Glycidyl methacrylate

sc-250060

Material Safety Data Sheet

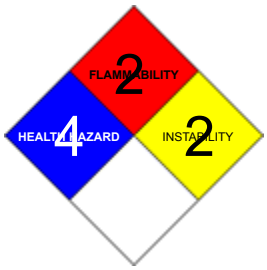
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Glycidyl methacrylate

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

NFPA



SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C7-H10-O3, "2, 3-epoxypropyl methacrylate", "2, 3-epoxy propylmethacrylate", "glycidyl alpha-methyl acrylate", "1-propanol, 2, 3-epoxy-, methacrylate", "Sartomer 379", CP-105, GMA

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	1		
Toxicity	2		
Body Contact	3		
Reactivity	2		
Chronic	2		

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

May cause SENSITISATION by skin contact.
Possible risk of irreversible effects.
HARMFUL - May cause lung damage if swallowed.
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes, respiratory system and skin.
Toxic to aquatic organisms.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result.
(ICSC13733).
■ Ingestion of glycidyl methacrylate may result in gastrointestinal irritation or ulceration and in burns of the mouth and throat.

EYE

■ This material can cause eye irritation and damage in some persons.
■ The material can produce chemical burns to the eye following direct contact.
Vapors or mists may be extremely irritating.
■ Glycidyl methacrylate may cause severe eye irritation or severe corneal injury.
Effects may be slow to heal.

SKIN

■ This material can cause inflammation of the skin oncontact in some persons.
■ Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.
■ The material can produce chemical burns following direct contactwith the skin.
■ Brief contact with glycidyl methacrylate may cause skin burns.
Symptoms may include pain, severe local redness and tissue damage.
■ Irritation and skin reactions are possible with sensitive skin.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ 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

■ If inhaled, this material can irritate the throat andlungs of some persons.
■ The material is not thought to produce adverse health effects following inhalation (as classified using animal models).
Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
■ Prolonged excessive exposure to glycidyl methacrylate may cause adverse effects.
Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs.

CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of

bronchial pneumonia may ensue.
Strong evidence exists that the substance may cause irreversible but non-lethal mutagenic effects following a single exposure.
Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.
The epoxide group is an alkylating agent and thus destroysnucleotides within the cell. This may cause cancer.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
glycidyl methacrylate	106-91-2	> 95
residual reactants as		
epichlorohydrin	106-89-8	0.2
glycidol	556-52-5	1.0
inhibited typically with		
4-methoxyphenol (MEHQ)	150-76-5	0.005

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Center or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- Avoid giving milk or oils.
- Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

EYE

If this product comes in contact with the eyes

- Immediately hold eyelids apart and flush the eye continuously with 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

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.

INHALED

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

Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN

■ Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically.
Treat symptomatically.
for corrosives
----------BASIC TREATMENT

- Establish a patent airway with suction where necessary.

- Watch for signs of respiratory insufficiency and assist ventilation as necessary.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	3.15, 25 C
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	1.068
Lower Explosive Limit (%)	1.1

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.

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

- Combustible.
- Slight fire hazard when exposed to heat or flame.

Combustion products include carbon dioxide (CO2), other pyrolysis products typical of burning organic material.
May emit corrosive fumes.

FIRE INCOMPATIBILITY

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

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- Dry chemical powder.

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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.

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

- Most acrylic monomers have low viscosity therefore pouring, material transfer and processing of these materials do not necessitate heating.
- Viscous monomers may require heating to facilitate handling. To facilitate product transfer from original containers, product must be heated to no more than 60 deg. C. (140 F.), for not more than 24 hours.
- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

Store in a dark glass or other suitable light resistant container.

- Lined metal can, Lined metal pail/drum
- Plastic pail

For low viscosity materials

- 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

- Storage requires stabilizing inhibitor content and dissolved oxygen content to be monitored. Refer to manufacturer's recommended levels.
- DO NOT overfill containers so as to maintain free head space above product.

Rotate all stock to prevent ageing. Use on FIFO (First In-First Out) basis.

- Store below 38 deg. C.
- Store in original containers.
- Keep containers securely sealed.

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
US AIHA Workplace Environmental Exposure Levels (WEELs)	glycidyl methacrylate (Glycidyl Methacrylate)	0.5							skin; DSEN
US OSHA Permissible Exposure Levels (PELs) - Table Z1	epichlorohydrin (Epichlorohydrin)	5	19						
US - Minnesota Permissible Exposure Limits (PELs)	epichlorohydrin (Epichlorohydrin)	2	8						
Canada - Northwest Territories Occupational Exposure Limits (English)	epichlorohydrin (Epichlorohydrin - Skin)	2	7.6	5	19				
Canada - Nova Scotia Occupational Exposure Limits	epichlorohydrin (Epichlorohydrin)	0.5							TLV Basis upper respiratory tract

						irritation; male reproductive effects
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	epichlorohydrin (Epichlorohydrin)	5	19			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	epichlorohydrin (Epichlorohydrin)	2	8			
US - Idaho - Limits for Air Contaminants	epichlorohydrin (Epichlorhydrin)	5	19			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	epichlorohydrin (Epichlorohdrin)	2	8			
Canada - Yukon Carcinogens with a Permitted Exposure	epichlorohydrin (Epichlorohydrin)	5	20			
US - Washington Permissible exposure limits of air contaminants	epichlorohydrin (1-Chloro-2, 3-epoxypropane (Epichlorhydrin))	2		4		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	epichlorohydrin (1-Chloro,2,3-epoxy-propane (Epichlorohydrin) - Skin)	5	20	10	40	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	epichlorohydrin (K Epichlorohydrin - Skin)		(See Table 14)			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	epichlorohydrin (Epichlorohydrin)	0.5		1.5		Skin, T20
US - Alaska Limits for Air Contaminants	epichlorohydrin (Epichlorohydrin)	2	8			
US - Michigan Exposure Limits for Air Contaminants	epichlorohydrin (Epichlorohydrin)	2	8			

US - Hawaii Air Contaminant Limits	epichlorohydrin (Epichlorohydrin)	2	8	
Canada - British Columbia Occupational Exposure Limits	epichlorohydrin (Epichlorohydrin)	0.1		Skin; 2A; R
Canada - Alberta Occupational Exposure Limits	epichlorohydrin (1-Chloro,2,3-epoxy-propane (Epichlorohydrin))	0.5	1.9	
US - California Permissible Exposure Limits for Chemical Contaminants	epichlorohydrin (Epichlorohydrin; 1-chloro-2, 3-epoxypropane)	0.05	0.19	
Canada - Prince Edward Island Occupational Exposure Limits	epichlorohydrin (Epichlorohydrin)	0.5		TLV Basis upper respiratory tract irritation; male reproductive effects
US - Oregon Permissible Exposure Limits (Z-1)	epichlorohydrin (Epichlorohydrin)	5	19	
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	epichlorohydrin (Epichlorohydrin)	5	19	
US ACGIH Threshold Limit Values (TLV)	epichlorohydrin (Epichlorohydrin)	0.5		TLV Basis upper respiratory tract irritation; male reproductive effects
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	epichlorohydrin (Epichlorohydrin)	2	7.6	
US NIOSH Recommended Exposure Limits (RELs)	glycidol (Glycidol)	25	75	
Canada - Alberta Occupational Exposure Limits	glycidol (2,3-Epoxy-1-propanol (Glycidol))	2	6.1	
Canada - British Columbia Occupational Exposure Limits	glycidol (Glycidol)	2		2A

Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	glycidol (Glycidol)	25	76		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	glycidol (Glycidol)	50	150		
US ACGIH Threshold Limit Values (TLV)	glycidol (Glycidol)	2			TLV Basis upper respiratory tract, eye & skin irritation
US - Minnesota Permissible Exposure Limits (PELs)	glycidol (Glycidol)	25	75		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	glycidol (Glycidol)	25	75		
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	glycidol (Glycidol)	50	150		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	glycidol (Glycidol)	25	75		
US - California Permissible Exposure Limits for Chemical Contaminants	glycidol (Glycidol; 2,3-epoxy-1-propanol)	2	6.1		
US - Idaho - Limits for Air Contaminants	glycidol (Glycidol)	50	150		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	glycidol (Glycidol)	2		4	
US - Hawaii Air Contaminant Limits	glycidol (Glycidol)	25	75		

US - Alaska Limits for Air Contaminants	glycidol (Glycidol)	25	75			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	glycidol (2,3-Epoxy-1-propanol, see Glycidol)	50	150	75	225	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	glycidol (Glycidol (2,3-Epoxy-1-propanol))	50	150	65	190	
US - Washington Permissible exposure limits of air contaminants	glycidol (2, 3-Epoxy-1-propanol (Glycidol))	25		38		
US - Michigan Exposure Limits for Air Contaminants	glycidol (Glycidol)	25	75			
Canada - Nova Scotia Occupational Exposure Limits	glycidol (Glycidol)	2				TLV Basis upper respiratory tract, eye & skin irritation
Canada - Prince Edward Island Occupational Exposure Limits	glycidol (Glycidol)	2				TLV Basis upper respiratory tract, eye & skin irritation
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US - Oregon Permissible Exposure Limits (Z-1)	glycidol (Glycidol)	50	150			
Canada - Northwest Territories Occupational Exposure Limits (English)	glycidol (2,3-epoxy-1-propanol (Glycidol))	25	76	100	303	
Canada - British Columbia Occupational Exposure Limits	4-methoxyphenol (MEHQ) (4-Methoxyphenol)		5			
US - Minnesota Permissible Exposure Limits (PELs)	4-methoxyphenol (MEHQ) (4-Methoxyphenol)		5			

US NIOSH Recommended Exposure Limits (RELs)	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
Canada - Alberta Occupational Exposure Limits	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US - California Permissible Exposure Limits for Chemical Contaminants	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US - Michigan Exposure Limits for Air Contaminants	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US - Washington Permissible exposure limits of air contaminants	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5	10	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5	10	
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		
US ACGIH Threshold Limit Values (TLV)	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		TLV Basis eye irritation; skin damage
Canada - Nova Scotia Occupational Exposure Limits	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		TLV Basis eye irritation; skin damage
Canada - Prince Edward Island Occupational Exposure Limits	4-methoxyphenol (MEHQ) (4-Methoxyphenol)	5		TLV Basis eye irritation; skin damage

PERSONAL PROTECTION




RESPIRATOR

•Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

NOTE The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- 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, AS/NZS 2161.1 or national equivalent).

- 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, AS/NZS 2161.10.1 or national equivalent) 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, AS/NZS 2161.10.1 or national equivalent) 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.

General warning Do NOT use latex gloves! Use only recommended gloves - using the wrong gloves may increase the risk

Exposure condition Short time use; (few minutes less than 0.5 hour) Little physical stress	Use of thin nitrile rubber gloves Nitrile rubber (0.1 mm) Excellent tactibility ("feel"), powder-free Disposable Inexpensive Give adequate protection to low molecular weigh acrylic monomers
Exposure condition Medium time use; less than 4 hours Physical stress (opening drums, using tools, etc.)	Use of medium thick nitrile rubber gloves Nitrile rubber, NRL (latex) free; <0.45 mm Moderate tactibility ("feel"), powder-free Disposable Moderate price Gives adequate protection for most acrylates up to 4 hours Do NOT give adequate protection to low molecular weight monomers at exposures longer than 1 hour
Exposure condition Long time Cleaning operations	Nitrile rubber, NRL (latex) free; >0.56 mm low tactibility ("feel"), powder free High price Gives adequate protection for most acrylates in combination with commonly used solvents up to 8 hours Do NOT give adequate protection to low molecular weight monomers at exposures longer than 1 hour Avoid use of ketones and acetates in wash-up solutions.

Where none of this gloves ensure safe handling (for example in long term handling of acrylates containing high levels of acetates and/ or ketones, use laminated multilayer gloves.

Guide to the Classification and Labelling of UV/EB Acrylates Third edition, 231 October 2007 - Cefic.

- When handling liquid-grade epoxy resins wear chemically protective gloves (e.g nitrile or nitrile-butatoluene rubber), boots and aprons.
- DO NOT use cotton or leather (which absorb and concentrate the resin), polyvinyl chloride, rubber or polyethylene gloves (which absorb the resin).
- DO NOT use barrier creams containing emulsified fats and oils as these may absorb the resin; silicone-based barrier creams should be reviewed prior to use.

OTHER
- Overalls.
- PVC Apron.

ENGINEERING CONTROLS
Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Corrosive.

State	LIQUID	Molecular Weight	142.15
Melting Range (°F)	<14	Viscosity	2.9, 25 C cSt@40°C
Boiling Range (°F)	385.8- 387.9	Solubility in water (g/L)	Partly Miscible
Flash Point (°F)	185	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	6.8-7.2
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	3.15, 25 C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.068
Lower Explosive Limit (%)	1.1	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	100	Evaporation Rate	Very Slow

APPEARANCE
Liquid; does not mix well with water (50 g/l, 25 C). Pungent odor. Soluble in solvents.

Ecotoxicity of acrylates is a function of n-octanol/ water partition coefficient (log Pow, log Kow). Compounds with a log Pow >5 exhibit simple narcosis, but at lower log Pow the toxicity of acrylates is greater than predicted for simple narcotics. Potential for Bioaccumulation Experimental and modelled log Kow values of 0.03 and 0.37, respectively suggest that the potential for bioaccumulation of epichlorohydrin in aquatic organisms is low. ■ Environmental toxicity is a function of the n-octanol/water partition coefficient (log Pow, log Kow). Compounds with log Pow >5 act as neutral organics, but at a lower log Pow, the toxicity of epoxide-containing polymers is greater than that predicted for simple narcotics.

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
- Polymerisation may occur at elevated temperatures.
- Polymerisation may be accompanied by generation of heat as exotherm.

STORAGE INCOMPATIBILITY
¦ Glycidyl methacrylate
- is self-reactive
- in the absence of an inhibitor forms heat-, mechanical shock and impact-- sensitive peroxides with air
- is normally stabilised with tert-butyl catechol or other inhibitors whose levels must be maintained at all times
- may react with water, with possible violent polymerisation, in the presence of heat- or catalysts, including acids
- may produce fire, explosions or hazardous polymerisation on contact with strong oxidisers, acids, amines,

amides, inorganic hydroxides, copper and high copper alloys, chlorine dioxide, crotonaldehyde, nitrogen dioxide, ozone, phenol, sodium nitrite, polymerisation initiators (such as azobisisobutylonitrile, hydroquinone, or peroxyacetic acid), strong reducing agents, including hydrides, nitrides, sulfides, and alkali metals
- polymerisation can be catalysed by the absence of air, the presence of free radical initiators and peroxides, UV light, bases, high temperatures
- may generate electrostatic charge on flow
- is incompatible with cellulose- or clay-based absorbents, metals such as cast iron, mild steel, copper, brass and metal oxides
- uninhibited vapours may form polymers in plug vents, confined spaces or flame arresters of storage tanks

For acrylic and methacrylic acid esters
- Avoid contact with strong acids, strong alkalies, oxidising agents, polymerisation initiators (peroxides, persulfates), iron or rust
- Avoid heat, flame, sunlight, x-rays or ultra-violet radiation.
- Polymerisation may occur at elevated temperature and in presence of ignition sources - polymerisation of large quantities may be violent (even explosive)
- Store below 38 deg. C.
- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- Epoxides are highly reactive with acids, bases, and oxidizing and reducing agents.
- Epoxides react, possibly with anhydrous metal chlorides, ammonia, amines and group 1 metals.

Avoid contamination with strong oxidizing agents as violent reaction may occur, with spontaneous decomposition or explosion.

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

Section 11 - TOXICOLOGICAL INFORMATION

glycidyl methacrylate

TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
EPICHLOROHYDRIN
4-METHOXYPHENOL (MEHQ)
GLYCIDYL METHACRYLATE
Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.
EPICHLOROHYDRIN
GLYCIDOL
GLYCIDYL METHACRYLATE
Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
GLYCIDOL
EPICHLOROHYDRIN
Tenth Annual Report on Carcinogens Substance anticipated to be Carcinogen
[National Toxicology Program U.S. Dep. of Health & Human Services 2002].
WARNING This substance has been classified by the IARC as Group 2A Probably Carcinogenic to Humans.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged

exposure to irritants may produce conjunctivitis.
GLYCIDYL METHACRYLATE

TOXICITY	IRRITATION
Oral (rat) LD50 597 mg/kg	Nil Reported
Oral (mouse) LD50 390 mg/kg	
Dermal (rabbit) LD50 469 mg/kg	
Oral (guinea pig) LD50 697 mg/kg	
Oral (Rat) LD50 500 mg/kg	
Inhalation (Rat) LC50 45 ppm/4h	

Where no "official" classification for acrylates and methacrylates exists, there has been cautious attempts to create classifications in the absence of contrary evidence. For example
Monalkyl or monoarylesters of acrylic acids should be classified as R36/37/38 and R51/53
Monoalkyl or monoaryl esters of methacrylic acid should be classified as R36/37/38.
Based on the available oncogenicity data and without a better understanding of the carcinogenic mechanism the Health and Environmental Review Division (HERD), Office of Toxic Substances (OTS), of the US EPA previously concluded that all chemicals that contain the acrylate or methacrylate moiety (CH2=CHCOO or CH2=C(CH3)COO) should be considered to be a carcinogenic hazard unless shown otherwise by adequate testing.
This position has now been revised and acrylates and methacrylates are no longer de facto carcinogens.

TOXICITY	IRRITATION
EPICHLOROHYDRIN	
Oral (rat) LD50 90 mg/kg	Skin (rabbit) 10 mg/24 hr (open)
Inhalation (human) TCLo 40 ppm/2h	Eye (rabbit) 23 mg
Inhalation (human) TCLo 20 ppm	Eye (rabbit)100 mg/24 hr-Moderate
Inhalation (rat) LC50 250 ppm/8h	
Dermal (rabbit) LD50 515 mg/kg	
Intraperitoneal (Rat) LD50 113 mg/kg	
Subcutaneous (Rat) LD50 150 mg/kg	
Intravenous (Rat) LD50 154 mg/kg	
Oral (Mouse) LD50 195 mg/kg	
Intraperitoneal (Mouse) LD50 170 mg/kg	
Subcutaneous (Mouse) LD 250 mg/kg	
Oral (Rabbit) LD50 345 mg/kg	
Intraperitoneal (Rabbit) LD50 160 mg/kg	
Intraperitoneal (Guinea pig) LD50 118 mg/kg	
GLYCIDOL	
Oral (rat) LD50 420 mg/kg	Skin (rabbit) 558 mg/3d Moderate
Intraperitoneal (rat) LD50 200 mg/kg	Skin (rabbit) 100 mg/24h - Moderate
Oral (mouse) LD50 431 mg/kg	Eye (rabbit) 2 mg/24h
Inhalation (mouse) LC50 450 ppm/4h	
Intraperitoneal (mouse) LD50 500 mg/kg	

Dermal (rabbit) LD50 1980 mg/kg

Inhalation (Rat) LC50 580 ppm/8h

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

Emphysema, foetotoxicity and changes to the male fertility index recorded.

4-METHOXYPHENOL (MEHQ)

Oral (rat) LD50 1600 mg/kg

Skin (rabbit) 6000 mg/12d-I Mild

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

CARCINOGEN

Epichlorohydrin (NB Overall evaluation upgraded to Group 2A with supporting evidence from other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2A
Epichlorohydrin	US EPA Carcinogens Listing	Carcinogenicity	B2
Epichlorohydrin	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B2
Epichlorohydrin	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A3
epichlorohydrin	US - Rhode Island Hazardous Substance List	IARC	C
EPICHLOROHYDRIN	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
EPICHLOROHYDRIN	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Epichlorohydrin	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2A
Epichlorohydrin	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
epichlorohydrin	US - Maine Chemicals of High Concern List	Carcinogen	B2
TWAPPM~	US - Maine Chemicals of High Concern List	Carcinogen	A3
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; IRIS; NTP 11th ROC
Glycidol (NB Overall evaluation upgraded to Group 2A with supporting evidence from other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2A
Glycidol	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A3

glycidol	US - Rhode Island Hazardous Substance List	IARC	
2,3-EPOXY 1-PROPANOL	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
2,3-EPOXY 1-PROPANOL	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC
4-methoxyphenol (MEHQ)	US - Rhode Island Hazardous Substance List	IARC	

REPROTOXIN

epichlorohydrin	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility	H A s

SKIN

glycidyl methacrylate	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	skin; DSEN
epichlorohydrin	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin	Skin Designation	X
epichlorohydrin	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
epichlorohydrin	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
epichlorohydrin	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
epichlorohydrin	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis upper respiratory tract irritation; male reproductive effects
epichlorohydrin	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
epichlorohydrin	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
epichlorohydrin	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
epichlorohydrin	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin; 2A; R
epichlorohydrin	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
epichlorohydrin	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
epichlorohydrin	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
epichlorohydrin	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X

epichlorohydrin	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
epichlorohydrin	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
epichlorohydrin	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

Toxic to aquatic organisms.
This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)
B. Component Waste Numbers
When epichlorohydrin 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 U041 (waste code T).
Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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:	8
Identification Numbers:	UN2922	PG:	III
Label Codes:	8, 6.1	Special provisions:	IB3, T7, TP1, TP28
Packaging: Exceptions:	154	Packaging: Non-bulk:	203
Packaging: Exceptions:	154	Quantity limitations: Passenger aircraft/rail:	5 L
Quantity Limitations: Cargo aircraft only:	60 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:
Corrosive liquids, toxic, n.o.s.

Air Transport IATA:

UN/ID Number:	2922	Packing Group:	III
Special provisions:	A3		
Cargo Only			
Packing Instructions:	856	Maximum Qty/Pack:	60 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	Y841	Maximum Qty/Pack:	5 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	852	Maximum Qty/Pack:	1 L

Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S. *(CONTAINS GLYCIDYL METHACRYLATE)

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	6.1
UN Number:	2922	Packing Group:	III
EMS Number:	F-A,S-B	Special provisions:	223 274
Limited Quantities:	5 L		

Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.(contains glycidyl methacrylate)

Section 15 - REGULATORY INFORMATION

glycidyl methacrylate (CAS: 106-91-2) is found on the following regulatory lists;
"Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US AIHA Workplace Environmental Exposure Levels (WEELs)","US EPA High Production Volume Chemicals 1994 List of Additions","US EPA Master Testing List - Index I Chemicals Listed","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 4 - Chemicals Subject to Testing Consent Orders","US TSCA Section 4/12 (b) - Sunset Date/Status","US TSCA Section 8 (d) - Health and Safety Data Reporting"

Regulations for ingredients

epichlorohydrin (CAS: 106-89-8,51594-55-9,67843-74-7) is found on the following regulatory lists;
"Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances","Canada - Yukon Carcinogens with a Permitted Exposure","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.1","International Council of Chemical Associations (ICCA) - High Production Volume List","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 Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","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 - 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 Class A toxic air pollutants: Known and Probable Carcinogens","US - Washington Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","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 Department of Transportation (DOT) Marine Pollutants - Appendix B","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Carcinogens Listing","US EPA High Production Volume Program Chemical List","US Food Additive Database","US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US OSHA Permissible Exposure Levels (PELs) - Table Z1","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 Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 8 (d) - Health and Safety Data Reporting","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27","WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

glycidol (CAS: 556-52-5,57044-25-4,60456-23-7) is found on the following regulatory lists;

"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 - Prince Edward Island Occupational Exposure Limits - Carcinogens","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 Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.1","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which production, use or other presence must be reported","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Priority List for the Development of NSRLs for Carcinogens","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern 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 Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","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 Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Master Testing List - Index I Chemicals Listed","US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

4-methoxyphenol (MEHQ) (CAS: 150-76-5) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","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 Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Fragrance Association (IFRA) Standards Prohibited","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US -

Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","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 - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","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 Permissible exposure limits of air contaminants","US ACGIH Threshold Limit Values (TLV)","US Cosmetic Ingredient Review (CIR) Ingredients found unsafe for use in cosmetics","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US NIOSH Recommended Exposure Limits (RELs)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements","US TSCA Section 4/12 (b) - Sunset Date/Status","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List","US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.
■ Limited evidence of a carcinogenic effect*.
■ Possible respiratory sensitiser*.
* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name	CAS
epichlorohydrin	106-89-8, 51594-55-9, 67843-74-7
glycidol	556-52-5, 57044-25-4, 60456-23-7

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■ 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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