



### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Air is a colorless, odorless, non-flammable gas. The main health hazards associated with releases of this gas are related to the high pressure. Although Air is generally considered non-flammable, Air will support combustion. A moderate cylinder rupture hazard exists when Air, which is under pressure, is subject to heat or flames.

**SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of overexposure for air is by inhalation at elevated or reduced pressure. The following paragraphs describe symptoms of exposure by route of exposure.

**INHALATION:** Air is non-toxic and necessary to support life. Inhalation of Air in high pressure environments, such as underwater diving or hyperbolic chambers can result in symptoms similar to overexposure to pure oxygen. These symptoms include tingling of the fingers and toes, abnormal sensations, and impaired coordination and confusion. Decompression sickness, the “bends”, is possible following rapid decompression.



**OTHER POTENTIAL HEALTH EFFECTS:** Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE:** An Explanation in **Lay Terms**. Overexposure to Air may cause the following health effects:

**ACUTE:** The most significant hazard associated with Air is the pressure hazard. Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite.

**CHRONIC:** There are currently no known adverse health effects associated with chronic exposure to compressed Air.

**TARGET ORGANS:** Respiratory system under ambient low pressure conditions. Central nervous system under ambient high pressure conditions.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
<b>HEALTH</b>		(BLUE)	0
<b>FLAMMABILITY</b>		(RED)	0
<b>REACTIVITY</b>		(YELLOW)	0
<b>PROTECTIVE EQUIPMENT</b>			B
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For routine industrial applications			

**See Section 16 for Definition of Ratings**

## PART II *What should I do if a hazardous situation occurs?*

### 4. FIRST-AID MEASURES

Remove victim(s) to a safe location. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. **DO NOT USE HOT WATER.** If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

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## 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable. Air will support combustion of flammable materials. Use extinguishing media appropriate for surrounding fire.

Water Spray: YES

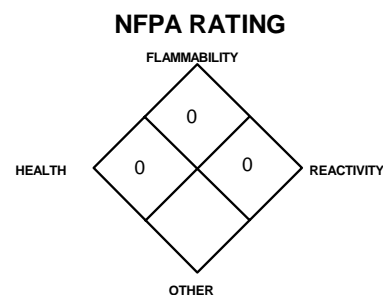
Carbon Dioxide: YES

Dry Chemical: YES

Halon: YES

Foam: YES

Other: Any "ABC" Class.



**See Section 16 for Definition of Ratings**

UNUSUAL FIRE AND EXPLOSION HAZARDS: Air does not burn; however, cylinders, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed cylinders if it can be done without risk to firefighters. Otherwise, cool containers with hose stream and protect personnel. Withdraw immediately in case of rising sounds from venting safety device or any discoloration of tanks due to the fire.

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## 6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Minimum Personal Protective Equipment should be **Level D: safety glasses and gloves resistant to tears.**

Locate and seal the source of the leaking gas. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in place or remove it to a safe area and allow the gas to be released there. Monitor the surrounding area for oxygen levels. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

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## PART III *How can I prevent hazardous situations from occurring?*

### 7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Air intended for breathing must conform to CGA Standard G-7 (Compressed Air for Human Respiration) and Standard G-7.1. All other sources of compressed air must be treated as unfit for human consumption until tested for conformance with these standards. Do not eat or drink while handling chemicals. Be aware of any signs of dizziness or fatigue.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable or combustible materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors, or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from incompatible materials including flammable materials. (see Section 10, Stability and Reactivity) for more information), which can burn violently. Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Air. Do not store containers where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting.

## 7. HANDLING and STORAGE (Continued)

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS (continued): Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:

**Before Use:** Move cylinders with a suitable hand truck. Do not drag, slide, or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in place (where provided) until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

**After Use:** Close main cylinder valve. Replace valve protection cap (where provided). Mark empty cylinders "EMPTY".

**NOTE:** Use only DOT or ASME code containers. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Also see CGA P-9, the Inert Gases, Argon, Air, and Helium; CGA P-14, Accident Prevention in Oxygen Rich and Oxygen Deficient Atmospheres; CGA Safety Bulletin SB-2, Oxygen Deficient Atmospheres.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely.

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## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

RESPIRATORY PROTECTION: Maintain oxygen level above 19.5% in the workplace. Use supplied air respiratory protection if oxygen level is below 19.5% or during emergency response to a release of Air. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards.

EYE PROTECTION: Splash goggles, face shields, or safety glasses.

HAND PROTECTION: Wear gloves resistant to tears when handling cylinders of Air.

BODY PROTECTION: Use body protection appropriate for task.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY @ 21.1°C (70°F): 1.2 kg/m<sup>3</sup> (0.0749 lb/ft<sup>3</sup>)

SPECIFIC GRAVITY: Not applicable.

SOLUBILITY IN WATER (v/v): 0.0292

VAPOR PRESSURE, mm Hg @ 20°C (68°F): Gas, ambient.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

APPEARANCE AND COLOR: Air is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of Air.

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EVAPORATION RATE (nBuAc = 1): Not applicable.

FREEZING POINT: -216.2°C (-357.2°F)

BOILING POINT (1 atm): -194.3°C (-317.8°F)

pH: Not applicable.

SPECIFIC VOLUME (ft<sup>3</sup>/lb): 13.8 (for Nitrogen)

VAPOR PRESSURE: Not applicable.

## 10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state. Air which contains excess oxygen may present the same hazards as Liquid Oxygen and could react violently with organic materials such as oil and grease.

DECOMPOSITION PRODUCTS: None.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Fuels may form explosive mixtures in air.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture.

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## PART III *How can I prevent hazardous situations from occurring?*

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### 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** The toxicology data currently available for the components of compressed Air present at a level greater than 1 mole % are listed as follows:

**NITROGEN:** Currently, there are no specific toxicology data available for Nitrogen gas.

**OXYGEN:**

Cytogenetic Analysis System (hamster lung) 80 pph  
TCLo (inhalation-woman) 12 pph for 10 minutes. Teratogenic effects.  
TCLo (inhalation-human) 100 pph for 14 hours. Pulmonary effects.

**SUSPECTED CANCER AGENT:** Air is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and there fore is neither considered to be nor suspected to be a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** Air is not an irritant. However, contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

**SENSITIZATION OF PRODUCT:** Air is not a sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of Air and its components on the human reproductive system.

**Mutagenicity:** Air is not expected to cause mutagenic effects in humans.

**Embryotoxicity:** Air is not expected to cause embryotoxic effects in humans.

**Teratogenicity:** Air is not expected to cause teratogenic effects in humans.

**Reproductive Toxicity:** Air is not expected to cause adverse reproductive effects in humans.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Overexposure to this gas is unlikely to aggravate existing medical conditions.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce overexposure if air is breathed in high pressure environment (e.g., illness associated with decompression, bends, or caisson disease). Decompression equipment may be required.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Currently, Biological Exposure Indices (BEIs) are not applicable for this compound.

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### 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** This gas will be dissipated rapidly in well-ventilated areas. The components of Air are stable in the environment. Additional environmental data are available for components as follows:

**NITROGEN:** Log  $K_{ow}$  = 0.92; Water solubility = 1.49% v/v (25°C, 1 atm.).

**OXYGEN:** Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log  $K_{ow}$  = -0.65

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No adverse effect is anticipated to occur to plant life, except for frost produced in the presence of rapidly expanding gases. See Section 11, Toxicological Information, for information on effects on animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** Not harmful to aquatic life under normal conditions of exposure.

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### 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to MESA International Technologies, Inc. Do not dispose of locally.

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## 14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Air, compressed  
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)  
UN IDENTIFICATION NUMBER: UN 1002  
PACKING GROUP: Not applicable.  
DOT LABEL(S) REQUIRED: Non-Flammable Gas  
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 122  
MARINE POLLUTANT: Air is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

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## 15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: Air is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITIES (RQ): Not applicable.

CANADIAN DSL/NDL INVENTORY STATUS: The components of Air are on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: Air is listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: Air is covered under specific State regulations, as follows:

<b>Alaska - Designated Toxic and Hazardous Substances:</b> No.	<b>Michigan - Critical Materials Register:</b> No.	<b>Pennsylvania - Hazardous Substance List:</b> No.
<b>California - Permissible Exposure Limits for Chemical Contaminants:</b> No.	<b>Minnesota - List of Hazardous Substances:</b> No.	<b>Rhode Island - Hazardous Substance List:</b> No.
<b>Florida - Substance List:</b> No.	<b>Missouri - Employer Information/Toxic Substance List:</b> No.	<b>Texas - Hazardous Substance List:</b> No.
<b>Illinois - Toxic Substance List:</b> No.	<b>New Jersey - Right to Know Hazardous Substance List:</b> Air.	<b>West Virginia - Hazardous Substance List:</b> No.
<b>Kansas - Section 302/313 List:</b> No.	<b>North Dakota - List of Hazardous Chemicals, Reportable Quantities:</b> No.	<b>Wisconsin - Toxic and Hazardous Substances:</b> No.
<b>Massachusetts - Substance List:</b> No.		

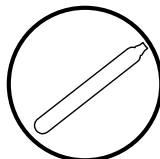
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Air and its components are not on the California Proposition 65 lists.

### LABELING:

**CAUTION:** HIGH PRESSURE GAS.  
MAY ACCELERATE COMBUSTION.  
Keep oil and grease away.  
Use equipment rated for cylinder pressure.  
Close valve after each use and when empty.  
Use in accordance with the Material Safety Data Sheet.  
DO NOT REMOVE THIS PRODUCT LABEL.

**FIRST-AID:** **IF INHALED,** remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

CANADIAN WHMIS SYMBOLS: **Class A:** Compressed Gases



## 16. OTHER INFORMATION

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. MESA International Technologies, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally MESA International Technologies, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

### DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

#### EXPOSURE LIMITS IN AIR:

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

**IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The**

**DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELS)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

#### HAZARD RATINGS:

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury).

**NATIONAL FIRE PROTECTION ASSOCIATION (Continued):** Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

#### FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

#### TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

#### REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDSL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations.