXPLOSIVE! MAY EXPLODE WHEN HEATED ABOVE 446°F OR SHOCKED!

Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate a wide area around the release and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless oily liquid
- Disagreeable odor
- Sinks in water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-52-5



NITROPROPANE

UN 2608

Shipping Name: Nitropropanes
Other Names: 1-Nitropropane
2-Nitropropane



Hazards:

- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE when exposed to fire
- When heated, material may decompose with explosive violence
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Mild, fruity odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-03-2 (1-Nitropropane); 79-46-9 (2-Nitropropane)



NITROSYL CHLORIDE

UN 1069

Shipping Name: Nitrosyl chloride
Other Names: Nitrogen chloride oxide
Nitrogen oxychloride



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- May interfere with the body's ability to use oxygen
- Decomposition products upon heating include toxic hydrogen chloride and nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow to reddish gas
- Choking odor
- Reacts with water to form toxic hydrochloric acid and is soluble in water
- Nonflammable but may cause combustibles to burn
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid at 24° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material; do not allow water to come in contact with the material, if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 2696-92-6



NITROTOLUENES

UN 1664

Shipping Name: Nitrotoluenes, liquid or solid
Other Names: 2-Nitrotoluene o-Nitrotoluene
3-Nitrotoluene p-Nitrotoluene
4-Nitrotoluene 3-Nitrotoluol
m-Nitrotoluene



Hazards: <ul style="list-style-type: none">● May interfere with the body's ability to use oxygen● Vapors are heavier than air and will collect and stay in low areas● Irritating to skin, eyes, nose and lungs● Container may BLEVE or explode when exposed to fire● Combustion products include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Yellow liquid● Weak, aromatic odor● Sinks in water and is insoluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 60° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 99-08-1(m, meta-); 99-99-0 (p, para-); 88-72-2 (o, ortho-)



NITROUS OXIDE

UN 1070 (Compressed gas)

UN 2201 (Refrigerated liquid)

Shipping Name: Nitrous oxide, compressed
Nitrous oxide, refrigerated liquid

Other Names: Dinitrogen monoxide Nitrogen oxide
Laughing gas



Hazards:

- Container may explode or BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Contact with liquid may cause frostbite
- May form explosive mixtures with air at elevated temperatures
- Decomposition products upon heating include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Shipped and stored as a cryogenic liquid
- Slightly sweet odor
- Soluble in water
- Nonflammable but will support combustion
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water

CAS: 10024-97-2



OCTANE

UN 1262

Shipping Name: Octanes
Other Names: n-Octane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 111-65-9



OCTENE

UN 3295

Shipping Name: Hydrocarbons, liquid, n.o.s.

Other Names: Caprylene
1-Octene
Octylene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 111-66-0



OLEUM

UN 1831

Shipping Name: Sulfuric acid, fuming

Other Names: Disulfuric acid
Fuming sulfuric acid



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic sulfur oxides
- Corrosive to most metals

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless oily, fuming liquid
- Choking odor
- Produces heat when mixed with water and is soluble in water
- Nonflammable but may cause combustibles to ignite
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 8014-95-7



OXYGEN

UN 1072 (Compressed gas)
UN 1073 (Refrigerated liquid)

Shipping Name: Oxygen, compressed
Oxygen, refrigerated liquid (cryogenic liquid)
Other Names: Dioxygen LOX
Liquid oxygen Molecular oxygen



WARNING! • STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Contact with liquid may cause frostbite
- Gas is heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials

Description:

- Colorless gas or light blue liquid; shipped and stored as a compressed gas or cryogenic liquid
- No odor
- Sinks in water and boils in water
- Nonflammable but may cause combustibles to ignite
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed noncryogenic containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location
- DO NOT APPLY WATER TO CRYOGENIC LIQUID CONTAINERS; if cryogenic liquid containers are exposed to direct flame or elevated temperatures for prolonged times, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Seek medical attention
- Frostbite - warm injured area in very warm water

CAS: 7782-44-7



OXYGEN DIFLUORIDE

UN 2190

Shipping Name: Oxygen difluoride
Other Names: Difluorine monoxide
Fluorine monoxide
Fluorine oxide



- WARNING!**
- **EXPLOSIVE ! EXPLODES UPON CONTACT WITH AIR AND WATER!**
 - **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE; MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards: <ul style="list-style-type: none">● Gas is heavier than air and will collect and stay in low areas● Container may BLEVE or explode when exposed to fire● Forms explosive reactions with adsorbents like silica gel, alumina and molecular sieve● Contact with liquid may cause frostbite● Decomposition products upon heating include toxic fluorine gas	Description: <ul style="list-style-type: none">● Colorless gas● Foul odor● Shipped and stored as a compressed gas● Moderately soluble in water and reacts slowly in water to form hydrofluoric acid● Nonflammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● DO NOT ATTEMPT RESCUE!● Stay upwind and uphill● Determine the extent of the problem● BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Use large amounts of water well away from the material to disperse vapors - contain runoff● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7783-41-7



PARATHION

UN 2783 (Mixture)

Other Names: Bladan
DDP
Diethyl p-nitrophenyl thiophosphate
Fostox
Thiophos



WARNING! • **POISON! BREATHING THE VAPOR, SKIN OR EYE CONTACT, OR SWALLOWING THE MATERIAL CAN KILL YOU!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Container may BLEVE or explode when exposed to fire• Vapors are heavier than air and will collect and stay in low areas• Combustion products include toxic sulfur and phosphorous oxides	Description: <ul style="list-style-type: none">• A yellow liquid• Faint garlic-like odor• Sinks in water and is insoluble in water• Flammable• Vapors are heavier than air and will collect and stay in low areas• Freezes at 43° F• An organophosphate insecticide used as a war nerve gas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim!• Stay uphill and upwind• Determine the extent of the problem• Isolate the area of release or fire or release and deny entry• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion• Evacuate or shelter in place the immediate area and downwind for a large release• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Stop the release if it can be done safely from a distance• Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release• Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 56-38-2



PENTABORANE

UN 1380

Shipping Name: Pentaborane
Other Names: Boron hydride
Pentaborane monohydride



- WARNING!** ● **POISON! BREATHING THE VAPORS, SWALLOWING THE LIQUID OR SKIN CONTACT CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE ! MAY IGNITE OR EXPLODE SPONTANEOUSLY UPON CONTACT WITH MOIST AIR!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Extremely irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors may accumulate in air or confined spaces and explode
- Reacts violently with halogenated (Halon) extinguishing agents

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent sour milk-like odor
- Floats on water and is insoluble in water; decomposes slowly in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Spills may ignite spontaneously
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

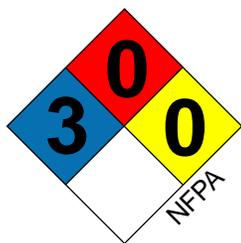
FIRE:

- If material is on fire, and conditions permit, **DO NOT EXTINGUISH**
- Do not use halogenated (Halon) extinguishing agents
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder. Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 19624-22-7



PENTACHLOROPHENOL

UN 3155

Shipping Name: Pentachlorophenol

Other Names: Dowcide 7

PCP

Woodtreat



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns● Container may explode when exposed to fire● Decomposition products upon heating include toxic hydrogen chloride● Solutions of material are flammable	Description: <ul style="list-style-type: none">● Colorless to grey solid● Sweet phenol-like odor● Sinks in water and is insoluble in water● Nonflammable● May be shipped and stored as a solution in a flammable solvent
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Solid material does not burn; fight surrounding fire with an agent appropriate for the burning material● Material in solution will burn, fight fire with foam or water● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 87-86-5



1,3-PENTADIENE

UN 3295

Shipping Name: Hydrocarbons, liquid, n.o.s.

Other Names: 1-Methylbutadiene

Piperylene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 108° F
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 504-60-9



PENTAN-2,4-DIONE

UN 2310

Shipping Name: Pentan-2,4-dione

Other Names: Acetoacetone
Acetyl acetone
Diacetylmethane

2,4-Pentadione
Pentadione



Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flash back
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet odor
- Floats in water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -9° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol based foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support (CPR) as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 123-54-6



PENTANE

UN 1265

Shipping Name: Pentanes
Other Names: n-Pentane
Skellysolve A



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to heat or fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 97° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-66-0



PERCHLORIC ACID

(50 TO 72%)

UN 1873

Shipping Name: Perchloric acid (50 to 72%)



- WARNING!** • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Containers may BLEVE when exposed to fire
- Reacts vigorously with water and produces heat
- Decomposition products upon heating include toxic hydrogen chloride

Description:

- Colorless fuming liquid
- No odor
- Soluble in water
- Nonflammable but may cause combustibles to ignite
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material or runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7601-90-3



PHENOL

UN 1671 (Solid)
UN 2312 (Molten)
UN 2821 (Solution)



Shipping Name: Phenol
Other Names: Benzenol Phenic acid
 Carbolic acid Phenyl alcohol
 Hydroxybenzene Phenylic acid
 Oxybenzene

WARNING! • BREATHING THE VAPORS OR SWALLOWING THE MATERIAL CAN KILL YOU!
SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid or liquid that darkens pink to red on exposure to light
- Sweet medicinal odor
- Sinks in water and is moderately soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Solid material melts at 106° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover solid material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-95-2



PHENYLACETONITRILE

UN 2470

Shipping Name: Phenylacetonitrile, liquid

Other Names: alpha-Tolunitrile
Benzeneacetonitrile
Benzyl cyanide

Benzyl nitrile
Cyanotoluene



WARNING! • **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**

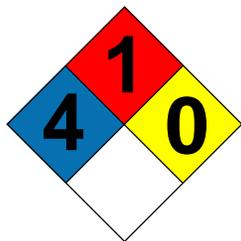
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Container may BLEVE when exposed to fire• Vapors are heavier than air and will collect and stay in low areas• Combustion products include toxic hydrogen cyanide	Description: <ul style="list-style-type: none">• Colorless, oily liquid• Aromatic odor• Sinks in water and is insoluble in water• Flammable• Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Stay upwind and uphill• Determine the extent of the problem• Isolate the area of release or fire and deny entry• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE• Evacuate or shelter in place the immediate area and downwind for a large release• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Stop the release if it can be done safely from a distance• Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release• Use large amounts of water to disperse vapors - contain runoff• Consider the application of foam to large areas of spilled liquid to control vapors• Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 140-29-4



PHENYLDICHLOROARSINE

UN 1556

Shipping Name: Arsenic compound, liquid, n.o.s.

Other Names: Dichlorophenylarsine
Phenylarsine dichloride
TL 69



WARNING! • **POISON! BREATHING THE VAPOR, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic fumes of arsine and hydrogen chloride

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Weak, but very unpleasant odor
- Sinks in water and is insoluble in water
- Reacts slowly with water to form toxic hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -4° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention immediately
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: if symptoms indicate, treatment is like that for arsine gas

CAS: 696-28-6



PHENYL MERCAPTAN

UN 2337

Shipping Name: Phenyl mercaptan

Other Names: Benzenethiol
Mercaptobenzene
Thiophenol



Hazards:

- May interfere with the body's ability to use oxygen
- Severely irritating to skin, eyes, nose and lungs; can cause burns or blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Burnt rubber stench-like, or garlic-like odor
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 5° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 108-98-5



PHENYL PHOSPHOROUS DICHLORIDE



UN 2798

Shipping Name: Phenyl phosphorous dichloride

Other Names: Benzene phosphorous dichloride

Dichlorophenyl phosphine

Phenylphosphine dichloride

WARNING! • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE VAPORS!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic hydrogen chloride
- Corrosive to most metals

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid that fumes in air
- Pungent odor
- Sinks in water and reacts in water to form toxic hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- **DO NOT USE WATER DIRECTLY ON PRODUCT.** Reacts vigorously with water to form toxic hydrochloric acid
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from rain or fire fighting from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to knock down vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If possible, do not allow water to come in contact with the material; if material is involved in a fire, use dry chemical to extinguish if available. If water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 644-97-3



PHENYLTHIOUREA

UN 2767

Shipping name: Phenyl urea, pesticides, solid, toxic

Other Names: N-phenylthiourea
Phenylthiocarbamide
1-Phenyl-2-thiourea
PTU



WARNING! • **POISON! SWALLOWING OR BREATHING THE POWDER CAN KILL YOU!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Irritating to skin, eyes, nose and lungs• Combustion or decomposition products upon heating include toxic nitrogen and sulfur oxides• Reacts with acids to release toxic sulfur oxides	Description: <ul style="list-style-type: none">• White solid• No odor found• Sinks in water and is slightly soluble in water• Very flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim• Stay upwind• Determine the extent of the problem• Isolate the area of release or fire and deny entry• Remove all ignition sources• For container exposed to fire evacuate the area in all directions because of the risk of explosion• Evacuate or shelter in place the immediate area and downwind for a large release• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Cover material to protect from wind, rain or spray• Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">• Use water to extinguish fire• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 103-85-5



PHOSGENE

UN 1076

Shipping Name: Phosgene
Other Names: Carbon dichloride oxide
Carbon oxychloride
Carbonyl chloride

Phosgen
Chloroformyl chloride



WARNING! • **POISON! BREATHING GAS WILL KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Containers not equipped with a safety valve may explode or rocket if exposed to heat or fire
- Reacts with water to form hydrochloric acid
- Corrosive to some metals, plastics and rubber
- Decomposition products upon heating include toxic chlorine gas and hydrogen chloride

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas; a colorless to light yellow fuming liquid below 46° F
- Musty odor like hay but may not be detectable at higher concentrations
- Shipped as liquefied compressed gas in cylinders
- Liquid sinks in water and reacts with water to form hydrochloric acid and carbon dioxide
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Has been used as a war gas

Operations Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If material is involved in a fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors.
- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-44-5



PHOSPHINE

UN 2199

Shipping Name: Phosphine

Other Names: Hydrogen phosphide
Phosphorous hydride
Phosphorous trihydride



WARNING! • POISON! BREATHING THE GAS CAN KILL YOU!

- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- EXTREMELY FLAMMABLE! MAY IGNITE SPONTANEOUSLY UPON EXPOSURE TO AIR!

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Container may BLEVE or explode when exposed to fire
- Gas may travel long distances and flashback
- Gas may explode in closed spaces (e.g., tanks, sewers, buildings)
- Irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite

Awareness and Operational Level Training Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay uphill and upwind
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- A colorless gas
- Garlic or fish-like odor
- Shipped and stored in cylinders as liquefied compressed gas
- Liquid floats and boils on the surface of water and is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Toxic effects may be delayed
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7803-51-2



PHOSPHORUS

UN 1381 (Dry, under water or in water solution)

UN 2447 (White molten)



Shipping Name: UN 2447 Phosphorus, white, molten

UN 1381 Phosphorus white, dry or under water or in solution; Phosphorus, yellow dry or under water or in solution.

Other Names: Elemental phosphorus

White phosphorus

Molten phosphorus

Yellow phosphorus

- WARNING!**
- **POISON! BREATHING THE VAPORS OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear including SCBA does not provide adequate protection. If exposure to the chemical occurs, remove and isolate gear immediately and thoroughly decontaminate personnel.
 - **EXTREMELY FLAMMABLE! WILL BURN SPONTANEOUSLY UPON CONTACT WITH AIR!**

Hazards:

- Will re-ignite after fire is extinguished if still exposed to air

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of spill or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Soft waxy solid
- Sharp garlic-like smell
- Sinks in water and is slightly soluble in water
- Stable under water or when excluded from air; burns spontaneously in air
- Extremely flammable
- Melts at 111° F to a yellow or white liquid

Operations Level Training Response:

RELEASE, NO FIRE:

- Flood with water spray or fog
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Fight fire with large amounts of water spray or fog, dry chemical, earth or sand
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support (CPR) as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7723-14-0



PHOSPHORUS OXYCHLORIDE

UN 1810

Shipping Name: Phosphorus oxychloride
Other Names: Phosphorus chloride oxide
Phosphorus oxide trichloride



Phosphoryl chloride
Phosphorus oxytrichloride

WARNING! • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **DO NOT USE WATER! REACTS WITH WATER TO PRODUCE HEAT AND HYDROCHLORIC ACID!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Rapidly corrodes wet metals producing highly flammable hydrogen gas
- Decomposition products upon heating include toxic hydrogen chloride and phosphoric acid

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow oily liquid that fumes in moist air
- Pungent, musty disagreeable odor
- Sinks in water and reacts violently in water to form toxic hydrochloric acid and phosphoric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 36° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10025-87-3



PHOSPHORUS PENTASULFIDE

UN 1340

Shipping Name: Phosphorus pentasulfide
Other Names: Diphosphorus pentasulfide
Phosphoric sulfide
Phosphorus persulfide

Sulfur phosphide
Thiophosphoric anhydride



WARNING! • DO NOT USE WATER! REACTS WITH WATER TO FORM PHOSPHORIC ACID AND HIGHLY TOXIC HYDROGEN SULFIDE!
• MATERIAL MAY PRODUCE HEAT AND SPONTANEOUSLY IGNITE IN THE PRESENCE OF MOISTURE!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may explode when exposed to fire
- Combustion products include the toxic sulfur oxide, phosphorous pentoxide, hydrogen sulfide gases and phosphoric acid
- Interferes with the body's ability to use oxygen

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- If in a confined area STAY OUT - toxic hydrogen sulfide may be released
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Greenish-yellow, greenish-gray or grayish-yellow solid
- Rotten egg-like odor
- Sinks in water and reacts with water to form toxic hydrogen sulfide and phosphoric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- DO NOT allow water to come in contact with the material
- If material is on fire and conditions permit, DO NOT EXTINGUISH - fight fire with carbon dioxide or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause sulfhemoglobinemia; if symptoms indicate, amyl nitrate is the initial antidote

CAS: 1314-80-3



PHOSPHORUS TRIBROMIDE

UN 1808

Shipping Name: Phosphorus tribromide

Other Names: Phosphorus bromide

Tribromophosphine



WARNING! • POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN BROMIDE AND PHOSPHORIC ACID!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Corrosive to most metals when moisture is present
- Decomposition products upon heating include toxic phosphine, phosphoric acid and hydrogen bromide

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid that fumes in moist air
- Sharp, irritating odor
- Sinks in water and reacts violently with water releasing toxic hydrobromic acid and phosphoric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7789-60-8



PHOSPHORUS TRICHLORIDE

UN 1809

Shipping Name: Phosphorus trichloride
Other Names: Chloride of phosphorus
Phosphorus chloride
Trichlorophosphine



WARNING! • **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **DO NOT USE WATER! REACTS WITH WATER TO PRODUCE HEAT AND HYDROCHLORIC ACID!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Rapidly corrodes wet metals producing highly flammable hydrogen gas
- Decomposition products upon heating include toxic hydrogen chloride and phosphoric acid

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow oily liquid that fumes in moist air
- Pungent, musty disagreeable odor
- Sinks in water and reacts violently in water to form toxic hydrochloric acid and phosphoric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7719-12-2



PICRIC ACID

UN 0154 (dry or wetted with less than 30% water)

NA 1344 (wetted with greater than 10% water)



Shipping Name: UN 0154 Picric acid, dry or or wetted with less than 30% water

NA 1344 Picric acid, wet with not less than 10% water

Other Names: Melinite Picral
Phenol trinitrate Trinitrophenol

WARNING! ● **EXPLOSIVE! DRY MATERIAL WILL EXPLODE UPON CONTACT WITH HEAT, FLAMES OR IF SHOCKED!**
● **EXTREMELY FLAMMABLE!**

Hazards:

- Very irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors in confined areas (e.g., tanks, sewers ,buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides
- Corrosive to metals

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow solid
- No odor
- Sinks in water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Wet material with water or foam from a safe distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

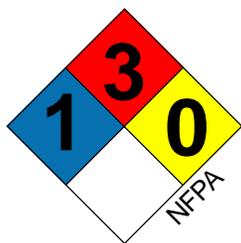
FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Use water or foam to extinguish fire
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 88-89-1



alpha-PINENE

UN 2368

Shipping Name: alpha-Pinene

Other Names: Pinene



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless oily liquid
- Turpentine or pine-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

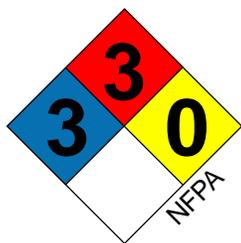
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 80-56-8



PIPERIDINE

UN 2401

Shipping Name: Piperidine

Other Names: Azacyclohexane
Cyclopentimine
Hexahydropyridine



Hazards:

- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Highly flammable
- Containers may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area around the release and deny entry
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fishy ammonia or pepper-like odor
- Initially floats on water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low area
- Freezes at 19° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-89-4



POTASSIUM

UN 2257

Shipping Name: Potassium

Other Names: K



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY TO FORM HIGHLY FLAMMABLE AND EXPLOSIVE HYDROGEN GAS!
• MAY IGNITE SPONTANEOUSLY IN AIR!
• DO NOT USE CARBON DIOXIDE OR HALOGENATED EXTINGUISHING AGENTS - FORMS EXPLOSIVE MIXTURES!

Hazards:

- Skin and eye contact causes severe burns and blindness
- Highly flammable
- Fumes from burning material are extremely irritating to skin, eyes, nose and lungs
- Container may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterway notify downstream users of potentially contaminated water

Description:

- Silvery-white soft solid
- No odor
- Shipped and stored under oil or nitrogen
- Reacts violently with water producing highly flammable and explosive hydrogen gas
- Highly flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT USE WATER DIRECTLY ON MATERIAL - reacts violently with water to form highly flammable hydrogen gas
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- APPROACH FIRE WITH EXTREME CAUTION; consider letting fire burn
- Do not allow water to come in contact with the material; if material is on fire use Class D extinguisher, graphite, soda ash or inert powder to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7440-09-7



POTASSIUM PERSULFATE

UN 1492

Shipping Name: Potassium persulfate

Other Names: Anthion
Dipotassium persulfate
Potassium peroxydisulfate



WARNING! • STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!

Hazards:

- Moderately irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Material will react with moisture in a closed container producing an explosive mixture of ozone and sulfuric acid
- Container may explode when exposed to fire
- Decomposition products upon heating include toxic sulfur oxides

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Odorless
- Sinks in water and is moderately soluble in water
- Nonflammable but may cause combustibles to burn

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7727-21-1



PROPANE

UN 1978

Shipping Name: Propane or Propane mixture
Other Names: Dimethylmethane



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may explode or BLEVE when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Exposure to the liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Faint petroleum-like odor
- Shipped and stored as a liquefied gas under its own pressure
- Liquid floats on the surface of water and boils; is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 74-98-6



PROPANETHIOL

UN 2402

Shipping Name: Propanethiols
Other Names: 1-Propanethiol
n-Propyl mercaptan
Propyl mercaptan



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Offensive, skunk-like odor
- Floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-03-9



PROPARGYL ALCOHOL

NA 1986

Shipping Name: Propargyl alcohol
Other Names: Ethynylcarbinol
3-Hydroxy-1-propyne
2-Propynol
Propynyl alcohol



- WARNING!** • **POISON! BREATHING THE VAPOR, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**
- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **MAY REACT WITH ITSELF WITHOUT WARNING WITH EXPLOSIVE VIOLENCE!**

Hazards:

- Highly flammable
- Very irritating to skin, eyes, nose and lungs
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Mild, geranium-like odor
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and the consequences are acceptable, **DO NOT EXTINGUISH.**
- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-19-7



PROPIOLACTONE

Other Names: BPL
2-Oxetanone
3-Propanolide
beta-Propiolactone

Hazards:

- Extremely toxic when inhaled
- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact can cause burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Chemical reaction of compound upon storage may plug release vents causing a violent explosion

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent smell
- Initially sinks in water and is soluble in water
- Reacts slowly with water to form less toxic materials
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 57-57-8



PROPIONIC ACID

UN 1848

Shipping Name: Propionic acid
Other Names: Ethylformic acid
Luprisol
Methyl acetic acid

Propanoic acid
Prozoin



Hazards:

- Very irritating to skin, eyes, nose and lungs; skin and eye contact can cause severe burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless, oily liquid
- Pungent rancid odor
- Initially floats on the surface of water and is soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -6° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a non-flammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-09-4



PROPIONITRILE

UN 2404

Shipping Name: Propionitrile
Other Names: Cyanoethane
Ethyl cyanide
Propionic nitrile
Propyl nitrile



WARNING! • **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! CONVERTED TO CYANIDE IN THE BODY!**
• Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel.

Hazards: <ul style="list-style-type: none">• Vapors are heavier than air and will collect and stay in low areas• Highly flammable• Container may BLEVE or explode when exposed to fire• Vapors may travel long distances to ignition sources and flashback• Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire• Irritating to skin, eyes, nose and lungs• Combustion and decomposition products upon heating include toxic cyanide and nitrogen oxides	Description: <ul style="list-style-type: none">• Colorless to brown liquid• Sweet odor• Floats on the surface of water and is moderately soluble in water• Highly flammable• Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Do not put yourself in danger by entering a contaminated area to rescue a victim• Stay upwind and uphill• Determine the extent of the problem• Isolate the area of release or fire and deny entry• Remove all ignition sources• For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion• Evacuate the immediate area and downwind for a large release• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Stop the release if it can be done safely from a distance• Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release• Use large amounts of water to disperse vapors - contain runoff• Consider the application of alcohol resistant (AFFF) foam only to large areas of spilled liquid to control vapors• Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">• Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support (CPR) as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 107-12-0



n-PROPYL ACETATE

UN 1276

Shipping Name: n-Propyl acetate
Other Names: Acetic acid, n-propyl ester
1-Acetoxypropane
1-Propyl acetate



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Pleasant, sweet odor
- Floats on the surface of water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-60-4



n-PROPYL BENZENE

UN 2364

Shipping Name: n-Propyl benzene

Other Names: Isocumene
1-Phenylpropane



Hazards:

- Highly flammable
- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Description:

- Light yellow to colorless liquid
- Petroleum-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 103-65-1



n-PROPYL CHLOROFORMATE

UN 2740

Shipping Name: n-Propyl chloroformate
Other Names: Propyl chlorocarbonate
Propyl chloroformate



Hazards:

- Highly flammable
- Very irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pungent, irritating odor
- Decomposes slowly in water to form toxic hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low area

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-61-5



PROPYLENE

UN 1077

Shipping Name: Propylene

Other Names: Methylethene
Methylethylene
1-Propene

Propene
1-Propylene



WARNING! • EXTREMELY FLAMMABLE!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Faint petroleum-like odor
- Floats on water and boils on water and is insoluble in water
- Shipped and stored as a liquefied compressed gas
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- Frostbite - warm injured area in very warm water

CAS: 115-07-1



PROPYLENE DICHLORIDE

UN 1279

Shipping Name: Propylene dichloride

Other Names: 1,2-Dichloropropane
Dichloro-1,2-propane



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, chloroform-like odor
- Sinks in water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 78-87-5



PROPYLENEIMINE

(INHIBITED)

UN 1921

Shipping Name: Propyleneimine, inhibited

Other Names: Methylaziridine



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!

Hazards:

- Extremely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless oily liquid that fumes upon contact with air
- Strong ammonia-like smell
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-55-8



PROPYLENE OXIDE

UN 1280

Shipping Name: Propylene oxide

Other Names: 1,2-Epoxypropane

Epoxy propane

Methyloxirane

Propene oxide



WARNING! • **EXTREMELY FLAMMABLE!**

• **MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!**

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear colorless liquid
- Sweet ether-like odor
- Soluble in water
- Shipped under a blanket of nitrogen
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 94° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, vent sound suddenly increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-56-9



PYRIDINE

UN 1282

Shipping Name: Pyridine

Other Names: Azabenzene
Azine



Hazards:

- Moderately irritating to skin, eyes, nose and lungs; prolonged exposure can cause burns
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic nitrogen oxides
- Corrosive to some forms of rubber, plastics and coatings

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to slightly yellow liquid
- Powerful fish-like odor
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

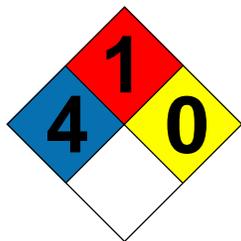
FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 110-86-1



SARIN

Other Names: GB
Isopropoxymrthylphosphoryl fluoride
Methylphosphonofluoridic acid, isopropylester

WARNING! • **POISON! BREATHING THE VAPOR, SKIN AND EYE CONTACT CAN KILL YOU!**
• Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic phosphorous oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay uphill and upwind
- Determine the extent of the problem
- BACK OFF! - Isolate the area of release or fire, deny entry and call for expert help
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- A colorless liquid
- No odor
- Sinks in water and is insoluble in water
- Flammable
- Very volatile
- Vapors are heavier than air and will collect and stay in low areas
- An organophosphate insecticide used as a war nerve agent

Operational Level Training Response:

RELEASE, NO FIRE:

- BACK OFF! - Isolate a wide area around the release and call for expert help
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If material is involved in a fire and conditions permit, DO NOT EXTINGUISH. Combustion products are less toxic than the material itself.
- If material is involved in a fire which must be extinguished, use an agent appropriate for the burning material using unattended equipment

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 107-44-8



SILICON CHLORIDE

UN 1818

Shipping Name: Silicon tetrachloride

Other Names: Tetrachlorosilane



WARNING! • POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic hydrogen chloride
- In the presence of moisture is corrosive to most metals

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Suffocating odor
- Sinks in water and reacts violently with water to produce silicic acid and hydrochloric acid; is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large volumes of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Do not use water directly on the material; material reacts violently with water to produce toxic hydrochloric acid
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Do not allow water to come in contact with the material; Material does not burn; fight surrounding fire with an agent appropriate for the burning material; if material is involved in a fire, use dry chemical to extinguish, if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10026-04-7



SODIUM

UN 1428

Shipping Name: Sodium

Other Names: Natarium



- WARNING!**
- DO NOT USE WATER! REACTS VIOLENTLY TO FORM HIGHLY FLAMMABLE AND EXPLOSIVE HYDROGEN GAS!
 - HIGHLY FLAMMABLE! WHEN HEATED IGNITES SPONTANEOUSLY IN AIR!
 - MAY REACT VIOLENTLY WITH CARBON DIOXIDE OR HALOGENATED EXTINGUISHING AGENTS!

Hazards:

- Skin and eye contact causes severe burns and blindness
- Fumes from burning material are extremely irritating to skin, eyes nose and lungs
- Container may explode when exposed to fire

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Silvery-white solid
- Shipped or stored under an inert gas or mineral oil
- No odor
- Floats on the surface of water and reacts violently with water producing flammable and explosive hydrogen gas
- Highly flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- DO NOT USE WATER DIRECTLY ON MATERIAL - reacts with water to form highly flammable hydrogen gas
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

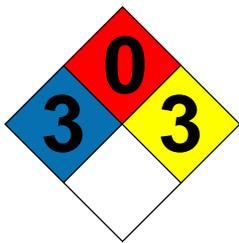
FIRE:

- APPROACH FIRE WITH EXTREME CAUTION; consider letting fire burn
- Do not allow water to come in contact with the material; if material is on fire, use graphite, Class D extinguisher, soda ash or inert powder to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7440-23-5



SODIUM AZIDE

UN 1687

Shipping Name: Sodium azide

Other Names: Azide

Hydrazoic acid, sodium salt



WARNING! • EXPLOSIVE! SHOCK OR HEAT MAY CAUSE MATERIAL TO EXPLODE!

Hazards:

- Breathing in the dust, swallowing the material or absorption through the skin can cause serious illness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may explode when exposed to fire
- Decomposition products upon heating include toxic hydrazoic acid fumes and nitrogen oxides

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Evacuate the immediate area and down wind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- No odor
- Initially sinks in water and is soluble in water
- Nonflammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- **APPROACH FIRE WITH EXTREME CAUTION;** consider letting fire burn
- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 26628-22-8



SODIUM CYANIDE

UN 1689

Shipping Name: Sodium cyanide

Other Names: Hydrocyanic acid, sodium salt



- WARNING!** ● **POISON! BREATHING OR SWALLOWING THE DUST, OR SKIN CONTACT CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **CONTACT WITH CARBON DIOXIDE (CO₂) OR ACIDS WILL RELEASE CYANIDE GAS!**

Hazards:

- Decomposition products upon heating include toxic cyanide and nitrogen oxides
- Corrosive to aluminum

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- Colorless solid
- Odorless or almond-like odor
- Dissolves in water
- Nonflammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- **DO NOT USE CARBON DIOXIDE (CO₂) EXTINGUISHERS ON FIRE;** releases toxic hydrogen cyanide gas
- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- **Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus**
- Note to physician: can produce cyanide toxicity; if symptoms indicate, initial treatment includes the cyanide antidote kit

CAS: 143-33-9



SODIUM HYDROXIDE



UN 1823 (Dry solid)

UN 1824 (Solution)

Shipping Name: UN 1823 Sodium hydroxide, solid

UN 1824 Sodium hydroxide, solution

Other Names: Caustic soda

Soda lye

Caustic soda, solution

Sodium hydrate

Lye

White caustic

WARNING! • **CORROSIVE! SKIN AND EYE CONTACT WILL CAUSE BURNS AND BLINDNESS!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">• Reacts with water or moisture to produce large amounts of heat and may splatter• Reacts with some metals to produce highly flammable hydrogen gas	Description: <ul style="list-style-type: none">• White solid or clear to milky solution in water• No odor• Soluble in water producing large amounts of heat• Nonflammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">• Stay upwind and uphill• Determine the extent of the problem• Isolate the area of release or fire and deny entry• Notify local health and fire officials and pollution control agencies• If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">• Cover solid material to protect from wind, rain or spray• Stop the release of liquid material if it can be done safely from a distance• Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">• Material does not burn; fight surrounding fire with an agent appropriate for the burning material• Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely• If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 60 minutes and seek medical evaluation
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1310-73-2



SODIUM HYPOCHLORITE

UN 1791 (Solution)



Shipping Name: Hypochlorite solution, with more than 5% available chlorine
Hypochlorite solution, with 16% or more available chlorine

Other Names: B-K Liquid Dakins solution
Bleach Hypochlorite
Clorox Sodium hypochlorite solution

Hazards:

- Very irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Container may explode or BLEVE when exposed to fire; solutions release oxygen upon storage
- Combustion products include toxic caustic fumes
- Corrosive to aluminum

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Greenish-yellow solid but usually found as a colorless to yellow solution in water
- Bleach-like odor
- Soluble in water
- Nonflammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7681-52-9



SOMAN

Other Names: 3,3-Dimethyl-2-butyl methylphosphonofluoridate
GD
Pinacolyl methylphosphonofluoridate
PMFP

WARNING! • POISON! BREATHING THE VAPOR, SKIN OR EYE CONTACT, OR SWALLOWING THE MATERIAL CAN KILL YOU!

- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic phosphorous oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay uphill and upwind
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area of release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow or brown liquid
- Faint camphor-like odor
- Reacts slowly with water to form less toxic materials and is soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Very volatile
- An organophosphate insecticide used as a war nerve gas

Operational Level Training Response:

RELEASE, NO FIRE:

- BACK OFF! - Isolate a wide area around the release and call for expert help
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

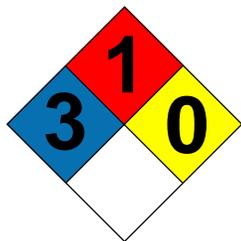
FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Combustion products are less toxic than the material itself.
- If material is involved in a fire which must be extinguished, use an agent appropriate for the burning material using unattended equipment.

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 96-64-0



STRYCHNINE

UN 1692

Shipping Name: Strychnine
Other Names: Caswell No 805
Certox
Kwik-Kil

Mouse-Rid
Ro-Dex



WARNING! • **POISON! BREATHING THE DUST OR SWALLOWING THE SOLID CAN KILL YOU!**
• Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Container may explode when exposed to fire
- Combustion or decomposition products upon heating include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterway, notify downstream users of potentially contaminated water

Description:

- White to colorless solid
- No odor
- Sinks in water and is insoluble in water
- Flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Toxic effects may be delayed

CAS: 57-24-9



STYRENE (MONOMER, INHIBITED)

UN 2055

Shipping Name: Styrene monomer, inhibited

Other Names: Cinnamenol

Ethenylbenzene

Phenylethylene

Styrene monomer

Styrol

Styrolene

Vinyl benzene



WARNING! • MAY REACT WITH ITSELF BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Very irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Sharp, disagreeable odor that is sweet at lower concentrations
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -23° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, vent sound suddenly increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 100-42-5



STYRENE OXIDE

Other Names: Epoxyethylbenzene
2-Phenyloxirane
Styrene-7,8-oxide

WARNING! • MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES
LEADING TO CONTAINER EXPLOSION!

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● May react vigorously with water in the presence of acids or alkalis	Description: <ul style="list-style-type: none">● Colorless to yellow liquid● Sweet odor● Sinks in water and is insoluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, vent sound suddenly increases and/or unexpectedly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 96-09-3



SULFOLANE

Other Names: Bondolane A
Sulfolane-W
Tetrahydrothiophene-1
Tetramethylene sulfone
Thiolane-1,1-dioxide
Thiophan sulfone

Hazards:

- Container may BLEVE or explode when exposed to fire
- Irritating to nose, eyes and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White solid
- Solid is odorless, liquid has slight oil-like odor
- Initially liquid sinks in water and dissolves in water
- Flammable
- Becomes a liquid at 81° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, container discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 126-33-0



SULFUR

UN 2448 (Molten)

UN 1350

Shipping Name: UN 2448 Sulfur, molten

UN 1350 Sulfur

Other Names: Brimstone



WARNING! • TANKS OF MOLTEN SULFUR MAY CONTAIN TOXIC AND FLAMMABLE HYDROGEN SULFIDE GAS UNDER PRESSURE!
• COMBUSTION PRODUCES LARGE QUANTITIES OF HIGHLY TOXIC SULFUR DIOXIDE GAS!

<p>Hazards:</p> <ul style="list-style-type: none"> ● Irritating to skin, eyes, nose and lungs; molten material will cause burns ● Fires may be difficult to extinguish ● Hot molten sulfur will form a solid crust as it cools, liquid below will remain hot for an extended time ● Flames of burning sulfur may be difficult to see in daylight ● Container may BLEVE or explode when exposed to fire 	<p>Description:</p> <ul style="list-style-type: none"> ● Yellow solid ● May have a faint rotten-egg odor ● Sinks in water and is insoluble in water ● Flammable ● May be shipped in molten form at temperatures between 280° F and 300° F
<p>Awareness and Operational Level Training Response:</p> <ul style="list-style-type: none"> ● Stay upwind and uphill ● Determine the extent of the problem ● Isolate a wide area around the release, deny entry and call for expert help ● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion ● If material is on fire, evacuate or shelter in place the immediate area and downwind for a large release ● Notify local health and fire officials and pollution control agencies ● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water 	<p>Operational Level Training Response:</p> <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none"> ● Stop the release if it can be done safely from a distance ● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release ● For a small release, a carbon dioxide extinguisher may be used to cool and solidify molten material ● Allow the molten material to cool and solidify ● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none"> ● Use water or foam to extinguish ● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely ● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7704-34-9



SULFUR DICHLORIDE

UN 1828

Shipping Name: Sulfur chlorides

Other Names: Chlorine sulfide

Dichlorosulfane



- WARNING!** ● **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Strong oxidizer that will increase the intensity of a fire and may cause fire upon contact with combustibles
- Reacts violently with many metals and acids and hydrogen gas
- Combustion and decomposition products upon heating include toxic sulfur oxides and chlorine gas

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Reddish-brown, fuming liquid
- Pungent, irritating odor
- Sinks in water and reacts with water to form hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material; if possible, do not allow water to come in contact with the material. If material is on fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10545-99-0



SULFUR DIOXIDE

(LIQUEFIED)

UN 1079

Shipping Name: Sulfur dioxide, liquefied

Other Names: Bisulfite
Sulfurous oxide
Sulfurous acid anhydride

Sulfur oxide
Sulfurous anhydride



WARNING! • **POISON! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas is heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Reacts with water to form corrosive sulfurous acid
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Sharp pungent odor
- Shipped and stored as a compressed liquefied gas
- Liquid sinks in water and boils forming toxic sulfurous acid
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Becomes a liquid below 14° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material do not allow water to come in contact with the material. If material is involved in a fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7446-09-5



SULFURIC ACID

UN 1830 (More than 51%)

Shipping Name: Sulfuric acid

Other Names: Hydrogen sulfate
Oil of Vitrol



- WARNING!**
- **POISON! BREATHING THE VAPORS OR SWALLOWING THE MATERIAL CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **REACTS VIOLENTLY WITH WATER!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Contact with most metals produces flammable and potentially explosive hydrogen gas
- Decomposition products upon heating include toxic sulfur oxides
- Reacts violently with many organic materials including wood and paper

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to dark brown thick liquid
- No odor unless heated, then has a choking odor
- Reacts violently with water producing sulfuric acid and is soluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 50° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material; if possible, do not allow water to come in contact with the material. If material is involved in a fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 60 minutes and seek medical attention
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7664-93-9



SULFUR MONOCHLORIDE

UN 1828

Shipping Name: Sulfur chlorides
Other Names: Chlorosulfane
Disulfur dichloride
Sulfur chloride
Sulfur subchloride



- WARNING!** • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE; MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Container may BLEVE when exposed to fire
- Reacts violently with many metals and acids
- Combustion and decomposition products upon heating include toxic sulfur oxides and chlorine gas
- Corrosive to metals and some plastics when wet

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Light amber to yellowish red oily fuming liquid
- Nauseating odor
- Sinks in water and reacts with water to form toxic hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material; if material is on fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other sign of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10025-67-9



SULFUR TETRAFLUORIDE

UN 2418

Shipping Name: Sulfur tetrafluoride
Other Names: Tetrafluorosulfurane



- WARNING!**
- **POISON ! BREATHING THE GAS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER DIRECTLY ON THE MATERIAL! REACTS WITH WATER TO FORM TOXIC HYDROFLUORIC ACID!**

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Container may explode or BLEVE when exposed to fire
- Decomposes upon heating to form toxic sulfur oxides and hydrogen fluoride gas
- Exposure to the liquid may cause frostbite

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Distinct sulfur odor like rotten eggs
- Reacts with water to form toxic hydrofluoric acid
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- Shipped and stored as a compressed liquefied gas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse the gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine gas by closing doors and shutting down HVAC systems

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material; if possible, do not allow water to come in contact with the material. If material is involved in a fire, use dry chemical to extinguish; if water must be used, use it in flooding quantities
- If container is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- Material does not burn; fight surrounding fire with an agent appropriate for the burning material

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Victims should be examined by a physician as soon as possible
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7783-60-0



SULFUR TRIOXIDE

(INHIBITED)

UN 1829

Other Names: Sulfan
Sulfur anhydride
Sulfuric anhydride
Sulfuric oxide



WARNING! • POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!

- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC SULFURIC ACID!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE or explode when exposed to fire
- Corrosive to common metals to form flammable hydrogen gas
- Decomposition products upon heating include toxic sulfur oxides

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to white fuming solid or liquid
- Irritating, pungent acid-like odor
- Reacts violently with water to form sulfuric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low area
- Produces large amounts of vapor
- Freezes below 62° F and boils at 112° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Cover solid material to protect from wind, rain or spray
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If possible, do not allow water to come in contact with the material. Material does not burn; fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7446-11-9



SULFURYL CHLORIDE

UN 1834

Shipping Name: Sulfuryl chloride
Other Names: Sulfonyl chloride
Sulfur oxychloride
Sulfuric oxychloride



- WARNING!** • **POISON! BREATHING THE VAPORS CAN KILL YOU! EXTREMELY CORROSIVE TO SKIN AND EYES! CAN CAUSE SEVERE BURNS AND BLINDNESS!**
- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIGOROUSLY WITH WATER TO FORM TOXIC HYDROCHLORIC AND SULFURIC ACIDS!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include highly toxic sulfur oxides and hydrogen chloride
- Reacts with metals in the presence of moisture to release highly flammable and explosive hydrogen gas

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Very pungent odor
- Sinks in water and reacts vigorously with water producing toxic hydrochloric and sulfuric acids
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If possible, do not allow water to come in contact with the material. Material does not burn; if material is involved in a fire, fight surrounding fire with an agent other than water; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ♦ Inhalation - remove the victim to fresh air and give oxygen if available
 - ♦ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ♦ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ♦ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7791-25-5



METHYL DICHLOROACETATE

UN 2299

Shipping Name: Methyl dichloroacetate

Other Names: Dichloroacetic acid, methyl ester

Methyl dichloroethanoate



Hazards:

- Severely irritating to skin, eyes, nose and lungs; even brief contact can cause burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion or decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, ether-like odor
- Sinks and reacts slowly with water to form toxic hydrochloric acid; is slightly soluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 116-54-1



TELLURIUM HEXAFLUORIDE

UN 2195

Shipping Name: Tellurium hexafluoride

Other Names: Tellurium fluoride



- WARNING!** ● **POISON! BREATHING THE GAS CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Container may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Decomposes upon heating to release toxic hydrofluoric acid and tellurium

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless, compressed gas
- Repulsive odor
- Decomposes slowly in water
- Nonflammable
- Gas is heavier than air and will collect and stay in low areas
- May impart a garlic-like odor to the breath and sweat after exposure

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, confine gas by closing doors and shutting down HVAC systems while evacuating the occupants

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: skin burns can be treated with calcium gluconate gel

CAS: 7783-80-4



TETRACHLOROETHANE

UN 1702

Shipping Name: Tetrachloroethane
Other Names: Acetylene tetrachloride
Bonoform
Cellon
1,1,2,2-Tetrachloroethane
s-Tetrachloroethane



Hazards:

- Irritating to skin, eyes, nose and lungs
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Decomposition products upon heating include toxic hydrogen chloride
- Corrosive to some plastics and rubber

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow liquid
- Sweet odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 79-34-5



TETRACHLOROETHYLENE

UN 1897

Shipping Name: Tetrachloroethylene
Other Names: Ethylene tetrachloride
PCE
PERC
Perchlor
Perchloroethylene
Perclene



Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Irritating to skin, eyes, nose and lungs
- Decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet chloroform-like odor
- Sinks in water and is insoluble in water
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -8° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 127-18-4



TETRAETHYL LEAD

NA 1649

Shipping Name: Tetraethyl lead, liquid

Other Names: TEL
Tetraethylplumbane



Hazards:

- Container may BLEVE when exposed to fire
- Inhaling the vapors or absorption through the skin can cause severe lead poisoning
- Slightly irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless oily liquid; often dyed red, orange or blue
- Pleasant fruity odor
- Sinks in water and is insoluble in water
- Very flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -17° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 78-00-2



TETRAETHYL PYROPHOSPHATE



NA 2783 (Solid)

NA 3018 (Liquid)

Shipping Name: Tetraethylpyrophosphate

Other Names: Bis-O,O-diethylpyrophosphoric anhydride

Fosvex

Pyrophosphoric acid, tetraethyl ester

TEP

TEPP

Vapotone

- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU!**
 - **Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel**

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion or decomposition products upon heating include toxic phosphorous oxides or explosive ethylene gas

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to amber liquid
- Fruit-like odor
- Reacts with water to form corrosive phosphoric acid and flammable ethylene gas and is soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 32° F
- An organophosphate insecticide

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire or involved in a fire and conditions permit, **DO NOT EXTINGUISH**. Cool exposures using unattended monitors.
- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, atropine is an initial antidote

CAS: 107-49-3



TETRAFLUOROETHYLENE (INHIBITED)



UN 1081

Shipping Name: Tetrafluoroethylene, inhibited

Other Names: Perfluoroethylene

WARNING! ● **EXTREMELY FLAMMABLE!**
● **MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!**

Hazards:

- Container may explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs
- Combustion products include toxic hydrogen fluoride

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas
- No odor
- Insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If venting sound suddenly increases and/or unexpectedly stops, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 116-14-3



TETRAHYDROFURAN

UN 2056

Shipping Name: Tetrahydrofuran
Other Names: Diethylene oxide
1,4-Epoxybutane
Hydrofuran
Oxacyclopentane
Tetramethylene oxide
THF



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact will cause burns
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Forms explosive peroxides upon prolonged storage
- Corrosive to some plastics

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Smells slightly fruity like acetone
- Initially floats on the surface of water and is soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-99-9



TETRANITROMETHANE

UN 1510

Shipping Name: Tetranitromethane

Other Names: Tetran
TNM



WARNING! ● **EXPLOSIVE! MAY EXPLODE WHEN HEATED OR SHOCKED!**
● **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- May interfere with the body's ability to use oxygen
- Vapors are lighter than air but may collect and stay in low areas
- Combustion products include toxic nitrogen oxides
- Corrosive to iron, copper, brass, zinc and rubber

Description:

- Colorless to yellow oily liquid
- Pungent to acrid biting odor
- Sinks in water and is insoluble in water
- Flammable
- Vapors are lighter than air but may collect and stay in low areas
- Freezes at 56° F

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Approach fire with extreme caution; consider letting fire burn
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support (CPR) as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 509-14-8



THIONYL CHLORIDE

UN 1836

Shipping Name: Thionyl chloride
Other Names: Sulfynyl chloride
Sulfur chloride oxide
Sulfurous oxychloride



- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Decomposition products upon heating include toxic hydrogen chloride and sulfur oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated run off enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow or red fuming liquid
- Suffocating, pungent odor
- Reacts violently with water to form hydrochloric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and run off from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain run off
- Ventilate confined area if it can be done without placing personnel at risk

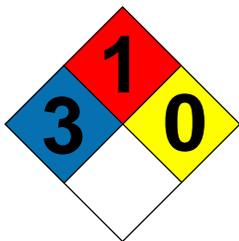
FIRE:

- Material does not burn; fight surrounding fire with an agent other than water or foam; do not allow water to come in contact with the material; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7719-09-7



THIOUREA

NA 1325

Shipping Name: Medicines, flammable, solid, n.o.s.

Other Names: Isothiourea
Thiocarbamide
2-Thiourea



Hazards:

- Harmful or fatal if swallowed
- Irritating to skin, eyes, nose and lungs
- Container may explode when exposed to fire
- Combustion or decomposition products upon heating include toxic nitrogen and sulfur oxides

Description:

- White solid
- No odor found
- Sinks in water and is moderately soluble in water
- Flammable

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 62-56-6



TITANIUM TETRACHLORIDE

UN 1838

Shipping Name: Titanium tetrachloride
Other Names: Tetrachlorotitanium
Titanium chloride
Titanium (IV) chloride



WARNING! • DO NOT USE WATER! REACTS WITH WATER TO FORM TOXIC HYDROCHLORIC ACID!

Hazards:

- Severely irritating; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Vapors are heavier than air and will collect and stay in low areas
- Containers may BLEVE when exposed to fire
- Decomposition products upon heating include toxic hydrogen chloride
- Corrosive to most metals

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Container may BLEVE when exposed to fire
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to light yellow fuming liquid
- Vapors react with moisture in air forming a white cloud
- Pungent odor
- Reacts with water to form hydrochloric acid and heat
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at -11° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water; if possible, do not allow water to come in contact with the material. If water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7550-45-0



TOLUENE

UN 1294

Shipping Name: Toluene

Other Names: Methylbenzene
Methylbenzol
Phenylmethane
Toluol
Tolu-sol

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flash back
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Pleasant odor like model glue
- Floats on water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

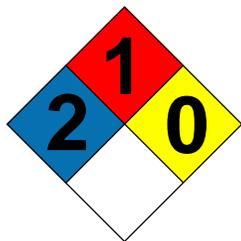
RELEASE, NO FIRE:

- Stop the release if it can be done safely
 - Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
 - Use large amounts of water to disperse vapors - contain runoff
 - Consider the application of foam to large areas of spilled liquid to control vapors
 - Ventilate confined area if it can be done without placing personnel at risk
- ### FIRE:
- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
 - Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
 - If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-88-3



2,4-TOLUENEDIAMINE

UN 1709

Shipping Name: 2,4-Toluenediamine, or 2,4-Toluylenediamine

Other Names: 2,4-Diaminotoluene
Diaminotoluene

Toluene-2,4-diamine
Toluene diamine



Hazards: <ul style="list-style-type: none">● May interfere with the body's ability to use oxygen● Vapors are heavier than air and will collect and stay in low areas● Irritating to skin, eyes, nose and lungs● Container may explode when exposed to fire● Combustion or decomposition products upon heating include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless solid● No odor found● Floats on the surface of water and is slightly soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Cover material to protect from wind, rain or spray● Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 95-80-7



TOLUENE DIISOCYANATE

UN 2078

Shipping Name: Toluene diisocyanate

Other Names: 2,4-TDI

TDI

Toluene 2,4-diisocyanate



- WARNING!** ● **POISON! BREATHING THE VAPORS, SKIN CONTACT OR SWALLOWING THE MATERIAL CAN KILL YOU!**
- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Extremely irritating to skin, eyes, nose and lungs
- Container may explode or BLEVE when exposed to fire
- May react with itself without warning blocking relief valves and causing a violent explosion
- Reacts with water releasing carbon dioxide
- Combustion or decomposition products upon heating include toxic nitrogen oxides and cyanide vapors

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- White to pale yellow liquid or solid
- Sharp pungent smell
- Sinks in water and reacts with water to form carbon dioxide
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes between 67° F and 71° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, specifically trained personnel may use coordinated fog streams to extinguish burning liquid. Keep exposures cool to prevent re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed

CAS: 584-84-9



TOLUIDINES

UN 1708

Shipping Name: Toluidines
Other Names: Aminotoluene
m-Toluidine
o-Toluidine
p-Toluidin



Hazards:

- May interfere with the body's ability to use oxygen
- Irritating to skin, eyes, nose and lungs
- Vapors are heavier than air and will collect and stay in low areas
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to reddish-brown liquid
- Aromatic odor
- Very flammable
- Slightly soluble in water
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Note to physician: can cause methemoglobinemia; if symptoms indicate, methylene blue is the initial antidote

CAS: 95-53-4 (o, ortho), 106-49-0 (p, para), 108-44-1 (m, meta)



TRICHLOROACETYL CHLORIDE

UN 2442

Shipping Name: Trichloroacetyl chloride

Other Names: Trichloroacetic acid chloride



WARNING! • DO NOT USE WATER! REACTS VIOLENTLY WITH WATER RELEASING TOXIC HYDROCHLORIC ACID!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion and decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- Pungent, irritating smell
- Reacts violently with water to form toxic hydrochloric acid
- Flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material; if possible do not allow water to come in contact with the material; if water is used, use in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 76-02-8



1,1,1-TRICHLOROETHANE

UN 2831

Shipping Name: 1,1,1-Trichloroethane

Other Names: Chloroethane Solvent 111
Chlorylen Tri
Dowclene LS Triethane
Methylchloroform Methyltrichloromethane



<p>Hazards:</p> <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic hydrogen chloride	<p>Description:</p> <ul style="list-style-type: none">● Colorless liquid● Sweet, chloroform-like odor● Sinks in water and is insoluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Produces large amounts of vapor● Freezes at -22° F
<p>Awareness and Operational Level Training Response:</p> <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	<p>Operational Level Training Response:</p> <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 71-55-6



TRICHLOROETHYLENE

UN 1710

Shipping Name: Trichloroethylene

Other Names: Acetylene trichloride
Ethylene trichloride
TCE

Trichlor
Trichloroethene
TRI



Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs; prolonged contact with skin will cause burns● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion products include toxic hydrogen chloride	Description: <ul style="list-style-type: none">● Colorless liquid● Sweet odor, similar to chloroform● Sinks in water and is insoluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors or blanket spilled material - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 79-01-6



TRICHLOROSILANE

UN 1295

Shipping Name: Trichlorosilane
Other Names: Silicochloroform
Trichloromonosilane



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE! SPONTANEOUSLY COMBUSTS IN AIR!**
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE AND EXTREMELY FLAMMABLE AND EXPLOSIVE HYDROGEN GAS!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Vapors may travel long distances to ignition sources and flash back
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen chloride
- Corrosive to common metals releasing highly flammable hydrogen gas

Description:

- Colorless liquid that fumes upon contact with air
- Sharp choking odor
- Sinks in water and reacts violently with water to produce toxic hydrochloric acid and extremely flammable and explosive hydrogen gas
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Boils at 90° F
- Produces large amounts of vapor

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

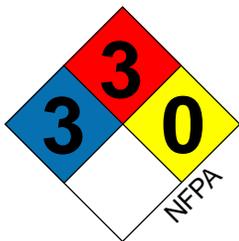
FIRE:

- If material is on fire, and conditions permit, **DO NOT EXTINGUISH.**
- Material reacts with water but can be extinguished with medium expansion AFFF alcohol resistant foam
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 10025-78-2



TRIETHYLAMINE

UN 1296

Shipping Name: Triethylamine

Other Names: (Diethylamino) ethane TEA
N,N-diethylethanamine TEN



Hazards:

- Highly flammable
- Severely irritating to skin and lungs; eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Liquid attacks some forms of plastics, rubber and coatings
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Fish-like odor at low concentrations; ammonia-like odor at high concentrations
- Floats on the surface of water and is moderately soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 121-44-8



TRIETHYLENETETRAMINE

UN 2259

Shipping Name: Triethylenetetramine

Other Names: N-N'-bis(2-aminoethyl)-1,2-ethanediamine
TETA
Trien



Hazards: <ul style="list-style-type: none">● Severely irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Combustion or decomposition products upon heating include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Straw colored to amber colored oily liquid● Ammonia-like odor● Soluble in water● Flammable● Vapors are heavier than air and will collect and stay in low areas● Freezes at 52° F
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate or shelter in place the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid or dilute to a nonflammable mixture. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 112-24-3



TRIFLUORO CHLOROETHYLENE

(INHIBITED)



UN 1082

Shipping Name: Trifluorochloroethylene

Other Names: Chlorotrifluoroethylene

CTFE

Diaflan

R1113

Trifluorovinyl chloride

Trithene

WARNING! ● **EXTREMELY FLAMMABLE!**
● **EXPLOSIVE! CONTAINER MAY BLEVE OR EXPLODE WHEN EXPOSED TO FIRE!**

Hazards:

- Chemical reaction of compound may plug pressure release vents causing a violent explosion
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flash back
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Contact with liquid may cause frostbite
- Combustion products include toxic hydrochloric acid and hydrofluoric acid vapors

Awareness and Operational Level Training Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Shipped and stored as a liquefied compressed gas
- Odorless or faint ether-like odor
- Sinks in water and boils in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- A liquid below -18° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Contact with liquid may cause frostbite
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 79-38-9



TRISOBUTYLALUMINUM

UN 3051

Shipping Name: Aluminum alkyls
Other Names: Aluminum, triisobutyl
TIBAL
Triisobutylalane



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**
 - Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **EXTREMELY FLAMMABLE! IGNITES SPONTANEOUSLY IN AIR!**
 - **DO NOT USE WATER! REACTS VIOLENTLY WITH WATER FORMING HIGHLY FLAMMABLE GASES!**

Hazards:

- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release or fire, deny entry and call for expert help
- Remove all ignition sources
- For container exposed to fire, evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Reacts violently with water to produce highly flammable gases
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 34° F
- Usually shipped and stored under a nitrogen blanket

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the release to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH**
- Specially trained personnel operating from a safe distance can fight fires using dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 100-99-2



TRIMETHOXYSIANE

NA 9269

Shipping Name: Trimethoxysilane



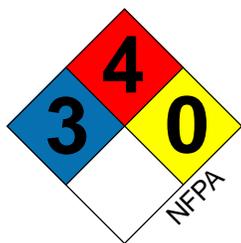
- WARNING!**
- **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards: <ul style="list-style-type: none">● Highly flammable● Vapors are heavier than air and will collect and stay in low areas● Containers may BLEVE when exposed to fire● Vapors may travel long distances to ignition sources and flashback● Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire● May react with itself when heated plugging relief valves causing a violent explosion	Description: <ul style="list-style-type: none">● Colorless liquid● Sweet odor● Floats on water and is insoluble in water but slowly reacts with water forming a corrosive mixture● Highly flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue a victim● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water well away from the material to disperse vapors - contain runoff● Consider the application of foam to large areas of spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● If material is on fire, and conditions permit, DO NOT EXTINGUISH.● Material reacts with water but can be extinguished with medium expansion AFFF alcohol resistant foam● If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 2487-90-3



TRIMETHYLAMINE

(ANHYDROUS)

UN 1083

Shipping Name: Trimethylamine, anhydrous

Other Names: TMA



WARNING! ● EXTREMELY FLAMMABLE!
● CONTAINER MAY BLEVE OR EXPLODE WHEN EXPOSED TO FIRE!

Hazards:

- Severely irritating to skin, eyes, nose and lungs; skin and eye contact causes severe burns and blindness
- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Contact with liquid may cause frostbite
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay uphill and upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless compressed gas
- Pungent fishy odor
- Completely soluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- May be shipped as an aqueous (water) solution; which is highly flammable and will generate large amounts of flammable gas
- A liquid below 37° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent contaminated runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-50-3



TRIMETHYLCHLOROSILANE

UN 1298

Shipping Name: Trimethylchlorosilane
Other Names: Chlorotrimethylsilane



- WARNING!**
- **POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**
 - Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
 - **DO NOT USE WATER! REACTS WITH WATER TO FORM TOXIC HYDROGEN CHLORIDE!**

Hazards:

- Containers may BLEVE when exposed to fire
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Corrosive to metals releasing highly flammable hydrogen gas
- Decomposition products upon heating include toxic hydrogen chloride gas

Awareness and Operational Level Training

Response:

- **Do not put yourself in danger by entering a contaminated area to rescue victim!**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless fuming liquid
- Pungent odor
- Floats on water and reacts violently with water to form toxic hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH.
- Material reacts with water but can be extinguished with low or medium expansion (AFFF) alcohol resistant foam
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue victim!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-77-4



TRINITROTOLUENE

UN 0209 (Dry or wetted with less than 30% water)

UN 1356 (Wetted with more than 30% water)

Other Names: 2,4,6-Trinitrotoluene
TNT



WARNING! ● **EXTREMELY FLAMMABLE!**
● **CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE!**

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● May interfere with the body's ability to use oxygen● Combustion products include toxic nitrogen oxides	Description: <ul style="list-style-type: none">● Colorless to pale yellow solid● No odor● Sinks in water and is insoluble in water● Very flammable
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Do not put yourself in danger by entering a contaminated area to rescue victim!● Stay upwind and uphill● Determine the extent of the problem● BACK OFF! - Isolate a wide area around the release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of explosion● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release <p>FIRE:</p> <ul style="list-style-type: none">● If material is on fire and conditions permit, DO NOT EXTINGUISH. Cool exposures using unattended monitors. If fire must be extinguished, use any agent appropriate for the burning material.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue victim!**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- Note to physician: can cause methemoglobinemia: if symptoms indicate, methylene blue is the initial antidote

CAS: 8001-26-1



TRIS-(2-CHLOROETHYL) AMINE

Other Names: HN_3
Nitrogen mustard
2,2',2''-Trichlorotriethylamine
TS 160

WARNING! • **POISON! BREATHING THE VAPORS, SWALLOWING THE MATERIAL OR SKIN CONTACT CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!**

- Firefighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Combustion products include toxic nitrogen oxides and hydrogen chloride

Description:

- Pale yellow liquid
- Faint fishy, or soap-like odor
- Slightly soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- Freezes at 25° F
- Has been used as a blister-type war gas

Awareness and Operational Level Training

Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area around the release or fire, deny entry and call for expert help
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate or shelter in place the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 555-77-1



TURPENTINE

UN 1299

Shipping Name: Turpentine

Other Names: Oil of turpentine
Spirits of turpentine
Turpentine oil
Turpentine spirits



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Characteristic odor
- Floats on water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 8006-64-2



UREA PEROXIDE

UN 1511

Shipping Name: Urea hydrogen peroxide

Other Names: Carbamide peroxide

Gly-oxide

Percarbamide



WARNING! • **STRONG OXIDIZER! WILL INCREASE THE INTENSITY OF A FIRE! MAY CAUSE FIRE UPON CONTACT WITH COMBUSTIBLES!**

Hazards:

- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Container may explode when exposed to fire
- Combustion or decomposition products upon heating include toxic nitrogen oxides

Description:

- White solid
- No odor
- Soluble in water releasing hydrogen peroxide
- Flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- Material does not easily burn; fight surrounding fire with an agent appropriate for the burning material
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

Awareness and Operational Level Training

Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 124-43-6



VANADIUM OXYTRICHLORIDE

UN 2443

Shipping Name: Vanadium oxytrichloride

Other Names: Vanadium oxychloride

Vanadium trichloride oxide

Vanadyl trichloride



WARNING! • POISON! BREATHING THE VAPORS CAN KILL YOU! SKIN AND EYE CONTACT CAUSES SEVERE BURNS AND BLINDNESS!

- Firefighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- DO NOT USE WATER! REACTS VIOLENTLY WITH WATER RELEASING TOXIC HYDROGEN CHLORIDE VAPOR!

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Container may BLEVE when exposed to fire
- Corrosive to most metals in the presence of moisture
- Decomposition products upon heating include toxic hydrogen chloride

Awareness and Operational Level Response:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Yellow liquid that becomes thick and blood red when mixed with water
- Emits red fumes upon contact with moist air
- Sharp irritating and unpleasant odor
- Sinks in water and reacts violently with water to form toxic hydrochloric acid
- Nonflammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Material does not burn; fight surrounding fire with an agent other than water or foam; if possible, do not allow water to come in contact with material; if water must be used, use it in flooding quantities
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 7727-18-6



VINYL ACETATE

(INHIBITED)

UN 1301

Shipping Name: Vinyl acetate, inhibited

Other Names: Acetic acid, ethinyl ester

Acetic acid, vinyl ester

1-Acetoxyethylene

VAC

VAM

Vinyl A Monomer



WARNING! • MAY REACT WITH ITSELF WITH EXPLOSIVE VIOLENCE BLOCKING RELIEF VALVES LEADING TO TANK EXPLOSION!

Hazards:

- Highly flammable
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Reacts violently with strong acids, bases and peroxides

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless liquid
- Sweet, fruity odor
- Floats on water and is slightly soluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of alcohol resistant (AFFF) foam to spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using alcohol resistant (AFFF) foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 108-05-4



VINYL BROMIDE

(INHIBITED)

UN 1085

Shipping Name: Vinyl bromide, inhibited

Other Names: Bromoethene
Bromoethylene



WARNING! • **EXTREMELY FLAMMABLE!**
• **MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!**

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers buildings) may explode when exposed to fire
- Very irritating to skin, eyes, nose and lungs
- Contact with liquid may cause frostbite
- Combustion or decomposition products upon heating include toxic hydrogen bromide

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Pungent odor
- Insoluble in water and liquid sinks in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- A liquid below 60° F
- May be shipped and stored as a liquid under pressure

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse the gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to direct flame or elevated temperatures, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Prolonged contact with skin can cause burns

CAS: 593-60-2



VINYL CHLORIDE

(INHIBITED OR STABILIZED)

UN 1086

Shipping Name: Vinyl chloride, inhibited or stabilized

Other Names: Chloroethene VC

Chloroethylene VCM

Monochloroethylene Vinyl chloride monomer



WARNING! • EXTREMELY FLAMMABLE!

• MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES
LEADING TO VIOLENT CONTAINER EXPLOSION!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes and lungs
- Combustion products include toxic hydrogen chloride
- Contact with liquid may cause frostbite
- Known to cause cancer in humans following long term exposure: contact should be avoided

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For containers exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and down wind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless gas
- Shipped as liquefied compressed gas
- Sweet, pleasant odor
- Liquid floats and boils on the surface of water; gas is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas
- Combustion produces a visible and toxic vapor cloud
- Becomes a liquid below 7° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting suddenly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-01-4



VINYL ETHYL ETHER

(INHIBITED)

UN 1302

Shipping Name: Vinyl ethyl ether, inhibited

Other Names: Ethyl vinyl ether



WARNING! • EXTREMELY FLAMMABLE!

• MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!

Hazards:

- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs

Description:

- Colorless liquid
- Ether-like odor
- Floats on the surface of water and is insoluble in water
- Extremely flammable
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 96° F

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, venting suddenly stops, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 109-92-2



VINYL FLUORIDE

(INHIBITED)

UN 1860

Shipping Name: Vinyl fluoride, inhibited

Other Names: 1-Fluoroethene

Fluoroethene

Fluoroethylene

Monofluoroethene



WARNING! • EXTREMELY FLAMMABLE!

• MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!

Hazards:

- Container may BLEVE or explode when exposed to fire
- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Combustion products include toxic hydrogen fluoride gas
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies

Description:

- Colorless compressed gas
- Sweet ether-like odor
- Liquid floats on the surface of water and boils and is insoluble in water
- Extremely flammable
- Gas is heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Use large amounts of water well away from the material to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-02-5



VINYLDENE CHLORIDE

(INHIBITED)

UN 1303

Shipping Name: Vinylidene chloride, inhibited

Other Names: 1,1-DCE

1,1-Dichloroethylene

DCE

NCI-C54262

1,1-Dichloroethane

VDC



WARNING! ● **EXTREMELY FLAMMABLE! CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE!**
● **MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELEASE VALVES AND CAUSING A VIOLENT EXPLOSION!**

Hazards:

- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- On storage, forms white solid deposits which may explode with shock or heat
- Combustion products include toxic phosgene and hydrogen chloride which may be more toxic than the material itself
- Irritating to skin, eyes, nose and lungs

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless clear liquid
- Sweet chloroform-like odor
- Sinks in water and is slightly soluble in water
- Extremely flammable
- Forms white solid deposits on storage which may explode with shock or heat
- Vapors are heavier than air and will collect and stay in low areas
- Produces large amounts of vapor
- Boils at 89° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-35-4



VINYL METHYL ETHER

(INHIBITED)

UN 1087

Shipping Name: Vinyl methyl ether, inhibited
Other Names: 1-Methoxyethylene
Methoxyethylene
Methyl vinyl ether



WARNING! ● EXTREMELY FLAMMABLE! CONTAINER MAY EXPLODE WHEN EXPOSED TO FIRE!
● MAY REACT WITH ITSELF BLOCKING RELIEF VALVES AND LEADING TO TANK EXPLOSION!

Hazards:

- Gas is heavier than air and will collect and stay in low areas
- Gas may travel long distances to ignition sources and flashback
- Gas in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin, eyes, nose and lungs; prolonged contact with skin can cause burns
- Contact with liquid may cause frostbite

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless gas
- Sweet odor
- Liquid floats on the surface of water and is slightly soluble in water
- Extremely flammable
- Shipped and stored as a compressed gas
- Gas is heavier than air and will collect and stay in low areas
- A liquid below 42° F

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse gas - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Do not extinguish the fire unless the flow of the gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Frostbite - warm injured area in very warm water
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 107-25-5



VINYL TOLUENE

(INHIBITED)

UN 2618

Shipping Name: Vinyl toluene inhibited

Other Names: Methyl styrene



WARNING! • WHEN HEATED, MAY REACT WITH ITSELF WITHOUT WARNING BLOCKING RELIEF VALVES LEADING TO CONTAINER EXPLOSION!

Hazards: <ul style="list-style-type: none">● Irritating to skin, eyes, nose and lungs● Container may BLEVE when exposed to fire● Vapors are heavier than air and will collect and stay in low areas● Vapors may travel long distances to ignition sources and flashback	Description: <ul style="list-style-type: none">● Colorless liquid● Strong, disagreeable odor● Floats on the surface of water and is insoluble in water● Very flammable● Vapors are heavier than air and will collect and stay in low areas
Awareness and Operational Level Training Response: <ul style="list-style-type: none">● Stay upwind and uphill● Determine the extent of the problem● Isolate the area of release or fire and deny entry● Remove all ignition sources● For container exposed to fire evacuate the area in all directions because of the risk of BLEVE● Evacuate the immediate area and downwind for a large release● Notify local health and fire officials and pollution control agencies● If material or contaminated runoff enters waterway, notify downstream users of potentially contaminated water	Operational Level Training Response: <p>RELEASE, NO FIRE:</p> <ul style="list-style-type: none">● Stop the release if it can be done safely from a distance● Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release● Use large amounts of water to disperse vapors - contain runoff● Consider the application of foam to spilled liquid to control vapors● Ventilate confined area if it can be done without placing personnel at risk <p>FIRE:</p> <ul style="list-style-type: none">● Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts or use fog streams to extinguish burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into liquid.● Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely● If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention

CAS: 25013-15-4



VINYLTRICHLOROSILANE

UN 1305

Shipping Name: Vinyltrichlorosilane

Other Names: A-150

Trichloroethylenylsilane

Trichlorovinylsilicon

Vinylsilicon trichloride



WARNING! • **POISON! BREATHING THE VAPOR CAN KILL YOU! SKIN AND EYE CONTACT CAN CAUSE SEVERE BURNS AND BLINDNESS!**

- Fire fighting gear (including SCBA) does not provide adequate protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel
- **DO NOT USE WATER! REACTS VIOLENTLY TO FORM TOXIC HYDROGEN CHLORIDE AND HYDROCHLORIC ACID!**

Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Upon contact with moisture reacts with metals to produce hydrogen gas
- Combustion products include toxic hydrogen chloride

Awareness and Operational Level Training Response:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Stay uphill and upwind
- Determine the extent of the problem
- **BACK OFF!** - Isolate a wide area around the release and call for expert help
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the area downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to pale yellow fuming liquid
- Sharp choking odor like hydrochloric acid
- Sinks in water and reacts with water to form hydrochloric acid
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and run from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water well away from the material to disperse vapors - contain runoff
- Ventilate confined area if it can be done without placing personnel at risk

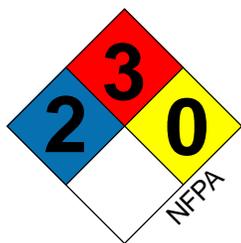
FIRE:

- If material is on fire and conditions permit, **DO NOT EXTINGUISH.**
- Material reacts with water but can be extinguished with low or medium expansion AFFF foam or dry chemical if available in sufficient amounts
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of expanding), withdraw immediately to a secure location

First Aid:

- **Do not put yourself in danger by entering a contaminated area to rescue a victim**
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 75-94-5



XYLENES

UN 1307

Shipping Name: Xylenes

Other Names: 1,2-Dimethylbenzene
1,3-Dimethylbenzene
1,4-Dimethylbenzene
meta-Xylene

ortho-Xylene
para-Xylene
Xylol



Hazards:

- Highly flammable
- Container may BLEVE when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Vapors may travel long distances to ignition sources and flashback
- Vapors in confined areas (e.g., tanks, sewers, buildings) may explode when exposed to fire
- Irritating to skin and eyes

Awareness and Operational Level Training

Response:

- Stay upwind and uphill
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Clear, colorless liquid
- Benzene or gasoline-like odor
- Floats on the surface of water and is insoluble in water
- Highly flammable
- Vapors are heavier than air and will collect and stay in low areas

Operational Level Training Response:

RELEASE, NO FIRE:

- Stop the release if it can be done safely from a distance
- Prevent material and runoff from entering sewers and waterways if it can be done safely well ahead of the release
- Use large amounts of water to disperse vapors - contain runoff
- Consider the application of foam to large areas of spilled liquid to control vapors
- Ventilate confined area if it can be done without placing personnel at risk

FIRE:

- Specially trained personnel operating from a safe distance can fight fires using foam or dry chemical if available in sufficient amounts. Under favorable conditions, experienced crews can use coordinated fog streams to sweep the flames off the surface of the burning liquid. Keep exposures cool to protect against re-ignition. Do not direct straight streams into the liquid.
- Cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure location

First Aid:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1330-20-07 (mixed); 95-47-6 (ortho, o-); 108-38-3 (meta, m-); 106-42-3 (para, p-)



VX

Other Names: s-(2-Bis(1-methylethyl)amino)ethyl) o-ethylester
Methylphosphonothioic acid
TX 60

WARNING! • POISON! BREATHING THE VAPOR, SKIN OR EYE CONTACT, OR SWALLOWING THE MATERIAL CAN KILL YOU!

- Fire fighting gear (including SCBA) provides NO protection. If exposure occurs, remove and isolate gear immediately and thoroughly decontaminate personnel

Hazards:

- Odor is not a reliable indicator of the presence of toxic amounts of vapor
- Container may BLEVE or explode when exposed to fire
- Vapors are heavier than air and will collect and stay in low areas
- Combustion products include toxic nitrogen oxides

Awareness and Operational Level Training

Response:

- **DO NOT ATTEMPT RESCUE!**
- Stay uphill and upwind
- Determine the extent of the problem
- BACK OFF! - Isolate a wide area of release or fire, deny entry and call for expert help
- Evacuate or shelter in place the immediate area and downwind for a large release
- For container exposed to fire evacuate the area in all directions because of the risk of BLEVE or explosion
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Colorless to yellow liquid
- No odor
- Sinks in water and is slightly soluble in water
- Flammable
- Vapors are heavier than air and will collect and stay in low areas
- An organophosphate insecticide used as a war nerve gas

Operational Level Training Response:

RELEASE, NO FIRE:

- BACK OFF! - Isolate a wide area around the release and call for expert help
- If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH. Combustion products are less toxic than the material itself.
- If material is involved in a fire which must be extinguished, use an agent appropriate for the burning material, using unattended equipment.

First Aid:

- **DO NOT ATTEMPT RESCUE!**
- The contaminated victim poses a health risk to the responder
- Decontaminate the victim from a safe distance with a stream of water; have the victim remove clothing if possible; provide Basic Life Support/CPR as needed
- Further decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Do NOT perform direct mouth to mouth resuscitation; use a bag/mask apparatus
- Victims should be examined by a physician as soon as possible
- Toxic effects may be delayed
- Note to physician: an organophosphate insecticide; if symptoms indicate, initial treatment includes atropine

CAS: 50782-69-9



ZINC PHOSPHIDE

UN 1714

Shipping Name: Zinc phosphide
Other Names: Mous-con
Phosvin
Ratal
ZP



WARNING! • DO NOT USE WATER, CARBON DIOXIDE (CO₂) OR HALOGENATED FIRE FIGHTING AGENTS! HIGHLY TOXIC AND FLAMMABLE PHOSPHINE RELEASED!

Hazards:

- Highly flammable
- Harmful or fatal if swallowed
- Container may explode when exposed to fire
- Reacts with acids and water to produce highly toxic and flammable phosphine gas
- Decomposition products upon heating include toxic phosphorous oxides

Awareness and Operational Level Training Response:

- Stay upwind
- Determine the extent of the problem
- Isolate the area of release or fire and deny entry
- Remove all ignition sources
- For container exposed to fire evacuate the area in all directions because of the risk of explosion
- Evacuate the immediate area and downwind for a large release
- Notify local health and fire officials and pollution control agencies
- If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated water

Description:

- Gray solid
- Faint garlic-like odor
- Sinks in water and reacts with water releasing highly toxic and flammable phosphine gas; is insoluble in water
- Highly flammable

Operational Level Training Response:

RELEASE, NO FIRE:

- Cover material to protect from wind, rain or spray
- Prevent runoff from entering sewers and waterways if it can be done safely well ahead of the release

FIRE:

- If material is on fire and conditions permit, DO NOT EXTINGUISH.
- Do not allow water to come in contact with the material; if material is on fire, use Class D extinguisher to extinguish
- If material is not leaking, cool exposed containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely
- If cooling streams are ineffective (unvented container distorts, bulges or shows any other signs of expanding), withdraw immediately to a secure location

First Aid:

- Do not put yourself in danger by entering a contaminated area to rescue a victim
- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
 - ◆ Inhalation - remove the victim to fresh air and give oxygen if available
 - ◆ Skin - remove and isolate contaminated clothing (including shoes) and wash skin with soap and large volumes of water for 15 minutes
 - ◆ Eye - rinse eyes with large volumes of water or saline for 15 minutes
 - ◆ Swallowed - do not make the victim vomit
- Seek medical attention
- Toxic effects may be delayed
- For skin burns decontaminate with water and apply a clean dry dressing

CAS: 1314-84-7

**Materials
Summary
Response
Table**

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Acetamide			0	1	0	
Acetone thiosemicarbazide			2	1	0	
Acetophenone			1	2	0	
2-Acetylaminofluorene			1	1	0	
Acetyl peroxide solution	2084		1	2	4	
Acridine	2713	Poison	2	2	0	
Agent T			4	1	0	
Adipic acid			1	1	0	
Alachlor			2	0	0	
Aldrin	2761	Poison	4	0	0	
Alkyl benzene sulfonic acids			2	1	0	
Allene	2200	Flammablegas	2	4	3	
Allethrin	2902	Poison	1	1	0	
Allyl acetate	2333	Flammable	1	3	0	
Allyl ether			3	3	2	
Allyl ethyl ether	2335	Flammable	2	4	4	
Allyl iodide	1723	Flammable	2	3	2	
Allyl isothiocyanate	1545	Poison	3	2	0	
Aluminum (dust)	1396	Flammable solid	0	3	1	
Aluminum borohydride	2870	Spontaneously combustible	2	4	0	
Aluminum chloride	1726	Corrosive	3	0	2	W
Aluminum fluoride			3	0	0	
Aluminum nitrate	1438	Oxidizer	2	0	1	OX
Aluminum oxide			0	0	0	
Aluminum phosphide	1397	Dangerous when wet	4	4	2	W
Aluminum sulfate			0	0	0	
4-Aminoazobenzene			2	1	0	
4-Aminobutyl diethoxymethyl silane			3	2	2	
2-(2-Aminoethoxy)ethanol	3055	Corrosive	1	1	0	
Aminoethyl ethanol amine			2	1	0	
N-aminoethyl piperazine	2815	Corrosive	2	2	0	
2-Amino-2-methyl-1-propanol			2	2	0	
4-Aminopropiophenone			2	2	0	
Amiton	3017		4	2	1	
Amiton oxalate			4	2	1	
Amitrole			1	0	0	

Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors.
"R" under special situations signifies a radioactivity hazard.

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Ammonium acetate			1	0	0	
Ammonium bicarbonate			0	0	0	
Ammonium bifluoride	1727	Corrosive	3	0	0	
Ammonium bisulfite	2693		2	0	0	
Ammonium bromide			1	0	0	
Ammonium carbonate	9084		1	0	0	
Ammonium chloride	9085		1	0	0	OX
Ammonium chromate	9086		2	0	1	OX
Ammonium citrate	9087		0	1	0	
Ammonium dichromate	1439	Oxidizer	2	1	1	OX
Ammonium fluoborate	9088		4	0	0	
Ammonium fluoride	2505	Poison	3	0	0	
Ammonium formate			0	1	0	
Ammonium gluconate			0	1	0	
Ammonium hypophosphite			1	2	0	
Ammonium iodide			1	0	0	
Ammonium lactate			0	1	0	
Ammonium lauryl sulfate			2	0	0	
Ammonium molybdate			1	0	0	
Ammonium nitrate	1942	Oxidizer	0	0	3	OX
Ammonium nitrate fertilizers	2072	Oxidizer	0	0	3	OX
Ammonium nitrate-phosphate mixture	2070		1	0	1	OX
Ammonium nitrate-sulfate mixture	2069	Oxidizer	1	0	1	OX
Ammonium nitrate-urea solution			2	0	1	
Ammonium oleate			0	1	0	
Ammonium oxalate	2449		1	1	0	
Ammonium pentaborate			2	0	0	
Ammonium permanganate	9190	Oxidizer	0	0	3	OX
Ammonium persulfate	1444	Oxidizer	1	0	1	OX
Ammonium phosphate			0	0	0	
Ammonium picrate (wet)	1310	Flammable solid	3	3	3	OX
Ammonium silicofluoride	2854	Poison	2	0	0	
Ammonium stearate			0	1	0	
Ammonium sulfamate	9089		0	0	0	
Ammonium sulfate			0	0	0	
Ammonium tartrate	9091		1	1	0	
Ammonium thiosulfate	9093		1	0	0	

Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors.
 "R" under special situations signifies a radioactivity hazard.

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
n-Amyl acetate	1104	Flammable	1	3	0	
n-Amyl chloride	1107	Flammable	1	3	0	
n-Amyl mercaptan	1111	Flammable	2	3	0	
n-Amyl nitrate	1112	Flammable	2	2	0	OX
n-Amyl nitrite	1113	Flammable	1	3	2	
Amyl phthalate			0	1	0	
o-Anisidine	2431	Poison	2	1	0	
o-Anisidine hydrochloride			2	1	0	
p-Anisidine	2431	Poison	2	1	0	
Anisole	2222	Flammable	1	2	0	
Anisoyl chloride	1729	Corrosive	1	1	1	
Anthracene			0	1	0	
Antimony (powder)	2871	Poison	2	2	1	
Antimony pentachloride	1730	Poison	3	0	1	
Antimony pentafluoride	1732	Corrosive	4	0	1	
Antimony potassium tartrate	1551	Poison	2	0	0	
Antimony tribromide	1549	Corrosive	3	0	1	
Antimony trichloride	1733	Corrosive	3	0	2	W
Antimony trifluoride	1549	Corrosive	3	0	0	
Antimony trioxide			0	0	0	
ANTU	1651	Poison	4	1	0	
Aramite			1	1	0	
Argon	1006	Nonflammable gas	0	0	0	
Arsenic	1558	Poison	3	1	0	
Arsenic acid	1561	Poison	3	0	0	
Arsenic disulfide	1557	Poison	3	0	0	
Arsenic pentoxide	1559	Poison	3	0	0	
Arsenic trioxide	1561	Poison	3	0	0	
Arsenic trisulfide	1557	Poison	3	0	0	
Asbestos	2212	Class 9	2	0	0	
Asphalt	1999	Flammable	0	2	0	
Asphalt blending stocks: roofers flux	1999	Flammable	0	1	0	
Asphalt blending stocks: straight run residue	1999	Flammable	0	1	0	
Atrazine			1	0	0	
Auramine			2	1	0	
Barium	1400	Dangerous when wet	1	4	3	W

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Barium carbonate	1564		2	0	0	
Barium chlorate	1445	Oxidizer	2	0	1	OX
Barium cyanide	1565	Poison	3	0	0	
Barium nitrate	1446	Oxidizer	2	0	0	OX
Barium perchlorate	1447	Oxidizer	2	0	0	OX
Barium permanganate	1448	Oxidizer	2	0	0	OX
Barium peroxide	1449	Oxidizer	3	0	1	OX
Benomyl			0	2	0	
Bentazon			2	2	0	
Benzene arsonic acid			4	1	0	
Benzene hexachloride	2729	Poison	2	0	0	
Benzene sulfonyl chloride	2225	Corrosive	3	1	1	
Benzidine	1885	Poison	2	1	0	
Benzo (A) anthracene			1	1	0	
Benzo (A) pyrene			2	1	0	
Benzo (B) fluoranthene			3	1	0	
Benzo (GHI) perylene			2	1	0	
Benzoic acid			2	1	0	
Benzophenone			1	1	0	
Benzoyl peroxide	2085		1	4	4	OX
Benzyl acetate			1	1	0	
Benzyl alcohol			2	1	0	
Benzyl amine			2	1	0	
Benzyl dimethyl amine	2619	Corrosive	2	2	0	
Benzyl dimethyl octadecyl ammonium chloride			1	1	0	
Benzyl iodide	2653	Poison		1	0	
Benzyl trimethyl ammonium chloride			1	1	0	
Benzyl violet			0	1	0	
Beryllium	1567	Poison	3	1	0	
Beryllium chloride	1566	Poison	2	0	2	W
Beryllium fluoride	1566	Poison	2	0	0	
Beryllium nitrate	2464	Oxidizer	2	0	1	OX
Beryllium oxide	1566	Poison	2	0	0	
Beryllium sulfate	1566	Poison	2	0	0	
BHA			1	1	0	
BHC, alpha-			2	0	0	
BHC, beta-			1	0	0	

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			Refer to Page 550 for explanation of numbers			
BHC, delta-			1	0	0	
BHC, gamma-			3	0	0	
Biphenyl			2	1	0	
Bis-(2-chloroethoxy) methane			2	1	0	
Bis-(2-chloroisopropyl) ether	2490	Poison	2	2	0	
Bis-(2-chloro-1-methyl ethyl) ether	2490	Poison	2	2	0	
Bis-(2-ethyl hexyl) adipate			0	1	0	
Bis-(2-ethyl hexyl) phthalate			0	1	0	
Bismuth oxychloride			0	0	0	
Bisphenol A			1	1	0	
Bisphenol A diglycidyl ether			1	1	0	
Bithionol			3	1	0	
Bitoscanate			2	1	0	
Black powder, compressed	0028	1.1D Explosive	1	3	4	
Black powder, granular	0027	1.1D Explosive	1	3	4	
Black powder, pellets	0028	1.1D Explosive	1	3	4	
Bolero			1	1	0	
Boric acid			0	0	0	
Borneol	1312	Flammable solid	2	2	0	
Boron trifluoride: dimethyl etherate	2965	Dangerous when wet	4	4	1	
Bromacil			1	0	0	
Bromadiolone			4	1	0	
Bromine chloride	2901	Poison gas	3	0	2	OX
Bromoacetic acid	1938	Corrosive	2	1	0	
Bromoacetone	1569	Poison	2	2	0	
2-Bromobutane	2339	Flammable	2	3	0	
Bromochloromethane	1887	Keep away from food	1	0	0	
2-Bromoethyl ethyl ether	2340	Flammable	2	3	0	
Bromoform	2515	Poison	1	0	0	
1-Bromo-3-methylbutane	2341		1	3	0	
2-Bromopentane			1	3	0	
4-Bromophenyl phenyl ether			1	1	0	
1-Bromopropane			2	3	0	
Bromotrifluoroethylene	2419	Flammable gas	3	4	1	
Bromotrifluoromethane	1009	Nonflammable gas	1	0	0	

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			Refer to Page 550 for explanation of numbers			
Brucine	1570	Poison	2	1	0	
Butanedione	2346	Flammable	1	3	0	
n-Butanol	1120	Flammable	1	3	0	
sec-Butanol	1120	Flammable	1	3	0	
1,4-Butenediol			1	1	0	
Butyl acid phosphate	1718	Corrosive	2	1	1	
n-Butyl alcohol	1120	Flammable	1	3	0	
sec-Butyl alcohol	1120	Flammable	1	3	0	
sec-Butylamine			3	3	0	
n-Butylaniline	2738	Poison	3	1	0	
Butylated hydroxyanisole			1	1	0	
Butyl benzyl phthalate			1	1	0	
Butyl butyrate			2	2	0	
n-Butyl chloroformate	2743	Poison	2	3	1	
Butyl, decyl, cetyl-eicosyl methacrylate			2	2	0	
2,3-Butylene oxide			2	3	2	
Butyl ether	1149	Flammable	2	3	1	
tert-Butyl ether	1149	Flammable	2	3	1	
Butyl isovalerate			0	2	0	
n-Butyl methacrylate	2227	Flammable	2	2	0	
Butyl methyl ether	2350	Flammable	1	2	0	
Butyl nitrite	2351	Flammable	2	2	0	
tert-Butyl peroxybenzoate	2097		1	3	4	OX
p-tert-Butyl phenol	2229	Poison	1	1	0	
Butyl toluene	2667	Poison	2	2	0	
n-Butyric acid	2820	Corrosive	3	2	0	
beta-Butyrolactone			0	1	0	
Cacodylic acid	1572	Poison	1	0	0	
Cadmium(powder)			2	2	0	
Cadmium acetate			2	0	0	
Cadmium bromide			2	0	0	
Cadmium chloride			2	0	0	
Cadmium fluoroborate			2	0	0	
Cadmium nitrate			2	0	0	OX
Cadmium oxide			2	0	0	
Cadmium stearate			2	1	0	
Cadmium sulfate			2	0	0	

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			Refer to Page 550 for explanation of numbers			
Calcium	1401	Dangerous when wet	3	1	2	W
Calcium arsenite	1574	Poison	4	0	0	
Calcium chlorate	1452	Oxidizer	1	0	2	
Calcium chloride			1	0	0	
Calcium chromate	9096		2	0	0	
Calcium cyanide	1575	Poison	3	0	1	
Calcium fluoride			2	0	0	
Calcium hydride	1404	Dangerous when wet	3	4	2	W
Calcium hydroxide			1	0	0	
Calcium hypochlorite	1748	Corrosive	3	0	1	OX
Calcium nitrate	1454	Oxidizer	2	0	1	OX
Calcium oxide	1910	Corrosive	1	0	0	
Calcium peroxide	1457	Oxidizer	1	0	1	OX
Calcium phosphate			0	0	0	
Calcium phosphide	1360	Dangerous when wet	4	0	2	W
Calcium resinate			0	2	1	
Camphene	9011		2	2	0	
Camphor oil	1130	Flammable	0	2	0	
Cantharidin			4	1	0	
Caprolactam			1	1	0	
Capsicum			2	1	0	
Captan	9099		3	2	0	
Carbaryl (solid)	2757	Poison	2	0	0	
Carbolic oil	2821	Poison	3	2	0	
Carene			0	2	0	
Castor oil, edible			0	1	0	
Catechol			2	1	0	
Caustic potash solution	1814	Corrosive	3	0	1	
Cesium	1407	Dangerous when wet	2	4	2	W
Chloramben			0	0	0	
Chlorbisan			4	1	0	
Chlordane, flammable liquid	2762	Flammable	2	3	0	
Chlordecone			3	1	0	
Chlorfenvinfos			4	1	0	

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			Refer to Page 550 for explanation of numbers			
Chlorine monoxide			3	4	3	OX
Chlorine pentafluoride	2548	Poison gas	3	0	2	OX,W
Chlormephos			3	1	0	
Chlormequat chloride			3	0	0	
Chloroacetic acid	1751	Corrosive	3	1	0	
Chloroacetone, stabilized	1695	Poison	2	2	0	
p-Chloroaniline	2018	Poison	2	1	0	
Chlorobenzilate			1	0	0	
2-Chlorobutane	1127	Flammable	2	3	0	
p-Chloro-m-cresol			1	1	0	
Chlorodibromomethane			2	0	0	
10-Chloro-5,10-dihydrophenarsazine (DM)			2	1	0	
Chlorodifluoromethane	1018	Nonflammable gas	0	0	0	
2-Chloroethane sulfonyl chloride			2	1	0	
2-Chloroethyl vinyl ether			2	3	2	
Chlorohydrins			2	3	1	
Chloromethyl ethyl ether	2354	Flammable	2	2	0	
Chloromethyl methyl ether	1239	Poison	2	3	1	
1-(Chloromethyl)-4-nitrobenzene			2	1	0	
2-Chloronaphthalene			1	1	0	
o-Chlorophenol	2021	Poison	3	2	0	
4-Chlorophenyl phenyl ether			1	1	0	
Chloropicrin: methyl chloride	1582	Poison gas	4	4	3	
Chloropivaloyl chloride	9263	Poison	3	1	0	
1-Chloropropane	1278	Flammable	2	3	0	
2-Chloropropane	2356	Flammable	2	4	0	
1-Chloro-1-propene			2	4	2	
2-Chloropropene	2456	Flammable	2	4	2	
Chloroprotham			1	1	0	
1-Chloropropylene			2	4	2	
3-Chloropropyl octyl sulfoxide			3	1	0	
Chlorothalonil			3	1	0	
p-Chloro-o-toluidine			1	1	0	
3-Chlorotoluene	2238	Flammable	2	2	0	
Chlorotrifluoroethane	1983	Nonflammable gas	1	0	0	

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			Refer to Page 550 for explanation of numbers			
Chlorotrifluoromethane	1022	Nonflammable gas	1	0	0	
Chloroxuron			3	0	0	
Chlorthiophos			3	1	0	
Chromic acetate	9101		1	0	0	
Chromic acid	1755	Corrosive	3	0	0	OX
Chromic anhydride	1463	Oxidizer	1	0	2	OX
Chromic sulfate	9100		1	0	0	
Chromium (dust)			0	1	0	
Chromium oxychloride	1758	Corrosive	1	0	2	OX, W
Chromous chloride	9102		1	0	0	
Chrysene			1	1	0	
C.I. acid blue 9, diammonium salt			0	1	0	
C.I. acid blue 9, disodium salt			0	1	0	
C.I. acid green 3			0	1	0	
C.I. basic green 4			3	1	0	
C.I. basic red 1			3	1	0	
C.I. disperse yellow 3			0	1	0	
C.I. food red 5			0	1	0	
C.I. food red 15			1	1	0	
C.I. solvent orange 7			0	1	0	
C.I. solvent yellow 3			0	1	0	
C.I. solvent yellow 14			2	1	0	
C.I. vat yellow 4			0	1	0	
Citric acid			0	1	0	
Citrus red No. 2			0	1	0	
Coal gas	1023	Poison gas	2	4	0	
Cobalt			1	3	0	
Cobalt acetate			1	0	0	
Cobalt bromide			2	0	0	
Cobalt carbonyl			2	0	0	
Cobalt chloride			3	0	0	
Cobalt fluoride			2	0	0	
Cobalt formate	9104		2	0	0	
Cobalt nitrate			2	0	1	OX
Cobalt sulfamate			2	0	0	
Cobalt sulfate			2	0	0	

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			Refer to Page 550 for explanation of numbers			
Cocculus	1584	Poison	3	1	0	
Coconut oil: edible			0	1	0	
Colchicine			3	1	0	
Collodion	2059	Flammable	1	4	0	
Copper			0	0	0	
Copper acetate	9106		1	0	0	
Copper acetoarsenite	1585	Poison	3	0	0	
Copper arsenite	1586	Poison	4	0	0	
Copper bromide			2	0	0	
Copper chloride	2802	Corrosive	2	0	0	
Copper cyanide	1587	Poison	4	0	0	
Copper fluoroborate			3	0	0	
Copper formate			2	0	0	
Copper glycinate			1	1	0	
Copper iodide			2	0	0	
Copper lactate			1	1	0	
Copper naphthenate			0	2	0	
Copper nitrate			1	0	1	OX
Copper oxalate			0	0	0	
Copper subacetate			1	0	0	
Copper sulfate			2	0	0	
Copper sulfate, ammoniated	9110		1	0	0	
Copper tartrate	9111		1	0	0	
Coumaphos	2783	Poison	3	1	0	
Coumatetralyl			4	1	0	
CR (Dibenzo (b,f)-1,4-oxazepine)			2	1	0	
Creosote, coal tar	1993	Combustible liquid	2	2	0	
p-Cresidine			1	2	0	
Cresols	2076	Poison	3	2	0	
Cresyl glycidyl ether			1	2	0	
Cresylate spent caustic solution			3	0	0	
Crimidine	2588	Poison	4	1	0	
Croton oil			4	1	0	
Crude oil	1267	Flammable	0	1	0	
Cupferron			2	1	0	
Cupriethylene diamine solution	1761	Corrosive	1	1	0	

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			Refer to Page 550 for explanation of numbers			
Cyanazine			2	1	0	
Cycasin			2	2	0	
Cyclobutane	2601	Flammable gas	1	4	0	
Cycloheptatriene	2603	Flammable	2	3	0	
Cycloheptene	2242	Flammable	1	3	0	
Cyclohexanol			1	2	0	
Cyclohexanone peroxide	2119		1	2	2	OX
Cyclohexene	2256	Flammable	1	3	0	
Cyclohexenyl trichlorosilane	1762	Corrosive	2	2	1	W
Cyclohexyl acetate	2243	Flammable	1	2	0	
Cyclohexyl isocyanate	2488	Poison	2	2	0	
Cyclopentanol	2244	Flammable	0	2	0	
Cyclopentanone	2245	Flammable	2	3	0	
p-Cymene	2046	Flammable	2	2	0	
Dalapon	1760	Corrosive	1	1	1	
DDD	2761	Poison	2	1	0	
4,4'-DDT	2761	Poison	2	2	0	
Decabromodiphenyl oxide			2	0	0	
Decahydronaphthalene	1147	Flammable	2	2	0	
Decaldehyde			0	2	0	
Decanoic acid			0	1	0	
1-Decene			0	2	0	
n-Decyl acrylate			2	1	0	
n-Decyl alcohol			0	2	0	
n-Decyl benzene			2	1	0	
Demeton			3	2	0	
Demeton-s-methyl			2	2	0	
Deuterium	1957	Flammable gas	0	4	0	
Dextrose solution			0	0	0	
Diacetone alcohol	1148	Flammable	1	2	0	
Diacetone alcohol peroxide	2163	Forbidden	2	4	4	OX
Diacetyl	2346	Flammable	1	3	0	
N,N'-diacetyl benzidine			2	1	0	
Dialifos	3018	Poison	4	1	0	
Diallate			2	0	0	
Diallylamine	2359	Flammable	3	3	1	
Diallyl ether	2360	Flammable	3	3	2	

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			Refer to Page 550 for explanation of numbers			
4,4'-Diaminodiphenyl ether			1	1	0	
Diaminotoluene (mixed isomers)			2	1	0	
Diammonium sulfate			0	0	0	
Di-n-amylamine	2841	Poison	3	2	0	
Di-n-amyl phthalate			0	1	0	
Diazinon	2783	Poison	3	1	0	
Diazomethane			4	3	3	
Dibenzo (A,E) pyrene			1	1	0	
Dibenzo (A,H) anthracene			1	1	0	
Dibenzo (A,H) pyrene			1	1	0	
Dibenzo (A,I) pyrene			1	1	0	
Dibenzo (A,J) acridine			1	1	0	
Dibenzo (A,L) pyrene			1	1	0	
Dibenzo (b,f)-1,4-oxazepine (CR)			2	1	0	
7H-Dibenzo (C,G) carbazole			2	1	0	
Dibenzofuran			1	1	0	
Dibenzoyl peroxide	2087	Organic peroxide	0	3	3	OX
1,2-Dibromo-3-chloropropane	2872	Poison	2	2	0	
Di-n-butylamine	2248	Corrosive	3	2	0	
Di-n-butyl ether	1149	Flammable	2	3	1	
N,N'-dibutyl hexamethylene diamine			2	2	0	
Di-n-butyl ketone			1	2	0	
Di-tert-butyl peroxide	2102	Organic peroxide	3	2	4	OX
1,1-Di(tert-butylperoxy)cyclohexane	2179	Organic peroxide	3	3	3	
Dibutyl phenol			1	2	0	
Dibutyl phthalate			0	1	0	
Di-n-butyl phthalate			0	1	0	
Dicamba			1	0	0	
Dichlobenil			2	2	0	
Dichlone			2	0	0	
Dichloroacetic acid	1764	Corrosive	3	1	0	
Dichloroacetyl chloride	1765	Corrosive	3	2	2	W
Dichloroacetylene			3	0	0	
3,3'-Dichlorobenzidine			0	1	0	
Dichlorobromomethane			3	0	0	
Dichlorodifluoromethane	1028	Nonflammable gas	1	0	0	

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			Refer to Page 550 for explanation of numbers			
2,2-Dichloroisopropyl ether	2490	Poison	2	2	0	
Dichloromethylphenylsilane			2	3	1	
Dichloromonofluoromethane	1029	Nonflammable gas	1	0	0	
2,4-Dichlorophenol			1	1	0	
Dichlorophenoxyacetic esters			1	1	0	
2,3-Dichloropropene	2047	Flammable	3	3	0	
Dichloropropionic acid	1760	Corrosive	1	0	0	
Dichlorotetrafluoroethane	1958	Nonflammable gas	0	0	0	
2,2'-Dichlorotriethylamine			3	1	1	
Dichlorvos	2783	Poison	3	1	0	
Dicofol			2	1	0	
Dicrotophos			3	1	0	
Dieldrin	2761	Poison	3	0	0	
Diethanol amine			1	1	0	
Diethylaluminum chloride (DEA)			3	4	3	W
Diethylaluminum hydride				3	3	W
2,6-Diethyl aniline			2	2	0	
N,N-diethyl aniline	2432	Keep away from food	3	2	0	
Diethyl benzene	2049	Flammable	1	2	0	
Diethyl carbamazine citrate			2	1	0	
Diethyl chlorophosphate			4	1	0	
Diethylene glycol			1	1	0	
Diethylene glycol dibutyl ether			1	1	0	
Diethylene glycol dimethyl ether			1	2	1	
Diethylene glycol monobutyl ether			1	2	0	
Diethylene glycol monobutyl ether acetate			1	1	0	
Diethylene glycol monoethyl ether			1	1	0	
Diethylene glycol monomethyl ether			1	1	0	
Diethyl ethylphosphate			3	2	0	
Diethylphosphate			3	2	0	
Diethyl phthalate			0	1	0	
Diethyl stilbestrol			3	1	0	
Diethyl sulfate	1594	Poison	3	1	1	
Diethyl sulfide	2375	Flammable	1	1	0	

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			Refer to Page 550 for explanation of numbers			
Diethyl zinc	1366	Spontaneously combustible	3	4	3	W
Difluorochloromethane	1018	Nonflammable	0	0	0	
Difluorodichloromethane	1028	Nonflammable	1	0	0	
1,1-Difluoroethylene	1959	Flammable gas	1	4	1	
Difluorophosphoric acid	1768	Corrosive	3	0	1	
Diglycidyl ether			4	2	0	
Diheptyl phthalate			0	1	0	
2,3-Dihydropyran	2376	Flammable	2	3	0	
Diisobutyl amine	2361	Flammable	3	3	0	
Diisobutyl carbinol			1	2	0	
Diisobutylene	2050	Flammable	1	3	0	
Diisobutyl ketone	1157	Flammable	1	2	0	
Diisobutyl phthalate			0	1	0	
Diisodecyl phthalate			0	1	0	
Diisononyl phthalate			0	1	0	
Diisooctyl phthalate			0	1	0	
Diisopropanol amine			0	1	0	
Diisopropyl benzene (all isomers)			3	3	0	
Diisopropyl benzene hydroperoxide	2171	Forbidden	0	2	0	
Diisopropyl ether	1159	Flammable	1	3	1	
Dimefox	3018	Poison	4	1	1	
Dimethoate			3	2	0	
Dimethyl adipate			1	1	0	
Dimethylamine, solution	1160	Flammable	3	4	0	
4-Dimethyl aminoazobenzene			2	2	0	
2-Dimethylaminoethanol	2051	Flammable	2	2	0	
Dimethyl carbonate	1161	Flammable	3	3	0	
N,N-Dimethyl cyclohexylamine			2	2	0	
Dimethylethanolamine	2051	Flammable	2	2	0	
Dimethyl ethylphosphonate			3	2	0	
Dimethyl glutarate			1	1	0	
Dimethylhexane dihydroperoxide	2174	Forbidden	1	2	3	OX
Dimethyl hydrogen phosphite			1	3	0	
Dimethyl mercury			3	1	0	
2,2-Dimethyl octanoic acid			1	2	0	
2,4-Dimethylphenol	2261	Poison	1	2	0	

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Dimethyl phthalate			0	1	0	
Dimethyl polysiloxane			0	1	0	
2,2-Dimethylpropane	2044	Flammable gas	0	4	0	
2,2-Dimethylpropane-1,3-diol			1	3	0	
Dimethyl succinate			0	2	0	
Dimethyl sulfoxide			1	1	0	
Dimethyl terephthalate			1	1	0	
Dimethyl tetracholorterephthalate			1	1	0	
Dimetilan			3	1	0	
Dinitrochlorobenzene	1577	Poison	3	1	4	
4,6-Dinitro-o-cyclohexyl phenol	9026		2	2	2	
2,4-Dinitrotoluene	2038	Poison	3	1	3	
Dinonyl phthalate			0	1	0	
Dinoterb			3	2	3	
Diocetyl adipate			0	1	0	
Diocetyl phthalate			0	1	0	
Di-n-octyl phthalate			0	1	0	
Diocetyl sodium sulfosuccinate			0	0	0	
Dioxathion			3	0	0	
Dipentene	2052	Flammable	0	2	0	
Diphacinone			3	1	0	
Diphenamide			1	0	0	
Diphenyl			2	1	0	
Diphenylamine			3	1	0	
Diphenylamine chloroarsine	1698	Poison	3	2	0	
Diphenyldichlorosilane	1769	Corrosive	3	1	0	
Diphenyl ether			1	1	0	
Diphenylmethane diisocyanate	2489	Poison	2	1	1	
Diphosgene	1076	Poison gas	4	0	1	
Dipropylene glycol			0	1	0	
Dipropylene glycol dibenzoate			0	1	0	
Dipropylene glycol methyl ether			0	2	0	
Diquat	2781	Poison	2	0	0	
Direct black 38			1	1	0	
Direct blue 6			1	1	0	
Direct brown 95			0	1	0	
Disulfoton	2783	Poison	4	1	0	

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			Refer to Page 550 for explanation of numbers			
Dithiobiuret			3	1	0	
Ditridecyl phthalate			0	1	0	
Diundecyl phthalate			0	1	0	
Diuron			1	0	0	
DM (10-Chloro-5,10-dihydrophenarsazine)			2	1	0	
DMSO			1	1	0	
DNBP			3	2	0	
Dodecanol			0	1	0	
Dodecene			0	1	0	
Dodecylbenzene			1	1	0	
Dodecylbenzene sulfonic acid	2584	Corrosive	1	1	0	
Dodecylbenzene sulfonic acid, calcium salt			1	1	0	
Dodecylbenzene sulfonic acid, isopropyl amine salt			1	1	0	
Dodecylbenzene sulfonic acid, sodium salt			1	1	0	
Dodecylbenzene sulfonic acid, triethanol amine salt			1	1	0	
Dodecyl diphenyl ether disulfonate			1	0	0	
Dodecyl methacrylate			0	1	1	
Dodecyl/pentadecyl methacrylate			0	1	1	
Dodecyl sulfate, diethanolamine salt			1	1	0	
Dodecyl sulfate, magnesium salt			1	0	0	
Dodecyl sulfate, sodium salt			1	0	0	
Dodecyl sulfate, triethanolamine salt			1	0	0	
Dodecyltrichlorosilane	1771	Corrosive	3	2	2	
Dowtherm			1	1	0	
Endosulfan	2761	Poison	4	1	0	
alpha-Endosulfan			4	1	0	
beta-Endosulfan			4	1	0	
Endosulfan sulfate			4	1	0	
Endothion			4	1	2	
Endrin	2761	Poison	4	1	0	
Endrin aldehyde			4	1	0	
Enterotoxin B			4	1	0	
EPN			4	1	0	
Estradiol 17 b			1	1	0	
Estrone			1	1	0	
Ethienocarb			3	1	0	

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			Refer to Page 550 for explanation of numbers			
Ethinylestradiol			1	1	0	
Ethion	2783	Poison	3	1	0	
Ethoprophos			3	1	0	
Ethoxydihydropyran			2	2	1	
Ethoxyethylbenzene			1	2	0	
Ethoxylated dodecanol			2	1	0	
Ethoxylated nonylphenol			0	1	0	
Ethoxylated pentadecanol			2	1	0	
Ethoxylated tetradecanol			2	1	0	
Ethoxylated tridecanol			2	1	0	
Ethoxy triglycol			0	1	0	
Ethyl acetoacetate			2	2	0	
Ethylacetylene	2452	Flammable gas	1	4	2	
Ethyl aluminum dichloride			3	3	3	W
Ethyl aluminum sesquichloride			3	3	3	W
Ethyl amyl ketone	2271	Flammable	0	2	0	
N-ethylaniline	2272	Keep away from food	3	2	0	
Ethyl azinphos			4	1	0	
Ethyl bromide	1891	Poison	2	1	0	
Ethyl bromoacetate	1603	Poison	2	2	0	
Ethyl butanol	2275	Flammable	1	2	0	
Ethyl butyl ether	1179	Flammable	2	3	0	
Ethyl carbamate			1	1	0	
Ethyl chlorothioformate	2826	Corrosive	0	1	0	
Ethyl cyclohexane			1	3	0	
N-ethyl cyclohexylamine			3	3	0	
N-ethyl-2,2'-di(chloroethyl) amine (HN ₁)			4	1	0	
Ethylenediamine tetracetic acid	9117		1	0	0	
Ethylene glycol			1	1	0	
Ethylene glycol acetate			0	1	0	
Ethylene glycol diacetate			1	1	0	
Ethylene glycol isopropyl ether			1	3	0	
Ethylene glycol monobutyl ether	2369	Flammable	2	2	0	
Ethylene glycol monobutyl ether acetate			1	2	0	
Ethylene glycol monoethyl ether acetate	1172	Flammable	1	2	0	
Ethylene glycol phenyl ether			0	1	0	

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Ethylene thiourea			2	1	0	
Ethyl-3-ethoxypropionate			0	2	0	
Ethyl hexaldehyde	1191	Flammable	2	2	1	
2-Ethyl hexanoic acid			1	1	0	
2-Ethyl hexanol			1	2	0	
2-Ethyl hexylamine	2276	Corrosive	2	2	0	
Ethyl hexyl tallate			2	1	0	
Ethylidene norbornene			2	2	0	
Ethyl lactate	1192	Flammable	2	2	0	
Ethyl methacrylate	2277	Flammable	2	3	0	
Ethyl methane sulfonate			2	1	0	
Ethyl methyl ether	1039	Flammable gas	1	4	1	
Ethyl nitrate	1993	Combustible	2	3	4	
Ethyl phenol			2	1	0	
Ethyl phosphonothioic dichloride	2927	Poison	3	1	1	W
Ethylphosphonous dichloride	2845	Spontaneously Combustible	3	4	3	
Ethylphosphonous difluoride			3	4	3	
Ethylphosphonyl difluoride			3	4	3	
Ethyl phosphorodichloridate	2927	Poison	3	1	1	W
Ethyl pirimifos			3	1	0	
2-Ethyl-3-propyl acrolein			2	2	1	
Ethyl silicate	1292	Flammable	2	2	0	
Ethyl sulfate	1594	Poison	3	1	1	
Ethyl t-butyl ether			2	3	0	
2-Ethyltoluene			2	2	0	
F 12	1028	Nonflammable gas	1	0	0	
F 22	1018	Nonflammable gas	0	0	0	
Fenamiphos			3	1	0	
Fenitrothion			3	1	0	
Fensulfothion	2783	Poison	4	1	0	
Ferric ammonium citrate	9118		0	0	0	
Ferric ammonium oxalate	9119		0	0	0	
Ferric chloride	1773	Corrosive	1	0	0	
Ferric fluoride	9120		3	0	0	
Ferric glycerophosphate			2	0	0	

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			Refer to Page 550 for explanation of numbers			
Ferric nitrate	1466	Oxidizer	0	0	0	OX
Ferric sulfate	9121		1	0	0	
Ferrous ammonium sulfate	9122		0	0	0	
Ferrous chloride	1759	Corrosive	2	0	0	
Ferrous fluoroborate			1	0	0	
Ferrous oxalate			0	0	0	
Ferrous sulfate	9125		2	0	0	
Fluonitil			3	1	0	
Fluoboric acid	1775	Corrosive	3	0	0	
Fluometuron			1	1	0	
Fluoranthene			0	1	0	
Fluorene			1	1	0	
Fluoroacetamide			4	1	0	
Fluoroacetyl chloride			4	1	2	W
2-Fluoroaniline	2941	Poison	2	2	0	
4-Fluoroaniline	2941	Poison	2	2	0	
4-Fluorotoluene	2388	Flammable	2	2	0	
Fonofos	2783	Poison	4	1	0	
Forane 22B			1	0	0	
Formamide			2	1	0	
Formetanate hydrochloride			3	1	0	
Formothion			2	1	0	
Formparanate			3	1	0	
Formyl hydrazino-4-(5-nitro-2-furyl)thiazole			3	1	0	
Fosthietan			4	1	0	
Freon 12	1028	Nonflammable gas	1	0	0	
Freon 22	1018	Nonflammable gas	0	0	0	
Fuberidazole			1	1	0	
Fuel oil, No. 2	1993	Combustible	0	2	0	
Fumaric acid			0	1	0	
Furfuryl alcohol	2874	Poison	1	2	1	
Fusel oil	1201	Flammable	1	2	0	
Gallic acid			1	1	0	
Gallium metal	2803	Corrosive	2	0	0	
Gallium trichloride			3	0	1	
Germane	2192	Poison gas	4	4	3	W

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Glutaraldehyde solution			2	0	0	
Glycerine			1	1	0	
Glycidaldehyde	2622	Flammable	2	3	0	
Glycidyl methacrylate			2	2	1	
Glyoxal			1	0	2	W
Hendecane	2330	Flammable	0	2	0	
Heptachlor			3	0	0	
Heptachlor epoxide			3	1	0	
Heptachlorodibenzofurans			4	1	0	
Heptachlorodibenzo-p-dioxins			4	1	0	
Heptanoic acid			1	1	0	
Heptanol			0	2	0	
Heptyl acetate			0	2	0	
Hexachloroacetone	2661	Keep away from food	1	0	0	
Hexachlorobenzene	2729	Poison	1	1	0	
Hexachlorobutadiene	2279	Poison	2	1	1	
Hexachlorocyclohexanes			2	1	0	
Hexachlorocyclopentadiene	2646	Poison	2	1	0	
Hexachlorodibenzofurans			4	1	0	
Hexachlorodibenzo-p-dioxins			4	1	0	
Hexachloroethane	9037		0	0	0	
Hexachloronaphthalene			1	1	0	
Hexachlorophene	2875	Poison	3	1	0	
Hexadecyl sulfate, sodium salt			1	0	0	
Hexadecyl trimethyl ammonium chloride			1	2	0	
Hexaethyl tetraphosphate and compressed gas	1612	Poison gas	3	1	1	
Hexafluoroacetone	2420	Poison gas	3	0	0	
Hexafluoroethane	2193	Nonflammable gas	1	0	0	
n-Hexaldehyde	1207	Flammable	2	3	1	
Hexamethyl phosphoramidate			1	1	0	
Hexamethylenediamine	2280	Corrosive	1	2	0	
Hexamethylene diisocyanate	2281	Poison	3	1	1	
Hexamethyleneimine	2493	Flammable	2	3	0	
Hexamethylene tetramine	1328	Flammable	2	1	0	
1-Hexanol	2282	Flammable	2	3	1	

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			Refer to Page 550 for explanation of numbers			
2-Hexene			1	3	0	
3-Hexene			1	3	0	
Hexyl acetate			1	2	0	
Hexylene glycol			1	1	0	
HN ₁ (N-Ethyl-2-2'di(chloroethyl) amine			4	1	0	
Hydrogen iodide, anhydrous	2197	Poison gas	3	3	0	
Hydrogen peroxide (35% solution)	2014	Oxidizer	1	0	1	OX
Hydroquinone	2662	Poison	2	1	0	
2-Hydroxyethyl acrylate			2	1	2	
Hydroxylamine sulfate	2865	Corrosive	1	0	1	
Hydroxypropyl acrylate			3	1	2	
Indeno(1,2,3-CD)pyrene			1	1	0	
Iron (powder)			0	2	0	
Isobenzan			4	0	0	
Isobutanol	1212	Flammable	1	3	0	
Isobutyl aldehyde	2045	Flammable	2	3	1	
Isobutylamine	1214	Flammable	2	3	0	
Isobutyl formate	2393	Flammable	2	3	0	
Isobutyric acid	2529	Flammable	1	2	0	
Isodecaldehyde			0	2	0	
Isodrin			3	1	0	
Isodiphosphate			4	1	0	
Isooctaldehyde	1191	Flammable	1	2	0	
Isooctane	1262	Flammable	0	3	0	
Isooctyl alcohol			1	2	0	
Isopentane	1265	Flammable	1	4	0	
Isophorone			2	2	0	
Isophorone diamine	2289	Poison	1	1	0	
Isophorone diisocyanate (IPDI)	2290	Poison	2	1	1	
Isophthalic acid			1	1	0	
Isopropenyl acetate	2403	Flammable	2	3	0	
Isopropyl chloride	2356	Flammable	2	4	0	
Isopropyl cyclohexane			1	3	0	
Isopropyl ether			1	3	1	
4,4'-Isopropylidenediphenol			0	1	0	
Isopropylmethylpyrazolyl dimethyl carbamate			4	1	0	

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			Refer to Page 550 for explanation of numbers			
Isopropyl nitrate	1222	Flammable	3	3	0	
Isopropyl percarbonate			0	2	2	OX
Isopropyl peroxydicarbonate	2133		0	4	4	OX
Isopropyl propionate	2409	Flammable	2	3	0	
Kepone			2	1	0	
Ketene			4	2	3	W
Lacquer	1263	Flammable	1	3	0	
Lacquer thinner	1263	Flammable	1	3	0	
Lactic acid			1	1	0	
Lasiocarpine			2	1	0	
Lauric acid			0	1	0	
Lauroyl peroxide	2124	Organic peroxide	0	2	0	
Lauroyl peroxide (<42%)	2893	Organic peroxide	0	2	0	
Lauryl mercaptan			2	1	0	
Lead			0	0	0	
Lead acetate	1616	Poison	1	0	0	
Lead arsenate	1617	Poison	2	0	0	
Lead azide (wetted with >20% water)	0129	1.1A Explosive	3	0	3	
Lead chloride	2291	Poison	1	0	0	
Lead fluoride	2811	Poison	1	0	0	
Lead fluoroborate	2291	Poison	1	0	0	
Lead iodide			1	0	0	
Lead nitrate	1469	Oxidizer	1	0	0	OX
Lead phosphate			0	0	0	
Lead stearate			1	0	0	
Lead sulfate	1794	Corrosive	0	0	0	
Lead sulfide			1	0	0	
Lead tetraacetate			2	0	0	
Lead thiocyanate			1	0	0	
Lead thiosulfate			1	0	0	
Lead tungstate			1	0	0	
Leptophos			3	1	0	
Lindane	2761	Poison	3	0	0	
Linseed oil, boiled			2	2	0	
Linseed oil, raw			0	1	0	
Litharge			0	0	0	
Lithium aluminum hydride	1410	Dangerous when wet	3	2	2	W

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			Refer to Page 550 for explanation of numbers			
Lithium bichromate			1	0	1	OX
Lithium borohydride	1413	Dangerous when wet	3	4	3	W
Lithium chromate			1	0	1	OX
Lithium hydride	1414	Dangerous when wet	3	2	2	W
Magnesium (powder)	1418	Dangerous when wet	0	1	1	
Magnesium perchlorate	1475	Oxidizer	1	0	0	OX
Magnesium phosphide	2011	Dangerous when wet	4	3	2	W
Malathion	2783	Poison	2	1	0	
Maleic acid	2215	Corrosive	1	1	0	
Maleic anhydride	2215	Corrosive	3	1	1	
Maleic hydrazide			1	1	0	
Maneb	2968	Spontaneously combustible	0	4	0	
Manganese (dust)			0	2	2	
Melamine			0	2	0	
Mephosfolan			4	1	0	
Mercaptodimethur	2784	Flammable	3	1	0	
Mercuric acetate	1629	Poison	2	0	0	
Mercuric ammonium chloride	1630	Poison	3	0	0	
Mercuric chloride	1624	Poison	3	0	0	
Mercuric cyanide	1636	Poison	3	0	0	
Mercuric iodide	1638	Poison	3	0	0	
Mercuric nitrate	1625	Poison	3	0	0	OX
Mercuric oxide	1641	Poison	3	0	0	
Mercuric sulfate	1645	Poison	3	0	0	
Mercuric sulfide			3	0	0	
Mercuric thiocyanate	1646	Poison	3	1	0	
Mercurous acetate	1629	Poison	3	0	0	
Mercurous chloride			2	0	0	
Mercurous nitrate	1627	Poison	1	0	0	OX
Mercury	2809	Corrosive	1	0	0	
Mercury fulminate (wetted >20% water)	0135	1.1A Explosive	3	0	3	
Mercury oxide	1641	Poison	3	0	0	
Mestranol			2	1	0	
Metaldehyde	1332	Flammable solid	1	3	1	

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			Refer to Page 550 for explanation of numbers			
Methacrolein diacetate			3	1	1	
Methacrylaldehyde	2396	Flammable	3	3	2	
Methacrylic anhydride			3	1	2	
Methacryloyloxyethyl isocyanate			3	2	0	
Methallyl chloride			2	3	1	
Methamidophos			3	1	0	
Methanearsonic acid, sodium salt			1	1	0	
Methiocarb			3	1	0	
Methomyl			3	1	0	
3-Methoxybutyl acetate			1	2	0	
Methoxychlor			2	1	0	
Methoxyethyl mercuric acetate			3	1	0	
Methoxymethyl isocyanate	2605	Flammable	3	2	0	
Methyl acetoacetate			2	2	0	
Methyl acetone	1232	Flammable	1	3	0	
Methyl acetylene			1	4	2	
Methyl amyl acetate	1233	Flammable	1	2	0	
N-methyl aniline	2294	Poison	2	2	0	
Methyl azinphos	2783	Poison	4	0	0	
Methyl azoxymethanol acetate			1	3	1	
Methyl 2-benzimidazole carbamate			2	1	0	
Methyl benzoate	2938	Poison	0	2	0	
alpha-Methyl benzyl alcohol	2937	Poison	0	2	0	
2-Methyl-1-butene	2459	Flammable	2	4	0	
2-Methyl-2-butene	2460	Flammable	2	3	0	
3-Methyl-1-butene	2561	Flammable	2	4	0	
Methyl butenol			1	3	0	
Methyl chloroformate	1238	Poison	1	3	1	
Methyl chloromethyl ether	1239	Poison	3	3	2	
Methyl cyclohexanone	2297	Flammable	1	2	0	
Methyl cyclopentadiene dimer			1	3	0	
Methyl cyclopentadienyl manganese tricarbonyl			3	1	1	
Methyl dichloroarsine	1556	Poison	3	1	1	
4,4'-Methylene-bis-(2-chloroaniline)			1	1	0	
4,4'-Methylene-bis-(2-methylaniline)			1	1	0	
Methylene-bis-(phenylisocyanate) (or MBI)	2489		2	1	1	
4,4'-Methylene dianiline			3	1	0	

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			Refer to Page 550 for explanation of numbers			
Methylene diisocyanate			1	2	1	W
Methylethylamine			3	3	0	
2-Methyl-6-ethyl aniline			1	1	0	
3-(1-Methyl ethyl) phenyl methyl carbamate			2	1	0	
Methyl ethyl pyridine	2300	Poison	3	2	0	
Methyl fluoroacetate			4	3	0	
Methyl fluorosulfate			4	1	0	
Methyl formal	1234	Flammable	2	3	2	
Methyl heptyl ketone			0	2	0	
2-Methyl-2-hydroxy-3-butyne			2	3	0	
Methyl mercaptopropionaldehyde			2	2	0	
Methyl mercuric dicyanamide			3	1	0	
Methyl mercury			3	1	0	
Methyl methane sulfonate			2	2	0	
1-Methyl naphthalene			2	2	0	
Methyl nitrite	2455	Forbidden	3	4	0	
2-Methyl-1-nitroanthraquinone			2	1	0	
3-Methyl nitrosoaminopropionitrile			3	2	0	
Methyl orthosilicate	2606	Flammable	0	2	0	
Methylpentane	2462	Flammable	1	3	0	
2-Methyl-1-pentene			1	3	0	
2-Methyl-2-pentene			1	3	0	
4-Methyl-2-pentene			1	3	0	
Methyl phenkapton			3	1	0	
Methyl phosphonous dichloride	2845	Poison	4	4	3	W
Methylphosphonyl dichloride			3			
Methylpiperidine	2399	Flammable	2	3	2	
Methyl propionate	1248	Flammable	1	3	0	
Methyl propyl ether	2612	Flammable	0	3	0	
Methyl propyl ketone	1249	Flammable	2	3	0	
1-Methyl pyrrolidone			2	1	0	
Methyl salicylate			1	1	0	
Methyltetrahydrofuran	2536	Flammable	2	3	0	
Methyl trichloroacetate	2533	Flammable	2	1	0	
2-Methyl-5-vinyl pyridine (MVP)	3073	Poison	2	2	0	
Metolachlor			1	0	0	
Metolcarb			3	1	0	

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Mevinphos	2783	Poison	4	1	0	
Mexacarbate	2757	Poison	3	1	0	
Michler's ketone			3	1	0	
Mineral oil			0	1	0	
Mirex			2	1	0	
Molybdenum trioxide			2	0	0	
Monochlorotetrafluoroethane			1	0	0	
Monochlorotrifluoromethane			1	0	0	
Monocrotaline			2	2	0	
Monocrotophos			3	1	0	
Mustine hydrochloride			4	1	0	
MVP (2-Methyl-5-vinyl pyridine)	3073	Poison	2	2	0	
Myrcene			2	2	0	
Nabam			2	0	0	
Nafenopin			2	2	0	
Naled			2	0	1	
Naphtha: coal tar	2553	Flammable	2	2	0	
Naphtha: stoddard solvent	1271	Flammable	1	4	0	
Naphtha: VM & P			1	3	0	
Naphthalene	1334	Flammable solid	2	2	0	
alpha-Naphthylamine	2077	Poison	2	1	0	
Naphthylthiourea	1651	Poison	4	1	0	
Naphthylurea	1652	Poison		1	0	
Neodecanoic acid			0	1	0	
N-ethyl-2-2' di(chloroethyl) amine (HN ₁)			4	1	0	
Neon	1065	Nonflammable gas	0	0	0	
Nickel	2881	Spontaneously combustible	2	4	1	
Nickel acetate			2	0	0	
Nickel ammonium sulfate	9138		2	0	0	
Nickel bromide			2	0	0	
Nickel chloride			2	0	0	
Nickel cyanide	1653	Poison	2	0	0	
Nickel fluoroborate			2	0	0	
Nickel formate			2	0	0	
Nickel hydroxide	9140		2	1	0	
Nickel nitrate	2725	Oxidizer	2	0	0	OX

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			Refer to Page 550 for explanation of numbers			
Nickel subsulfide			2	0	0	
Nickel sulfate			2	0	0	
Nicotine	1654	Poison	4	1	0	
Nicotine sulfate	1658	Poison	4	1	0	
Nitralin			1	1	1	
Nitrilotriacetic acid			1	1	0	
Nitrilotriacetic acid, disodium salt			1	1	0	
Nitrilotriacetic acid, sodium salt			1	1	0	
Nitrilotriacetic acid, trisodium salt			1	1	0	
5-Nitroacenaphthene			1	1	0	
4-Nitroaniline	1661	Poison	3	1	2	
5-Nitro-o-anisidine			2	1	0	
4-Nitrobiphenyl			2	1	0	
Nitrocellulose (with plasticizer >18%)	0343	Explosive 1.3C	2	3	3	
Nitrocellulose (with >25% water)	2555	Flammable solid	2	3	3	
Nitrocresols	2446	Keep away from food	1	1	0	
Nitrocyclohexane			2	2	3	
Nitroethane	2842	Flammable	1	3	3	
Nitrofen			2	2	0	
Nitrogen mustard hydrochloride			3	2	0	
Nitrogen mustard N-oxide			2	2	0	
Nitrogen mustard N-oxide hydrochloride			2	2	0	
Nitrogen trifluoride	2451	Nonflammable gas	3	0	3	OX
m-Nitrophenol	1663	Poison	3	1	2	
o-Nitrophenol	1663	Poison	3	1	2	
p-Nitrophenol	1663	Poison	3	1	2	
2-Nitrophenol	1663	Poison	3	1	2	
3-Nitrophenol	1663	Poison	3	1	2	
4-Nitrophenol	1663	Poison	3	1	2	
N-methyl-2,2'-di(chloroethyl) amine			4	1	0	
4-Nitropyridine-1-oxide			2	2	0	
N-nitrosodiethanolamine			0	1	0	
N-nitrosodiethylamine			2	1	0	
N-nitrosodimethylamine			2	1	1	
N-nitrosodi-n-butylamine			1	1	0	
N-nitrosodi-n-propylamine			2	1	0	

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			Refer to Page 550 for explanation of numbers			
N-nitrosodiphenylamine			1	2	0	
N-nitrosomethylethylamine			2	1	0	
N-nitrosomethylvinylamine			3	1	0	
N-nitrosomorpholine			2	1	0	
N-nitroso-N-ethyl urea			2	1	0	
N-nitroso-N-methyl urea			2	1	0	
N-nitroso-N-methyl urethane			2	1	0	
N-nitrosornicotine			2	1	0	
N-nitrosopiperidine			2	1	0	
N-nitrosopyrrolidine			2	1	0	
N-nitrososarcosine			0	1	0	
Nitrostarch (dry or wetted with <20% water)	0146	Explosive 1.1D	2	3	4	
Nitrostarch (wetted with >20% water)	1337	Flammable solid	2	3	2	
Nitrosylsulfuric acid	2308	Corrosive	3	0	2	OX
Nonane	1920	Flammable	0	3	0	
Nonanol			1	2	0	
Nonene	2057	Flammable	0	3	0	
Nonylphenol			2	1	0	
Norbormide			0	1	0	
Norethisterone			0	1	0	
Octachloronaphthalene			3	0	0	
Octamethyl diphosphoramidate			3	1	0	
Octanoic acid			1	1	0	
Octanol			1	2	0	
Octyl epoxy tallate			0	2	0	
tert-Octyl mercaptan	3023	Poison	2	2	0	
Oleic acid			0	1	0	
Oleic acid, potassium salt			0	1	0	
Oleic acid, sodium salt			0	1	0	
Orange oil SS			0	1	0	
Ordram(or Molinate)			2	1	0	
Osmium tetroxide	2471	Poison	2	0	0	OX
Oxalic acid			3	1	0	
Oxamyl			4	1	0	
Oxydisulfoton			4	1	0	

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			Refer to Page 550 for explanation of numbers			
Ozone			2	0	3	OX
Paint, latex			0	0	0	
Paint, oil base	1263	Flammable	1	3	0	
Paint thinner	1263	Flammable	1	3	0	
Panfuran S			0	1	0	
Paraformaldehyde	2213	Flammable solid	3	1	0	
Paraldehyde	1264	Flammable	2	3	1	
Paraquat	2781	Poison	4	0	0	
Paraquat methosulfate			4	0	0	
Paris green	1585	Poison	3	0	0	
1,2,3,7,8-Pentachlorodibenzofurans			4	1	0	
Pentachlorodibenzo-p-dioxins			4	1	0	
Pentachloroethane	1669	Poison	0	0	0	
Pentachlorophenate, sodium	2567	Poison	2	0	0	
Pentadecanol			0	1	0	
Pentadecylamine			1	1	0	
Pentaerythritol			0	2	0	
Pentaerythritol tetranitrate (PETN)	0411	1.1D Explosive	2	2	3	
Pentanoic acid	1760	Corrosive	2	1	0	
1-Pentene	1108	Flammable	1	4	0	
2-Pentene			0	4	0	
Pepper spray			2	1	0	
Peracetic acid	2131		3	2	4	OX
Perchloromethyl mercaptan	1670	Poison	2	0	0	
Perchloryl fluoride	3083	Poison gas	3	0	2	OX
PETN (Pentaerythritol tetranitrate)	0411	1.1D Explosive	2	2	3	
Petrolatum			0	1	0	
Phenanthrene			1	1	0	
Phenylcarbylamine chloride	1672	Poison	2	1	0	
Phenylenediamine	1673	Poison	2	1	0	
Phenylhydrazine hydrochloride			3	2	0	
Phenyl isocyanate	2487	Poison	1	2	0	
Phenylmercuric acetate	1674	Poison	3	1	0	
o-Phenyl phenate, sodium			1	1	0	
o-Phenyl phenol			1	1	0	

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Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Phenyl phosphorous thiodichloride	2799	Corrosive	3	2	2	W
Phenyl silatrane			3	1	0	
Phorate	3018	Poison	4	1	0	
Phosacetim			4	1	0	
Phosfolan	2783	Poison	4	1	0	
Phosmet			3	1	0	
Phosphamidon			3	1	0	
Phosphoric acid	1805	Corrosive	3	0	0	
Phosphorus (amorphous red)	1338	Flammable solid	1	1	1	
Phosphorus (black)			1	1	0	
Phosphorus pentachloride	1806	Corrosive	3	0	2	W
Phosphorus pentafluoride	2198	Poison gas	4	0	2	W
Phosphorus pentoxide	1807	Corrosive	3	0	2	W
Phosporous trioxide	2578	Corrosive	3	4	0	W
Phthalic anhydride	2214	Corrosive	3	1	0	
Picoline	2313	Flammable	2	2	0	
Picrotoxin	1584	Poison	3	1	0	
Pine oil	1272	Flammable	2	2	0	
Pinacolyl alcohol			1	2	0	
Piperazine	2579	Poison	2	2	0	
Piprotal			4	1	0	
Platinum tetrachloride			2	0	0	
Polybrominated biphenyls	3152	Class 9	4	1	0	
Polybutene			0	1	0	
Polychlorinated biphenyls	2315	Class 9	2	1	0	
Polyethylene polyamines			0	1	0	
Polyphosphoric acid			3	0	1	
Polypropylene			0	2	0	
Polypropylene glycol			0	1	0	
Polypropylene glycol methyl ether			0	1	0	
Ponceau 3R			1	1	0	
Potassium arsenite	1678	Poison	3	0	0	
Potassium binoxalate			1	0	0	
Potassium bromate	1484	Oxidizer	2	0	0	OX
Potassium chlorate	1485	Oxidizer	1	0	0	OX
Potassium chromate			2	0	0	OX
Potassium cyanide	1680	Poison	3	0	0	

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			Refer to Page 550 for explanation of numbers			
Potassium dichloro-s-triazinetrione	2465	Oxidizer	3	0	2	OX
Potassium dichromate	1479	Oxidizer	2	0	2	OX
Potassium fluoride	1812	Poison	3	0	0	
Potassium hydroxide	1813	Corrosive	3	0	1	
Potassium hydroxide solution	1814	Corrosive	3	0	1	
Potassium iodide			1	0	0	
Potassium oxalate			1	0	0	
Potassium permanganate	1490	Oxidizer	1	0	1	OX
Potassium peroxide	1491	Oxidizer	3	0	1	OX
Potassium silver cyanide			3	0	0	
Progesterone			0	1	0	
Promecarb			3	1	0	
Prometryne			1	1	0	
Propadiene	2200	Flammable gas	2	4	3	
Propane sultone			2	1	0	
N- propanolamine			3	2	0	
Propargite			2	3	0	
Propellant 12	1028	Nonflammable gas	1	0	0	
Propionaldehyde	1275	Flammable	3	2	1	
Propionic anhydride	2496	Corrosive	3	2	1	
Propoxur			2	1	0	
Propylamine	1277	Flammable	3	3	0	
Propylene butylene polymer			0	2	0	
1,2-Propylenediamine	2258	Corrosive	2	3	0	
Propylene glycol			0	1	0	
Propylene glycol ethyl ether			0	2	0	
Propylene glycol methyl ether			0	3	0	
Propylene tetramer	2850	Flammable	0	1	0	
Propylene trimer	2057	Flammable	0	3	0	
n-Propyl nitrate	1865	Flammable	2	3	3	OX
Prothoate	2783	Poison	4	1	0	
Pyrene			1	2	0	
Pyrethrins	9184		2	1	0	
Pyriminil			3	1	0	
Pyrogallic acid			2	1	0	
Pyrosulfuryl chloride	1817	Corrosive	3	1	2	OX, W

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			Refer to Page 550 for explanation of numbers			
Pyrrolidine	1922	Flammable	2	3	1	
2-Pyrrolidone			2	1	0	
Quinoline	2656	Poison	2	1	0	
R 12	1028	Nonflammable gas	1	0	0	
R 22	1018	Nonflammable gas	0	0	0	
Refrigerant 12	1028	Nonflammable gas	1	0	0	
Refrigerant 22	1018	Nonflammable gas	0	0	0	
Resorcinol	2876	Poison	2	1	0	
Ricin			4	1	0	
Rubidium	1423	Dangerous when wet	3	4	3	W
Saccharin			2	1	0	
Safrole			1	1	0	
Salicylaldehyde			0	2	0	
Salicylic acid			0	1	0	
Saltpeter	1942	Oxidizer	2	0	2	OX
Saxitoxin			4	1	0	
Selenic acid	1905	Corrosive	2	0	0	
Selenium(powder)	2658	Poison	1	1	1	
Selenium dioxide	2811	Poison	1	0	0	
Selenium hexafluoride	2194	Poison gas	4	0	0	
Selenium oxychloride	2879	Corrosive	2	0	1	
Selenium trioxide			1	0	0	
Semicarbazide hydrochloride			2	1	0	
Silane	2203	Flammable gas	1	4	3	
Silica, crystalline			0	0	0	
Silica, gel			0	0	0	
Silicon dioxide (sand)			0	0	0	
Silicon (powder)	1346	Flammable solid	1	2	0	
Silver			0	0	0	
Silver acetate			0	0	0	
Silver carbonate			1	0	0	
Silver iodate			2	0	0	
Silver nitrate	1493	Oxidizer	2	0	0	OX
Silver oxide			0	0	0	

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			Refer to Page 550 for explanation of numbers			
Silver sulfate			1	0	0	
Silvex	2765	Poison	2	1	0	
Simazine			1	1	0	
Sodium alkylbenzene sulfonates			2	0	0	
Sodium alkyl sulfates			1	0	0	
Sodium amide			3	3	2	W
Sodium arsenate	1685	Poison	3	0	0	
Sodium arsenite	2027	Poison	3	0	0	
Sodium bifluoride	2439	Corrosive	3	0	1	
Sodium bisulfite	2693	Corrosive	1	0	0	
Sodium borate			0	0	0	
Sodium borohydride	1426	Dangerous when wet	3	2	1	W
Sodium borohydride (15% or less)			3	0	1	
Sodium cacodylate	1688	Poison	4	0	0	
Sodium chlorate	1495	Oxidizer	1	0	2	OX
Sodium chlorate solution	2428	Oxidizer	1	0	0	OX
Sodium chromate			2	0	0	OX
Sodium dichloro-s-triazinetrione	2465	Oxidizer	2	0	2	OX
Sodium dichromate	1479	Oxidizer	2	0	1	OX
Sodium ferrocyanide			1	0	0	
Sodium fluoride	1690	Poison	3	0	0	
Sodium fluoroacetate	2629	Poison	4	0	0	
Sodium fluorosilicate	2674	Poison	2	0	2	
Sodium hydride	1427	Dangerous when wet	3	3	2	W
Sodium hydrosulfide solution	2922	Corrosive	3	0	0	
Sodium 2-mercaptobenzothiazol solution			3	0	0	
Sodium methylate	1431	Spontaneously combustible	2	4	1	W
Sodium nitrate	1498	Oxidizer	1	0	1	OX
Sodium nitrite	1500	Oxidizer	2	0	1	OX
Sodium oxalate			1	0	0	
Sodium perchlorate	1502	Oxidizer	2	0	2	OX
Sodium persulfate			2	0	0	
Sodium phosphate	9147		0	0	0	
Sodium phosphate, tribasic			1	0	0	
Sodium phosphide	1432	Dangerous when wet	4	4	3	W

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			Refer to Page 550 for explanation of numbers			
Sodium saccharin			1	1	0	
Sodium selenate	2630	Poison	4	0	0	
Sodium selenite	2630	Poison	4	0	0	
Sodium silicate			0	0	0	
Sodium sulfate			0	0	0	
Sodium sulfide	1385	Spontaneously combustible	3	1	1	
Sodium sulfite			1	0	1	
Sodium tellurite			2	0	0	
Sodium thiocyanate			2	0	0	
Sorbitol			0	1	0	
Stannous fluoride			2	0	0	
Stearic acid			1	1	0	
Sterigmatocystin			1	1	0	
Stibine	2676	Poison gas	4	4	2	
Strontium chromate			1	0	1	W
Strychnine sulfate	1692	Poison	4	1	0	
Sucrose			0	1	0	
Sulfallate			1	1	0	
Sulfotep	1704	Poison	4	1	1	
Sulfurous acid	1833	Corrosive	3	0	2	
Sulfur pentafluoride			2	0	0	
Supracide			3	1	0	
T			4	1	0	
Tall oil			0	1	0	
Tannic acid			0	1	0	
Tar	1999	Flammable	0	2	0	
Tellurium (powder)			3	2	2	
Terbufos			4	3	0	
Terephthalic acid			0	1	0	
Terphenyl			0	1	0	
Terpinolene	2541	Flammable	1	2	0	
Testosterone and its esters			1	1	0	
Tetrabutyl titanate			0	2	0	
2,3,7,8- Tetrachlorodibenzofurans			4	1	0	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	2378		4	1	0	
Tetrachlorvinphos			1	1	0	
Tetradecanol			0	1	0	

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			Refer to Page 550 for explanation of numbers			
1-Tetradecene			0	1	0	
Tetradecyl benzene			0	1	0	
Tetraethyl dithiopyrophosphate	1704	Poison	4	1	1	
Tetraethylene glycol			1	1	0	
Tetraethylene pentamine	2320	Corrosive	2	1	0	
Tetraethyl tin			3	3	0	
Tetrafluorohydrazine	1955		2	1	3	
Tetrafluoromethane	1982	Nonflammable gas	0	0	0	
Tetrahydronaphthalene			1	2	0	
1,2,3,5-Tetramethylbenzene			0	2	0	
Tetramethyl lead			3	3	3	
Tetramethylsilane	2749	Flammable	2	4	0	
Tetrodotoxin			4	1	0	
Thallium			3	1	0	
Thallium acetate			3	0	0	
Thallium carbonate			3	0	0	
Thallium nitrate	2727	Poison	3	0	0	
Thallium sulfate	1707	Poison	3	0	0	
Thallos carbonate			3	0	0	
Thallos chloride			3	0	0	
Thallos malonate			3	0	0	
Thallos sulfate			3	0	0	
4-Thiapentanal	2785	Poison	2	1	0	
Thioacetamide			2	1	0	
Thioacetic acid	2436	Poison	2	3	0	
Thiobencarb			1	1	0	
Thiocarbazide			2	1	0	
4,4'-Thiodianiline			2	1	0	
Thiodiglycol			2	1	0	
Thiofanox			3	1	0	
Thionazin	3018		4	1	0	
Thiophosgene	2474	Poison	1	1	1	W
Thiosemicarbazide			3	1	0	
Thiram	2771	Poison	2	1	0	
Thorium dioxide			2	1	0	R
Thorium nitrate	2976	Radioactive	1	1	0	OX,R
Titanium dioxide			0	0	0	

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			Refer to Page 550 for explanation of numbers			
p-Toluene sulfonic acid	2585	Corrosive	3	1	0	
Toxaphene	2761	Poison	3	0	0	
2,4,5-TP (or Silvex)	2765	Poison	2	1	0	
Triamiphos			3	1	0	
Triaziquone			2	1	0	
Triazofos			2	1	0	
Tributylamine	2542	Corrosive	3	2	0	
Tributyl phosphate			2	1	0	
Tricarbonyl methyl cyclopentadienyl manganese			3	1	1	
Trichlorfon	2783	Poison	2	1	0	
Trichloroacetic acid	1839	Corrosive	2	0	0	
Trichlorobenzene	2321	Keep away from food	2	1	0	
1,2,4-Trichlorobenzene	2321	Poison	2	1	0	
Trichlorobutene	2322	Poison	2	1	0	
Trichloro(chloromethyl)silane			3	2	1	W
Trichlorofluoromethane			1	0	0	
Trichloronate			3	1	0	
2,4,6-Trichlorophenol	2020	Poison	2	0	0	
2,4,5-Trichlorophenoxyacetic acid	2765	Poison	2	1	0	
2,4,5-Trichlorophenoxyacetic acid, sodium salt			2	1	0	
2-(2,4,5-Trichlorophenoxy)propanoic acid	2765	Poison	2	1	0	
2-(2,4,5-Trichlorophenoxy)propanoic acid, isooctyl ester			2	1	0	
Trichlorophenylsilane			3	2	0	
1,2,3-Trichloropropane			1	2	0	
Trichloro-s-triazinetriene	2468	Oxidizer	2	0	0	OX
Trichlorotrifluoroethane			0	0	0	
1,1,2-Trichloro-1,2,2-trifluoroethane			0	0	0	
Tri-p-cresyl phosphate	2574	Poison	2	1	0	
Tridecane			0	2	0	
Tridecanol			0	1	0	
1-Tridecene			0	2	0	
Tridecyl benzene			1	1	0	
Triethanol amine			2	1	1	
Triethoxysilane			2	3	0	
Triethyl aluminum			3	4	3	W

Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors.
"R" under special situations signifies a radioactivity hazard.

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Triethyl benzene			1	2	0	
Triethylene glycol			1	1	0	
Triethylene thiophosphoramidate			3	1	0	
Triethyl phosphate			0	1	1	
Triethyl phosphite	2323	Flammable	1	2	0	
Trifluoroacetic acid	2699	Corrosive	3	1	0	
3-Trifluoromethylaniline	2948	Poison	3	1	0	
Trifluralin			1	1	0	
Triisobutylene	2324	Flammable	1	2	0	
Triisopropanol amine			2	1	0	
Trimethylacetic acid			2	2	0	
Trimethylacetyl chloride	2438	Corrosive	3	3	2	W
2,4,6-Trimethyl aniline			2	1	0	
Trimethyl benzene	2325	Flammable	0	2	0	
Trimethylhexamethylenediamine	2327	Corrosive	1	1	0	
Trimethylhexamethylene diisocyanate	2328	Poison	2	2	1	
Trimethyl phosphite	2329	Flammable	1	2	0	
Trimethyl tin chloride			3	2	0	
Trinitrobenzene (dry or wetted with <30% water)	0213	Explosive 1.1D	2	4	4	
Trinitrobenzene (wetted with >30% water)	1354	Flammable solid	2	4	2	
Trinitrobenzoic acid (dry or wetted with <30% water)	0215	Explosive 1.1D	2	3	3	
Trinitrobenzoic acid (wetted with >30% water)	1355	Flammable solid	2	3	2	
Triphenyl tin chloride			3	2	0	
Tripropylene glycol			0	1	0	
Tripropylene glycol methyl ether			0	1	0	
Tris(aziridinyl)phosphine oxide	2501	Corrosive	3	0	2	
Tris-(2,3-dibromopropyl) phosphate			1	1	0	
Trithion			4	1	0	
Trixylenyl phosphate			2	1	0	
Trypan blue			0	1	0	
Undecane	2330	Flammable	0	2	0	
Undecanoic acid			1	1	0	
Undecanol			1	1	0	
1-Undecene			0	1	0	

Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors.
 "R" under special situations signifies a radioactivity hazard.

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
n-Undecylbenzene			1	1	0	
Uracil mustard			4	0	0	
Uranium hexafluoride	2978	Radioactive	4	0	2	W, R
Uranium metal (pyrophoric)	2979	Radioactive	3	4	4	W, R
Uranium peroxide			4	0	0	R
Uranyl acetate	9180		4	0	1	R
Uranyl nitrate	2981	Radioactive	4	0	0	OX,R
Uranyl sulfate			4	0	0	R
Urea			0	0	0	
Urea-ammonium nitrate solution			2	0	0	
Urethane			1	1	0	
Valeraldehyde	2058	Flammable	1	3	0	
Valeric acid	1760	Corrosive	2	1	0	
Vanadium	3285		3	2	0	
Vanadium pentoxide	2862	Poison	1	0	0	OX
Vanadyl sulfate	2931	Poison	1	0	0	
Vinyl acetylene			2	4	3	
Vinyl allyl ether			2	3	2	
Vinyl isobutyl ether	1304	Flammable	2	3	2	
Vinyl neodecanoate			2	2	1	
Xenon	2036	Nonflammable gas	0	0	0	
Xylenol	2261	Poison	2	2	0	
2,6-Xylidine	1711	Poison	3	1	0	
Zectran			3	1	0	
Zinc	1436	Dangerous when wet	0	2	2	W
Zinc acetate	9153		2	0	0	
Zinc ammonium chloride	9154		2	0	0	
Zinc arsenate	1712	Poison	3	0	0	
Zinc bichromate			1	0	1	OX
Zinc borate			2	0	0	
Zinc bromide	9156		1	0	0	
Zinc carbonate	9157		1	0	0	
Zinc chloride	2331	Corrosive	1	0	0	
Zinc chromate			2	0	0	OX
Zinc cyanide	1713	Poison	3	0	0	
Zinc dialkyldithiophosphate			3	1	0	

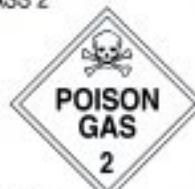
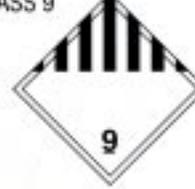
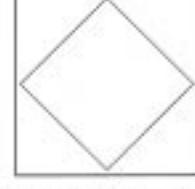
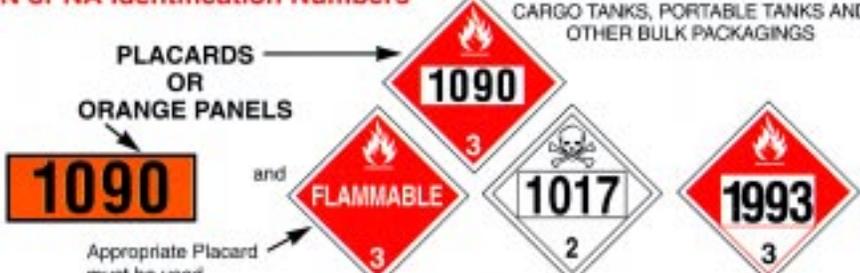
Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors.
 "R" under special situations signifies a radioactivity hazard.

Chemical Name	UN/NA#	DOT Placard	Health	Fire	Reactivity	Special Situations
			Refer to Page 550 for explanation of numbers			
Zinc dithionite	1931	Class 9		0	1	
Zinc fluoride	9158		2	0	0	
Zinc fluoroborate			2	0	0	
Zinc fluorosilicate	2855	Poison	2	0	0	
Zinc formate	9159		1	0	0	
Zinc nitrate	1514	Oxidizer	1	0	0	OX
Zinc oxide			0	0	0	
Zinc phenolsulfonate	9160		1	0	0	
Zinc potassium chromate			2	1	0	
Zinc sulfate	9161		0	0	0	
Zineb			1	1	1	
Ziram			1	1	0	
Zirconium	2008	Spontaneously combustible	1	4	1	
Zirconium acetate			1	0	0	
Zirconium nitrate	2728	Oxidizer	1	0	0	OX
Zirconium oxychloride			3	0	0	
Zirconium potassium fluoride	9162		2	0	0	
Zirconium sulfate	9163	Corrosive	0	0	0	
Zirconium tetrachloride	2503	Corrosive	3	0	2	W
Zylylene dichloride			2	1	0	

Notes: NFPA -704 designations shown in green are from NFPA49 or NFPA325. Those in black are designations assigned by the authors. "R" under special situations signifies a radioactivity hazard.

DOT Placards - Chart 10

Hazardous Materials Warning Placards

<p>CLASS 1</p>  <p>EXPLOSIVES *Enter Division Number 1.1, 1.2, or 1.3 and compatibility group letter, when required. Placard any quantity.</p>	<p>CLASS 1</p>  <p>EXPLOSIVES 1.4 *Enter compatibility group letter, when required. Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 1</p>  <p>EXPLOSIVES 1.5 *Enter compatibility group letter, when required. Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 1</p>  <p>EXPLOSIVES 1.6 *Enter compatibility group letter, when required. Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 2</p>  <p>OXYGEN Placard 454 kg (1,001 lbs) or more, gross weight of either compressed gas or refrigerated liquid.</p>
<p>CLASS 2</p>  <p>FLAMMABLE GAS Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 2</p>  <p>NON-FLAMMABLE GAS Placard 454 kg (1,001 lbs) or more gross weight.</p>	<p>CLASS 2</p>  <p>POISON GAS Placard any quantity of Division 2.3 material.</p>	<p>CLASS 3</p>  <p>FLAMMABLE Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 3</p>  <p>GASOLINE May be used in place of FLAMMABLE on a placard displayed on a cargo tank or a portable tank being used to transport gasoline by highway.</p>
<p>CLASS 3</p>  <p>COMBUSTIBLE Placard a combustible liquid when transported in bulk. See §172.304(k)(2) for use of FLAMMABLE placard in place of COMBUSTIBLE placard.</p>	<p>CLASS 3</p>  <p>FUEL OIL May be used in place of COMBUSTIBLE on a placard displayed on a cargo tank or portable tank being used to transport by highway fuel oil not classed as a flammable liquid.</p>	<p>CLASS 4</p>  <p>FLAMMABLE SOLID Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 4</p>  <p>SPONTANEOUSLY COMBUSTIBLE Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 4</p>  <p>DANGEROUS WHEN WET Placard any quantity of Division 4.3 material.</p>
<p>CLASS 5</p>  <p>OXIDIZER Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 5</p>  <p>ORGANIC PEROXIDE Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 6</p>  <p>HARMFUL KEEP AWAY FROM FOOD Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 6</p>  <p>POISON Placard any quantity of 6.1, PGI, inhalation hazard only. Placard 454 kg (1,001 lbs) or more of PGI or II, other than PGI inhalation hazard.</p>	<p>CLASS 7</p>  <p>RADIOACTIVE Placard any quantity of packages bearing the RADIOACTIVE label. Certain low specific activity radioactive materials in "exclusive use" will not bear the label, but RADIOACTIVE placard is required.</p>
<p>CLASS 8</p>  <p>CORROSIVE Placard 454 kg (1,001 lbs) or more.</p>	<p>CLASS 9</p>  <p>MISCELLANEOUS Not required for domestic transportation. Placard 454 kg (1,001 lbs) or more gross weight of a material which presents a hazard during transport, but is not included in any other hazard class.</p>	<p>DANGEROUS Placard 454 kg (1,001 lbs) gross weight of two or more categories of hazardous materials listed in Table 2. A freight container, unit load device, motor vehicle, or rail car which contain non-bulk packagings with two or more categories of hazardous materials that require placards specified in Table 2 may be placarded with a DANGEROUS placard instead of the separate placarding specified for each of the materials in Table 2. However, when 2,268 kg (5,000 lbs) or more of one category of material is loaded at one facility, the placard specified in Table 2 must be applied.</p>		<p>SUBSIDIARY RISK PLACARD</p>  <p>Class numbers do not appear on subsidiary risk placard.</p>
<p>RAIL Placard empty tank cars for residue of material last contained.</p> 	 <p>Required background for placards on rail shipments of certain explosives and poisons. Also required for highway auto-controlled quantities of radioactive materials (see §§172.307 and 172.516).</p>	<p>UN or NA Identification Numbers</p> <p>MUST BE DISPLAYED ON TANK CARS, CARGO TANKS, PORTABLE TANKS AND OTHER BULK PACKAGINGS</p> <p>PLACARDS OR ORANGE PANELS</p>  <p>Appropriate Placard must be used.</p>		

Response begins with identification!
Response begins with identification!

Hazardous Materials Warning Labels

<p>CLASS 1 Explosive 1.1, 1.2, 1.3</p>  <p>*Include appropriate division number and compatibility group letter.</p>	<p>CLASS 1 Explosive 1.4</p>  <p>*Include appropriate compatibility group letter.</p>	<p>CLASS 1 Explosive 1.5</p>  <p>*Include appropriate compatibility group letter.</p>	<p>CLASS 1 Explosive 1.6</p>  <p>*Include appropriate compatibility group letter.</p>	<p>CLASS 2 Division 2.1</p>  <p>Flammable gas</p>	<p>CLASS 2 Division 2.2</p>  <p>Non-flammable gas</p>	<p>CLASS 2 Division 2.2</p>  <p>Oxygen</p>
<p>CLASS 2 Division 2.3</p>  <p>Poison gas</p>	<p>CLASS 3</p>  <p>Flammable liquid</p>	<p>CLASS 4 Division 4.1</p>  <p>Flammable solid</p>	<p>CLASS 4 Division 4.2</p>  <p>Spontaneously Combustible</p>	<p>CLASS 4 Division 4.3</p>  <p>Dangerous when wet</p>	<p>CLASS 5 Division 5.1</p>  <p>Oxidizer</p>	<p>CLASS 5 Division 5.2</p>  <p>Organic peroxide</p>
<p>CLASS 6 Division 6.1</p>  <p>Poison-Packing Group I and II</p>	<p>CLASS 6 Division 6.1</p>  <p>Poison-Packing III</p>	<p>CLASS 6 Division 6.2</p>  <p>Infectious substance</p>	 <p>42 CFR 72.3 (Biological agent label may apply.)</p>	<p>CLASS 7 I</p>  <p>7</p>	<p>CLASS 7 II</p>  <p>7</p>	<p>CLASS 7 III</p>  <p>7</p>
<p>CLASS 8</p>  <p>Corrosive</p>	<p>CLASS 9</p> 	<p>SUBSIDIARY RISK LABELS</p>  <p>Explosive Flammable gas Flammable liquid Flammable solid Corrosive Oxidizer Poison Spontaneously Combustible Dangerous when wet</p> <p>The class number may not be displayed on a subsidiary label (see Section 172.402).</p>		<p>EMPTY</p>	<p>FOR AIRCRAFT</p> <p>Cargo Aircraft Only</p>  	
<p>TRANSITION-2001</p>  <p>EXPLOSIVE A</p>	<p>TRANSITION-2001</p>  <p>EXPLOSIVE B</p>	<p>TRANSITION-2001</p>  <p>EXPLOSIVE C</p>	<p>TRANSITION-2001</p>  <p>BLASTING AGENT</p>	<p>TRANSITION-2001</p>  <p>CHLORINE</p>	<p>TRANSITION-2001</p>  <p>FLAMMABLE SOLID</p>	<p>TRANSITION-2001</p>  <p>IRRITANT</p>

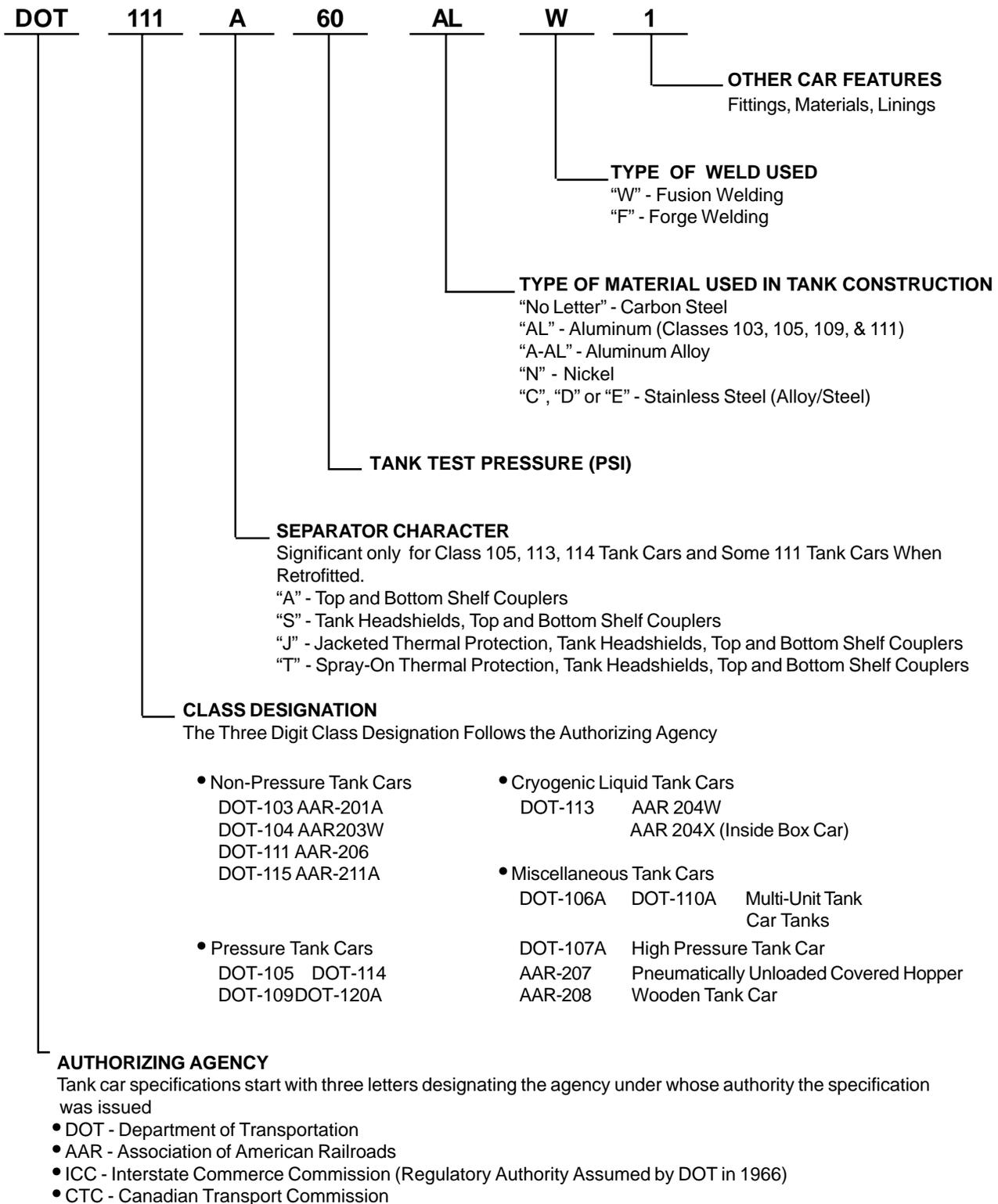
HAZARDOUS MATERIALS PACKAGE MARKINGS

<p>INNER PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS</p> <p>§173.25(a)(4)</p>  <p>§172.312(a)</p>	<p>MARINE POLLUTANT</p> <p>§172.322</p> 	<p>HOT</p> <p>§172.325</p> 	<p>HAZARD</p> <p>The loading of THIS only has been authorized by the following DOT TRAINING UNIT:</p> <p>Name of person (last, first, or full)</p> <p>DATE OF TRAINING (month, day, year)</p> <p>§173.9</p>	<p>INHALATION HAZARD</p> <p>§172.313(a)</p> 	<p>CONSUMER COMMODITY</p> <p>ORM-D</p> <p>§172.316(a)</p>	<p>CONSUMER COMMODITY</p> <p>ORM-D-AIR</p> <p>§172.316(a)(1)</p> 
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Keep a copy of the DOT Emergency Response Guidebook handy!

**Silhouettes of Rail Cars,
Tank Trucks and
Chemical Tanks**

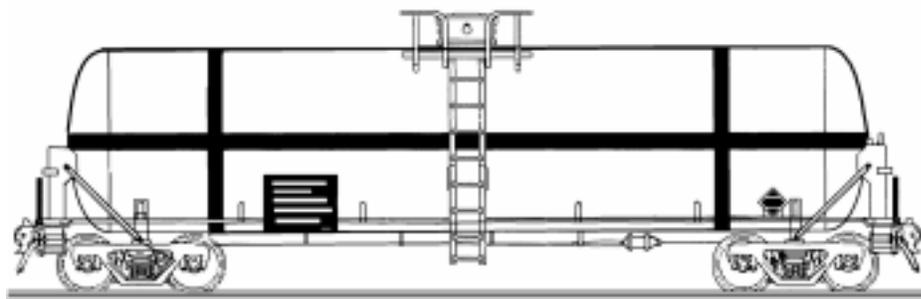
Railroad Tank Car Marking System



Pressure Cars

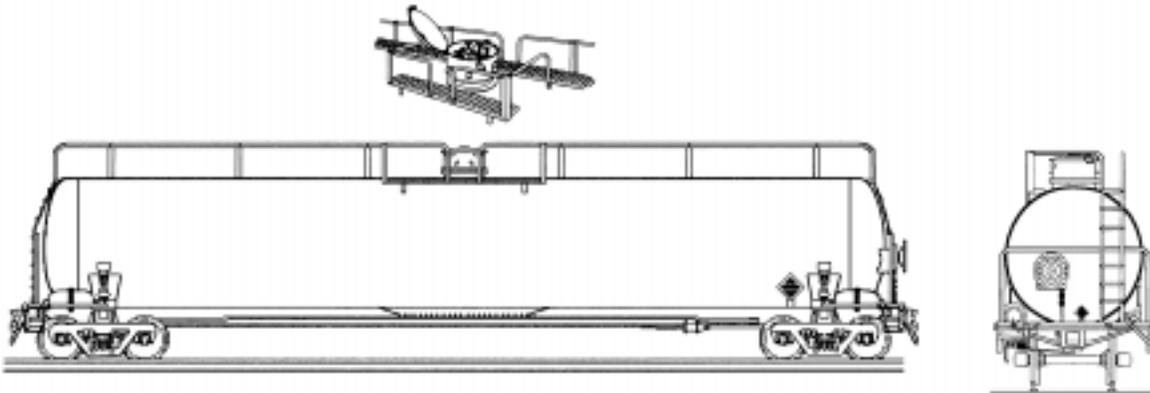
Pressure cars are used to transport hazardous materials under pressure or hazardous materials which the DOT or the shipper feel require the additional protection of a stronger car. The most common types of pressurized cars used in rail transportation are the DOT 105, 112 and 114. Drawings of 105's and 112's can be found in this Appendix. The DOT 114 is the same as the DOT 112 except that the 112 has bottom outlets and washouts. DOT Car Types 107 And 109 are also pressurized cars. DOT Types 106 and 110 pressurized, multi-unit tank cars are one-ton cylinders which can also be transported by highway. As a general rule, safety valves are set at a pressure to match vapor pressure of product at 105° F.

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
A-3 — Class 105	
DOT 105J100W Thermal Protection. Head Protection. Safety Valves (75 psi).	Ethylene Oxide Liquefied Petroleum Gas Liquefied Hydrocarbon Gas
DOT 105J200W Thermal Protection. Head Protection. Safety Valve (150 psi).	Sulfur Dioxide Vinyl Chloride Liquefied Petroleum Gas
DOT 105J300W Thermal Protection. Head Protection. Safety Valve (225 psi).	Anhydrous Hydrofluoric Acid Anhydrous Ammonia Metallic Sodium Chlorine Liquefied Petroleum Gas Liquefied Hydrocarbon Gas Motor Fuel Anti-Knock Compound Vinyl Chloride
DOT 105J400W Thermal Protection. Head Protection. Safety Valve (300 psi).	Liquefied Petroleum Gas Liquefied Hydrocarbon Gas
DOT 105A500W - Hydrogen Cyanide (Hydrocyanic Acid), HCN	



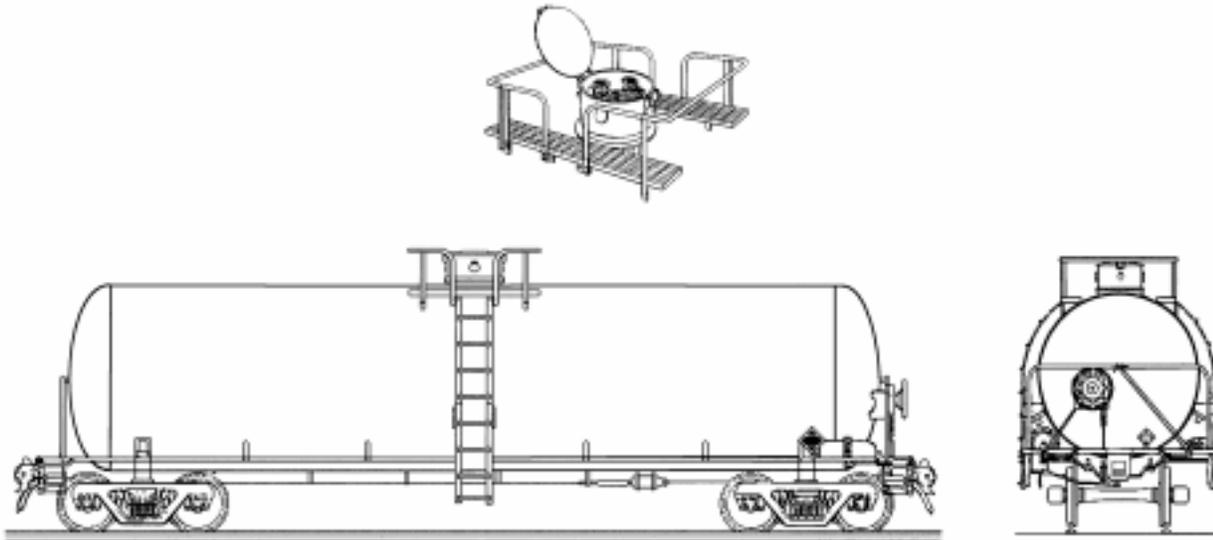
B-END

Hydrogen Cyanide is shipped in specially built cars. Pictured is a 105A500W 20,500-gallon capacity. Other cars used are the 105A600W and the 105J600W. For safety purposes, the cars may be stenciled as 300W, but have the higher-pressure safety valves. These cars have a 1-1/8" thick inner shell, 4" of cork insulation and a 1/4" outer shell. **Some HCN cars will be painted white with the red bands or "candy stripes."**

TANK DESCRIPTION**TYPICAL COMMODITIES TRANSPORTED**
(typical commodities only listed, there may be others)**DOT 105A500W Insulated — Carbon Dioxide Service**

20,000 GALLON CAPACITY - INSULATED
DOT 105A500W
FOR CARBON DIOXIDE SERVICE
(PRE 1983)

B-END

DOT 105A500W Insulated — Chlorine Service

90 TON CAPACITY - INSULATED
DOT 105A500W
FOR CHLORINE SERVICE
(POST 1982)

B-END

Insulated.
Safety Valve (375 psi) (350 psi on Carbon Dioxide Cars)

Chlorine
Carbon Dioxide
Anhydrous Hydrofluoric Acid

DOT 105J500W
Thermal Protection.
Head Protection
Safety Valve (375 psi)

Liquefied Petroleum Gas
Liquefied Hydrocarbon Gas

DOT 105A600W
Insulated.
Safety Valve (450 psi) (400 psi on Carbon Dioxide Cars).

Carbon Dioxide

DOT 105J600W
Thermal Protection.
Head Protection.
Safety Valve (450 psi)

Liquefied Petroleum Gas
Liquefied Hydrocarbon Gas

DOT 105A100ALW
Insulated.
Safety Valve (75 psi).

Fertilizer Ammoniating Solution
(Ammonium Nitrate Solution)

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
DOT 105A200ALW Insulated. Safety Valve (150 psi).	Fertilizer Ammoniating Solution (Ammonium Nitrate Solution)
DOT 105A300ALW Insulated. Safety Valve (225 psi).	Fertilizer Ammoniating Solution (Ammonium Nitrate Solution)
A-4 — Class 106A (Similar to 110A Tanks)	
DOT 106A500X Multiple Unit with Removable Steel Uninsulated Tanks. Each Tank equipped with Loading and Discharge Valve & Safety Valve or Vent Set for Pressure not Exceeding 375 psi. Popular Name is “Ton Container”.	Chlorine Anhydrous Ammonia Sulfur Dioxide Butadiene Refrigerant or Dispersant Gases
DOT 106A800X Multiple Unit with Removable Steel, Uninsulated Tanks Mounted on Underframe. Popular name is “Ton Container”. Each Tank equipped with Loading and Discharge Valves & Safety Vent Set for Pressure not Exceeding 600 psi.	Nitrosyl Chloride
A-5 — Class DOT 107A	
DOT 107A***** Multiple Unit Uninsulated High Pressure Seamless Forged & Drawn Steel Tanks. About 30 Permanently Mounted on Underframe	Helium Hydrogen Oxygen
A-6 — Class DOT 109A	
DOT 109A300W Non-Insulated or Insulated. Safety Valve (225 psi).	Nitrogen Fertilizer Solution (Ammonium Nitrate Solution) or 115° F [non-insulated])
DOT 109A100ALW Non-Insulated or Insulated. .Safety Valve (75 psi).	Nitrogen Fertilizer Solution (Ammonium Nitrate Solution)
DOT 109A200ALW Non-Insulated or Insulated Safety Valve (150 psi).	Nitrogen Fertilizer Solution (Ammonium Nitrate Solution)
DOT 109A300ALW Non-Insulated or Insulated. Safety Valve (225 psi).	Nitrogen Fertilizer Solution Ammonium Nitrate Solution)
A-7 — Class DOT110A (Similar to 106A Tanks)	
DOT 110A500W Multiple Unit with Removable Steel Tanks Mounted on Underframe. Popular name is “Ton Container”. Each Tank equipped with Loading & Discharge Valves & Safety Valve or Vent Not Exceeding 375 psi	Sulfur Dioxide Refrigerants
DOT 110A800W Multiple Unit with Removable Steel Tanks Mounted on Underframe. Popular name is “Ton Container”. Each Tank equipped with Loading & Discharge Valves & Safety Valve or Vent Not Exceeding 600 psi	Monobromotrifluoromethane
A-9 — Class DOT 111A 112A, 112S, 112J, 112T	
DOT 112A200W Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint). Safety Valve (150 psi).	Ethyl Chloride
DOT 112A340W Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint). Safety Valve (225 psi); Alternate setting 280.5 psi for Certain Commodities	
DOT 112S340W Same as DOT 112A340W Except Equipped with Head Protection	Anhydrous Ammonia
DOT 112J340W Same as DOT 112A340W Except Equipped with Head Protection and a Thermal Protection Enclosed in a Metal Jacket. No Reflective Paint Required	Liquefied Petroleum Gas

TANK DESCRIPTION**TYPICAL COMMODITIES TRANSPORTED**
(typical commodities only listed, there may be others)**DOT 112T340W**

Same as DOT 112A340W Except Equipped with Head Protection and a Non-Jacket Thermal Protection System. No Reflective Paint Required.

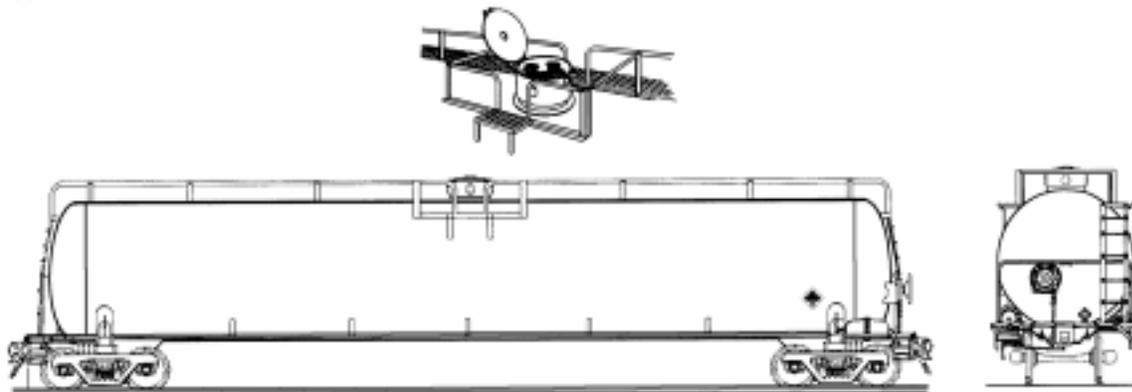
DOT 112A400W

Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint). Safety Valve (300 psi). Alternate setting 330 psi for Certain Commodities

DOT 112S440W

Same as DOT 112T400W Except Equipped with Head Protection.

Anhydrous Ammonia

DOT 112J400W

33,500 GALLON CAPACITY - NON INSULATED
DOT 112J400W

FOR PROPYLENE, LIQUEFIED PETROLEUM GAS
AND ANHYDROUS AMMONIA SERVICE

Liquefied Petroleum Gas
(V.P.) Not Exceeding 300 psi @ 115° F)
Vinyl Chloride

Same as DOT 112T400W Except Equipped with Head Protection and a Thermal Protection System. Enclosed in a Metal Jacket. No Reflective Paint Required.

DOT 112T400W

Same as DOT 112T400W Except Equipped with Head Protection and a Non-Jacket Thermal Protection System. No Reflective Paint Required.

DOT 112A500W

Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint). Safety Valve (375 psi).

DOT 112S500W

Same as DOT 112A500W Except Equipped with Head Protection.

Anhydrous Ammonia

DOT 112J500W

Same as DOT 112A500W Except Equipped with Head Protection and a Thermal Protection System. Enclosed in A Metal Jacket No Reflective Paint Required.

Liquefied Petroleum Gas
Vinyl Chloride

DOT 112T500W

Same as DOT 112A500W Except Equipped with Head Protection and a Non-Jacketed Thermal Protection System. No Reflective Paint Required.

A-10 — Class 113 (Similar to AAR204W)**DOT 113A60W**

Insulated.
Safety Valve (30 psi) (On Tank).
Safety Vent (60 psi) (On Tank).
Safety Vent (16 psi) (On Outer Shell).

Hydrogen

DOT 113A175W (Obsolete for New Construction, 10-1-84)

Insulated.
Gauging Device.
Safety Valve (115 psi) (On Tank).
Safety Vent (175 psi) (On Tank).
Safety Vent (16 psi) (On Outer Shell).

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
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A-11 — Class 114A, 114S, 114J and 114T

DOT 114A340W

Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint).
 Manway and Cover May Not be Located at Top of Tank.
 Safety Valve (225 psi). Alternate Setting 280.5 psi for Certain Commodities.
 Bottom Outlet or Washout Optional.

DOT 114S340W

Same as DOT 114A340W Except Equipped with Head Protection. Anhydrous Ammonia

DOT 114J340W

Same as DOT 114A340W Except Equipped with Head Protection and a Thermal Protection System. Enclosed in a Metal Jacket. No Reflective Paint Required. Liquefied Petroleum Gas

DOT 114T340W

Same as DOT 114A340W Except Equipped with Head Protection and a Non-Jacketed Thermal Protection System. No Reflective Paint Required.

DOT 114A400W

Non-Insulated (Upper 2/3 of Tank Must be painted with Light-Reflective Paint).
 Manway and Cover May Not be Located at Top of Tank.
 Valve and Fittings on Top of Tank.
 Safety Valve (300 psi). Alternate Setting 330 psi for Certain Commodities.

DOT 114S400W

Same as DOT 114A400W Except Equipped with Head Protection. Anhydrous Ammonia

DOT 114J00W

Same as DOT 114A400W Except Equipped with Head Protection and a Thermal Protection System Enclosed in a Metal Jacket. No Reflective Paint Required. Liquefied Petroleum Gas

DOT 114T400W

Same as DOT 114A400W Except Equipped with Head Protection and a Non-Jacketed Thermal Protection System. No Reflective Paint Required.

AAR TANK CARS: AAR tank cars are for non-regulated commodity services. Most AAR tank cars have DOT counter parts.

B-1 — Class AAR 203

AAR 203W (Obsolete for New Construction)

Non-Insulated or Insulated.	Vegetable Oils
Safety Valve (35 ⁺ psi) or Safety Vent (45 psi).	Fish Oils
These Cars Conform, with Certain	Wine
Exceptions, to Class DOT 103W.	Clay
	Latex

B-2 — Class AAR 204 (Similar to DOT 113A)

AAR 204W

Insulated.	Liquid Argon
Safety Valve (38 psi) (On Tank).	Liquid Nitrogen
Safety Vent (45 psi) (On Tank).	Liquid Oxygen
Safety Vent (17 psi) (On Outer Shell)	

B-3 — Class AAR 206 (Similar to DOT 115A)

AAR 206W

Tank Cars are Insulated Non-Pressure having an Inner Container. These cars conform, with Certain Exceptions, to Class DOT 115A.

AAR207AAW— AAR207A**ALW**

Non Insulated or Insulated.	Cement
Special Granular Non-Regulatory Commodities.	Granular Commodities
Designed for 15 PSIG Minimum Internal Pressure.	

ICC TANK CARS

Beginning in 1968, the currently effective ICC tank car classes were redesigned DOT. However, the marking on existing cars of the affected classes is optional and the majority are still marked ICE. (Tank cars of classes no longer effective for new construction, such as riveted and forge welded, remain with ICC markings. For characteristics and typical commodities, see the corresponding DOT classes)

THE PRECEDING MATERIAL WAS MEANT TO PROVIDE A GENERAL DESCRIPTION ONLY, NOT COMPLETE SPECIFICATIONS.

* Cars built prior to January 1, 1959, may be equipped with (2) 25 psi safety valves.

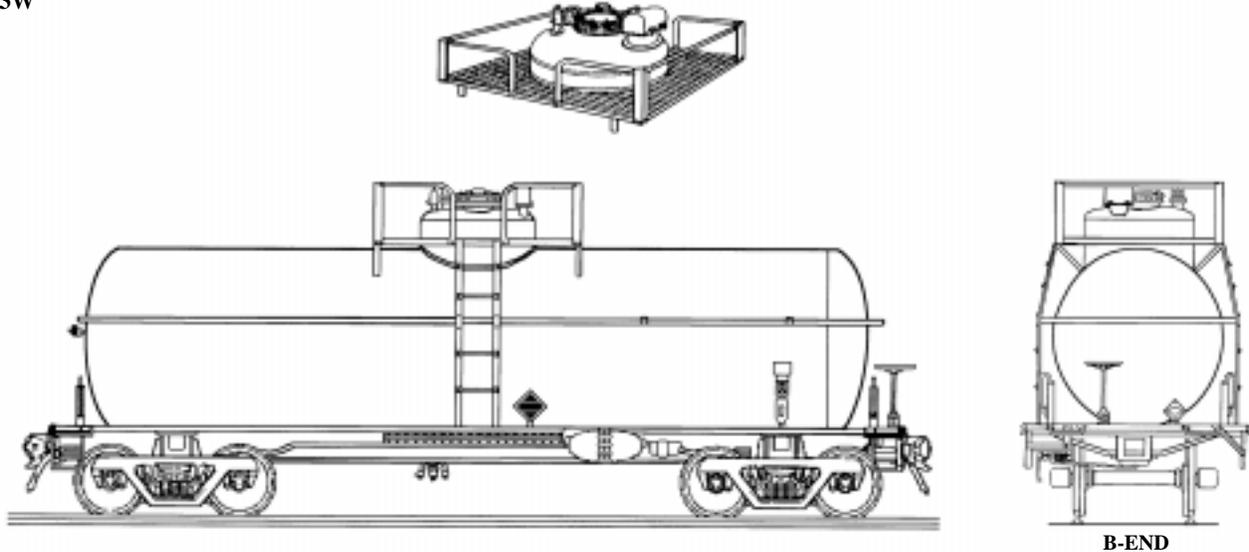
Non-Pressure Cars

DOT Car Types 103, 104, 111, 115 And AAR Car Types 204, 206 And 211 Are Non-Pressure Cars. These Cars Are Used To Transport Commodities Such As Corn Syrup, Edible Oils And Other General Commodities As Well As A Variety Of Hazardous Materials. **The Most Commonly Used Non Pressure Cars Are Types 103 And 111. Drawings Of Several (Not All) Of These Two Types Are Found In This Appendix.**

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
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A-1 — Class 103

DOT 103W



**10,000 GALLON CAPACITY - INSULATED
FOR GENERAL SERVICE COMMODITIES**

Non-Insulated or Insulated.
General Service.
Safety valves (35* psi) or Safety Vent (60 psi)

Phosphorus, Benzene, Gasoline, Vegetable Oil, Caustic Soda,
Fuel Oil, Alcohol

DOT 103AW

Non-Insulated or Insulated.
Acid Service.
Safety valves (35* psi) or Safety Vent (60 psi).

Sulfuric Acid
Oleum
Aqueous Hydrofluoric Acid 60% to 80%
Titanium Tetrachloride

DOT 103ANW

Non-Insulated or Insulated.
Safety Valve (35* psi) or Safety Vent (60 psi).

Phosphorous Oxychloride
Phosphorus Trichloride
Benzyl Chloride
Chloroacetyl Chloride

DOT 103ALW

Non-Insulated or Insulated.
Safety Valves (35* psi) or Safety Vent (60 psi).

Acetic Acid, Acetic Anhydride,
Acrylonitrile, Ethylene Glycol,
Glycerine, Butraldehyde,
Hydrogen Peroxide (Under 52% by weight), Fatty Acids

DOT 103A-ALW

Non-Insulated or Insulated.
Safety Valves (35* psi) or Safety Vent (60 psi).

Hydrogen Peroxide
Hydrazine
Nitric Acid (80% or more)

DOT 103BW

Non-Insulated or Insulated.
Rubber Lined Tank.
Safety Vent (60 psi).

Hydrochloric Acid not over 38% by weight
Zinc Chloride
Phosphoric Acid
Ferric Chloride
Aluminum Sulfate

* Cars built prior to January 1, 1959, may be equipped with (2) 25 psi safety valves.

** Cars built prior to January 1, 1959, may be equipped with 45 psi safety valve.

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
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DOT 103CW Non-Insulated or Insulated. Safety Valve (35 ** psi)	Nitric Acid Hydrazine Chlorosulfonic Acid Formic Acid
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DOT 103DW Non-Insulated Or Insulated. Safety Valve (35+psi).Or Safety Vent (60 psi)	Acetic Acid, Whiskey Ethyl Alcohol, Caramel Fruit Juices, Vegetable Juices
---	--

DOT 103EW Non-Insulated or Insulated. Safety Valve (35* psi) or Safety Vent (60 psi).	Phosphoric Acid Chlorosulfonic Acid Diisooctyl Acid Phosphate
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A-2 — Class 104

DOT 104W Insulated. Safety Valves (35* psi) or Safety Vent (60 psi)	Ethyl Ether Casinghead Gasoline Refined Vegetable Oils
--	--

A-8 — Class DOT111A

DOT 111A60W1 (DOT 111A60F1) * Non-Insulated or Insulated. Safety Valve (35 psi) or Safety Vent (60 psi).	Benzene Gasoline Alcohol Caustic Soda Fuel Oil
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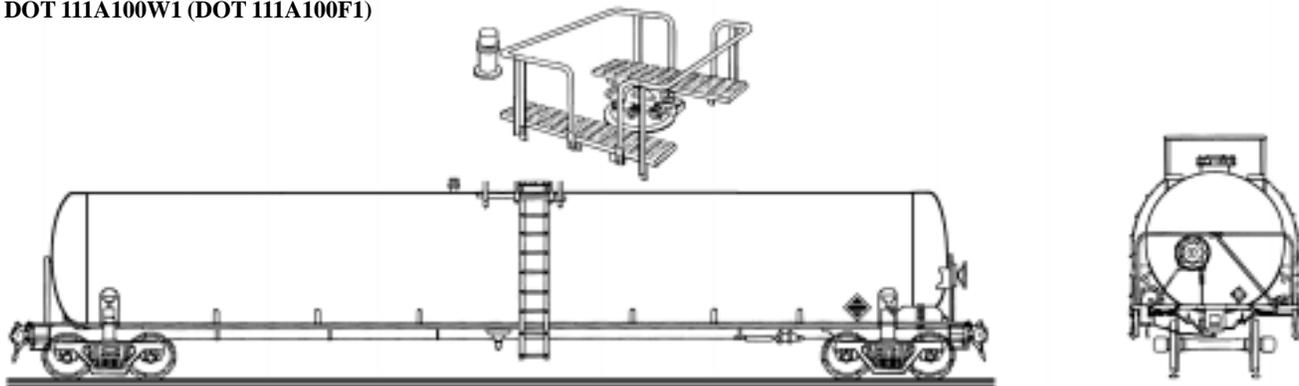
DOT 111A60W2 Non-Insulated or Insulated. Safety Valve (35 psi) (Required on Certain Commodities) or Safety Vent (60 psi).	Aqueous Hydrofluoric Acid, 60% to 80% Mixed Acid Sulfuric Acid Titanium Tetrachloride
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DOT 111A60W5 Non-Insulated or Insulated. Rubber Lined Tank. Safety Vent (60 psi).	Hydrochloric Acid not over 38% by weight Phosphoric Acid Aluminum Sulfate
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DOT 111A60W7 Non-Insulated or Insulated. Safety Valve (35 psi) or Safety Vent (60 psi)	Oleum
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DOT 111A60ALW1 Non-Insulated or Insulated. Safety Valve (35 psi) or Safety Vent (60 psi)	Acetic Acid, Acetic Anhydride, Acrylonitrile, Fatty Acids Ethylene Glycol, Glycerine, Butraldehyde, Hydrogen Peroxide (under 52% by Weight)
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DOT 111A100W1 (DOT 111A100F1)



26,000 GALLON CAPACITY - NON INSULATED
DOT - 111A100W1
FOR GENERAL SERVICE COMMODITIES
.2181"/FT TOP & BOTTOM SLOPE

Non-Insulated or Insulated. Safety Valve (75 psi) or Safety Vent (100 psi)	Kerosene, Gasoline, Fuel Oil, Vegetable Oils, Phosphorus
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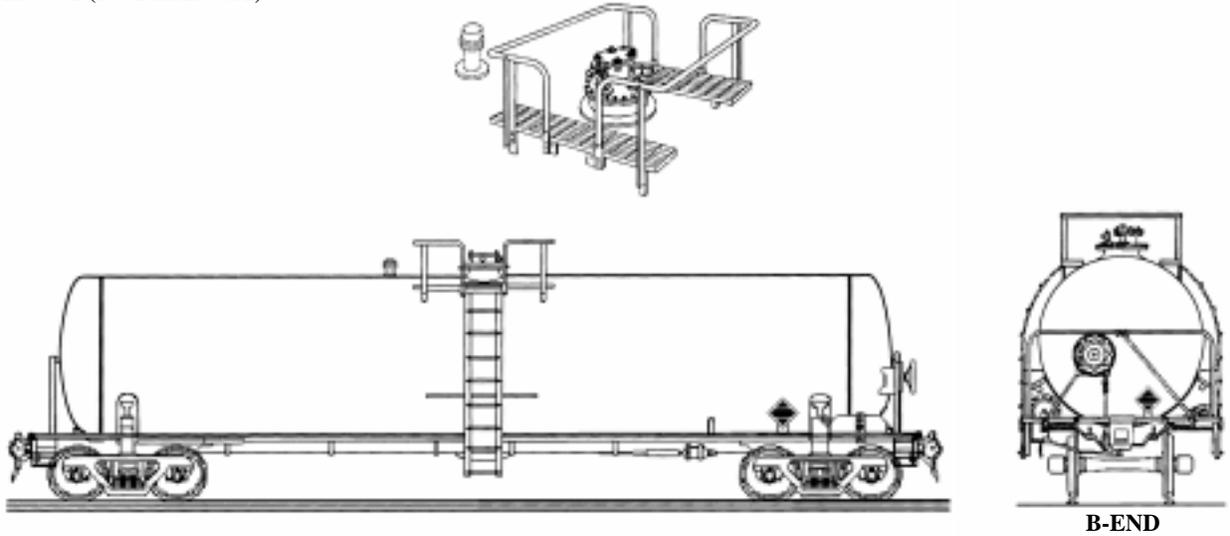
* Cars built prior to January 1, 1959, may be equipped with (2) 25 psi safety valves.

** Cars built prior to January 1, 1959, may be equipped with 45 psi safety valve.

TANK DESCRIPTION

TYPICAL COMMODITIES TRANSPORTED
(typical commodities only listed, there may be others)

DOT 111A100W2 (DOT 11A100F2)*



13,600 GALLON CAPACITY - NON INSULATED
DOT - 111A100W2
FOR SULFURIC ACID SERVICE
(POST 1982)

Safety Valve (75 psi) or Safety Vent (100 psi)
Non-Insulated or Insulated.
Safety Valve (75 psi) (Required on Certain
Commodities) or Safety Vent (100 psi)

Vegetable Oils, Phosphorus, Aqueous Hydrofluoric
Acid (60% to 80%), Mixed Acid, Sulfuric Acid

DOT 111A100W3

Insulated.
Safety Valve (75 psi) or Safety Vent (100 psi)

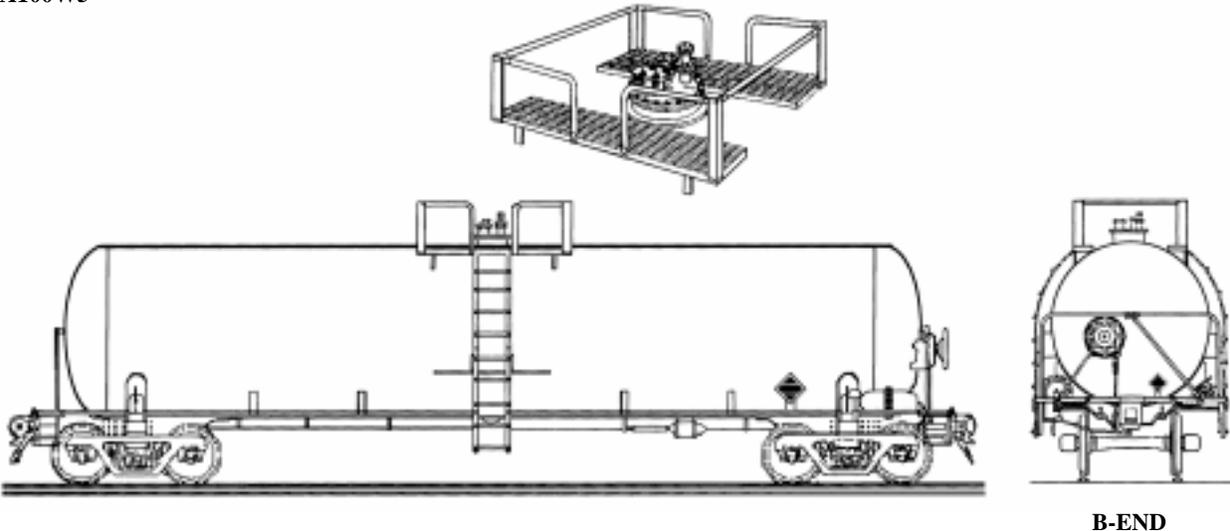
Casinghead Gasoline, Ethyl Ether

DOT 111A100W4

Insulated.
Safety valve (75 psi).

Aqua Ammonia Solution containing Anhydrous Ammonia

DOT 111A100W5



20,000 GALLON CAPACITY - NON INSULATED
DOT - 111A100W5
FOR HYDROCHLORIC ACID SERVICE
(PRE 1983)

Non-Insulated or Insulated.
Rubber-Lined Tank.
Safety Vent (100 psi).

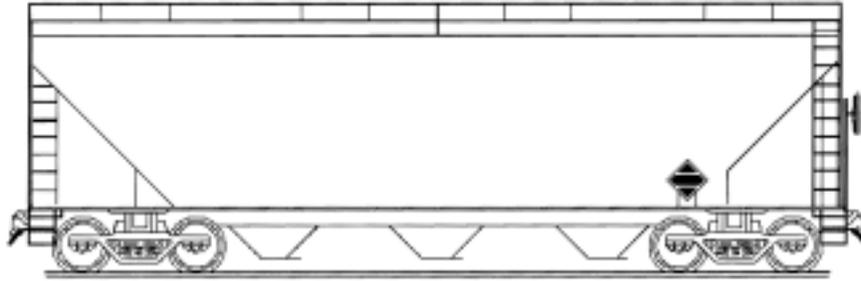
Hydrochloric Acid not over 38% by weight,
Phosphoric Acid, Aluminum Sulfate

TANK DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED (typical commodities only listed, there may be others)
DOT 111A100W6 Non-Insulated or Insulated. Safety valve (75 psi) or Safety Vent (100 psi).	Acetic Acid, Caprolactam, Hydrazine, Fruit Juices, Vegetable Juices, Whiskey
A-12— DOT115A (Similar to AAR206W)	
DOT 115A60W1 Insulated (Tank-Within-A-Tank) Safety Valve (35 psi) or Safety Vent (45 psi).	Latex, Methyl Methacrylate (Proposed)
DOT 115A60W6 Insulated (Tank-Within-A-Tank). Safety Valve (35 psi) or Safety Vent (45 psi).	Caramel Coloring, Corn Syrup
DOT 115A60ALW Insulated (Tank-Within-A-Tank). Safety Valve (35 psi) or Safety Vent (45 psi).	
AAR TANK CARS: AAR tank cars are for non-regulated commodity services. Most AAR tank cars have DOT counter parts.	
B-1 — Class AAR 203	
B-2 — Class AAR 204 (Similar to DOT 113A)	
AAR 204W Insulated. Safety Valve (38 psi) (On Tank). Safety Vent (45 psi) (On Tank). Safety Vent (17 psi) (On Outer Shell)	Liquid Argon, Liquid Nitrogen, Liquid Oxygen
B-3 — Class AAR 206 (Similar to DOT 115A)	
AAR 206W Tank Cars are Insulated Non-Pressure having an Inner Container. These cars conform, with Certain Exceptions, to Class DOT 115A.	
AAR207A**AW— AAR207A**ALW Non Insulated or Insulated. Special Granular Non-Regulatory Commodities. Designed for 15 PSIG Minimum Internal Pressure.	Cement Granular Commodities
B-5 — Class AAR 208	
AAR208 Non-Pressure Cars having Wood Staved Metal Hooped Tanks for the Transportation of Certain Food Stuffs or Other Acidic Products. Safety Relief Devices are Not Required	Vinegar Pickle Liquor
B-6 — Class AAR 221A	
AAR 211A60W1— AAR211A100W1 Non-Insulated or Insulated.	Corn Syrup, Molten Sulfur, Edible & Inedible Oils Latex, Wine, Glycerol
AAR 211A60W2— AAR 211A100W2 Non-Insulated or Insulated.	Phosphoric Acid, Liquid Alum
AAR 211A100W6 Non-Insulated or Insulated.	Caprolactam
AAR 211A60W7 Non-Insulated or Insulated.	Lactic Acid
AR 211A60ALW1— AAR 211A100ALW1 Non-Insulated or Insulated.	Glycerine, Glycol, Nitrogen Fertilizer Solution
ICC TANK CARS Beginning in 1968, the currently effective ICC tank car classes were redesigned DOT. However, the marking on existing cars of the affected classes is optional and the majority are still marked ICE. (Tank cars of classes no longer effective for new construction, such as riveted and forge welded, remain with ICC markings. For characteristics and typical commodities, see the corresponding DOT classes)	

THE PRECEDING MATERIAL WAS MEANT TO PROVIDE A GENERAL DESCRIPTION ONLY, NOT COMPLETE SPECIFICATIONS.

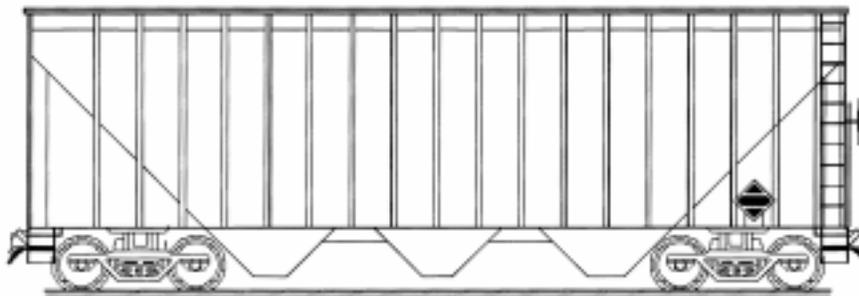
Other Rail Cars

COVERED HOPPER



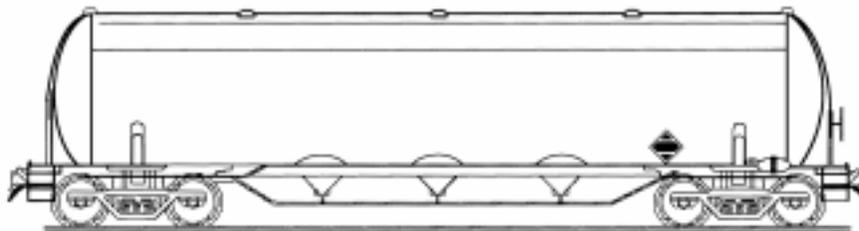
COVERED HOPPER
CARRIES CALCIUM CARBIDE, CEMENT, GRAIN

OPEN TOP HOPPER



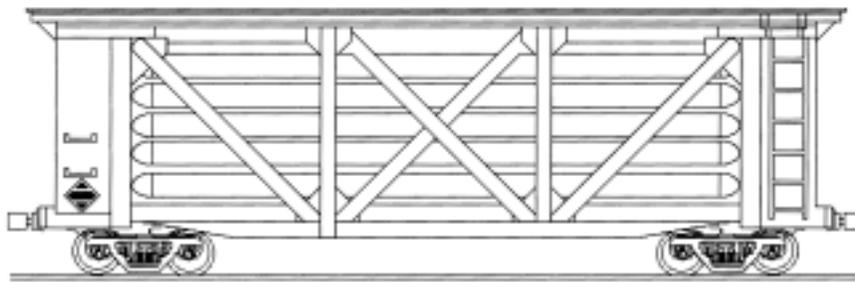
OPEN TOP HOPPER
CARRIES COAL, ROCK, SAND

PNEUMATIC HOPPER



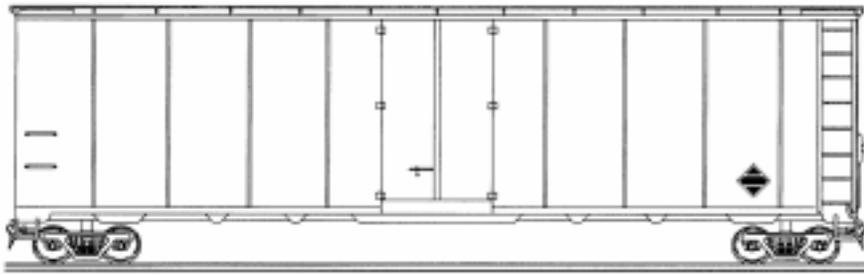
PNEUMATIC HOPPER
CARRIES PLASTIC PELLETS, FLOUR, OTHER FINE-POWDERED MATERIALS

TUBE CAR



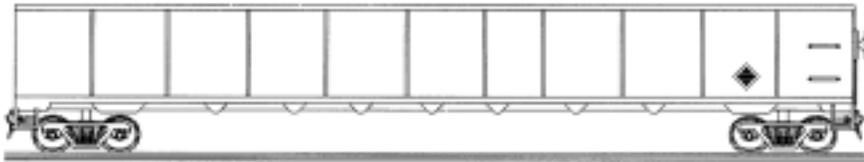
TUBE CAR
CARRIES HELIUM, HYDROGEN, METHANE, OXYGEN, OTHER GASES

BOX CAR



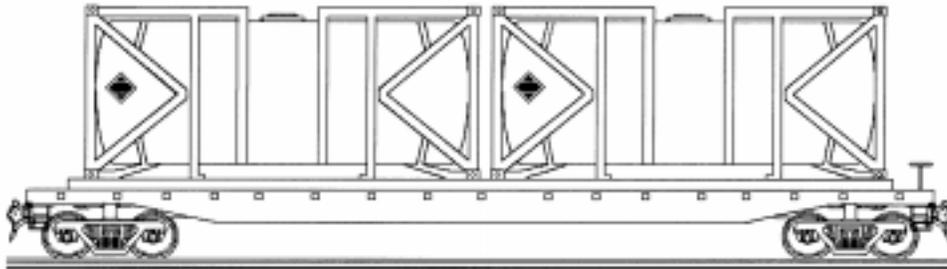
BOX CAR
CARRIES ALL TYPES OF MATERIAL AND FINISHED GOODS

GONDOLA



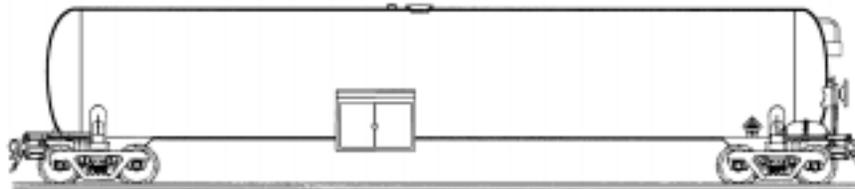
GONDOLA
CARRIES SAND, ROLLED STEEL AND OTHER PRODUCTS AND MATERIALS
THAT DO NOT REQUIRE PROTECTION FROM THE WEATHER

FLAT BED CAR WITH INTERMODAL TANKS



FLAT BED CAR WITH INTERMODAL TANKS
CARRIES VARIOUS PRODUCTS IN CONTAINERS, I.E., ONE-TON CHLORINE CYLINDERS,
INTERMODAL CONTAINERS (SHOWN), LARGE VEHICLES, OTHER COMMODITIES
THAT DO NOT REQUIRE PROTECTION FROM THE WEATHER

CRYOGENIC CAR



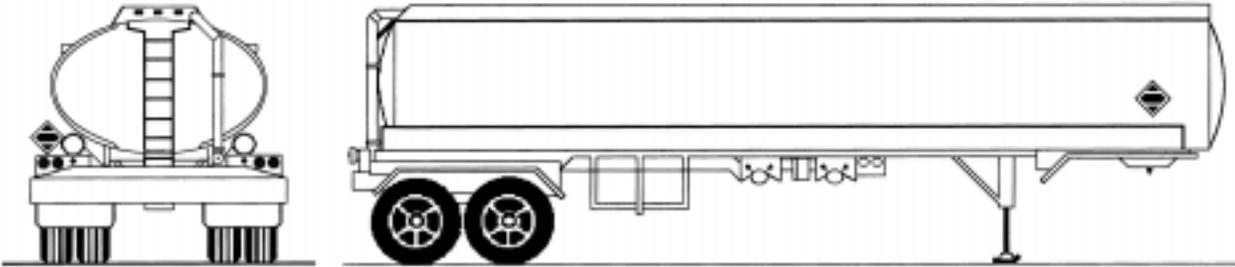
CRYOGENIC CAR
CARRIES LIQUID OXYGEN, LIQUID NITROGEN, LIQUID CARBON DIOXIDE, LIQUID HYDROGEN,
OTHER GASES THAT HAVE BEEN LIQUEFIED BY LOWERING THEIR TEMPERATURE

CARGO TANK TRUCKS

There are many variations and modifications to trailers and tankers. This material is provided as general information on the listed classifications.

TANK SPECIFICATION\DESCRIPTION	TYPICAL COMMODITIES TRANSPORTED
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DOT 406/MC 306 Non Pressure Liquid Tank

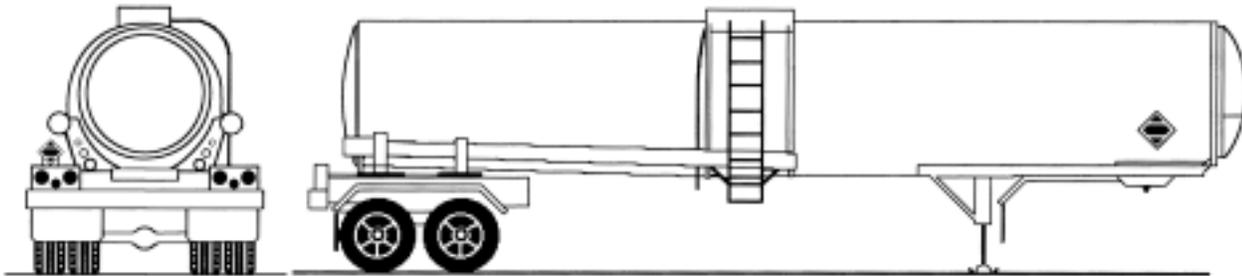


DOT 406/MC-306 ATMOSPHERIC PRESSURE TANK TRUCK 9,000 GALLONS CAPACITY GENERAL PURPOSE CARGO

OPS Pressure Less Than 3 PSI
Typical Maximum Capacity 9,000 Gallons
New Tanks Aluminum
Older Tanks Steel
Oval Shape/Multiple Compartments
Recessed Manholes/Rollover Protection
Bottom Valves
Will Likely Have Vapor Recovery

Gasoline,
Fuel Oil
Alcohol
Other Flammable/Combustible Liquids
Liquids
Liquid Fuel Products
(In Non-Coded Tankers)

DOT 407/MC 307 Low Pressure Chemical Tank

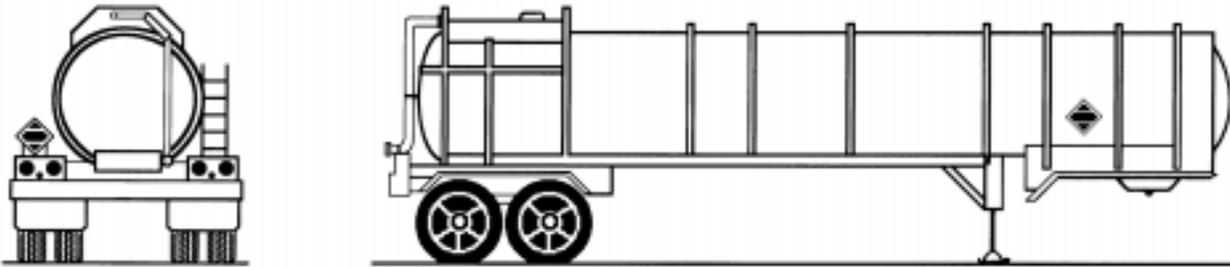


DOT 407/MC-307 LOW PRESSURE TANK TRUCK 6,000-7,000 GALLONS CAPACITY TRANSPORTS CHEMICALS, FLAMMABLE AND COMBUSTIBLE LIQUIDS

OPS @ 25-40 PSI
Typical Maximum Capacity 6,000 Gallons
May Be Rubber Lined/Steel
Single Or Double Top Manhole
Single Outlet Discharge For Each
Compartment At Bottom (Midship Or Rear)
Typically Double Shell
Stiffening Rings
Rollover Protection
May Be Multiple Compartments
Horseshoe Or Round Shaped
Unit Pictured Is Insulated And Covered With Smooth Metal Skin.
Tank Has Several Stiffing Rings

Flammable Liquids
Combustible Liquids
Acids
Caustics
Poisons

MC-312 Corrosive Liquid Tank

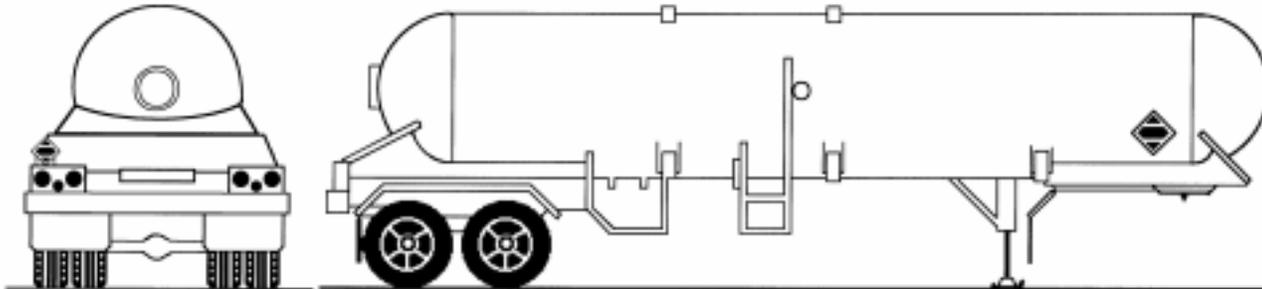


MC-312 CORROSIVE LIQUID TANK

OPS Pressure Less Than 75 PSI
 Typical Maximum Capacity 6,000 Gallons
 May Be Rubber Lined/Steel
 Stiffening Rings And Rollover Protection
 Splash Guard Provides Rollover Protection
 Top Loading At Rear Or Center
 Loading Area Typically Coated With Corrosive Resistant Material
 Small Diameter For Length (Tube Shaped)
 Typical Single Compartment

Corrosive Liquids
 Typically Acids

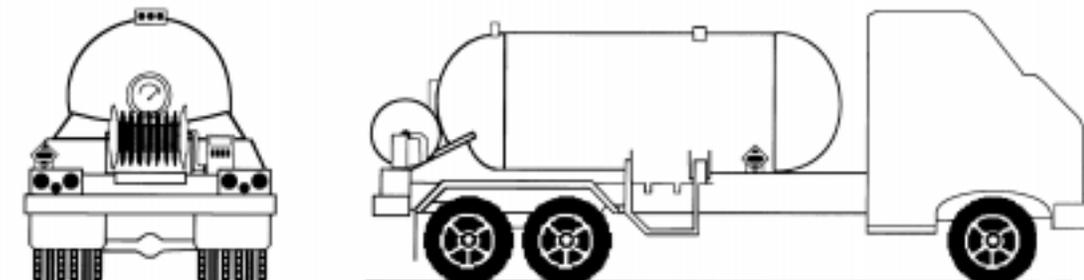
MC 331 High Pressure Tank



MC-331 HIGH PRESSURE TANK TRUCK
11,500 GALLONS CAPACITY
TRANSPORTS LP GAS AND ANHYDROUS AMMONIA

OPS Pressure Up To 300 PSI
 Typical Maximum Capacity 11,500 Gallons
 Steel Single Compartment/Non Insulated
 Bolted Manhole At Front or Rear
 Internal and Rear-Outlet Valves
 Typically Painted White Or Other Reflective Color
 May Be Marked Flammable Gas and Compressed Gas
 Round/Dome Shaped Ends

Pressurized Gases & Liquids
 Anhydrous Ammonia
 Propane
 Butane
 Other Gases That Have Been
 Liquefied Under Pressure

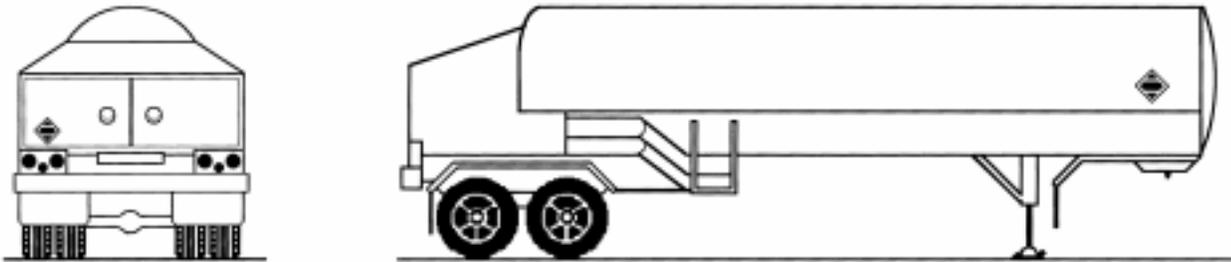


BOBTAIL TANK — LOCAL DELIVERY OF LP GAS AND ANHYDROUS AMMONIA

TANK SPECIFICATION\DESCRIPTION

TYPICAL COMMODITIES TRANSPORTED

MC338 CRYOGENIC LIQUID TANK

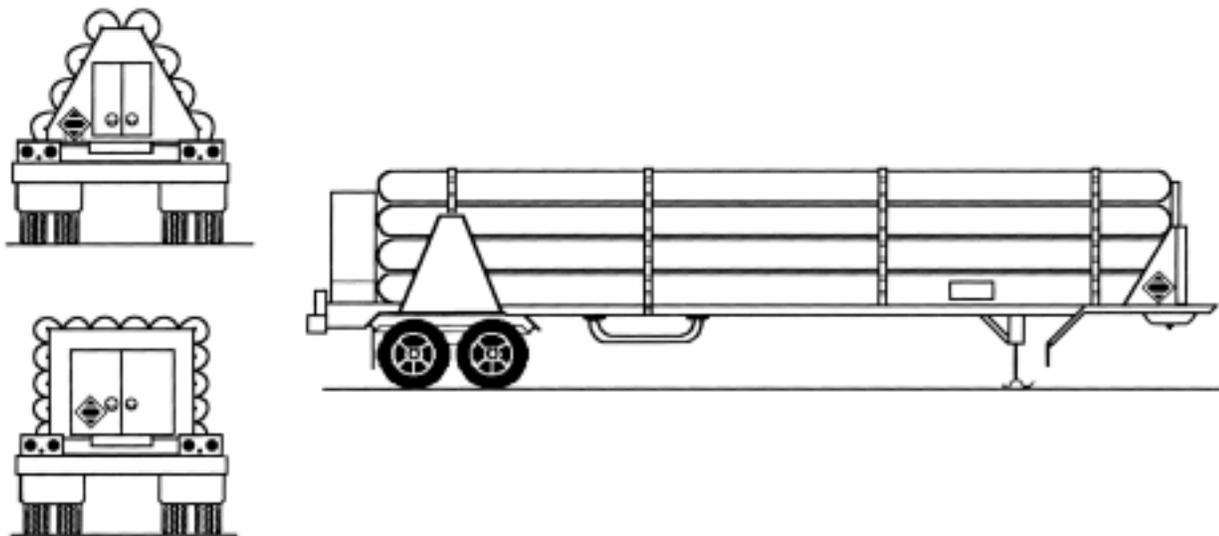


MC-338 CRYOGENIC LIQUID TANK TRUCK
WELL-INSULATED 'THERMOS BOTTLE' DESIGN
TRANSPORTS LIQUID NITROGEN, OXYGEN, CARBON DIOXIDE, ETC.

OPS AT Less THAN 22 PSI
Well Insulated Thermos Bottle Like Steel Tank
May Have Vapor Discharging from Relief Valves
Loading/Unloading Valves Enclosed at Rear
May Be Marked "Refrigerated Liquid"
Round Tank with Same Type of Cabinet at Rear

Liquid Oxygen
Liquid Nitrogen
Liquid Carbon Dioxide
Liquid Hydrogen
Other Gases That Have Been Liquefied
by Lowering Their Temperature

COMPRESSED GAS/TUBE TRAILER

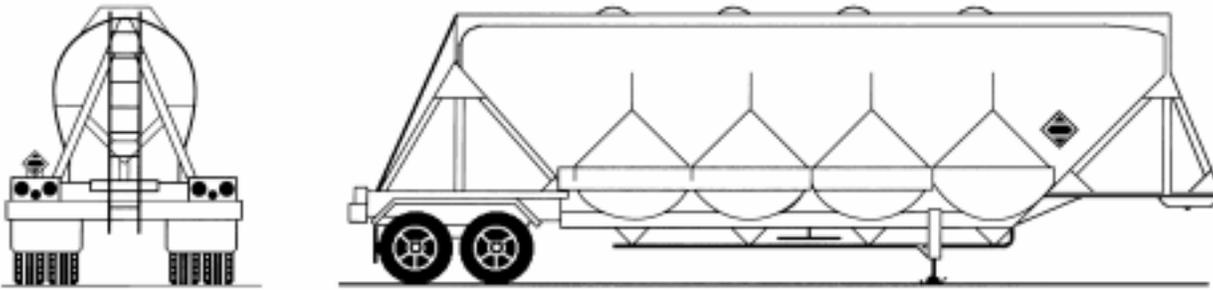


COMPRESSED GAS TRAILER
3,000-5,000 PSI
TRANSPORTS COMPRESSED GAS

OPS at 3,000-5,000 PSI (Gas Only)
Individual Steel Cylinders Stacked and Banded Together
Typically will have Over Pressure Device for each cylinder
Valving at Rear (Protected)
Manufacturer Name May Be on cylinders, i.e. AIRCO, Liquid
Air, Liquid Carbonic, etc)
Flat Truck with Multiple Cylinder Stacked in Modular or Nested Shape

Helium
Hydrogen
Methane
Oxygen
Other Gases

DRY BULK CARGO TANKER

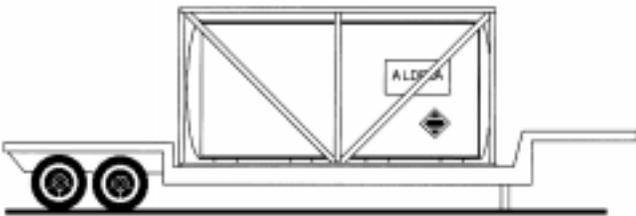


DRY BULK CARGO TANKER

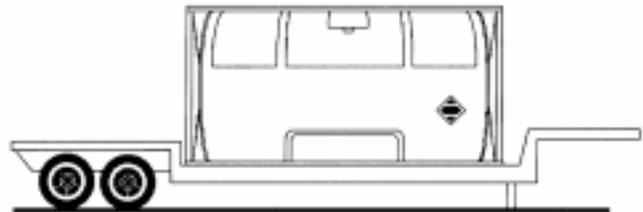
Typically Not Under Pressure
 Over the Road
 Top Side Manholes
 Bottom Valves/Air Assisted Loading/
 Unloading
 Shapes Vary, But Will Have Hoppers

Calcium Carbide
 Oxidizers
 Corrosive Solids
 Cement
 Plastic Pellets
 Fertilizers

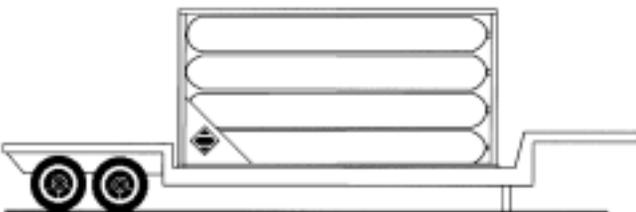
INTERMODAL CONTAINERS**



NON-PRESSURE OR PRESSURE TANK



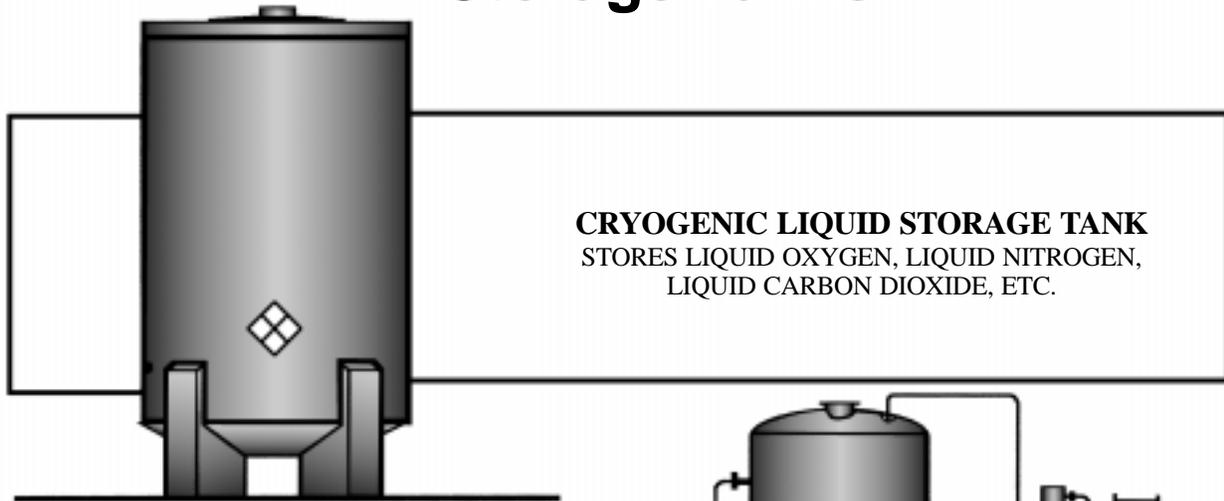
CRYOGENIC TANK



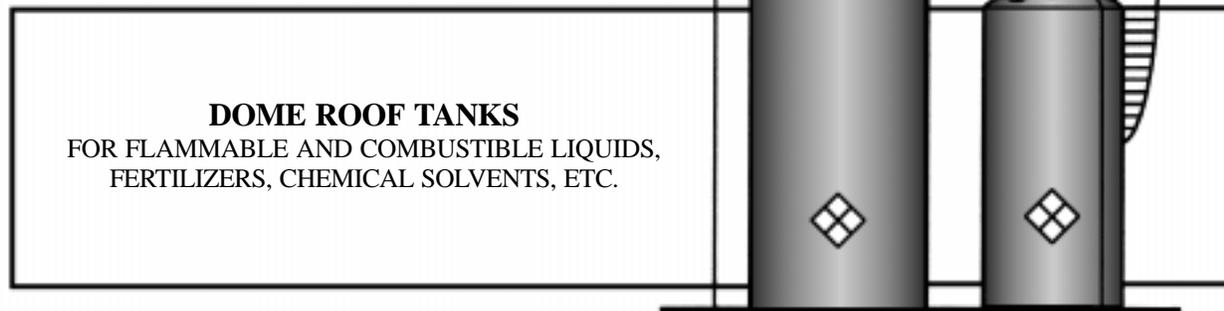
TUBE MODULES

** ALL THREE TYPES MAY ALSO BE FOUND ON RAIL CARS OR ABOARD SHIPS

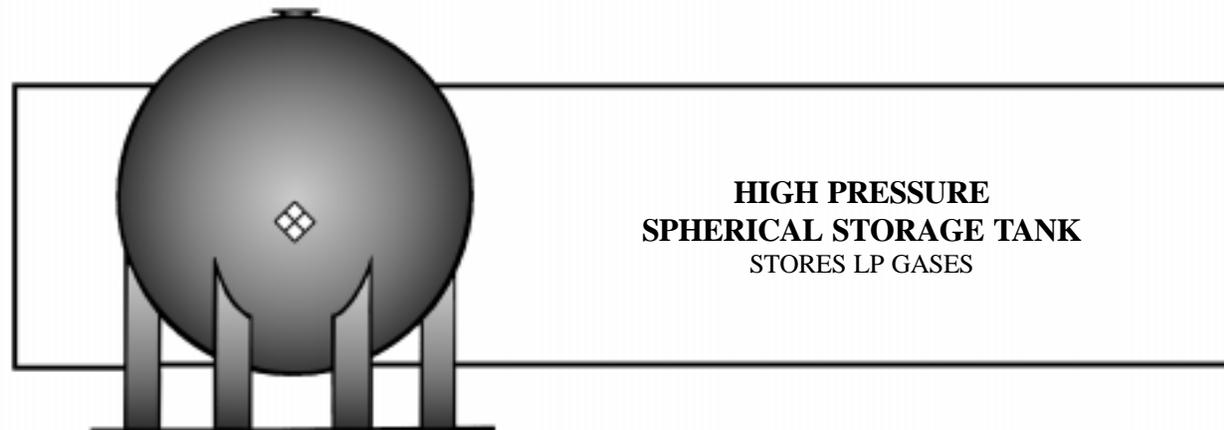
Storage Tanks



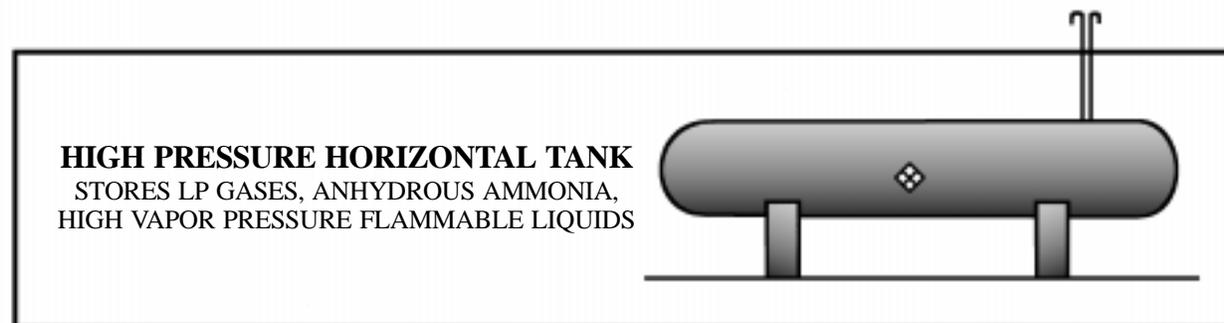
CRYOGENIC LIQUID STORAGE TANK
STORES LIQUID OXYGEN, LIQUID NITROGEN,
LIQUID CARBON DIOXIDE, ETC.



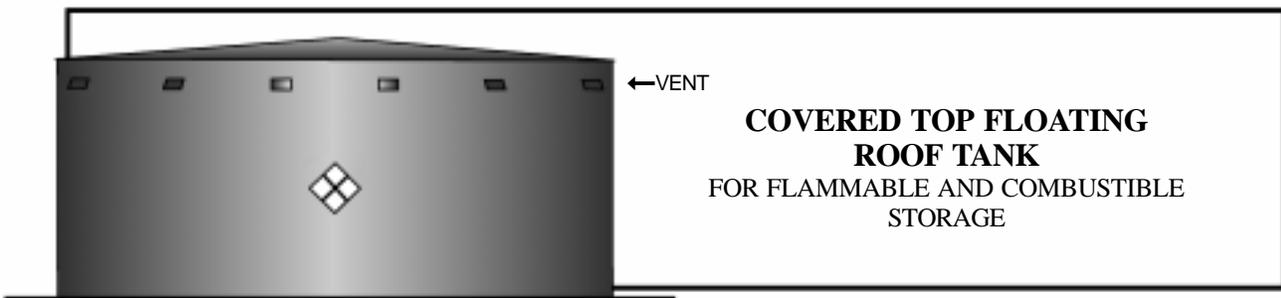
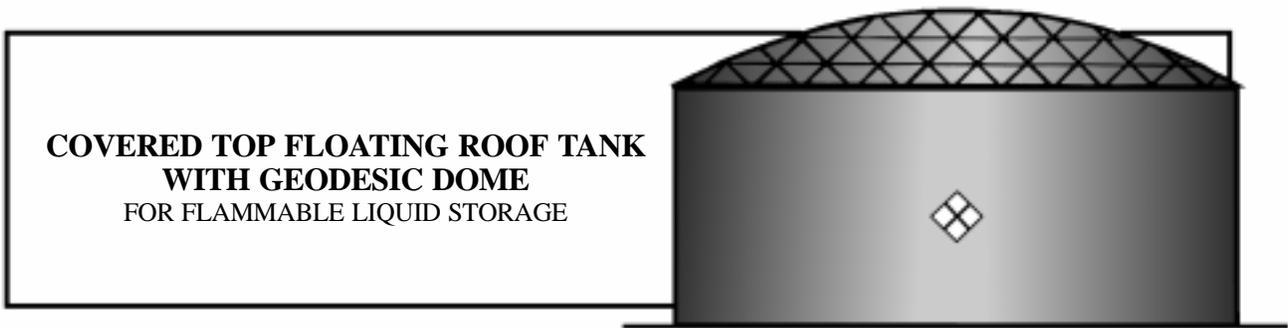
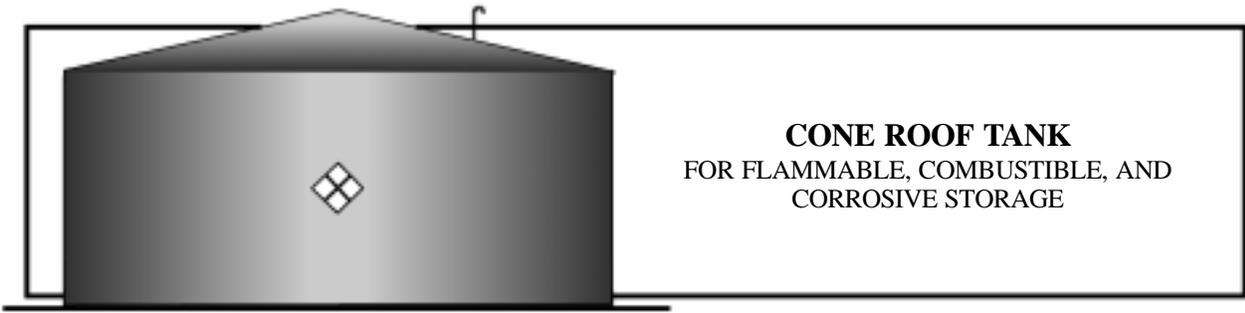
DOME ROOF TANKS
FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS,
FERTILIZERS, CHEMICAL SOLVENTS, ETC.

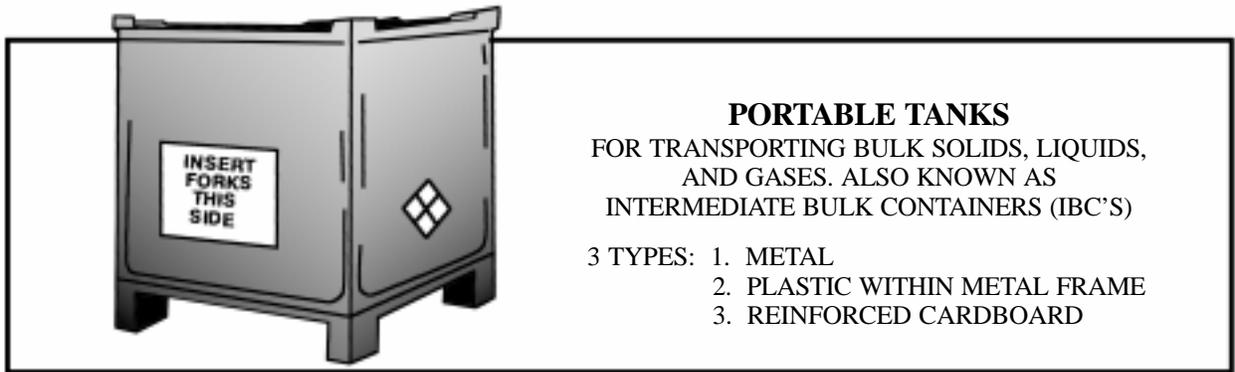


**HIGH PRESSURE
SPHERICAL STORAGE TANK**
STORES LP GASES



HIGH PRESSURE HORIZONTAL TANK
STORES LP GASES, ANHYDROUS AMMONIA,
HIGH VAPOR PRESSURE FLAMMABLE LIQUIDS

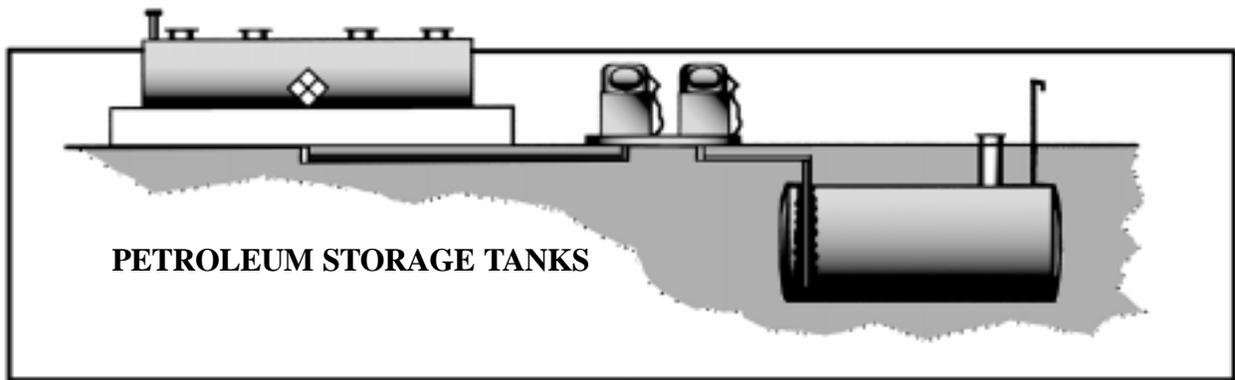




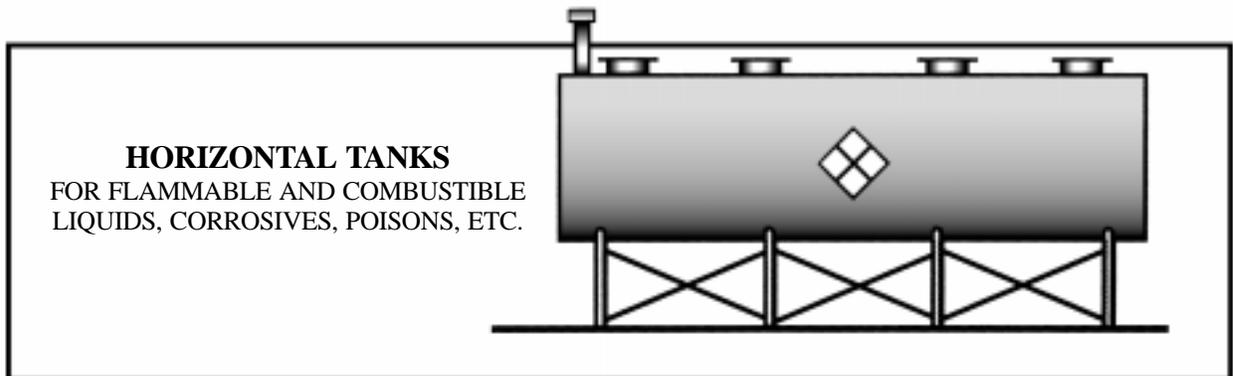
PORTABLE TANKS

FOR TRANSPORTING BULK SOLIDS, LIQUIDS,
AND GASES. ALSO KNOWN AS
INTERMEDIATE BULK CONTAINERS (IBC'S)

- 3 TYPES: 1. METAL
2. PLASTIC WITHIN METAL FRAME
3. REINFORCED CARDBOARD



PETROLEUM STORAGE TANKS



HORIZONTAL TANKS

FOR FLAMMABLE AND COMBUSTIBLE
LIQUIDS, CORROSIVES, POISONS, ETC.

**General Approach
to a
Hazmat
Incident**

GENERAL APPROACH TO A HAZMAT INCIDENT

Hazardous materials incidents are different from fire suppression or other usual emergency operations. The nature of the hazard requires different protective equipment, operational approaches, skills and attitudes. The rules are changed. Getting in and making a fast attack is not the order of the day. A slower methodical approach is called for, as well as the need to follow federal and state law.

REGULATORY CONSIDERATIONS

The HAZWOPER standard (29CFR 1910.120) requires an **Incident Command System (ICS)** as well as a **Site Safety Plan** and a **Safety Officer**. Remember, OSHA regulations are law while standards such as NFPA 471 and 472 are recommendations, which may or may not be adopted by a jurisdiction. Emergency services have been heavily fined for not following OSHA regulations.

The **Superfund Amendments and Reauthorization Act** of 1986 (SARA), which required OSHA to create and implement the HAZWOPER standard, directs OSHA to protect all employees responding to emergencies without specifying their location. Section 126 (d)(4) of SARA states, "Standards shall set forth requirements for training of workers who are responsible for responding to hazardous emergency situations who may be exposed to toxic substances in carrying out their responsibilities."

First Responders such as fire departments, emergency medical services, and police departments, if they accept jurisdiction for hazardous materials incidents, are each normally required to have an **emergency response plan** which addresses personnel roles, lines of authority, training, and communication [29CFR 1910.120(q)(2)]. However, a community could have a comprehensive plan addressing these issues for all employees. The amount of **training** must be based on the duties and functions to be performed by each responder. To safely respond to a hazardous materials incident, an individual must be both trained and mentally prepared. **What you don't know can kill you.**

BACKGROUND

A **Hazardous Material** is any substance (gas, liquid, or solid) capable of causing harm to people, property, or the environment. There are thousands of different materials in use in the world today. Most are shipped as part of normal commerce. All substances in large enough amounts are poisonous to humans and all chemical exposures should be avoided. Some substances, even in very small quantities, may rapidly cause death. Except for materials known to cause cancer in humans, only acute health effects have been considered in this book. A **Hazmat Incident** involves the actual or potential unplanned/uncontrolled release of a hazardous material.

A **First Responder** is an individual who may arrive first on the scene of a Hazmat Incident with the responsibility to act, regardless of what agency they represent. A **general response scheme** for the initial phases of a response is shown on the outside of the back cover of this book. When

approaching the scene, slow down and **approach cautiously**, from an uphill and upwind direction if possible. That is, move downhill with the wind at your back. Be alert for visible signs such as smoke, vapor clouds, fire, or the sound of explosions. Look for discoloration of grass or trees, dead birds, or other animals. Check flags, smokestacks or vapor clouds for wind direction. Dispatch should call the **Weather Bureau** for the current temperature, wind speed and humidity as well as the general forecast for the next several hours. Having this information while en route will assist in the initial assessment of the incident. Agencies must develop the capability to measure the wind speed and direction at the site of the incident for greater accuracy.

When setting up the command post and determining the evacuation sectors, keep in mind the possibility of shifting winds. Park vehicles pointed away from the scene to allow for a rapid exit if necessary. Keep the staging area a safe distance from the release area since vehicles can be an ignition source. By OSHA law you must limit the number of people in the **Hot Zone**.

The following sections provide some general information about Hazmat actions for those trained at the **Awareness and Operational Levels**. These individuals respond in a **defensive fashion**. Under OSHA 1910.120, both Awareness and Operational Levels cannot perform offensive actions within the Hot Zone. **Rescue** or other aggressive actions are generally not appropriate for individuals trained at these levels. Failure to heed this limitation of action can easily lead to the death or serious injury of the responder. **Be part of the solution; don't become part of the problem!**

TRAINING SPECIFIC RESPONSES

Awareness Level Response

First Responders at the Awareness Level are expected to recognize the presence of hazardous materials, protect themselves appropriately, call for help, and secure the area.

Several clues can provide assistance in establishing the presence and identity of a hazardous material. Use your senses, but with caution. Many hazardous materials have **odors** or produce visible clouds. Even though the presence of some materials can be detected by smell at very low and even nontoxic levels, this is not a reliable indicator of potential toxicity. Other materials can be fatal without any detectable odor. If an odor is detectable, you may already be too close and need to retreat.

Another clue is the **nature of the site** of the incident. Anticipate the presence of certain kinds of materials in certain types of buildings. For example, a burning barn or hardware store is likely to contain pesticides and should be dealt with accordingly. Manufacturing facilities are likely to have a variety of solvents. Tank farms will probably contain petroleum products. Other types of structures may provide clues about the hazardous materials they might contain.

If containers are involved, the **shape** may provide a clue to the contents. Silhouettes of **rail cars, tank trucks**, and fixed

site **tanks** used to carry or store materials are shown on pages 527 through 545. While not likely to identify the specific chemical name, the silhouette guide may identify the general type of material involved.

Markings on containers, buildings, or facilities may also provide material identification information. Under **DOT regulations**, some **rail cars** must be labeled with the name of the material they contain (see Railroad Tank Car Marking System, page 526). The **NFPA 704 placard** system (see Table 1, page 550) is widely used on container labels and fixed facilities. This system provides valuable information about the risks associated with the material(s) in the facility. Other marking systems exist which are similar to the NFPA 704 system. **DOT placards** (see page 521) on vehicles may provide an additional clue to the nature of the contents. These placards on vehicles may include or be found above an identification number. This number is the **UN Number** for the material contained in the vehicle and can be used to identify the material or class of material by using this book or the North American Emergency Response Guide. DOT symbols may also be used as labels on containers of material in commerce. All markings on vehicles, buildings, and rail cars should be observed from the greatest distance possible. First Responders should carry a pair of good binoculars.

First Responders may have access to papers describing the contents of shipments (shipping papers, bills of lading, etc.) and/or the hazards associated with these materials. At a fixed facility **MSDS** (Material Safety Data Sheets), which will identify the specific material(s) and associated hazards, should be available. Shipping papers, which identify the chemical or chemicals present, are usually located in the cabs of trucks, the first engine of freight trains, on the bridge of ships and in a marked tube-like container on the deck of a barge. Frequently during transportation accidents shipping papers are inaccessible and identifying the involved materials becomes part of the overall problem. Until the material is identified, it should be treated as if it were extremely hazardous.

Securing the area around a hazardous materials incident is a vitally important action of the First Responder. It may not be immediately apparent what area to secure, particularly if the hazardous substance and/or quantity are unknown. It is usually wise to secure a wide area, particularly if the material is known to be highly toxic. In general, keep **ignition sources**, such as sparks and flares, out of the secured area until you know that there is no flammability or explosion risk.

For large releases of flammable, explosive or toxic gases, the First Responder must **alert inhabitants** of the surrounding area. This is particularly true for heavier-than-air gases or vapors, which will not disperse as they spread. Do not expose yourself to the material by entering areas downwind or below grade. Evacuation, with all of its difficulties, will be necessary for some materials and situations. For others, the best option is to **shelter in place** - that is, move people inside, close doors and windows, and shut down air intake distribution systems - until the gas or vapor has moved past or dispersed.

Remember that **wind directions may change** during an incident, so the at-risk populations or areas need to be continually reevaluated with on-site wind direction information.

Remember that a dead or injured First Responder is of no help to anyone. **Protect yourself!** Do not enter the contaminated area. Do not attempt to rescue victims who have been contaminated with highly toxic or dangerous materials. **Fire fighting gear is not chemical protective clothing.** Many chemicals call for specialized personal protective clothing and expertise that is above the capability of Awareness or Operational level personnel.

Operational Level Response

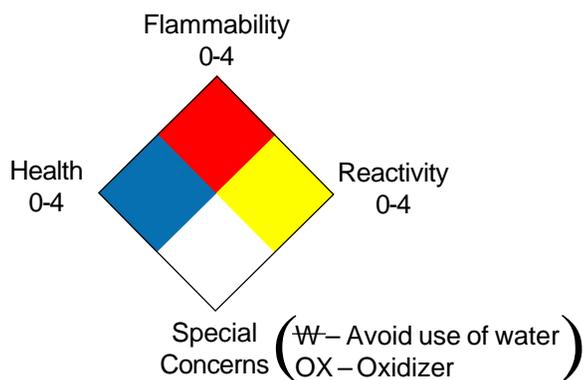
First Responders at the **Operational Level**, in addition to carrying out the actions of the Awareness Level Responder, may take **defensive actions** from a safe distance which will **control the release** and keep it from spreading. These actions are intended to protect nearby persons, property, and the environment from the effects of the release. Generally, First Responders at the **Operational Level** are not trained to enter the **Hot zone** and should not do so unless they have had specific training in dealing with the material and situation present.

In situations where there is only a release and no fire, Operational Level personnel should consider **diking** or diverting liquid **runoff** to prevent contamination of sewers or waterways. This must be done well ahead of the runoff to prevent personnel exposure and should only be attempted if it can be done safely. For release of gases it may be possible to suppress vapor clouds with fog lines or other agents using unattended monitors. For large releases, particularly of toxic gases, consider the **evacuation** or **sheltering in place** of populations downhill or downwind of the release. Remember that wind direction may shift during an incident and on-site **wind direction monitoring** is essential. You may be able to **shut off a release** from a safe distance. Do this only if the material is identified and the shutoff is outside the Hot zone.

If a fire is present in addition to a release, the incident is considerably more complicated. All of the tasks discussed previously must be considered and a decision must be made whether to fight the fire, and if so how. It is generally best to **let a gas-fed fire burn** unless you can stop the flow of gas by closing a valve at some distant point outside of the Hot Zone. Keep in mind that after you close a distant valve there will still be some gas in the line(s). Use fog lines to keep the area cooled and let the fire burn itself out. There may be an incident where it is necessary to extinguish a gas-fed fire in order to get to a valve to shut off the flow. Large amounts of fog may be used to cool down the area. Dry chemical or carbon dioxide extinguishers may be used to extinguish the fire. **Extinguishing the fire without stopping the flow of gas is dangerous.** The gas and air may form an explosive mixture. If the surrounding area is still hot it may provide an ignition source and cause an explosion. The explosion may cause more injuries and more property damage than the original fire.

Table 1
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
Fire Diamonds

Identification of Health Hazard Color Code: BLUE		Identification of Flammability Color Code: RED		Identification of Reactivity Color Code: YELLOW	
Type of Possible Injury		Susceptibility of Materials to Burning		Susceptibility to Release of Energy	
Signal		Signal		Signal	
4	Materials that on very short exposure could cause death or major residual injury.	4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air and that will burn readily.	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Materials that on short exposure could cause serious temporary or residual injury.	3	Liquids and solids that can be ignited under almost all ambient temperature conditions.	3	Materials that in themselves are capable of detonation or explosive decomposition but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
2	Materials that on intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.	2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	2	Materials that readily undergo violent chemical change at elevated temperatures and pressures or which react violently with water or which may form explosive mixtures with water.
1	Materials that on exposure would cause irritation but only minor residual injury.	1	Material that must be preheated before ignition can occur.	1	Materials that in themselves are normally stable, but which become unstable at elevated temperatures and pressures.
0	Materials that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.	0	Materials that will not burn.	0	Materials that in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.



If the products of combustion are less of a hazard than the leaking chemical, the best course of action may be to protect exposures and **let the chemical burn itself out**. The location of the incident will influence your decision. If you are in a rural area that is sparsely populated, the decision to let a fire burn will be much easier than if you are in the central business district of a major city. There may be pressure on the **Incident Commander (IC)** to extinguish the fire in order to minimize inconvenience to the local population. You must weigh all of your options and choose the course that presents the least risk to your personnel and the general public. **The potential for harm is always more important than convenience**. In some circumstances, if the identity of the material(s) is not known it may be better to let the material burn and concentrate on protecting life and surrounding property.

Foam can be very effective at **vapor suppression** and extinguishing many flammable liquids. Some materials, such as alcohols and amines, are water soluble and break down ordinary foam. You will see a listing “consider the application of **alcohol based foam**” for materials that are water soluble. Alcohol based foam is designed for these materials. If alcohol based foam is not available, regular foam may be helpful but may be required in higher application rates. Check your foam supplier and the container label for the uses and limitations of the foam you have. Keep in mind that 6% foam is 94% water. The use of foam on materials that are water reactive may not be desirable. The reaction may be so great that it will outweigh the benefits of using foam. If you are going to attack a fire with foam BE SURE you have enough foam at the scene before you begin your attack. If you start without enough agent to finish the job, the fire will rekindle and destroy the foam blanket you have applied and you will lose any advantage you may have gained.

Carbon dioxide (CO₂) and **dry chemical** are effective on many products. The limiting factor is the method of application. Generally, these agents come in **handheld extinguishers** requiring you to get within a few feet of the fire. With most hazardous materials, that is too close for personnel at the Operational Level. Handheld equipment is meant for first aid fire fighting and is designed for use on small fires. Some facilities have special extinguishers on wheels or vehicles containing **dry chemical** or CO₂. Many large fire departments also have this equipment. If you have these kinds of resources you may be better able to fight larger fires. CO₂ and **Halon** gases, are more effective at fighting fires in confined spaces - but they also present a significant asphyxiation risk to responders under these circumstances. Fires involving combustible metals usually require dry powder (not the same as dry chemical) extinguishers.

If water is the correct agent to use, it is usually applied in the form of **fog** and applied in **large volumes**. **Solid streams** will cause powders and other materials to be spread about in an uncontrolled manner. Solid streams directed into burning liquids will splash the burning materials and may spread the fire. If you are operating at a fixed facilities, you should know

in advance how much water you have available for fire fighting. At a transportation incident you may not have the volumes of water needed to safely attack a fire. “**Back Off and Protect the Exposures**” may be your best option. You don’t attack a tank (military version) with a 22 caliber handgun. “**If you don’t have the water don’t go to war.**”

Fog streams from **unattended monitors** or even large volume handlines that are tied off, can be effective in **knocking down or suppressing vapors**. Be aware that the mist that is falling back to the ground is now contaminated and must be managed. This may be done by **diking or damming** well ahead of the material runoff. Care must be taken to keep personnel out of danger from contamination or contact with the material. **Pits** may be dug to contain the runoff. With some chemicals, diluting the runoff water in the pit may reduce the hazard to a more manageable level. There may be times when it is desirable to knock down the vapors from a product that is water reactive. Under these circumstances, care must be taken to not let the water fall back onto the material. Set up your monitors well ahead of the material and be aware of changes in the wind direction or speed.

Many liquid containers, when heated, may **explode or BLEVE**. In a BLEVE large pieces of the tank may rocket great distances. The directions in which these pieces will travel is unpredictable and depends on the section of the tank that ruptures and on the tank supports. Tanks involved in a fire should be approached with great caution because of the risk of explosion or BLEVE.

Information about all of these concerns is provided in the material specific sections of this guide. The First Responder Strategy Using the NFPA 704 Placard provided on the back inside cover of this book can be used as a guide to fighting fires if only the NFPA 704 designations are known. Remember that this table only applies to materials designated with NFPA reactivity (yellow box) 0 or 1. For more reactive materials, maintain a purely defensive posture toward the fire.

Material Safety Data Sheets (MSDS), if they are available, are one of the best sources of information about materials. As part of your planning process get the MSDSs for major products in your jurisdiction. If you are dealing with a fixed facility, check with the **Facility Emergency Coordinator (FEC)**. This person is required by SARA Title III to be the individual who has worked with the **Local Emergency Planning Committee (LEPC)** in the development of the community response plan as it relates to that facility. Make this person part of your **Unified Command Staff**. The FEC knows that facility and the materials involved better than you do. Listen to the advice you get, but keep in mind that the objectives of plant personnel may sometimes be different than yours. They may think first of the plant, while you must think first of the community. When there is a difference, you must make the decision keeping the good of the community in mind.

Some hard decisions are going to have to be made when it comes to **rescuing victims** in the Hot zone - decisions that in most cases can only be made by the IC at the time of the

incident. The authors have attempted to offer some guidance, but the final decision will be yours. In the Awareness and Operational Level Training Response section of the chemical specific pages you may see the statement “**Do not attempt rescue**”. This statement is used when the hazards to the would-be rescuer are so great that serious injury or death may result. Remember that under most conditions, **if you are not trained at the Technician Level you cannot legally go into the Hot zone**. In many cases normal fire fighting gear doesn't provide the protection you need to safely handle people in the area of contamination. In some situations it is possible that you might be able to rescue someone without putting yourself in danger. Danger is a relative term and the IC must determine the degree of danger present. In addition, the IC must then decide the level of danger that is acceptable for the rescue personnel. **We do not trade rescue personnel for victims**. Injury to emergency service personnel to effect a rescue is not acceptable in any community.

SPECIAL SITUATIONS

HazMat incidents occur under a wide variety of conditions. For some of these situations there are special considerations and concerns. Listed below are some of these considerations and concerns for Hazmat incidents involving highway transport, rail transport, marine transport, fixed facilities, pipelines, radioactive materials, cryogenic tanks, chemical and biological terrorism and illegal or clandestine drug laboratories.

Highway Transport: Accidents on highways involving trucks carrying hazardous materials are perhaps the most common cause of Hazmat incidents. Many of these incidents occur in heavily populated areas and may involve large quantities of hazardous materials. Shipping papers are kept in the truck cab, which may be inaccessible if there is a leak or fire. Shipping papers will include a contact telephone number for emergency information. DOT placards provide information on the nature of the cargo. Unfortunately, some trucks containing hazardous materials may not have placards, either in violation of DOT regulations or because the quantities of material being transported do not require a placard. Placards don't always tell the whole story. Trucks can carry dangerous amounts of hazardous materials and still be under the legal amount required to have a placard. Many UN Numbers, which may appear on or below the placard, represent a variety of compounds which may pose varying risks. If the shipper and truck numbers are known, CHEMTREC® (1-800-424-9300) can often identify the cargo. Any truck or van should be assumed to contain hazardous materials. Until the cargo is identified all action should be undertaken from a safe distance. Tank trucks, in particular, often contain materials which may explode or BLEVE. If it is possible, cool tank trucks exposed to heat with water from an unattended monitor. This should only be considered if an adequate water supply is available and enough trained personnel are quickly on the scene.

Rail Transport: Hazmat incidents involving trains are often complicated by the large amounts and numbers of materials

found on a single train. These materials may chemically interact if they come in contact with one another. This creates a major risk of personal injury or property damage, further compounding the problem. Train incidents also may occur in relatively remote areas, which may limit the availability of personnel, equipment, and water. Shipping papers on trains are found with the engineer in the first engine. Initial assessment should be done from a safe distance through binoculars without approaching a train. There may be sufficient information on the outside of the rail cars to identify the materials they contain. The silhouette information on pages 527 through 545 may also be helpful in identifying different types of cars and their possible cargoes. Many materials shipped by rail will BLEVE if their tanks are heated by fire. These tanks may travel several thousand feet. It is generally best to maintain a safe distance until trained personnel and equipment arrive. Remember, if there is a fire stay away from the sides of cars and the train because of the risk of a BLEVE.

Marine Transport: Shipboard incidents in which land based responders are involved usually occur in heavily populated port areas. The quantities of hazardous materials involved can be very large, creating huge potential risks to adjacent populations and property. Cargos may also contain multiple chemicals with the possibility of chemical reaction. Most ships and barges will not be labeled or placarded. Shipping papers or manifests for cargo are usually located with the first officer on the bridge of a ship. On a barge, shipping papers are in a tube-like container or mailbox on the deck. The Coast Guard Captain of the Port is responsible for dealing with releases and fires. Frequently land based responders are called upon to assist in the incident response. Land based responders in port areas need to be familiar with the various jurisdictions and issues relating to both shipboard fires and waterway pollution. All ships and most towboats have crews who are trained to deal with releases and fires. They also will have varying amounts of on-board fire fighting equipment. Towboats may not have adequate equipment to fight on-board fires. Barges do not have adequate equipment to fight on-board fires or control releases. Fire companies responding to marine incidents should be equipped with **International Shore Connection fittings** to permit the pumping of water from shore into the firefighting system on board ship.

Fixed Facilities: Fixed facilities include both open facilities such as bulk liquid terminals and open processing areas, and closed facilities such as manufacturing or processing plants, laboratories, warehouses, and retail establishments. In general, the quantity of material in fixed facility incidents has the potential to be very large, particularly if there are large storage containers on site. There are also likely to be several hazardous materials at any given site. Identification of the materials at a site may be made from labeling, **MSDS** provided by facility personnel or from community inventories provided under SARA Title III. NFPA 704 placards may provide general information about the nature of the hazards in a particular facility or building (see Table 1, page 550). The NFPA 704 designations indicate the most severe risks associated with all of the materials in the building or facility.

Be aware that buildings or containers may have inaccurate placards. Fixed facilities are often in industrial zones and may have other hazardous materials sites located in close proximity. There may also be many people working on or close to the site.

First Responder actions at a fixed facility HazMat incident should be defensive in nature. After rapidly assessing the situation, notify the appropriate authorities and support services. **Deny entry** to the building or facility and consider evacuation. If a multi-story structure is involved and the released material is a gas that is heavier than air, it may not be desirable to evacuate the upper floors of the building. A decision can be made to shut down the heating, ventilating, and air conditioning (HVAC) system in a building if the risk of evacuating and dispersing a gaseous material appears greater than the explosion or flammability risk of leaving it contained in a portion of the building. Refer to this guide or other sources of information for aid in making that decision. If the HVAC is left on, it may also be possible to increase dispersion by leaving other building doors and windows open. For liquid releases from storage tanks it may be possible to prevent spread by diking or damming. This must be done well ahead of the liquid to prevent exposure of personnel and should only be attempted if it can be done safely.

If there is a fire, it may be preferable not to extinguish it until the nature of the material(s) is known and adequate resources are assembled. For some materials, allowing them to burn poses much less risk to the responder and surrounding areas than trying to extinguish them. It may be possible to protect surrounding structures or storage tanks by the use of a cooling fog stream, preferably from an unattended monitor. For some materials, fog streams can be used to suppress or disperse vapor releases. Information on all of these approaches will be found in the material specific sections of this book. Liquid chemical tanks exposed to flame impingement may explode or BLEVE, so maintain a safe distance if a fire is present. Many fixed facilities may have firefighting capabilities, including sprinkler systems and/or special suppressing or extinguishing agents. These may help to suppress fires. They may also suggest what firefighting agent is appropriate for the materials involved.

Pipelines: Pipelines carry many hazardous materials. If a pipeline breaks, very large quantities of materials can be released over a short period of time. Depending upon the material, this means that the cloud, fire, or release could be very large and will continue to grow until the flow stops. The key is to minimize the release by cutting off the flow at the pumping station or other shutoff. This will generally be done by pipeline personnel. **Do not fight the fire or approach the scene until the flow has been stopped.**

Radioactive Materials: There are many radioactive materials in commerce, usually in small quantities. Larger quantities may be encountered at fixed facilities. All containers, including packages, vehicles, and rail cars, containing radioactive material are required to carry a warning label or placard. Buildings or containers at fixed facilities

containing radioactive material should also carry appropriate warning labels. If such a label is present at the scene of an accident, First Responders should generally back off until trained personnel and appropriate equipment are available to assess the situation.

There are several types of radiation hazards. Different radioactive materials produce different types of radioactivity. The most common radioactive materials in commerce produce alpha (α) and beta (β) particles. Other materials may produce x-rays, gamma (γ) rays or neutron particles. While all of these can potentially damage human tissue, alpha and beta particles do not penetrate the skin, so will not cause damage unless the actual material emitting these particles gets into the body by swallowing it, breathing it in, or getting it into an open wound. Avoiding physical contact with the material prevents these potential injuries. X-rays, gamma rays, and neutron particles do penetrate clothing and skin and can cause damage if the amount of radiation is sufficient. Exposure to these forms of radiation is only prevented by using a heavy metal shield. As with alpha and beta particle producers, contact with the material must be avoided. Injury caused by radiation may not develop for many days or even years after exposure.

Radioactivity is not destroyed by fire. In fact fire, explosion, and water dispersion as part of a fire may make a radioactive material incident worse by spreading radiation-emitting material over a large area. **Remember if you see a radioactive warning label or placard: Back off until the experts arrive.**

Cryogenic Gases: Cryogenic gases are gases shipped and stored refrigerated and under pressure. Tank shape and a visible vapor cloud upon release should alert the First Responder to the presence of a cryogenic gas. Tank shapes can be found on pages 527 through 545. When cooled to very low temperatures (less than -150°F) and/or placed under pressure, these gases become liquids that take up less space for storage and shipment. These gases, some of which are extremely flammable (hydrogen and LNG) or toxic (chlorine), pose a major risk to the first responder. All of these gases are released from storage vessels at temperatures so low that they will instantly freeze unprotected tissues like skin and eyes. The release of even small amounts of gas can produce large amounts of vapor. **Leaking cryogenic containers should not be approached.** Trained personnel and appropriate equipment are required to stop the leak. Materials on fire should be allowed to burn until the release can be stopped. It is important not to put water, fog, or foam on cryogenic tanks or pools of cryogenic liquids, whether or not they are burning. The water will act as a heater, increasing evaporation or burning. **Water, foam, and fog cannot extinguish a cryogenic fire.** The cold vapors rising from a pool of cryogenic liquid almost always hug the ground and drift downwind without rapid dispersion.

Chemical and Biological Terrorism: Chemicals have been used in organized warfare since World War I. While biologi-

cal agents such as highly infectious and toxic bacteria (“germ agents”), have been researched as potential war agents since the 1930’s, they have never been used on a large scale. In recent years, fears have mounted that both chemical and biological agents could be used in terrorist actions against either civilian or military targets. In fact, chemical agents have now been used in such a fashion.

For this reason it is important that first responders become familiar with possible chemical agents involved in these incidents and how to appropriately respond. While biological agents, like germ agents, could be used in terrorist attacks, they would most likely unfold as an outbreak of a disease. It is unlikely that first responders will find themselves involved in these kinds of incidents because identification and response would then be provided primarily by public health authorities. Nuclear terrorism is also a possibility, however, response to nuclear accidents or events is beyond the scope of this book and the scope of training of most First Responders.

While we tend to think of chemicals used in terrorist attacks as highly specialized substances designed for war, in fact, many common industrial chemicals have similar properties and toxic potential. Chlorine gas, for example, has been used as a war gas. Many experts in terrorism think it is more likely that terrorists would use these easily available chemicals instead of the more exotic agents designed for war. Terrorist incidents might well involve the sabotage of industrial complexes near densely populated areas. Therefore, the technical and response problems posed by such an incident would be almost identical to other scenarios discussed in this book. It is important to remember that if terrorism or sabotage is suspected by the first responder appropriate law enforcement personnel should be notified and, to the extent possible, attempts should be made not to disturb or destroy potential evidence. Concern for evidence should not, however, prevent the first responder from carrying out actions appropriate for the chemicals involved. It is also important to remember that terrorists may booby-trap a scene in order to hinder response and produce additional casualties. First responders must remain alert for such possibilities. Secondary explosives for instance can be set to be detonated by radio signals transmitted from approaching response vehicles.

Table 2 on page 555 lists the kinds of chemical agents which have been used or proposed for use in terrorist attacks. The physical properties and symptoms they can produce in exposed individuals are also listed. Important information on all of these chemical agents can be found in this book, either in the Specific Materials Guides or in the Materials Summary Response Table. First responders should be familiar with the common physical symptoms caused by each kind of agent. These symptoms are likely to be the first clue that one of these agents is involved in an incident.

Illegal or Clandestine Drug Laboratories: Illegal or clandestine drug laboratories pose a new and often significant

risk for first responders. Such operations may contain a wide variety of chemicals, particularly flammable solvents, which are used in the production of illegal drugs. Unlike most legitimate manufacturing facilities, it will usually be impossible to obtain a listing of the chemicals present. Most of the chemicals commonly used in these laboratories will be found in this book because they are also found in legitimate manufacturing facilities. Some of the drugs usually produced in these laboratories and some of the chemical intermediates with drug-like actions are not included in this book. There have been reports of serious injuries to first responders from exposure to these drugs and chemical intermediates. For this reason, if the presence of an illegal or clandestine drug laboratory is suspected, extreme caution should be exercised by the first responder and exposure to chemicals at the scene should be avoided. Law enforcement personnel should be notified about the laboratory and, to the extent possible, attempts should be made not to disturb or destroy potential evidence.

The chemical specific sections of this book are designed to remind the responder of many of the basics discussed above as well as provide information on what options need to be considered for each specific chemical.

WHERE TO GET HELP

There are a number of sources of information available to the First Responder. Listed in Table 3 on page 556 are several national sources with which the First Responder should be familiar. Local and state sources of information such as health departments, Hazmat teams, industrial aid groups, emergency service agencies, and others should also be considered as valuable resources. Page 562 is provided to record the telephone numbers for your local area.

TABLE 2

CHEMICALS LIKELY INVOLVED IN TERRORIST INCIDENTS				
Kind of Agent	Example of War Agents	Example of Industrial Chemicals	Physical Properties of Chemicals	Early Symptoms of Exposure
Nerve Agents	Sarin Soman Tabun V-Agents	Organophosphate insecticides	Vapors or liquids Odorless to fruity odor	Tearing eyes Sweating Very small pupils Breathing problems Muscle weakness Abdominal pain
Blister Agents	HT Lewisite Mustard gas	Dimethyl sulfate	Oily liquids	Skin and eye burns Breathing problems
Blood Agents		Cyanogen chloride Hydrogen cyanide	Liquids or gases stored as liquids under pressure	Headache Breathing problems Convulsions Sudden death
Choking Agents		Ammonia Chlorine Phosgene	Gases – may be stored as liquids under pressure Irritating odor	Cough Breathing problems
Irritating (Crowd control) Agents	Mace Pepper spray Tear gas	Chloroacetophenone Chloropicrin	Dusts or liquids Irritating odor	Tearing eyes Cough Breathing problems

TABLE 3

NATIONAL AND REGIONAL HAZMAT RESOURCES

(Listed in alphabetical order, not in order of priority)

AGENCY NAME	CONTACT NUMBER	HOURS OF OPERATION	SERVICES PROVIDED
Agency for Toxic Substances Disease Registry (ATSDR)	404-639-0615	24 hours/day	Will assemble an expert team of toxicologists and response experts to provide needed information. Will come on site if needed
CHEMNET	Can access through local industry or CHEMTREC	24 hours/day	Industrial mutual aid network between shippers and manufacturers. Will provide on site assistance
CHEM-TEL, INC.	1-800-255-3924 (Toll-free in the U.S.)	24 hours/day	Will provide information on products as provided in manufacturers MSDS.
CHEMTREC®	1-800-424-9300 (Toll-free in the U.S.) 703-527-3887 (For calls originating elsewhere; collect calls are accepted)	24 hours/day	Will provide information on products as provided in manufacturers MSDS. Can assist in identifying and contacting manufacturer of product or shipment
National Pesticide Telecommunications Network	1-800-858-7378	0930-1930 EST	Will provide information on pesticides
National Response Center (U.S. Coast Guard)	1-800-424-8802	24 hours/day	Notification required by law for many releases. Can give information on all aspects of release management
Regional Poison Control Centers (state-wide resources)	See Local phone book	24 hours/day	Can provide information on the health risks associated with chemicals. May have information on other hazards and appropriate responses

**Glossary
of
Terms
and
Abbreviations**

GLOSSARY

Terms and Abbreviations

Acid: A chemical which neutralizes alkalis forming salts. Acids have low pH's.

Acute: Having a rapid onset and progression.

Aerosol: Particles dispersed in a gas (usually air). Examples are fog (liquid particles) and smoke (solid particles).

Alkali: A chemical which neutralizes acids forming salts. Alkalis have high pH's. Alkalis are corrosive.

Anhydrous: Containing no water.

asym: An abbreviation for asymmetrical - referring to a particular arrangement of elements within a chemical molecule.

Asphyxiation: Injury or death caused by the replacement of oxygen in the environment by another gas or vapor.

Awareness Level Trained: First responders at the awareness level are those persons who, in the course of their normal duties may be the first on the scene of an emergency involving hazardous materials. First responders at the awareness level are expected to recognize hazardous materials presence, protect themselves, call for trained personnel, and secure the area. (NFPA 472)

Basic Life Support (CPR): First aid measures done to assist a victim's breathing and heart action such as cardiopulmonary resuscitation.

BLEVE: An acronym for **B**oiling **L**iquid **E**xpanding **V**apor **E**xplosion. Materials which BLEVE may cause storage containers and parts of containers to rocket great distances, in many directions. Any liquid may cause a BLEVE.

Boil: To change from a liquid state to a gaseous state.

Cameo: Acronym for **C**omputer **A**ided **M**anagement of **E**mergency **O**perations developed by the National Oceanic and Atmospheric Administration.

CAS Identification Number: A number assigned to each unique chemical entity by the **C**hemical **A**bstract **S**ervice of the American Chemical Society.

Catalyst: A substance which, when present in a very small amount, increases the rate at which two or more chemicals react together.

Chemical Protective Clothing: Items such as clothing,

hood, boots and gloves (fully-encapsulating suit) made from chemical-resistant materials that are designed and configured to protect the wearer from hazardous materials.

CHEMTREC: The **C**HEMical **T**Ransportation **E**mergency **C**enter, a public service of the Chemical Manufacturers Association. Located in Washington D.C. Available 24 hours a day. (1-800-424-9300)

CHRIS: An acronym for the **C**hemical **H**azard **R**esponse **I**nformation **S**ystem. Written and maintained by the United States Coast Guard.

Chronic: Occurring over a long time - many days or longer.

cis: refers to a particular arrangement of elements with a chemical molecule.

Combustion: The process of burning.

Compressed Gas: A gas which exerts a pressure of at least 41 psi in the container in which it is stored.

Concentration: The amount of one substance mixed or dissolved in a specified amount of a second substance.

Confined Space: A space that has limited openings for entry and exit and has poor natural ventilation.

Confinement: Actions taken to keep a material in a defined or local area after it is released.

Container: Anything that holds material, including storage tanks, pipelines and packaging (drums, carboys, etc).

Contaminated: Containing potentially harmful material.

Contamination: A release of hazardous material from its source to people, animals, the environment or equipment.

Corrosive: Any material which causes visible damage or irreversible alteration of human tissue (skin, eyes, etc.) at the site of contact or causes metals or plastics to corrode at a rapid rate.

CPR: Acronym for **C**ardio**P**ulmonary **R**esuscitation an emergency procedure used to maintain and restore breathing and blood circulation.

Cryogenic: A material at a very low temperature.

Decompose: Breaking apart into smaller different chemi-

cal.

Decontamination: The removal of a hazardous material from a victim or equipment.

Decontamination Area: Area located on the upwind edge of the Hot Zone used to decontaminate personnel and equipment. All personnel coming out of the Hot Zone must pass through the Decontamination Area for decontamination.

Deforming: Changing shape.

Deluge: A flooding quantity of water.

Detonate: The rapid decomposition of an explosive material leading to a rapidly moving wave of high temperature and high pressure. May be started by impact, friction or heat.

Dike: Barrier constructed to hold back a spill or leak.

Disperse: To scatter in different directions.

DOT: An acronym for United States Department of Transportation.

Explode: The rapid expansion of a material or container with the release of energy, heat or pressure.

Explosive: Any substance designed to produce an explosion (i.e. an extremely rapid release of gas and heat) or capable of producing an explosion by reacting with itself.

FEC: An acronym for Facility Emergency Coordinator.

FEMA: An acronym for United States Federal Emergency Management Agency.

Fire Fighting Gear: Turnout gear including footwear, trousers, a coat, gloves, a helmet, and respiratory protection. (NFPA 472)

First Responder: The individual who arrives first at the scene of a Hazmat incident with the responsibility to act.

Flammability:

Flammable: In this volume, defined as the equivalent of NFPA Flammability Hazard Class 1.

Very Flammable: In this volume, defined as the equivalent of NFPA Flammability Hazard Class 2.

Highly Flammable: In this volume, defined as the equivalent of NFPA Flammability Hazard Class 3.

Extremely Flammable: In this volume, defined as the equivalent of NFPA Flammability Hazard Class 4.

Flashpoint: The lowest temperature at which the vapor of

a substance will catch on fire. It will not continue to burn without the addition of more heat. The flashpoint is lower than the ignition temperature.

Fog: Liquid particles dispersed in air.

Freeze: To change from a liquid state to a solid state.

Frostbite: Injury caused to skin or other tissue by very cold materials. The medical consequences are similar to those caused by burns.

Fumes: A general term for vapors, gases, or smoke.

Gas: A state of matter in which the material can expand and contract in response to pressure or temperature.

Hazard: A potential risk or danger.

Hazardous Material: Any substance capable of causing harm to people, animals, property or the environment.

Hazmat Incident: Actual or potential unplanned release of a hazardous material.

HAZWOPER: Name given to the 29CFR 1910.120 regulation entitled Hazardous Waste Operation and Emergency Response.

HVAC: An acronym for Heating, Ventilating, and Air Conditioning systems.

Hot Zone: The area immediately around the incident site. Appropriate protective clothing and equipment must be worn by all personnel in the Hot Zone. Awareness Level and Operational Level trained personnel are not permitted in the Hot Zone.

ICS: An acronym for Incident Command System.

Ignition Temperature: The minimum temperature to which a material must be raised before it will burn. The ignition temperature is higher than the flashpoint.

Incident Commander (IC): The individual responsible for the management and coordination of all incident operations.

Inhalation: Breathing a chemical into the lung.

Inhibited: Containing a small amount of another substance included to prevent the first material from reacting with itself or other things in its environment.

Insoluble: Not able to be dissolved.

Isomer: A material with the same chemical composition

(i.e. kind and number of elements) as another material but with a different arrangement of those elements. For example, n-butyl alcohol and t-butyl alcohol are isomers of one another.

LEPC: An acronym for **Local Emergency Planning Committee**.

m-: An abbreviation for “meta”. Referring to a particular arrangement of groups attached to a benzene molecule.

Methemoglobin: An abnormal form of hemoglobin which will not carry oxygen in the blood.

Monitor: A self supporting fire fighting nozzle which can function unattended and delivers a large volume of fire suppressant material.

MSDS: An acronym for **Material Safety Data Sheet**. Information provided by the manufacturer of a material about its physical and chemical properties as well as the hazards associated with its use.

n-: An abbreviation for “normal”. It refers to the arrangement of carbon atoms in a chemical molecule.

N-: A symbol used in some chemical names indicating that the next section of the name refers to a chemical group attached to a nitrogen atom.

NA Identification Number: An acronym for **North America**. A four-digit number assigned to some chemicals found in transport in North America.

NFPA: An acronym for **National Fire Protection Association, Inc.**

NIOSH: An acronym for United States **National Institute of Occupational Safety and Health**.

Non-flammable: Not capable of being burned under normal conditions.

o-: An abbreviation for “ortho”. Referring to a particular arrangement of elements within a chemical molecule.

Operations Level Trained: First responders at the operational level are those persons who respond to releases or potential releases of hazardous materials as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release. They shall be trained to respond in a defensive fashion to control the release from a safe distance and keep it from spreading. (ANSI/NFPA 472)

OSHA: An acronym for United States **Occupational Safety and Health Administration**.

Oxidizer: A chemical which when mixed with combus-

tible or flammable material will start a fire or make an existing fire worse.

p-: An abbreviation for “para”. Referring to a particular arrangement of elements within a chemical molecule.

Peroxide: Chemicals which contain two oxygen atoms bound together. Often explosive.

Placard: A sign or symbol designed to be hung on a wall, container or vehicle containing warning information to convey the level of hazard.

Pungent: Sharp or irritating.

Response: That portion of incident management in which personnel are involved in controlling a hazardous materials incident. (ANSI/NFPA 471)

Risk: A measure of the chances that damage to life, property, or the environment will occur if a hazard occurs. Risk includes consideration of the severity of the damage.

Runoff: Excess water produced during fire fighting or from rain.

SARA Title III: **Superfund Amendments and Reauthorization Act** of 1986. Title III of SARA, the Emergency Planning and Community Right-to-Know Act of 1986, includes detailed provisions for community planning.

SCBA: An acronym for **Self Contained Breathing Apparatus**. SCBA includes a seal tested mask, positive pressure regulator and a pressurized air supply.

sec-: An abbreviation for “secondary”. Referring to a particular arrangement of elements within a chemical molecule.

Shelter in Place: Protect people without evacuating by keeping them inside a building with windows and doors closed and external ventilation systems shut off until a hazardous situation has resolved.

Solubility: The degree to which one material may be completely mixed with or dissolved in another material.

Stabilized: Containing a small amount of another substance included to keep the first material from changing form.

STCC Identification Numbers: An acronym for **Standard Transportation Commodity Code**. A seven digit identification number commonly used for materials shipped by rail. Numbers beginning with 49- are hazardous materials.

Sublime: To change from a solid state to a gaseous

state without becoming a liquid.

sym-: An abbreviation for “symmetrical”. Referring to a particular arrangement of elements within a chemical molecule.

t-: An abbreviation for “tertiary”. Referring to a particular arrangement of elements within a chemical molecule.

tert-: An abbreviation for “tertiary”. Referring to a particular arrangement of elements within a chemical molecule.

Thio- : Containing a sulfur atom.

Toxic: Capable of causing human injury. A poison.

trans-: Referring to a particular arrangement of elements within a chemical molecule.

UN Identification Number: An international four digit number assigned to all hazardous materials regulated by the **United Nations**.

Volatile: Easily changes from a liquid to a vapor.

>: A symbol meaning “greater than”.

<: A symbol meaning “less than”.

Important Telephone Numbers

LOCAL

Air Pollution Control _____
Bomb Squad _____
CHEMNET _____
Coroner _____
Emergency Management Agency _____
Fire Department _____
Hazmat Team _____
Health Department _____
LEPC _____
Police Department _____
Weather Bureau _____
Other:

REGIONAL

Coast Guard _____
Poison Control Center _____
State Emergency Management Agency _____
State Emergency Response Commission (SERC) _____
State Fire Marshall _____
State Environmental Agency _____
State Police _____
Other:

NATIONAL

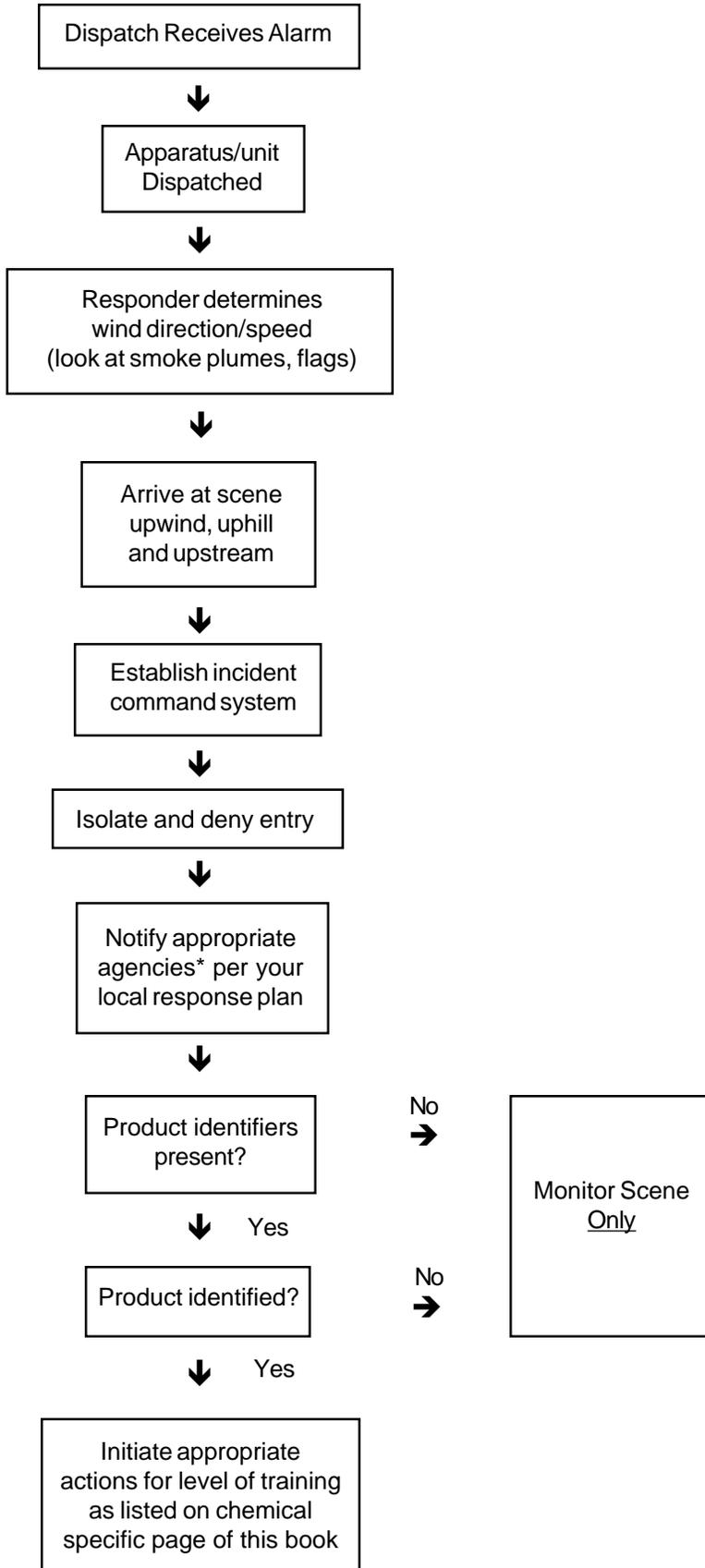
Agency for Toxic Substance Disease Registry (ATSDR) 1-404-639-0615
CHEM • TEL, INC..... 1-800-255-3924
CHEMTREC⁷ 1-800-424-9300
National Pesticide Telecommunications Network 1-800-858-7378
National Response Center 1-800-424-8802
Other:

First Responder Strategy Using the NFPA 704 Placard

		NFPA Reactivity Rating 0-1 (Rating 2-4 Defensive Only)				
NFPA Health Rating	4	Defensive operation only.				
	3	Defensive operation only when materials identified and deemed safe.	Defensive operation only when materials identified and deemed safe.	Defensive operation only when materials identified and deemed safe.	Defensive operation only when materials identified and deemed safe.	Defensive operation only when materials identified and deemed safe.
	2	Attack from safe distance in full SCBA. Decontaminate personnel/equipment thoroughly when complete.	Attack from safe distance in full SCBA. Decontaminate personnel/equipment thoroughly when complete.	Attack from safe distance in full SCBA. Decontaminate personnel/equipment thoroughly when complete.	Attack from safe distance in full SCBA. Decontaminate personnel/equipment thoroughly when complete.	Attack from safe distance in full SCBA. Decontaminate personnel/equipment thoroughly when complete. Consider extra attack lines.
	1	Attack with full protective clothing and SCBA. Decontaminate when finished.	Attack with full protective clothing and SCBA. Decontaminate when finished.	Attack with full protective clothing and SCBA. Decontaminate when finished.	Attack with full protective clothing and SCBA. Decontaminate when finished.	Attack with full protective clothing and SCBA. Decontaminate when finished. Consider extra attack lines.
	0	Attack with full protective clothing and SCBA.	Attack with full protective clothing and SCBA. Decontaminate when finished. Consider extra attack lines and master stream appliances.			
		0	1	2	3	4

NFPA Flammability Rating

HAZMAT General Response Scheme



*HAZMAT Teams
Law Enforcement
Fire Department
Health Department