Gallium(III) sulfide

sc-228244

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME | HIGH | MODERATE | LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Gallium(III) sulfide

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA


PRODUCT USE
■ Reagent. Intermediate

SYNONYMS
Ga2-S3, "digallium trisulfide", "gallium sesquisulfide", "gallium(3+) sulfide", "gallium sulphide"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	2		
Toxicity:	2		
Body Contact:	0		
Reactivity:	1		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS


EMERGENCY OVERVIEW
RISK
Contact with water liberates extremely flammable gases.

Flammable.
Very toxic to aquatic organisms.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
■ Accidental ingestion of the material may be damaging to the health of the individual.
■ If ingested, sulfide salts can form hydrogen sulfide, causing headache, cyanosis, low blood pressure, loss of consciousness, tremors and convulsions.

EYE
■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn).
Slight abrasive damage may also result.
■ Exposure to H2S may produce pain, blurred vision, and irritation.
These symptoms are temporary in all but severe cases.

SKIN
■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models).
Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
■ Solution of material in moisture on the skin, or perspiration, mayincrease irritant effects.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED
■ The material is not thought to produce respiratory irritation (as classified using animal models).
Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ Hydrogen sulfide poisoning can cause increased secretion of saliva, nausea, vomiting, diarrhea, giddiness, headache, vertigo, memory loss, palpitations, heartbeat irregularities, weakness, muscle cramps, confusion, sudden collapse, unconsciousness and death due to paralysis of breathing (at levels above 300 parts per million).
The "rotten egg" odor is not a good indicator of exposure since odor fatigue occurs and odor is lost at over 200 ppm.

CHRONIC HEALTH EFFECTS
■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
Long term low level exposure to hydrogen sulfide may produce headache, fatigue, dizziness, irritability and loss of sexual desire. These symptoms may also result when exposed to hydrogen sulfide at high concentration for a short period of time.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
gallium(III) sulfide	12024-22-5	>99
hydrolysis may yield		
hydrogen sulfide	7783-06-4	

Section 4 - FIRST AID MEASURES

SWALLOWED
· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE
■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ For exposures involving sulfides and hydrogen sulfide (including gastric acid decomposition products of alkaline sulfides).
· Hydrogen sulfide anion produces its major toxic effect through inhibition of cytochrome oxidases.
· Symptoms include profuse salivation, nausea, vomiting and diarrhea. Central nervous effects may include giddiness, headache, vertigo, amnesia, confusion and unconsciousness. Tachypnea, palpitation, tachycardia, arrhythmia, sweating, weakness and muscle cramps may also indicate over-exposures.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible.
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	3.65
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

■ DO NOT USE WATER, CO2 OR FOAM ON SUBSTANCE ITSELF
For SMALL FIRES:
· Dry chemical, soda ash or lime.
For LARGE FIRES:
· DRY sand, dry chemical, soda ash;

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· May be violently or explosively reactive.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· May ignite on contact with air, moist air or water.
· May react vigorously or explosively on contact with water.
Combustion products include: sulfur oxides (SOx), metal oxides.

FIRE INCOMPATIBILITY

■ Segregate from alcohol, water.
· NOTE: May develop pressure in containers; open carefully. Vent periodically.
· Keep dry.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Material from spill may be contaminated with water resulting in generation of gas which subsequently may pressure closed containers.
· Hold spill material in vented containers only and plan for prompt disposal.
· Eliminate all ignition sources.
· Cover with DRY earth, sand or other non-combustible material.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of overexposure occurs.

RECOMMENDED STORAGE METHODS

■ Glass container.
For low viscosity materials and solids: Drums and jerricans must be of the non-removable head type. Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

■ KEEP DRY! Packages must be protected from water ingress.

FOR MINOR QUANTITIES:
· Store in an indoor fireproof cabinet or in a room of noncombustible construction and
· provide adequate portable fire-extinguishers in or near the storage area.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Ontario Occupational Exposure Limits	gallium(III) sulfide (Particles (Insoluble or Poorly Soluble) Not Otherwise)		10 (I)						
Canada - British Columbia Occupational Exposure Limits	gallium(III) sulfide (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))		10 (N)						
Canada - Ontario Occupational Exposure Limits	gallium(III) sulfide (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs)		3 (R)						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	gallium(III) sulfide (Particulates not otherwise regulated Respirable fraction)		5						
US - California Permissible Exposure Limits for Chemical Contaminants	gallium(III) sulfide (Particulates not otherwise regulated Respirable fraction)		5						(n)
US - Oregon Permissible Exposure Limits (Z-1)	gallium(III) sulfide (Particulates not otherwise regulated (PNOR) (f) Total Dust)	-	10						Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means “particles not otherwise regulated.”
US - Michigan Exposure Limits for Air Contaminants	gallium(III) sulfide (Particulates not otherwise		5						

	regulated, Respirable dust)							
US - Oregon Permissible Exposure Limits (Z-1)	gallium(III) sulfide (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction)	-	5					Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means “particles not otherwise regulated.”
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	gallium(III) sulfide (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)		5					
Canada - Prince Edward Island Occupational Exposure Limits	gallium(III) sulfide (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)		10					See Appendix B current TLV/BEI Book
US - Minnesota Permissible Exposure Limits (PELs)	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21			
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	hydrogen sulfide (HYDROGEN SULFIDE)	0.07						
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	hydrogen sulfide (HYDROGEN SULFIDE)	0.02						
Canada - British Columbia Occupational Exposure Limits	hydrogen sulfide (Hydrogen sulfide)					10		
US ACGIH Threshold Limit Values (TLV)	hydrogen sulfide (Hydrogen sulfide)	1		5				TLV Basis: upper respiratory tract irritation; central nervous system impairment
US NIOSH Recommended Exposure Limits (RELs)	hydrogen sulfide (Hydrogen sulfide)					10	15	(Ceiling ([10-minute]))
Canada - Alberta Occupational Exposure Limits	hydrogen sulfide (Hydrogen sulphide)	10	14			15	21	

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	hydrogen sulfide (Hydrogen sulfide)		See Table Z-2			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	20
US - Idaho - Acceptable Maximum Peak Concentrations	hydrogen sulfide (Hydrogen sulfide (Z37.2-1966))					20
US - California Permissible Exposure Limits for Chemical Contaminants	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	50
US - Idaho - Limits for Air Contaminants	hydrogen sulfide (Hydrogen sulfied)		[2]			
US OSHA Permissible Exposure Levels (PELs) - Table Z2	hydrogen sulfide (Hydrogen sulfide (Z37.2–1966))					20
US - Alaska Limits for Air Contaminants	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	
US - Michigan Exposure Limits for Air Contaminants	hydrogen sulfide (Hydrogen sulphide)	10	14	15	21	
US - Hawaii Air Contaminant Limits	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	hydrogen sulfide (Hydrogen sulphide)	10	15	15	27	
US - Washington Permissible exposure limits of air contaminants	hydrogen sulfide (Hydrogen sulfide)	10		15		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	hydrogen sulfide (Hydrogen sulphide)	10		15		

Canada - Northwest Territories Occupational Exposure Limits (English)	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21	20	28	
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	hydrogen sulfide (Hydrogen sulfide (Z37.2-1966))					20		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	hydrogen sulfide (Hydrogen sulfide)	10	14	15	21			
US - Oregon Permissible Exposure Limits (Z-2)	hydrogen sulfide (Hydrogen sulfide (Z37.2-1966))						20	
Canada - Nova Scotia Occupational Exposure Limits	hydrogen sulfide (Hydrogen sulfide)	10		15				
Canada - Prince Edward Island Occupational Exposure Limits	hydrogen sulfide (Hydrogen sulfide)	1		5				TLV Basis: upper respiratory tract irritation; central nervous system impairment

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

• particulate.

EYE

· Safety glasses with side shields
· Chemical goggles.

HANDS/FEET

■ Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.

· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Wear chemical protective gloves, eg. PVC.

OTHER

· Overalls.
· Eyewash unit.
· Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
· For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

State	Divided solid	Molecular Weight	235.64
Melting Range (°F)	2273- 2309	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Reacts
Flash Point (°F)	Not applicable	pH (1% solution)	Not available.
Decomposition Temp (°F)	Not available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Negligible.
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	3.65
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Not applicable.	Evaporation Rate	Not applicable

APPEARANCE

White or yellow crystalline solid; hydrolyses.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· May heat spontaneously
· Identify and remove sources of ignition and heating.

STORAGE INCOMPATIBILITY

■ Hydrogen sulfide (H2S):
· is a highly flammable and reactive gas
· reacts violently with strong oxidisers, metal oxides, metal dusts and powders, bromine pentafluoride, chlorine trifluoride, chromium trioxide, chromyl chloride, dichlorine oxide, nitrogen trichloride, nitryl hypofluorite, oxygen difluoride, perchloryl fluoride, phospham, phosphorus persulfide, silver fulminate, soda-lime, sodium peroxide
· is incompatible with acetaldehyde, chlorine monoxide, chromic acid, chromic anhydride, copper, nitric acid, phenyldiazonium chloride, sodium
· forms explosive material with benzenediazonium salts
· attacks many metals
Flow or agitation of hydrogen sulfide may generate electrostatic charges due to low conductivity.
· Sulfides are incompatible with acids, diazo and azo compounds, halocarbons, isocyanates, aldehydes, alkali metals, nitrides, hydrides, and other strong reducing agents.
· Many reactions of sulfides with these materials generate heat and in many cases hydrogen gas.
· Many sulfide compounds may liberate hydrogen sulfide upon reaction with an acid.
Segregate from alcohol, water.
· NOTE: May develop pressure in containers; open carefully. Vent periodically.
· Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
· These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
· The state of subdivision may affect the results.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

gallium(III) sulfide

TOXICITY AND IRRITATION
GALLIUM(III) SULFIDE:
■ No significant acute toxicological data identified in literature search.
HYDROGEN SULFIDE:
■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Inhalation (human) LDLo: 5.7 mg/kg	Nil Reported
Inhalation (human) LCLo: 600 ppm/30m	
Inhalation (human) LCLo: 800 ppm/5m	

CARCINOGEN

hydrogen sulfide	US - Rhode Island Hazardous Substance List	IARC

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
gallium(III) sulfide	No Data Available	No Data Available		
hydrogen sulfide	LOW	No Data Available	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
A. General Product Information
Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).
B. Component Waste Numbers
When hydrogen sulfide is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U135 (waste code T).

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
¦ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 4.3
Identification Numbers: UN2813 PG: III
Label Codes: 4.3 Special provisions: IB8, IP4,
T1, TP33
Packaging: Exceptions: 151 Packaging: Non- bulk: 213
Packaging: Exceptions: 151 Quantity limitations: 25 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 100 kg Vessel stowage: Location: E
aircraft only:
Vessel stowage: Other: 40
Hazardous materials descriptions and proper shipping names:
Water-reactive solid, n.o.s.

Air Transport IATA:

ICAO/IATA Class: 4.3 ICAO/IATA Subrisk: None
UN/ID Number: 2813 Packing Group: III
Special provisions: A3
Cargo Only
Packing Instructions: 100 kg Maximum Qty/Pack: 491
Passenger and Cargo Passenger and Cargo
Packing Instructions: 25 kg Maximum Qty/Pack: 486
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: 10 kg Maximum Qty/Pack: Y477
■ Air transport may be forbidden if this material is flammable, corrosive or toxic gases may be released under normal conditions of transport.
Shipping Name: WATER-REACTIVE SOLID, N.O.S. *(CONTAINS
GALLIUM(III) SULFIDE)

Maritime Transport IMDG:

IMDG Class: 4.3 IMDG Subrisk: None
UN Number: 2813 Packing Group: III
EMS Number: F-G , S-N Special provisions: 223 274
Limited Quantities: 1 kg Marine Pollutant: Yes
Shipping Name: WATER-REACTIVE SOLID, N.O.S.(contains gallium(III) sulfide)

Section 15 - REGULATORY INFORMATION

gallium(III) sulfide (CAS: 12024-22-5) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)","US Toxic Substances Control Act (TSCA) - Inventory"

Regulations for ingredients

hydrogen sulfide (CAS: 7783-06-4) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Ambient Air Quality Objectives - Other","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible

Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Acceptable Maximum Peak Concentrations","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","US - Oregon Permissible Exposure Limits (Z-1)","US - Oregon Permissible Exposure Limits (Z-2)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Hazardous Constituents","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift","US ACGIH Threshold Limit Values (TLV)","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US CERCLA Priority List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US NIOSH Recommended Exposure Limits (RELs)","US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US OSHA Permissible Exposure Levels (PELs) - Table Z2","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27","WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"

Section 16 - OTHER INFORMATION

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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