



## MATERIAL SAFETY DATA SHEET

# Toluene

VALERO MARKETING & SUPPLY COMPANY  
and Affiliates  
P.O. Box 696000  
San Antonio, TX 78269-6000

### Emergency Phone Numbers

24 Hour Emergency: 866-565-5220  
Chemtrec Emergency: 800-424-9300

### General Assistance

General Assistance: 210-345-4593

**BRAND NAMES:** Valero, Diamond Shamrock, Shamrock, Ultramar, Beacon, Total

## Section 1. Chemical Product and Company Identification

**Common / Trade name** : Toluene

**Synonym** : toluol; phenyl methane; methyl benzene; benzene, methyl-

**SYNONYMS/COMMON NAMES:** This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product and are not reflected in this document. Consult specification sheets for technical information. This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Material uses** : This product is intended for use as a refinery feedstock, fuel, or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

**MSDS #** : 411

**CAS #** : 108-88-3

## Section 2. Composition, information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>Concentration (%)</u>
Toluene	108-88-3	>99

## Section 3. Hazards Identification

May cause irritation to eyes, skin and respiratory system. Avoid liquid, mist and vapor contact. Harmful or fatal if swallowed. Aspiration hazard, can enter lungs and cause damage. May cause irritation or be harmful if inhaled or absorbed through the skin. Flammable liquid. Vapors may explode.

**Physical state** : Liquid. (COLORLESS WATERY LIQUID WITH A SWEET, PUNGENT, BENZENE-LIKE ODOR)

**Emergency overview** : Warning!  
CANCER HAZARD.  
CONTAINS MATERIAL WHICH CAN CAUSE CANCER.  
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:  
KIDNEYS, LIVER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM,  
EYE, LENS OR CORNEA.  
FLAMMABLE LIQUID AND VAPOR.  
VAPOR MAY CAUSE FLASH FIRE.

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MAY BE HARMFUL IF SWALLOWED.

Do not ingest. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.

**Routes of entry** : Dermal contact. Eye contact. Inhalation. Ingestion.

#### **Potential acute health effects**

**Eyes** : May cause severe irritation, redness, tearing, blurred vision and conjunctivitis.

**Skin** : Prolonged or repeated contact may cause moderate irritation, defatting (cracking), redness, itching, inflammation, dermatitis and possible secondary infection. High pressure skin injections are **SERIOUS MEDICAL EMERGENCIES**. Injury may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.

**Inhalation** : Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest and sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm. Repeated or prolonged exposure may cause behavioral changes.

**Ingestion** : Harmful if swallowed.

**Medical conditions aggravated by over-exposure** : Preexisting eye, skin, heart, central nervous system and respiratory disorders may be aggravated by exposure to this product. Impaired kidney, liver and blood disorders may be aggravated by exposure to this product.

**Over-exposure signs/symptoms** : Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest or sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm.

See toxicological information (section 11)

## **Section 4. First Aid Measures**

**Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin contact** : In case of contact, immediately flush skin with plenty of water. Wash exposed area thoroughly with soap and water. Remove contaminated clothing promptly and launder before reuse. Contaminated leather goods should be discarded. If irritation persists or symptoms described in the MSDS develop, seek medical attention. High pressure skin injections are **SERIOUS MEDICAL EMERGENCIES**. Get immediate medical attention.

**Inhalation** : Remove to fresh air. If breathing is difficult, ensure clear airway and administer oxygen. If not breathing, apply artificial respiration or cardiopulmonary resuscitation. Keep person warm, quiet and get medical attention.

**Ingestion** : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.

**Notes to physician** : In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption. Consideration should be given to the use of an intratracheal tube, to prevent aspiration. Irregular heart beat may occur, use of adrenalin is not advisable. Individuals intoxicated by the product should be hospitalized immediately, with acute and continuing attention to neurological and cardiopulmonary function. Positive pressure ventilation may be necessary. After the initial episode, individuals should be monitored for changes in blood variables and the delayed appearance of pulmonary edema and chemical pneumonitis. Such patients should be monitored for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated. In case of skin injection, prompt debridement of the wound is necessary to minimize necrosis and tissue loss.

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## Section 5. Fire Fighting Measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : 535.85°C (996.5°F)
- Flash point** : Closed cup: 4.85°C (40.7°F).
- Flammable limits** : Lower: 1.2% Upper: 7.1%
- Products of combustion** : These products are carbon oxides (CO, CO<sub>2</sub>).
- Fire-fighting media and instructions** : Flammable Liquid. Use dry chemical, foam or carbon dioxide to extinguish the fire. Consult foam manufacturer for appropriate media, application rates and water/foam ratio. Water can be used to cool fire- exposed containers, structures and to protect personnel. If a leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak. Use water to flush spills away from sources of ignition. Do not flush down public sewers.
- Collect contaminated fire-fighting water separately. It must not enter the sewage system. Dike area of fire to prevent runoff. Decontaminate emergency personnel and equipment with soap and water.
- Flammable liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Dangerous when exposed to heat or flame. Vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources (pilot lights, welding equipment, electrical equipment, etc.) and flash back. Vapors may accumulate in low areas. Vapors may concentrate in confined areas. Flowing product can be ignited by self generated static electricity. Use adequate bonding and grounding to prevent static buildup. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Irritating or toxic substances may be emitted upon thermal decomposition. For fires involving this material, do not enter any enclosed or confined space without proper protective equipment, which may include NIOSH approved self-contained breathing apparatus with full face mask. Clothing, rags or similar organic material contaminated with this product and stored in a closed space may undergo spontaneous combustion. Transfer to and from commonly bonded and grounded containers.

## Section 6. Accidental Release Measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Do not touch or walk through spilled material. Tanks, vessels or other confined spaces which have contained product should be freed of vapors before entering. The container should be checked to ensure a safe atmosphere before entry. Empty containers may contain toxic, flammable/combustible or explosive residues or vapors. Do not cut, grind, drill, weld or reuse empty containers that contained this product. Do not transfer this product to another container unless the container receiving the product is labeled with proper DOT shipping name, hazard class and other information that describes the product and its hazards.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire and Explosion Hazard Data before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done

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without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 800-424- 8802. For highway or railway spills, contact Chemtrec at 800-424-9300.

**Methods for cleaning up** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain it to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

## Section 7. Handling and Storage

**Handling** : Do not ingest. Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. Use only in well ventilated locations. Keep away from heat, spark and flames. In case of fire, use water spray, foam, dry chemical or carbon dioxide as described in the Fire and Explosion Hazard Data section of the MSDS. Do not pressurize, cut, weld, braze, solder, drill on or near this container. "Empty" container contains residue (liquid and/or vapor) and may explode in heat of a fire.

Keep out of reach of children. Failure to use caution may cause serious injury or illness. Use good personal hygiene practices. After handling this product, wash hands before eating, drinking, or using toilet facilities.

**Storage** : Store in tightly closed containers in cool, dry, isolated and well ventilated area away from heat, sources of ignition and incompatible materials. Use non-sparking tools and explosion proof equipment. Ground lines, containers, and other equipment used during product transfer to reduce the possibility of a static induced spark. Do not "switch load" because of possible accumulation of a static charge resulting in a source of ignition. Use good personal hygiene practices.

## Section 8. Exposure controls, personal protection

**Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are close to the workstation location.

### Personal protection

**Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Keep away from eyes. Eye contact can be avoided by wearing safety glasses or chemical splash goggles.

**Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Keep away from skin. Skin contact can be minimized by wearing protective gloves such as neoprene, nitrile-butadiene rubber, etc. and, where necessary, impervious clothing and boots. Leather goods contaminated with this product should be discarded. A source of clean water should be available in the work area for flushing eyes and skin. Flame Retardant Clothing is recommended.

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protective equipment (Pictograms)** : Consult your Supervisor or S.O.P. for special handling directions.



- Personal protection in case of a large spill** : Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be adequate. Consult a specialist before handling this product. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

### Component

Toluene

### Exposure limits

**ACGIH TLV (United States, 5/2004). Skin Notes: 1996 Adoption Refers to Appendix A – Carcinogens.**

TWA: 50 ppm 8 hour/hours. Form: All forms

**NIOSH REL (United States, 6/2001).**

STEL: 150 ppm 15 minute/minutes. Form: All forms

TWA: 100 ppm 10 hour/hours. Form: All forms

**OSHA PEL Z2 (United States, 6/2002).**

AMP: 500 ppm 10 minute/minutes. Form: All forms

CEIL: 300 ppm Form: All forms

TWA: 200 ppm 8 hour/hours. Form: All forms

Consult local authorities for acceptable exposure limits.

## Section 9. Physical and Chemical Properties

- Physical state** : Liquid. (COLORLESS WATERY LIQUID WITH A SWEET, PUNGENT, BENZENE-LIKE ODOR)
- Color** : Colorless.
- Odor** : STRONG, PLEASANT
- Molecular formula** : C7-H8
- Boiling point** : 110.45°C (230.8°F)
- Melting/freezing point** : -95.15°C (-139.3°F)
- Specific gravity** : 0.867 (Water = 1)
- Vapor density** : 3.14 (Air = 1)
- Volatility** : 100% (v/v).
- Evaporation rate** : 2 compared with Butyl acetate.
- VOC** : 100 (%)
- Solubility** : Very slightly soluble in cold water.

## Section 10. Stability and reactivity data

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with oxidizing agents, reducing agents, acids, alkalis.
- Hazardous decomposition products** : These products are carbon oxides (CO, CO<sub>2</sub>).
- Hazardous polymerization** : Will not occur.

## Section 11. Toxicological Information

### Toxicity data

**TOLUENE** can affect the body if it is inhaled, comes in contact with the eyes or skin or it is swallowed. It may also enter the body through the skin. Toluene vapors cause narcosis. Controlled exposures of human subjects to 200 ppm for 8 hours produced mild fatigue, weakness, confusion, lacrimation and paresthesia. At 600 ppm for 8 hours, there was euphoria, headache, dizziness, dilated pupils and nausea. At 800 ppm for 8 hours, symptoms were more pronounced, and after effects included nervousness, muscular fatigue and insomnia persisting for several days. In workers exposed for many years to concentrations in the range of 80 to 300 ppm, there was no clinical or laboratory evidence of altered liver function. Toluene exposure does not result in the same chronic injury to bone marrow caused by benzene. Liquid splashed in the eyes of workers has caused transient corneal damage and conjunctival irritation, complete recovery occurred within 48 hours. Animal studies have shown that inhalation of high levels of toluene produced cardiac sensitization. Such sensitization may cause fatal changes in heart rhythms. This later effect was shown to be enhanced by hypoxia or the injection of adrenalin-like agents. Workers exposed at less than 200 ppm have complained of headache, lassitude and nausea, but physical findings were essentially negative. At concentrations between 200 and 500 ppm, impairment of coordination, momentary loss of memory and anorexia were present. Between 500 and 1500 ppm, palpitation, extreme weakness, pronounced loss of coordination and impairment of reaction time were noted. The red cell count fell in many instances and there were cases of aplastic anemia in which recovery followed intensive hospital treatment (although some of the effects may have been due to benzene impurity). Toluene has been reported to decrease immunological responses and cause recordable hearing loss in test animals. Damages genetic material in mammalian test systems. May cause adverse reproductive effects based on animal testing.

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Toluene	LD50	636 mg/kg	Oral	Rat
	LDLo	50 mg/kg	Oral	human

- IDLH** : 500 ppm
- Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Toluene]. Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union [Benzene].  
Contains material which causes damage to the following organs: kidneys, liver, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

**Other toxic effects on humans** :

### Specific effects

- Carcinogenic effects** : Contains material which may cause cancer, based on animal data. Risk of cancer depends on duration and level of exposure.
- Target organs** : Contains material which causes damage to the following organs: kidneys, liver, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

## Section 12. Ecological Information

### Ecotoxicity data

<u>Ingredient name</u>	<u>Species</u>	<u>Period</u>	<u>Result</u>
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Toluene	Daphnia magna (EC50)	48 hour/hours	6 mg/l
	Daphnia magna (EC50)	48 hour/hours	6.56 mg/l
	Oncorhynchus mykiss (EC50)	48 hour/hours	6.78 mg/l
	Oncorhynchus mykiss (LC50)	96 hour/hours	5.8 mg/l
	Oncorhynchus mykiss (LC50)	96 hour/hours	6.78 mg/l
	Pimephales promelas (LC50)	96 hour/hours	12.6 mg/l

**Products of degradation** : These products are carbon oxides (CO, CO<sub>2</sub>) and water.



**Toxicity of the products of biodegradation** : The products of degradation are less toxic than the product itself.

## Section 13. Disposal Considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Consult your local or regional authorities.

## Section 14. Transport Information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1294	TOLUENE	3	II		<p><b>Reportable quantity</b> 1000 lbs. (453.6 kg)</p> <p><b>Limited quantity</b> Yes.</p> <p><b>Packaging instruction</b> Passenger aircraft Quantity limitation: 5 L</p> <p><b>Cargo aircraft</b> Quantity limitation: 60 L</p> <p><b>Special provisions</b> IB2, T4, TP1</p>
<b>TDG Classification</b>	UN1294	TOLUENE	3	II		Not available.

## Section 15. Regulatory Information

### United States

- U.S. Federal regulations** : TSCA 8(b) inventory: Toluene  
 SARA 302/304/311/312 extremely hazardous substances: No products were found.  
 SARA 302/304 emergency planning and notification: No products were found.  
 SARA 302/304/311/312 hazardous chemicals: Toluene  
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Toluene:  
 Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard  
 Clean Water Act (CWA) 307: Toluene  
 Clean Water Act (CWA) 311: Toluene  
 Clean Air Act (CAA) 112 accidental release prevention: No products were found.  
 Clean Air Act (CAA) 112 regulated flammable substances: No products were found.  
 Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

### SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: Toluene	108-88-3	>99
<b>Supplier notification</b>	: Toluene	108-88-3	>99

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

- State regulations** : Connecticut hazardous material survey.: Toluene  
 Illinois toxic substances disclosure to employee act: Toluene  
 Rhode Island RTK hazardous substances: Toluene  
 Pennsylvania RTK: Toluene: (environmental hazard, generic environmental hazard)  
 Florida: Toluene  
 Michigan critical material: Toluene  
 Massachusetts RTK: Toluene  
 New Jersey: Toluene
- WARNING:** This product contains chemical/chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Toluene  
**WARNING:** This product contains chemical/chemicals known to the state of California to cause reproductive harm (male).: Benzene  
 California prop. 65 (no significant risk level): Benzene  
 California prop. 65 (Maximum Acceptable Dosage Level): Toluene  
**WARNING:** This product contains chemical/chemicals known to the state of California to cause birth defects or other reproductive harm.: Toluene  
**WARNING:** This product contains chemical/chemicals known to the state of California to cause cancer.: Benzene

### Canada

- WHMIS (Canada)** : Class B-2: Flammable liquid  
 Class D-2A: Material causing other toxic effects (Very toxic).  
 Class D-2B: Material causing other toxic effects (Toxic).  
 CEPA DSL: Toluene

## Section 16. Other Information

- Label requirements** : CANCER HAZARD.  
 CONTAINS MATERIAL WHICH CAN CAUSE CANCER.  
 CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:  
 KIDNEYS, LIVER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM,  
 EYE, LENS OR CORNEA.  
 FLAMMABLE LIQUID AND VAPOR.  
 VAPOR MAY CAUSE FLASH FIRE.  
 MAY BE HARMFUL IF SWALLOWED.

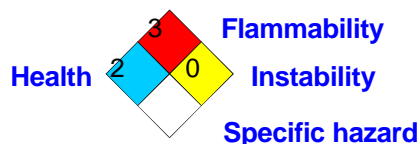
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**Hazardous Material  
Information System (U.S.A.)** :

Health	2
Fire hazard	3
Physical Hazard	0
Personal protection	

**National Fire Protection  
Association (U.S.A.)** :



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**Disclaimer**

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## Definitions of Material Safety Data Sheet Terminology

### GOVERNMENT AGENCIES AND PRIVATE ASSOCIATIONS

**ACGIH** - American Conference of Governmental Industrial Hygienists, (private association)  
**DOT** - United States Department of Transportation  
**EPA** - United States Environmental Protection Agency  
**IARC** - International Agency for Research on Cancer, (private association)  
**NFPA** - National Fire Protection Association, (private association)  
**MSHA** - Mine Safety and Health Administration, U.S. Department of Labor  
**NIOSH** - National Institute of Occupational Safety and Health, U.S. Department of Health and Human Services  
**NTP** - National Toxicology Program, (private association)  
**OSHA** - Occupational Safety and Health Administration, U.S. Department of Labor  
**WHMIS** - Workplace Hazardous Material Information System  
**CSA** - Canadian Standards Association

### HAZARD AND EXPOSURE INFORMATION

**Acute Hazard** - An adverse health effect which occurs rapidly as a result of short term exposure.  
**CAS #** - American Chemical Society's Chemical Abstract service registry number which identifies the product and/or ingredients.  
**Ceiling** - The concentration that should not be exceeded during any part of the working exposure  
**Chronic Hazard** - An adverse health effect which generally occurs as a result of long term exposure or short term exposure with delayed health effects and is of long duration  
**Fire Hazard** - A material that poses a physical hazard by being flammable, combustible, phyrophoric or an oxidizer as defined by 29 CFR 1910.1200  
**Hazard Class** - DOT hazard classification  
**Hazardous Ingredients** - Names of ingredients which have been identified as health hazards  
**IDLH** - Immediately Dangerous to Life and Health, the airborne concentration below which a person can escape without

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respiratory protection and exposure up to 30 minutes, and not suffer debilitating or irreversible health effects. Established by NIOSH.

**mg/m<sup>3</sup>** - Milligrams of contaminant per cubic meter of air, a mass to volume ratio

**N/A** - Not available or no relevant information found

**NA** - Not applicable

**PEL** - OSHA permissible exposure limit; an action level of one half this value may be applicable

**ppm** - Part per million (one volume of vapor or gas in one million volumes of air)

**Pressure Hazard** - A material that poses a physical hazard due to the potential of a sudden release of pressure such as explosive or a compressed gas as defined by 29 CFR 1910.1200

**Reactive Hazard** - A material that poses a physical hazard due to the potential to become unstable reactive, water reactive or that is an organic peroxide as defined by 29 CFR 1910.1200.

**STEL** - The ACGIH Short-Term Exposure Limit, a 15-minute Time-Weighted Average exposure which should not be exceeded at any time during a workday, even if the 8-hour TWA is less than the TLV.

**TLV** - ACGIH Threshold Limit Value, represented herein as an 8-hour TWA concentration.

**8-hour TWA** - The time weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

**LD<sub>50</sub>** - Single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of the defined animal population.

**LC<sub>50</sub>** - The concentration of a substance in air that, when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.