Salem Tube, Inc.
A Subsidiary of Tubacex Group

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**STAINLESS STEEL & NICKEL ALLOYS**
CHEMICAL NAME/CLASS:	Metal Alloys
PRODUCT USE:	Various
DISTRIBUTOR'S NAME:	**SALEM TUBE, INC.**
ADDRESS:	951 Fourth Street Greenville, PA 16125
BUSINESS PHONE:	724-646-4301
EMERGENCY PHONE:	United States/Canada: 1-800-424-9300 (Chemtrec) [24-hours] International: +1-703-527-3887 (Chemtrec) [24-hours] (collect calls accepted)
DATE OF PREPARATION:	February 3, 2008

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

2. HAZARD IDENTIFICATION

NOTE: These products are "Articles" under the U.S. Federal OSHA Hazard Communication Standard (29 CFR 1910.1200), and the Canadian Workplace Hazardous Materials Standard. Refer to Section 15 (Regulatory Information) for specific regulatory citations. As articles, these products present negligible health and physical hazards under reasonably anticipated circumstances of use. Subsequently, a Material Safety Data Sheet is not required for these products under Standards cited above. This document is prepared to provide persons using these products with additional safety information.

EMERGENCY OVERVIEW: Product Description: These product are solid metal alloys **Health Hazards:** During normal use and handling, this product presents minimal health hazards. When these alloys are cut or formed, inhalation of dusts may cause irritation of the respiratory system. If heated, fumes may cause metal fume fever. Contact with dusts or metal particles may cause mechanical irritation of the eyes. Sharp edges can cause cuts. Components of these alloys are known or suspected carcinogens. **Flammability Hazards:** These alloys are not flammable. **Reactivity Hazards:** These alloys are not reactive. **Environmental Hazards:** These alloys present negligible adverse effects to the environment. **Emergency Recommendations:** Emergency responders must wear the personal protective equipment suitable for the situation to which they are responding.

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w
Aluminum	7429-90-5	0.15-3.5
Beryllium	7440-41-7	0.006
Boron	7440-42-8	0.006
Carbon	7440-44-0	0.015-0.3
Chromium	7440-47-3	10.5-30.0
Cobalt	7440-48-4	0.0-2.5
Columbium (Nobium)	7440-03-1	0.05-0.4
Copper	7440-50-8	0.25-34.0
Iron	7439-89-6	0.0-2.5
Lead	7439-92-1	0.0-2.5
Manganese	7439-38-2	0.15-3.0
Molybdenum	7439-98-7	0.75-17.0
Nickel	7440-02-0	0.5-99.0
Phosphorous	7723-14-0	0.015-0.04
Selenium	7782-49-2	0.01-0.045
Silicon	7440-21-3	0.08-1.0
Cb +Tantalum	7440-25-7	0.1-4.5
Titanium	7440-32-6	0.10-1.2
Tungsten	7440-33-7	0.5-4.5
Vanadium	7440-62-2	0.04
Yttrium	7440-65-5	0.05-0.12
Zirconium	7440-67-7	0.01-0.10

See Section 8 for Exposure Limits applicable for each component

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

4. FIRST-AID MEASURES

Contaminated individuals must be taken for medical attention if any adverse effects occur. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to health professional with the contaminated individual.

SKIN EXPOSURE: If adverse skin effects occur, discontinue use and flush contaminated area. Seek medical attention if adverse effect occurs after flushing.

EYE EXPOSURE: If dusts or particulates enter the eyes, open the contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. Minimum flushing is for 15 minutes. Contact medial personnel if adverse effect persists after flushing.

INHALATION: If dusts or fumes are inhaled, remove the contaminated individual to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers. The contaminated individual should seek immediate medical attention if any adverse effects occur.

INGESTION: Ingestion is highly unlikely due to the form of these alloys. If poor hygiene or other conditions lead to ingestion of dusts from product, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Have victim rinse mouth with water or drink several cupfuls of water, if conscious. Never induce vomiting or give a diluent (e.g., water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting respiratory problems, dermatitis, and other skin disorders may be aggravated by exposure to dusts or fumes from this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

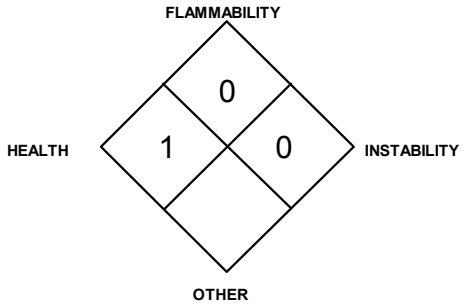
Lower (LEL): Not Applicable Upper (UEL): Not Applicable

FIRE EXTINGUISHING MATERIALS: This product is not flammable; use extinguishers appropriate for surrounding materials.

FIRE EXTINGUISHING MATERIALS NOT TO BE USED: None known.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is not flammable, but will decompose when highly heated. When involved in a fire, this material may decompose and produce irritating vapors and toxic oxides, including copper, lead, manganese, molybdenum, cobalt, bismuth, cadmium, silica, sulfur and iron. An accumulation of large amounts of dust from this material in air can cause a severe risk of an air/dust explosion. Long-term storage may result in oxidization and can present a hazard of spontaneous combustion under certain conditions.

NFPA RATING



Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Although this product is not sensitive to static discharge, dusts of this material can be ignited by static discharge, especially if large amounts of dusts are allowed to accumulate. All equipment in used in the handling of this material should be electrically grounded.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. Rinse contaminated equipment thoroughly before returning such equipment to service.

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: Due to the formed nature of this product, no release of any chemical material is possible.

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

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing fumes generated by this product if heated, or dusts if cut, ground or otherwise manipulated.

STORAGE AND HANDLING PRACTICES: All employees who handle this product should be trained to handle it safely. Store product in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity).

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Not applicable.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Ventilation should be that normally provided in the environment in which this product is used.

EXPOSURE LIMITS/GUIDELINES: Due to the form of the product, during normal use and handling, no exposure via inhalation is possible. If dusts or fumes are produced during welding, cutting, forming or sanding of these alloys, the following exposure limits may be applicable.

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Aluminum Exposure limits given are for aluminum metal dust and welding fumes, as Al	7429-90-5	Dust: 10; NIC = 1 (resp. fract.)	NE	Dust: 15 (total dust), 5 (resp. fract.) Fume: 5 (vacated 1989 PEL)	NE	Dust: 10 (total dust), 5 (resp. fract.) Fume: 5	NE	NE	DFG MAKs: TWA = Dust: 4 (inhalable fraction); 1.5 (respirable fraction) DFG MAK Pregnancy Risk Classification: D Carcinogen: Dust: NIC = TLV-A3
Beryllium Exposure limits are for beryllium and compounds	7440-41-7	0.002 NIC = 0.00005 (inhal. frac.) NIC = SEN, Skin	0.01 NIC = 0.0002 (inhal. frac.)	0.002	0.0025 (30 min. peak per 8-hr shift); 0.005 (ceiling)	NE	0.0005 (ceiling)	4, as Be	DFG MAK: Danger of Sensitization of the Airways and Skin Carcinogen: EPA-K/L; EPA-CBD; IARC-1; MAK-1; NIOSH-Ca; NTP-K; TLV-A1
Boron Exposure limits are for boron and compounds	7440-42-8	NE	NE	NE	NE	NE	NE	NE	Carcinogen: EPA-I
Carbon	7440-44-0	NE	NE	NE	NE	NE	NE	NE	NE
Chromium Metal	7440-47-3	0.5	NE	1	NE	0.5	NE	250, as Cr	Carcinogen: IARC-3, TLV-A4
Cobalt Exposure limits are for Cobalt and inorganic compounds, as Co	7440-48-4	0.02	NE	0.1 (for metal dust & fume, as Co) 0.05 (for metal dust & fume- vacated 1989 PEL)	NE	0.05 (for metal dust & fume, as Co)	NE	20, as Co	DG MAK: Danger of Sensitization of Airways and Skin (as inhalable dust/aerosols) DFG MAK Germ Cell Mutagen Category: 3A Carcinogen: IARC-2B, MAK-2, TLV-A3
Columbium (niobium)	7440-03-1	NE	NE	NE	NE	NE	NE	NE	NE
Copper Exposure limits are for copper, dusts, fume and mists, and copper oxides, as Cu	7440-50-8	Dust & Mist: 1 Fume: 0.2	Fume: 0.1	Dust & Mist: 1 Fume: 0.1	NE	Dust & Mist: 1 Fume: 0.1 (resp. fract.)	NE	100 (dusts, mists, fume)	DFG MAK: PEAK Fume: = 2•MAK 15 min. average value, 1-hr interval Carcinogen: Dust & Mist: EPA-D
Iron Exposure limits are for iron oxide, dust & fume, as Fe	7439-89-6	5 (resp. fract.)	NE	Fume:10	NE	Dust & Fume: 5, as Fe	NE	NE	DFG MAK: TWA = 1.5 (resp. fraction) Carcinogen: IARC-3, TLV-A4
Lead Exposure limits are for lead and inorganic compounds, as Pb	7439-92-1	0.05	NE	0.05 See 29 CFR 1910.1025	NE	< 0.1 Blood Pb < 0.06 mg/100 g whole blood	NE	100	DFG MAKs: TWA = 0.1 (inhalable fraction) PEAK = 8•MAK 15 min. average value, 1-hr interval DFG MAK Pregnancy Risk Classification: B Carcinogen: EPA-B2, IARC-2B, MAK-3B, TLV-A3
Manganese Exposure limits are for fume, as Mn	7439-96-5	0.2	NE	1 (vacated 1989 PEL)	3	1	3	500, as Mn	DFG MAKs: TWA = 0.5 (inhalable fraction) PEAK = III DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-D
Molybdenum Exposure limits are for Molybdenum & insoluble compounds, as Mo	7439-38-2	10 (inhal. fract.); 3 (resp. fract.)	NE	10 (vacated 1989 PEL)	NE	NE	NE	NE	NE
Nickel, Elemental	7440-02-0	1.5 (inhal. frac.)	NE	1	NE	0.015	NE	10 (as Ni)	DFG MAK: Inhalable Fraction: Danger of sensitization of airways (as inhalable dusts/aerosols) Carcinogen: IARC-2B, MAK-1, NIOSH-Ca, NTP-R, TLV-A5

NE = Not Established. NIC = Notice of Intended Change LOQ = Limit of Quantitation See Section 16 for Definitions of Terms Used.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/GUIDELINES (continued):

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Phosphorous, White	7723-14-0	NE	NE	NE	NE	NE	NE	NE	DFG MAKs: TWA = 0.05 (inhalable fraction) PEAK = 2•MAK 15 min. average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: D
Silicon	7440-21-3	TLV withdrawn	NE	15 (total dust), 5 (resp. fract.) 10 (total dust) vacated 1989 PEL	NE	10 (total dust), 5 (resp. fract.)	NE	NE	NE
Tantalum Exposure limits are for tantalum, metal and tantalum oxides and dusts, as Ta	7440-25-7	5	NE	5	NE	5	10	2500, as Ta	DFG MAK: TWA Metal: = 4 (inhalable fraction); 1.5 (respirable fraction)
Tellurium Exposure limits are for Tellurium and compounds, as Te	13494-80-9	0.1	NE	0.1	NE	0.1	NE	25, as Te	NE
Titanium	7440-32-6	NE	NE	NE	NE	NE	NE	NE	NE
Tungsten Exposure limits are for tungsten and insoluble compounds, as W	7440-33-7	5	10	5 (vacated 1989 PEL)	10 (vacated 1989 PEL)	5	10	NE	NE
Vanadium Exposure limits are for Vanadium and inorganic compounds	7440-62-2	NE	NE	Vanadium Dust: 0.05 mg V^2O^5/m^3 (resp. fract.) vacated 1989 PEL	Vanadium Fume: 0.05 mg V^2O^5/m^3 ceiling (resp. fract.) vacated 1989 PEL	NE	NE	35, as V	Carcinogen: MAK-2
Yttrium	7440-65-5	NE	NE	NE	NE	NE	NE	NE	NE
Zirconium, Elemental	7440-67-7	5	10	5	NE	NE	NE	50, as Zr	DFG MAKs: TWA = 1.3 PEAK = 1•MAK 15 min. average value, 1-hr interval, 4 per shift Danger of Sensitization of the Airways and the Skin Carcinogen: TLV-A4

NE = Not Established. NIC = Notice of Intended Change LOQ = Limit of Quantitation See Section 16 for Definitions of Terms Used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-02). Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: None needed under normal conditions of use and handling. Maintain airborne contaminant concentrations below exposure limits listed above if applicable. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or the Canadian CSA Standard Z94.3-02. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following NIOSH personal protective equipment guidelines are available for some components of these alloys and are provided in the event of possible dusts or fumes being produced during use.

BERYLLIUM

CONCENTRATION — RESPIRATORY PROTECTION

Based on NIOSH REL at Concentrations Above the NIOSH REL, or Where There is No REL, at Any Detectable Concentration: Any Self-Contained Breathing Apparatus (SCBA) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any Supplied-Air Respirator (SAR) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION (continued):

CHROMIUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 2.5 mg/m^3:	Any Dust and Mist respirator.
Up to 5 mg/m^3:	Any Dust and Mist respirator except single-use and quarter-mask respirators, or any Supplied-Air Respirator (SAR).
Up to 12.5 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter.
Up to 25 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any Powered, Air-Purifying Respirator (PAPR) with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.
Up to 250 mg/m^3:	Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

COPPER (DUSTS & MISTS, METAL FUME)

CONCENTRATION	RESPIRATORY PROTECTION
Up to 5 mg/m^3:	Any Dust and Mist Respirator.
Up to 10 mg/m^3:	Any Dust and Mist Respirator except single-use and quarter-mask respirators, or any Supplied-Air Respirator (SAR).
Up to 25 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter.
Up to 50 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any PAPR with a tight-fitting facepiece and a high-efficiency particulate filter, or Self-Contained Breathing Apparatus with a full facepiece, or any SAR with a full facepiece.
Up to 100 mg/m^3:	Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

LEAD

CONCENTRATION	RESPIRATORY PROTECTION
Up to 0.5 mg/m^3:	Any Air-Purifying Respirator with a high-efficiency particulate filter, or any Supplied-Air Respirator (SAR).
Up to 1.25 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator with a high-efficiency particulate filter.
Up to 2.5 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any PAPR with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-contained breathing apparatus with a full facepiece, or any SAR with a full facepiece.
Up to 50 mg/m^3:	Any SAR operated in a pressure-demand or other positive-pressure mode.
Up to 100 mg/m^3:	Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

NICKEL

CONCENTRATION	RESPIRATORY PROTECTION
At Concentrations Above	the NIOSH REL, or Where There is no REL, at Any Detectable Concentration: Any Self-Contained Breathing Apparatus (SCBA) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any Supplied-Air Respirator (SAR) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION (continued):

PHOSPHOROUS

CONCENTRATION	RESPIRATORY PROTECTION
Up to 1 mg/m3:	Any Supplied-Air Respirator (SAR).
Up to 2.5 mg/m3:	Any SAR operated in a continuous-flow mode.
Up to 5 mg/m3:	Any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any appropriate escape-type, SCBA.

SELENIUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 1 mg/m^3:	Any Dust and Mist respirator (IF NOT present as a fume), or any Dust, Mist, and Fume respirator, or any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter (IF NOT present as a fume), or any PAPR with a Dust, Mist, and Fume filter, or any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

TANTALUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 25 mg/m^3:	Any dust and Mist Respirator, IF NOT present as a fume
Up to 50 mg/m^3:	Any Dust and Mist Respirator except single-use and quarter-mask respirators, IF NOT present as a fume, or any Dust, Mist, and Fume Respirator, or any Supplied-Air Respirator (SAR).
Up to 125 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter, IF NOT present as a fume.
Up to 250 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any PAPR with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-Contained Breathing Apparatus with a full facepiece, or any SAR with a full facepiece.
Up to 2500 mg/m^3:	Any SAR operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any Self-Contained Breathing Apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

TELLURIUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 0.5 mg/m^3:	Any Dust and Mist Respirator (IF NOT present as a fume).
Up to 1 mg/m^3:	Any Dust and Mist Respirator except single-use and quarter-mask respirators (IF NOT present as a fume), or any Dust, Mist, and Fume Respirator, or any Supplied-Air Respirator (SAR).
Up to 2.5 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter (IF NOT present as a fume).
Up to 5 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any PAPR with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.
Up to 25 mg/m^3:	Any SAR operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION (continued):

TUNGSTEN

CONCENTRATION	RESPIRATORY PROTECTION
Up to 50 mg/m^3:	Any Air-Purifying Respirator with a high-efficiency particulate filter, or any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SAR) with a full facepiece.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

VANADIUM FUME/DUST

CONCENTRATION	RESPIRATORY PROTECTION
Up to 0.5 mg/m^3:	Any Air-Purifying Respirator with a high-efficiency particulate filter, or any Supplied-Air Respirator (SAR).
Up to 1.25 mg/m^3:	Any SAR operated in a continuous-flow mode, or any Powered, Air-Purifying Respirator (PAPR) with a high-efficiency particulate filter.
Up to 2.5 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any PAPR with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.
Up to 35 mg/m^3:	Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

YTTRITIUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 5 mg/m^3:	Single-use or quarter mask respirator.
Up to 10 mg/m^3:	Any Air-Purifying, Half-Mask Respirator equipped with any type of particulate filter (except single-use respirators), or any Air-Purifying, Full-Facepiece Respirator equipped with any type of particulate filter, or any Supplied-Air Respirator (SAR) equipped with a half mask and operated in a demand (negative-pressure) mode.
Up to 25 mg/m^3:	Any Powered, Air-Purifying Respirator (PAPR) equipped with a hood or helmet and any type of particulate filter, or any SAR equipped with a hood or helmet and operated in a continuous-flow mode.
Up to 50 mg/m^3:	Any Air-Purifying, Full-Facepiece Respirator equipped with a high-efficiency filter, or any PAPR equipped with a tight-fitting facepiece and a high-efficiency filter, or any SAR equipped with a full facepiece and operated in a demand (negative-pressure) mode, or any SAR equipped with a tight-fitting facepiece and operated in a continuous-flow mode, or, any Self-Contained Breathing Apparatus (SCBA) equipped with a full facepiece and operated in a demand (negative-pressure) mode.
Up to 1000 mg/m^3:	Any SAR equipped with a half mask and operated in a pressure-demand or other positive-pressure mode.
Up to 2000 mg/m^3:	Any SAR equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode, or any SAR equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in a pressure-demand or other positive-pressure mode
Firefighting:	Any SCBA equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator equipped with a high-efficiency filter, or any escape-type, SCBA with a suitable service life (number of minutes required to escape the environment).

ZIRCONIUM

CONCENTRATION	RESPIRATORY PROTECTION
Up to 25 mg/m^3:	Any Dust and Mist Respirator.
Up to 50 mg/m^3:	Any dust and mist respirator except single-use and quarter-mask respirators, or any Powered, Air-Purifying Respirator (PAPR) with a dust and mist filter, or any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any Supplied-Air Respirator (SAR); Self-Contained Breathing Apparatus (SAR) with a full facepiece.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.
Escape:	Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any appropriate escape-type, SCBA.

EYE PROTECTION: None needed under normal use and handling. Wear safety goggles if dusts or other particulates are present or other eye protection normally used in the environment that this product is used. If necessary refer to U.S. OSHA 29 CFR 1910.133 or the Canadian CSA Standard Z94.3-02.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

HAND PROTECTION: Wear appropriate glove for work being done. Resistance of specific materials can vary from product to product. Evaluate resistance under conditions of use and maintain gloves carefully. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-02, *Protective Footwear*.

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
EVAPORATION RATE (n-BuAc = 1): Not applicable.
SPECIFIC GRAVITY (water = 1): > 7
MELTING/FREEZING POINT: > 1400°C (> 2500°F)
SOLUBILITY IN WATER: Low solubility (< 0.1%)
BOILING POINT: Not applicable.
SOLUBILITY IN ORGANIC SOLVENTS: 100%
pH: 5-7%
VAPOR PRESSURE @ 20°C: 0.3 kPa
ODOR THRESHOLD: Not applicable.

DECOMPOSITION TEMPERATURE: When heated to 350°C (662°F) or above, oil vapors are produced from the binder materials in the malleable clay mixture.

APPEARANCE, ODOR AND COLOR: This product consists of a prefabricated, metal insertion device holding a fawn-brown colored, malleable clay mixture, formed into cylindrical shape.

HOW TO DETECT THIS SUBSTANCE IN EVENT OF ACCIDENTAL SPILL (warning properties): Not applicable (product cannot be 'spilled' or 'released'.)

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal: When heated to 1400°C (2500°F) the product can melt, producing metal oxides. Hydrolysis: Not applicable.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: None.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure to or extreme temperatures, including high heat and freezing.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: This product presents limited health hazards due to its form. The symptoms of overexposure potential dusts from this mixture if the product is cut or ground.

INHALATION: As a formed metal product, this product poses no hazard of inhalation. If dusts or particulates from this product are inhaled, moderate irritation to the nose, throat, and lungs can occur. Symptoms may include sneezing, coughing, nasal congestion, and difficulty breathing. Symptoms are generally alleviated upon exposure to fresh air. Chronic exposure to fumes from this product may cause metal fume fever. Symptoms of metal fume fever occur about 4 to 12 hours after exposure and usually last about 24 hours. Recovery is complete with no apparent permanent disability. The symptoms resemble the "flu" and include: sweating, shivering, headache, fever, chills, thirst, muscle aches, nausea, vomiting, weakness, and tiredness. A metallic or sweet taste in the mouth, dryness or irritation of the throat, and coughing may occur at the time of exposure to the metal fumes. Some workers may develop a short-term resistance so that repeated exposure to metal oxide fumes does not cause metal fume fever. This immunity is quickly lost after short absences from work (weekends or vacations). Inhalation of iron oxide fume or dust is cause of pulmonary roentgenographic appearance called siderosis, or an accumulation of iron that leads to reduced lung capacity.

CONTACT WITH SKIN or EYES: As a formed metal product, this product poses minimal hazard by skin or eye contact. Cuts or abrasions may occur from contact with sharp edges. Although not expected to occur, rare cases of allergic contact dermatitis have been reported in people working with copper dust. If during forming, cutting, grinding or heating, dusts and fumes can be produced, which can be irritating to the eyes, including mechanical irritation. Repeated contact of iron dusts with the eyes can cause conjunctivitis, or can cause discoloration of the eyes.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	0
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(ORANGE)	0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate
3 = Serious **4** = Severe * = Chronic hazard

11. TOXICOLOGICAL INFORMATION (Continued)

SKIN ABSORPTION: Not applicable.

INGESTION: Ingestion is an unlikely route of occupational exposure to this product. In the unlikely event that dusts from the product are ingested, nausea, vomiting, and diarrhea may result. Repeated ingestion of iron compounds can cause vomiting, diarrhea, pink urine, black stool, and liver or kidney damage. Repeated ingestion of iron compounds can also cause siderosis, which is an accumulation of iron in tissues.

INJECTION: In the unlikely event that the clay is injected into the kin (as may occur if skin is punctured by a contaminated object) irritation in addition to the wound may occur.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. In the event of overexposure, the following symptoms may be observed:

ACUTE: Due to its form, this product presents limited acute health hazards as a formed metal product. Sharp edges may cause cuts and abrasions. If heated, inhalation of fumes may cause metal fume fever. Inhalation of dusts from cutting, grinding or other forming can cause irritation the respiratory system. Dusts may cause mechanical irritation to the eyes.

CHRONIC: Rare cases of allergic contact dermatitis have been reported in people working with copper dust. This product contains Nickel and Beryllium, which are known human carcinogens and several other suspected human carcinogens.

TARGET ORGANS: DUSTS: ACUTE: Eyes, respiratory system. CHRONIC: Respiratory system, skin. FUMES: ACUTE: Central nervous system, muscles, respiratory system, eyes. CHRONIC: Respiratory system.

TOXICITY DATA: Although there are toxicity data for many components, none are presented in this MSDS due to the form of the product.

CARCINOGENIC POTENTIAL OF COMPONENTS: The components of the alloys are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

ALUMINUM (dust): ACGIH-TLV-A3 (Confirmed Animal Carcinogen)

BERYLLIUM: ACGIH TLV-A1 (Confirmed Human Carcinogen); EPA-K (Known Human Carcinogen); EPA-L (Likely to be Carcinogenic to Humans); EPA-CBD (Cannot Be Determined); IARC-1 (Carcinogenic to Humans), NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization), NTP-K (Known to Be a Human Carcinogen); OSHA-Ca (Carcinogen Defined with No Further Classification)

BORON: EPA-I (Data are Inadequate for an Assessment of Human Carcinogenic Potential)

CHROMIUM: ACGIH-TLV-A4 (Not Classifiable as a Human Carcinogen), IARC-3 (Unclassifiable as to Human Carcinogenicity)

COBALT: ACGIH-TLV-A3 (Confirmed Animal Carcinogen), IARC-2B (Possibly Carcinogenic to Humans), MAK-2 (Substances that are Considered to be Carcinogenic for Man Because Sufficient Data from Long-Term Animal Studies or Limited Evidence from Animal Studies Substantiated by Evidence from Epidemiological Studies Indicate that They Can Make a Significant Contribution to Cancer Risk),

COPPER: EPA-D (Not Classifiable as to Human Carcinogenicity)

IRON: ACGIH-TLV-A4 (Not Classifiable as a Human Carcinogen), IARC-3 (Unclassifiable as to Human Carcinogenicity)

LEAD: ACGIH-TLV-A3 (Confirmed Animal Carcinogen), EPA-B2 (Probable Human Carcinogen-Sufficient Evidence from Animal Studies; Inadequate Evidence or No Data from Epidemiologic Studies), IARC-2B (Possibly Carcinogenic to Humans), MAK-3B (Substances that Cause Concern That They Could Be Carcinogenic for Man But Cannot Be Assessed Conclusively Because of Lack of Data. Substances for Which in vitro tests or animal studies have yielded evidence of carcinogenic effects that is not sufficient for classification of the substance in one of the other categories. Further studies are required before a final classification can be made. A MAK or BAT value can be established, provided no genotoxic effects have been detected.)

MANGANESE: EPA-D (Not Classifiable as to Human Carcinogenicity)

NICKEL: IARC-1 (Carcinogenic to Humans), MAK-1 (Substances that Cause Cancer in Man and Can Be Assumed to Make a Significant Contribution to Cancer Risk), NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization), NTP-K (Known to Be a Human Carcinogen)

VANADIUM: MAK-2 (Substances that are Considered to be Carcinogenic for Man Because Sufficient Data from Long-Term Animal Studies or Limited Evidence from Animal Studies Substantiated by Evidence from Epidemiological Studies Indicate that They Can Make a Significant Contribution to Cancer Risk),

ZIRCONIUM: ACGIH-TLV-A4 (Not Classifiable as a Human Carcinogen)

IRRITANCY OF PRODUCT: Inhalation of dusts or fumes may cause respiratory irritation. Eye contact with dusts from the alloys may cause mechanical irritation.

SENSITIZATION TO THE PRODUCT: Components of this product are known sensitizers, including Nickel. Although some persons can develop sensitivity to Nickel from prolonged contact with metals, exposure to dusts and fumes from the product is heated, cut or otherwise manipulated is more likely to produce sensitization and allergic skin and/or respiratory reaction.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this material on the human reproductive system.

Mutagenicity: The components of this product are not reported to cause mutagenic effects in humans.

Embryotoxicity: The components of this product are not reported to cause embryotoxic effects in humans.

Teratogenicity: The components of this product are not reported to cause teratogenic effects in humans.

Reproductive Toxicity: The components of this product are not reported to cause reproductive effects in humans.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that 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 that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: As a formed metal product, the product will exist indefinitely in the environment as components do not decompose. Oxides can be formed.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Not tested. The product is not expected to cause harm to plants or animals; however product should not be disposed of in the open environment.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Not tested. In an aquatic environment, some leaching of metals can occur and cause harm to plants and animals.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be recovered for recycling, or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55 gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards

U.S. EPA WASTE NUMBER: Not applicable.

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION 49 CFR 172.101: This product is NOT regulated under regulations of the DOT.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is NOT classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is NOT classified as dangerous goods under rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION This product is NOT classified as Dangerous Goods by the International Maritime Organization.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: Not applicable as an article. The components of this product may have requirements as pure compounds; if dusts from the product are produced, SARA requirements may be applicable.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable as an article. The components of this product may have requirements as pure compounds; if dusts from the product are produced, SARA requirements may be applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable as an article.

U.S. TSCA INVENTORY STATUS: This is an article and is not subject to the requirements of TSCA.

OTHER U.S. FEDERAL REGULATIONS: This product meets the definition of an "Article" under the U.S. Federal OSHA Hazard Communication Standard (29 CFR 1910.1200). For further information, the definition of "Article" is provided below.

Article means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, *e.g.,* minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Components of this product are on the California Proposition 65 lists, including Nickel, Lead, and Cobalt (powder). Proposition 65 warning are not applicable for articles.

LABELING (Precautionary Statements) ANSI LABELING (Z129.1): Due to the form of this product no label information is required under OSHA 29 CFR 1910.1200 or ANSI Z400.1 to address the chemical hazards.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: Components of the product are on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: As an article, not applicable.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Not applicable.

16. OTHER INFORMATION

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DEFINITIONS OF TERMS

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

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known in vivo mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

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.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELs: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. 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 that was vacated by Court Order.

SKIN: Used when a there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that 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.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD:

0 (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation*: Essentially non-irritating. PII or Draize = "0". *Eye Irritation*: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD_{50} Rat*: < 5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC_{50} Rat*: < 20 mg/L.); **1** (Slight Hazard: Minor reversible Injury may occur; slightly or mildly irritating. *Skin Irritation*: Slightly or mildly irritating. *Eye Irritation*: Slightly or mildly irritating. *Oral Toxicity LD_{50} Rat*: > 500-5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 1000-2000 mg/kg. *Inhalation Toxicity LC_{50}* 4-hrs *Rat*: > 2-20 mg/L);**2** (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation*: Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation*: Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD_{50} Rat*: > 50-500 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 200-1000 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.5-2 mg/L.); **3** (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation*: Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation*: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD_{50} Rat*: > 1-50 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 20-200 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.05-0.5 mg/L.); **4** (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation*: Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation*: Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD_{50} Rat*: ≤ 1 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: ≤ 20 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: ≤ 0.05 mg/L).

FLAMMABILITY HAZARD:

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued):

1 (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; **2** (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, Including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); **3** (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

PHYSICAL HAZARD:

0 (*Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. Unstable *Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No "0" rating allowed. *Unstable Reactives*: Substances that will not polymerize, decompose, condense or self-react.); **1** (*Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives*: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); **2** (*Water Reactivity*: Materials that may react violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); **3** (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group I Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3.:2 potassium bromate/cellulose mixture. Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity*: Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides*: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives*: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases*: No Rating. *Pyrophorics*: Add to the definition of Flammability "4". *Oxidizers*: No "4" rating. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: **0** (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC_{50} for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD_{50} for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD_{50} for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the Method of Testing for Sustained Combustibility, per 49 CFR 173, Appendix H or the UN Recommendation on the Transport of Dangerous Goods, Model Regulations (current edition) and the related Manual of Tests and Criteria (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.**3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): **3 (continued):** Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: **0** Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **N**ational **F**ire **P**rotection **A**ssociation (**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.

ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: 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_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - 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^3** 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. 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. **Cancer Information:** 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 Information: BEI** - ACGIH 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.

REGULATORY INFORMATION:

U.S. and CANADA:

ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). **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. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.