Tapecoat TC Mastic

Chase Corporation - Tapecoat Division

Chemwatch: **25688-58**
Version No: **2.1**
Safety Data Sheet according to OSHA HazCom Standard (2024) requirements

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S.GHS.USA.EN.E.B

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Tapecoat TC Mastic
Synonyms	Not Available
Chemical formula	Not Applicable
Other means of identification	TCMAS

Recommended use of the chemical and restrictions on use

Relevant identified uses	Use according to manufacturer's directions.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	**Chase Corporation - Tapecoat Division**
Address	1527 Lyons Street, Evanston 60201 IL United States of America
Telephone	1 800 543-3458
Fax	Not Available
Website	info@chasecorp.com
Email	Not Available

Emergency phone number

Association / Organisation	**Chemtrec**
Emergency telephone number(s)	**1-800-424-9300 (US)**
Other emergency telephone number(s)	**(+1)703-527-3887 (outside the US)**

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Flammable Liquids Category 2, Skin Corrosion/Irritation Category 2, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 2A, Germ Cell Mutagenicity Category 1A, Carcinogenicity Category 1A, Reproductive Toxicity Category 1A, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1

Label elements

Hazard pictogram(s)	
SIGNAL WORD	DANGER

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read carefully and follow all instructions.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P260	Do not breathe mist/vapours/spray.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/ attention.
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
P302+P352	IF ON SKIN: Wash with plenty of water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314	Get medical advice/attention if you feel unwell.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

No further product hazard information.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
65996-93-2	40-50	coal tar pitch, high temperature
98-56-6	10-20	4-chlorobenzotrifluoride
1330-20-7	1-10	xylene
Not Available	1-10	proprietary ingredients
108-88-3	1-10	toluene
78-93-3	<5	methyl ethyl ketone
25036-25-3	<5	bisphenol A/ bisphenol A diglycidyl ether polymer
100-41-4	<5	ethylbenzene

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	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. • Seek medical attention without delay; if pain persists or recurs seek medical attention. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: • Immediately remove all contaminated clothing, including footwear. • Flush skin and hair with running water (and soap if available). • Seek medical attention in event of irritation.
Inhalation	• If fumes or combustion products are inhaled remove from contaminated area. • Lay patient down. Keep warm and rested. • Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. • Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. • Transport to hospital, or doctor.
Ingestion	• 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. • Observe the patient carefully.

	• Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. • Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. • Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.
For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO2 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

Treat symptomatically.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

Special hazards arising from the substance or mixture

Fire Incompatibility	• Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting	• Alert Fire Brigade and tell them location and nature of hazard. • May be violently or explosively reactive. • Wear breathing apparatus plus protective gloves in the event of a fire. • Prevent, by any means available, spillage from entering drains or water course. • Consider evacuation (or protect in place). • Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	• Liquid and vapour are highly flammable. • Severe fire hazard when exposed to heat, flame and/or oxidisers. • Vapour may travel a considerable distance to source of ignition. • Heating may cause expansion or decomposition leading to violent rupture of containers. • On combustion, may emit toxic fumes of carbon monoxide (CO). Combustion products include: • carbon dioxide (CO_2) hydrogen chloride phosgene hydrogen fluoride • other pyrolysis products typical of burning organic material.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	• Remove all ignition sources. • Clean up all spills immediately. • Avoid breathing vapours and contact with skin and eyes. • Control personal contact with the substance, by using protective equipment. • Contain and absorb small quantities with vermiculite or other absorbent material. • Wipe up.
Major Spills	• Clear area of personnel and move upwind. • Alert Fire Brigade and tell them location and nature of hazard. • May be violently or explosively reactive. • Wear breathing apparatus plus protective gloves. • Prevent, by any means available, spillage from entering drains or water course. • Consider evacuation (or protect in place).

Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	• Containers, even those that have been emptied, may contain explosive vapours. • Do NOT cut, drill, grind, weld or perform similar operations on or near containers. • **DO NOT** allow clothing wet with material to stay in contact with skin • Avoid skin contact, including inhalation. • Wear protective clothing when risk of exposure occurs. • Use in a well-ventilated area. • Prevent concentration in hollows and sumps. • **DO NOT** enter confined spaces until atmosphere has been checked. • Avoid smoking, naked lights, heat or ignition sources.
Other information	• Store in original containers in approved flame-proof area. • No smoking, naked lights, heat or ignition sources. • **DO NOT** store in pits, depression, basement or areas where vapours may be trapped. • Keep containers securely sealed. • Store away from incompatible materials in a cool, dry well ventilated area. • Protect containers against physical damage and check regularly for leaks.

Conditions for safe storage, including any incompatibilities

Suitable container	• Packing as supplied by manufacturer. • Plastic containers may only be used if approved for flammable liquid. • Check that containers are clearly labelled and free from leaks. • For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure. • For materials with a viscosity of at least 2680 cSt. (23 deg. C) • For manufactured product having a viscosity of at least 250 cSt. (23 deg. C) • Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C): (i) Removable head packaging; (ii) Cans with friction closures and (iii) low pressure tubes and cartridges may be used. • Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages • In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	Xylenes: • may ignite or explode in contact with strong oxidisers, 1,3-dichloro-5,5-dimethylhydantoin, uranium fluoride • attack some plastics, rubber and coatings • may generate electrostatic charges on flow or agitation due to low conductivity. For alkyl aromatics: The alkyl side chain of aromatic rings can undergo oxidation by several mechanisms. The most common and dominant one is the attack by oxidation at benzylic carbon as the intermediate formed is stabilised by resonance structure of the ring. • Following reaction with oxygen and under the influence of sunlight, a hydroperoxide at the alpha-position to the aromatic ring, is the primary oxidation product formed (provided a hydrogen atom is initially available at this position) - this product is often short-lived but may be stable dependent on the nature of the aromatic substitution; a secondary C-H bond is more easily attacked than a primary C-H bond whilst a tertiary C-H bond is even more susceptible to attack by oxygen • Monoalkylbenzenes may subsequently form monocarboxylic acids; alkyl naphthalenes mainly produce the corresponding naphthalene carboxylic acids. • Oxidation in the presence of transition metal salts not only accelerates but also selectively decomposes the hydroperoxides. • Hock-rearrangement by the influence of strong acids converts the hydroperoxides to hemiacetals. Peresters formed from the hydroperoxides undergo Criegee rearrangement easily. Toluene: • reacts violently with strong oxidisers, bromine, bromine trifluoride, chlorine, hydrochloric acid/ sulfuric acid mixture, 1,3-dichloro-5,5-dimethyl-2,4-imidazolidindione, dinitrogen tetraoxide, fluorine, concentrated nitric acid, nitrogen dioxide, silver chloride, sulfur dichloride, uranium fluoride, vinyl acetate • forms explosive mixtures with strong acids, strong oxidisers, silver perchlorate, tetranitromethane • is incompatible with bis-toluenediazo oxide • attacks some plastics, rubber and coatings • may generate electrostatic charges, due to low conductivity, on flow or agitation. • Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic rings and strong oxidising agents. • Aromatics can react exothermically with bases and with diazo compounds.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Limits (PELs) Table Z-1	coal tar pitch, high temperature	Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene)	0.2 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	coal tar pitch, high temperature	Coal tar pitch volatiles, as benzene soluble aerosol	0.2 mg/m3	Not Available	Not Available	A1; BElp
US NIOSH Recommended Exposure Limits (RELs)	coal tar pitch, high temperature	Coal tar pitch volatiles	0.1 mg/m3	Not Available	Not Available	Ca; (cyclohexane-extractable fraction); See Appendix A - NIOSH Potential Occupational Carcinogens; See Appendix C - Supplementary Exposure Limits
US OSHA Permissible Exposure Limits (PELs) Table Z-3	coal tar pitch, high temperature	Inert or Nuisance Dust: Respirable fraction	5 mg/m3 / 15 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-3	coal tar pitch, high temperature	Inert or Nuisance Dust: Total Dust	15 mg/m3 / 50 mppcf	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	xylene	Xylenes (o-, m-, p-isomers)	100 ppm / 435 mg/m3	Not Available	Not Available	Not Available

US ACGIH Threshold Limit Values (TLV)	xylene	Xylene, all isomers	20 ppm	Not Available	Not Available	OTO**; A4; BEI
US OSHA Permissible Exposure Limits (PELs) Table Z-2	toluene	toluene	200 ppm	300 ppm	500 (10 min) ppm	(Z37.12-1967)
US ACGIH Threshold Limit Values (TLV)	toluene	toluene	20 ppm	Not Available	Not Available	OTO; A4; BEI
US NIOSH Recommended Exposure Limits (RELs)	toluene	toluene	100 ppm / 375 mg/m3	560 mg/m3 / 150 ppm	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	methyl ethyl ketone	2-Butanone (Methyl ethyl ketone)	200 ppm / 590 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	methyl ethyl ketone	Methyl ethyl ketone	75 ppm	150 ppm	Not Available	Skin; BEI
US NIOSH Recommended Exposure Limits (RELs)	methyl ethyl ketone	2-Butanone	200 ppm / 590 mg/m3	885 mg/m3 / 300 ppm	Not Available	Not Available
US OSHA Permissible Exposure Limits (PELs) Table Z-1	ethylbenzene	Ethyl benzene	100 ppm / 435 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	ethylbenzene	Ethyl benzene	20 ppm	Not Available	Not Available	OTO; A3; BEI
US NIOSH Recommended Exposure Limits (RELs)	ethylbenzene	Ethyl benzene	100 ppm / 435 mg/m3	545 mg/m3 / 125 ppm	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	TEEL-1	TEEL-2	TEEL-3
coal tar pitch, high temperature	0.6 mg/m3	120 mg/m3	700 mg/m3
xylene	Not Available	Not Available	Not Available
toluene	Not Available	Not Available	Not Available
methyl ethyl ketone	Not Available	Not Available	Not Available
bisphenol A/ bisphenol A diglycidyl ether polymer	12 mg/m3	130 mg/m3	790 mg/m3
ethylbenzene	Not Available	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Individual protection measures, such as personal protective equipment	
Eye and face protection	• Safety glasses with side shields. • Chemical goggles.[AS/NZS 1337.1, EN166 or national equivalent] • Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	**NOTE:** • The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. • Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. When handling liquid-grade epoxy resins wear chemically protective gloves , boots and aprons. The performance, based on breakthrough times ,of: · Ethyl Vinyl Alcohol (EVAL laminate) is generally excellent · Butyl Rubber ranges from excellent to good · Nitrile Butyl Rubber (NBR) from excellent to fair. · Neoprene from excellent to fair · Polyvinyl (PVC) from excellent to poor As defined in ASTM F-739-96 · Excellent breakthrough time > 480 min · Good breakthrough time > 20 min · Fair breakthrough time < 20 min · Poor glove material degradation Gloves should be tested against each resin system prior to making a selection of the most suitable type. Systems include both the resin and any hardener, individually and collectively) · **DO NOT** use cotton or leather (which absorb and concentrate the resin), natural rubber (latex), medical 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. Replacement time should be considered when selecting the most appropriate glove.

Body protection	See Other protection below
Other protection	• Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] • Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] • Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely. • Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. • Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood. • Overalls. • PVC Apron. • PVC protective suit may be required if exposure severe. • Eyewash unit. • Ensure there is ready access to a safety shower. • 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 or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn.

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Black colour highly flammable liquid with aromatic solvent odour

Physical state	Liquid	**Relative density (Water = 1)**	~9.20
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	480
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	-94.9	**Viscosity (mm2/s)**	Not Available
Initial boiling point and boiling range (°C)	110.6	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	4	**Taste**	Not Available
Evaporation rate	3.2	**Explosive properties**	Not Available
Flammability	HIGHLY FLAMMABLE.	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	11.5	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	1.8	**Volatile Component (%vol)**	45-<55
Vapour pressure (kPa)	0.573	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**Total VOC %w/w**	Not Available
Heat of Combustion (kJ/g)	Not Available	**Ignition Distance (cm)**	Not Available
Flame Height (cm)	Not Available	**Flame Duration (s)**	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	**Enclosed Space Ignition Deflagration Density (g/m3)**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	Not Available		

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	• Unstable in the presence of incompatible materials. • Product is considered stable. • Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7

Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

a) Acute Toxicity	Based on available data, the classification criteria are not met.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	There is sufficient evidence to classify this material as sensitising to skin or the respiratory system
e) Mutagenicity	There is sufficient evidence to classify this material as mutagenic
f) Carcinogenicity	There is sufficient evidence to classify this material as carcinogenic
g) Reproductivity	There is sufficient evidence to classify this material as toxic to reproductivity
h) STOT - Single Exposure	Based on available data, the classification criteria are not met.
i) STOT - Repeated Exposure	There is sufficient evidence to classify this material as toxic to specific organs through repeated exposure
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	The material is not classified as causing respiratory irritation under Regulation (EC) No 1272/2008 (CLP), as amended. Nevertheless, inhalation of vapours, fumes or aerosols, particularly following prolonged exposure, may cause respiratory discomfort and, occasionally, respiratory distress. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. Inhalation hazard is increased at higher temperatures. Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal. Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination. Inhalation of creosotes or creosote-containing products may produce headache, dizziness and irregular breathing. Severe exposures may cause confusion, collapse and coma. The acute toxicity of inhaled alkylbenzene is best described by central nervous system depression. These compounds may also act as general anaesthetics. Whole body symptoms of poisoning include light-headedness, nervousness, apprehension, a feeling of well-being, confusion, dizziness, drowsiness, ringing in the ears, blurred or double vision, vomiting and sensations of heat, cold or numbness, twitching, tremors, convulsions, unconsciousness, depression of breathing, and arrest. Heart stoppage may result from cardiovascular collapse. A slow heart rate and low blood pressure may also occur. Alkylbenzenes are not generally toxic except at high levels of exposure. Headache, fatigue, tiredness, irritability and digestive disturbances (nausea, loss of appetite and bloating) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted amongst workers. Xylene is a central nervous system depressant
Ingestion	Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) Accidental ingestion of the material may be damaging to the health of the individual. At sufficiently high doses the material may be hepatotoxic (i.e. poisonous to the liver). Ingestion of creosotes or creosote-containing products may produce nausea, vomiting, abdominal pain, salivation, dizziness, breathing difficulties, weak pulse, loss of pupil reflexes, convulsions, low blood pressure and central nervous system stimulation. Exposure may cause salivation, and increases in blood cholesterol and triglycerides. There may also be increase in weight of the liver and kidney and deposition of fat in the adrenal gland.
Skin Contact	This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Open cuts, abraded or irritated skin should not be exposed to this material Skin contact with creosotes, coal tar oils may cause redness or greyish-yellow to bronze pigmentation, pimples, blisters, and ulcers. Photosensitivity may result in severe sunburn on subsequent exposure to ultraviolet light with an increased risk of skin cancer. 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.
Eye	This material causes serious eye irritation. Eye contact with creosotes or creosote-containing preparations may cause redness of the eye with inflammation, abrasion and scarring of the cornea.
Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. There is sufficient evidence to suggest that this material directly causes cancer in humans. There is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited. Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited. Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Ample evidence exists that this material directly causes reduced fertility Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material. Ample evidence exists that developmental disorders are directly caused by human exposure to the material. Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material. Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother. Bisphenol A diglycidyl ethers (BADGEs) produce a sensitization dermatitis (skin inflammation) characterized by eczema with blisters and papules, with considerable itching of the back of the hand. This may persist for 10-14 days after withdrawal from exposure and recur immediately on re-exposure. The dermatitis may last longer following each exposure, but is unlikely to become more intense. Lower molecular weight species produce sensitization more readily. Animal testing has shown an increase in the development of some tumours. For some reactive diluents, prolonged or repeated skin contact may result in absorption of potentially harmful amounts or allergic skin reactions.

Exposure to some reactive diluents (notably, neopentylglycol diglycidyl ether, CAS RN: 17557-23-2) has caused cancer in some animal testing.
Bisphenol A may have effects similar to female sex hormones and when administered to pregnant women, may damage the foetus. It may also damage male reproductive organs and sperm.
Polycyclic aromatic hydrocarbons are found in a number of materials such as coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified as extremely liable to cause cancer, especially that of the lung and genito-urinary tract.
Intentional abuse (glue sniffing) or occupational exposure to toluene can result in chronic habituation. Chronic abuse has caused inco-ordination, tremors of the extremeties (due to widespread cerebrum withering), headache, abnormal speech, temporary memory loss, convulsions, coma, drowsiness, reduced colour perception, blindness, nystagmus (rapid, involuntary eye movements), hearing loss leading to deafness and mild dementia.
Women exposed to xylene in the first 3 months of pregnancy showed a slightly increased risk of miscarriage and birth defects. Evaluation of workers chronically exposed to xylene has demonstrated lack of genetic toxicity.
4-chlorobenzotrifluoride (PCBTF) may have potential to cause cancer because of its structural similarities with two known cancer causing agents.
Chronic exposure to benzene may cause headache, fatigue, loss of appetite and lassitude with incipient blood effects including anaemia and blood changes. Benzene is a myelotoxicant known to suppress bone- marrow cell proliferation and to induce haematologic disorders in humans and animals.
Patients receiving tar ointments for various skin complaints have developed skin cancer in a number of case reports. There is evidence that these ointments can cause mutations.

Tapecoat TC Mastic	TOXICITY	IRRITATION
	Not Available	Not Available

coal tar pitch, high temperature	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg [1]	Eye: no adverse effect observed (not irritating) [1]
	Oral (Rat) LD50: 3300 mg/kg [2]	Skin: no adverse effect observed (not irritating) [1]

4-chlorobenzotrifluoride	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2 mg/kg [2]	Eye: no adverse effect observed (not irritating) [1]
	Inhalation (Rat) LC50: >32.03 mg/l4h [1]	Skin: no adverse effect observed (not irritating) [1]
	Oral (Mouse) LD50; 11500 mg/kg [2]	

xylene	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >1700 mg/kg [2]	Eye (Human): 200ppm
	Inhalation (Rat) LC50: 5000 ppm4h [2]	Eye (Rodent - rabbit): 5mg/24H - Severe
	Oral (Mouse) LD50; 2119 mg/kg [2]	Eye (Rodent - rabbit): 87mg - Mild
		Eye: adverse effect observed (irritating) [1]
		Skin (Rodent - rabbit): 100% - Moderate
		Skin (Rodent - rabbit): 500mg/24H - Moderate
		Skin (Rodent - rat): 60uL/8H - Mild
		Skin: adverse effect observed (irritating) [1]

toluene	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 12124 mg/kg [2]	Eye (Human): 300ppm
	Inhalation (Rat) LC50: >13350 ppm4h [2]	Eye (Rodent - rabbit): 0.1mL
	Oral (Rat) LD50: 636 mg/kg [2]	Eye (Rodent - rabbit): 0.1mL - Severe
		Eye (Rodent - rabbit): 100mg/30S - Mild
		Eye (Rodent - rabbit): 2mg/24H - Severe
		Eye (Rodent - rabbit): 870ug - Mild
		Eye: adverse effect observed (irritating) [1]
		Skin (Mammal - pig): 250uL/24H - Mild
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin (Rodent - rabbit): 435mg - Mild
		Skin (Rodent - rabbit): 500mg - Moderate
		Skin: adverse effect observed (irritating) [1]
		Skin: no adverse effect observed (not irritating) [1]

methyl ethyl ketone	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 6480 mg/kg [2]	Eye (Human): 350ppm
	Inhalation (Mouse) LC50: 32 mg/L4h [2]	Eye (Rodent - rabbit): 80mg
	Oral (Rat) LD50: 2054 mg/kg [1]	Eye: adverse effect observed (irritating) [1]
		Skin (Rodent - rabbit): 14mg/24H - Mild
		Skin (Rodent - rabbit): 402mg/24H - Mild
		Skin (Rodent - rabbit): 500mg/24H - Moderate
		Skin: no adverse effect observed (not irritating) [1]

bisphenol A/ bisphenol A diglycidyl ether polymer	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg [2]	Not Available
	Oral (Rat) LD50: >2000 mg/kg [2]	

ethylbenzene	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 17800 mg/kg [2]	Eye (Rodent - rabbit): 500mg - Severe

	Inhalation (Rat) LC50: 17.2 mg/l4h [2] | Skin (Rodent - rabbit): 15mg/24H - Mild Oral (Rat) LD50: 3500 mg/kg [2] |
Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

4-chlorobenzotrifluoride	Medium to long term exposure to chlorobenzotrifluoride may produce increase in weight of the liver, kidney, and thyroid gland at high doses. Only limited reproductive effects were noted, and no gene alteration effects. There was also no evidence of definite cancer-causing effects. No data on its ability to cause birth defects was available.
toluene	For toluene: Acute toxicity: Humans exposed to high levels of toluene for short periods of time experience adverse central nervous system effects ranging from headaches to intoxication, convulsions, narcosis (sleepiness) and death. When inhaled or swallowed, toluene can cause severe central nervous system depression, and in large doses has a narcotic effect. 60mL has caused death. Death of heart muscle fibres, liver swelling, congestion and bleeding of the lungs and kidney injury were all found on autopsy. Exposure to inhalation at a concentration of 600 parts per million for 8 hours resulted in the same and more serious symptoms including euphoria (a feeling of well-being), dilated pupils, convulsions and nausea. Exposure to 10000-30000 parts per million (1-3%) has been reported to cause narcosis and death. Toluene can also strip the skin of lipids, causing skin inflammation. Subchronic/chronic effects: Repeat doses of toluene cause adverse central nervous system effects and can damage the upper airway, the liver and the kidney. Adverse effects occur from both swallowing and inhalation. In humans, a reported lowest level causing adverse effects on the nervous system is 88 parts per million. In one case, toluene caused heart sensitization and death. In several cases of “glue sniffing”, damage to the cerebellum was noted. Workers chronically exposed to toluene fumes have reported reduced white cell counts. Developmental/Reproductive toxicity: Exposure to high levels of toluene can result in adverse effects in the developing foetus. Several studies have indicated that high levels of toluene can also adversely affect the developing offspring in laboratory animals. In children who were exposed to toluene before birth, as a result of solvent abuse by the mother, variable growth, a small head, central nervous system dysfunction, attention deficits, minor facial and limb abnormalities, and developmental delay were seen. Absorption: Studies in humans and animals have shown that toluene is easily absorbed through the lungs and gastrointestinal tract, with much less being absorbed through the skin. Distribution: Animal studies show that toluene may be distributed in the body fat, bone marrow, spinal nerves, spinal cord and brain white matter, with lower levels in the blood, kidney and liver. Toluene has generally been found to accumulate in fatty tissue, and in highly vascularised tissues. Metabolism: Inhaled or ingested toluene may be metabolized to benzyl alcohol, after which it is further oxidized to benzaldehyde and benzoic acid. Benzoic acid is sometimes conjugated with glycine to form hippuric acid or reacted with glucuronic acid to form benzoyl glucuronide. O-cresol and p-cresol formed by ring hydroxylation are considered minor metabolites. Excretion: Toluene is mainly (60-70%) excreted through the urine as hippuric acid. Benzoyl glucuronide accounts for 10-20% of excretion, and unchanged toluene through exhaled air also accounts for 10-20%. Excretion of hippuric acid is usually complete within 24 hours of exposure.
methyl ethyl ketone	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
coal tar pitch, high temperature	There is sufficient evidence that coal tar pitches are carcinogenic in humans and there is sufficient evidence that occupational exposure to coal tars as it occurs during the destructive distillation of coal is causally associated with the occurrence of skin tumours in humans. The production of creosotes and coal tars stems from the incomplete combustion of carbon-containing materials. Physically, they are usually viscous liquids or semisolids that are black or dark brown with a naphthalene-like odour. They have an oily liquid consistency and range in colour from yellowish-dark green to brown and largely contain a mixture of polycyclic aromatic hydrocarbons (PAHs) including phenol. It is likely that their toxicity is due largely to the major individual components, phenols, PAHs and others. **WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**.
xylene	Reproductive effector in rats The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
bisphenol A/ bisphenol A diglycidyl ether polymer	*Hexion MSDS Epikote 1001 The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics. Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner. However, BPA and several other derivatives did not show such activity. Results suggest that the 4-hydroxyl group of the A-phenyl ring and the B-phenyl ring of BPA derivatives are required for these hormonal activities, and substituents at the 3,5-positions of the phenyl rings and the bridging alkyl moiety markedly influence the activities. Bisphenols promoted cell proliferation and increased the synthesis and secretion of cell type-specific proteins. When ranked by proliferative potency, the longer the alkyl substituent at the bridging carbon, the lower the concentration needed for maximal cell yield; the most active compound contained two propyl chains at the bridging carbon. Bisphenols with two hydroxyl groups in the para position and an angular configuration are suitable for appropriate hydrogen bonding to the acceptor site of the oestrogen receptor. In vitro cell models were used to evaluate the ability of 22 bisphenols (BPs) to induce or inhibit estrogenic and androgenic activity. BPA, Bisphenol AF (BPAF), bisphenol Z (BPZ), bisphenol C (BPC), tetramethyl bisphenol A (TMBPA), bisphenol S (BPS), bisphenol E (BPE), 4,4-bisphenol F (4,4-BPF), bisphenol AP (BPAP), bisphenol B (BPB), tetrachlorobisphenol A (TCBPA), and benzylparaben (PHBB) induced estrogen receptor (ER)alpha and/or ERbeta-mediated activity. With the exception of BPS, TCBPA, and PHBB, these same BPs were also androgen receptor (AR) antagonists. Only 3 BPs were found to be ER antagonists. Bisphenol P (BPP) selectively inhibited ERbeta-mediated activity and 4-(4-phenylmethoxyphenyl)sulfonylphenol (BPS-MPE) and 2,4-bisphenol S (2,4-BPS) selectively inhibited ERalpha-mediated activity. None of the BPs induced AR-mediated activity. Animal testing over 13 weeks showed bisphenol A diglycidyl ether (BADGE) caused mild to moderate, chronic, inflammation of the skin. Reproductive and Developmental Toxicity: Animal testing showed BADGE given over several months caused reduction in body weight but had no reproductive effects. Cancer-causing potential: It has been concluded that bisphenol A diglycidyl ether cannot be classified with respect to its cancer-causing potential in humans. Genetic toxicity: Laboratory tests on genetic toxicity of BADGE have so far been negative. Immunotoxicity: Animal testing suggests regular injections of diluted BADGE may result in sensitization. Consumer exposure: Comsumer exposure to BADGE is almost exclusively from migration of BADGE from can coatings into food. Testing has not found any evidence of hormonal disruption.
ethylbenzene	Liver changes, utheral tract, effects on fertility, foetotoxicity, specific developmental abnormalities (musculoskeletal system) recorded. 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. Ethylbenzene is readily absorbed when inhaled, swallowed or in contact with the skin. It is distributed throughout the body, and passed out through urine. It may irritate the skin, eyes and may cause hearing loss if exposed to high doses. Long Term exposure may cause damage to the kidney, liver and lungs, including a tendency to cancer formation, according to animal testing. There is no research on its effect on sex organs and unborn babies. **NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

xylene & ethylbenzene	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
4-chlorobenzotrifluoride & methyl ethyl ketone & bisphenol A/ bisphenol A diglycidyl ether polymer	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. 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. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
xylene & toluene & methyl ethyl ketone	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.
coal tar pitch, high temperature & bisphenol A/ bisphenol A diglycidyl ether polymer	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✓
Skin Irritation/Corrosion	✓	**Reproductivity**	✓
Serious Eye Damage/Irritation	✓	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✓	**STOT - Repeated Exposure**	✓
Mutagenicity	✓	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✓ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Tapecoat TC Mastic

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

coal tar pitch, high temperature

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
EC10(ECx)	48h	Crustacea	<0.001mg/L	2

4-chlorobenzotrifluoride

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
EC50	72h	Algae or other aquatic plants	>0.41mg/l	2
EC50	48h	Crustacea	3.68mg/l	1
NOEC(ECx)	504h	Crustacea	0.03mg/l	1
LC50	96h	Fish	3mg/l	2

xylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
EC50	72h	Algae or other aquatic plants	4.6mg/l	2
EC50	48h	Crustacea	1.8mg/l	2
NOEC(ECx)	73h	Algae or other aquatic plants	0.44mg/l	2
LC50	96h	Fish	2.6mg/l	2

toluene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
NOEC(ECx)	168h	Crustacea	0.74mg/l	2
EC50	72h	Algae or other aquatic plants	12.5mg/L	4
EC50	48h	Crustacea	3.78mg/L	5
EC50	96h	Algae or other aquatic plants	>376.71mg/L	4
LC50	96h	Fish	5-35mg/l	4

methyl ethyl ketone

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	48h	Crustacea	308mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
LC50	96h	Fish	>324mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2

bisphenol A/ bisphenol A diglycidyl ether polymer

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

ethylbenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
EC50(ECx)	24h	Algae or other aquatic plants	0.02-938mg/L	4

	EC50	72h	Algae or other aquatic plants	2.4-9.8mg/L	4
	EC50	48h	Crustacea	1.37-4.4mg/l	4
	EC50	96h	Algae or other aquatic plants	1.7-7.6mg/L	4
	LC50	96h	Fish	3.381-4.075mg/L	4
Legend:	***Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data 8. User defined data***				

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For Aromatic Substances Series:
Environmental Fate: Large, molecularly complex polycyclic aromatic hydrocarbons, or PAHs, are persistent in the environment longer than smaller PAHs.
Atmospheric Fate: PAHs are 'semi-volatile substances" which can move between the atmosphere and the Earth's surface in repeated, temperature-driven cycles of deposition and volatilization. Terrestrial Fate: BTEX compounds have the potential to move through soil and contaminate ground water, and their vapors are highly flammable and explosive.
Ecotoxicity - Within an aromatic series, acute toxicity increases with increasing alkyl substitution on the aromatic nucleus. The order of most toxic to least in a study using grass shrimp and brown shrimp was dimethylnaphthalenes > methylnaphthalenes >naphthalenes. Anthrcene is a phototoxic PAH.
For bisphenol A and related bisphenols:
Environmental fate:
Biodegradability (28 d) 89% - Easily biodegradable
Bioconcentration factor (BCF) 7.8 mg/l
Bisphenol A, its derivatives and analogues, can be released from polymers, resins and certain substances by metabolic products
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII
As an environmental contaminant, bisphenol A interferes with nitrogen fixation at the roots of leguminous plants associated with the bacterial symbiont Sinorhizobium meliloti. Despite a half-life in the soil of only 1-10 days, its ubiquity makes it an important pollutant. According to Environment Canada, "initial assessment shows that at low levels, bisphenol A can harm fish and organisms over time. Studies also indicate that it can currently be found in municipal wastewater." However, a study conducted in the United States found that 91-98% of bisphenol A may be removed from water during treatment at municipal water treatment plants.
For 4-chlorobenzotrifluoride (PCBTF):
Environmental Fate:
Soil absorption is anticipated. This substance is relatively biodegradable and is not expected to bioaccumulate or bioconcentrate (BCF 120). It is insoluble in water; and water volatility may be high.
PCBTF is phytotoxic towards corn-root and potato disk cultures and inhibits root growth by disrupting the uptake of sulfate.
NTP Technical Report No. 14, NIH Publication 92-3133, July 1992 Study Scientists: C.W.
For Xylenes:
log Koc : 2.05-3.08; Koc : 25.4-204; Half-life (hr) air : 0.24-42; Half-life (hr) H2O surface water : 24-672; Half-life (hr) H2O ground : 336-8640; Half-life (hr) soil : 52-672; Henry's Pa m3 /mol : 637-879; Henry's atm m3 /mol - 7.68E-03; BOD 5 if unstated - 1.
for creosote:
As with other chemical mixtures, the fate and transport processes affecting creosote can be extremely complex. Creosote components may partition to the air, water, soil, or biota depending on their physical and chemical properties. Compounds initially released to the atmosphere may be deposited directly onto surface water, or may be carried by runoff containing soil-bound compounds. For coal tar creosote in old weathered materials, it is likely that virtually all the phenolic and heterocyclic fractions would have been volatilized, oxidized, or biodegraded, and the lighter fractions of the PAH materials will also have degraded. The remaining weathered creosote will have limited mobility and is likely to remain on-site.
Newly produced creosote, or materials from a spill or a more recent disposal site, may pose more serious toxicity concerns.
For Toluene:
log Kow : 2.1-3;
log Koc : 1.12-2.85;
Koc : 37-260;
log Kom : 1.39-2.89;
Half-life (hr) air : 2.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
4-chlorobenzotrifluoride	HIGH	HIGH
xylene	HIGH (Half-life = 360 days)	LOW (Half-life = 1.83 days)
toluene	LOW (Half-life = 28 days)	LOW (Half-life = 4.33 days)
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
ethylbenzene	HIGH (Half-life = 228 days)	LOW (Half-life = 3.57 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
coal tar pitch, high temperature	LOW (BCF = 0.13)
4-chlorobenzotrifluoride	LOW (BCF = 202)
xylene	MEDIUM (BCF = 740)
toluene	LOW (BCF = 90)
methyl ethyl ketone	LOW (LogKOW = 0.29)
ethylbenzene	LOW (BCF = 79.43)

Mobility in soil

Ingredient	Mobility
4-chlorobenzotrifluoride	LOW (KOC = 1912)
toluene	LOW (KOC = 268)
methyl ethyl ketone	MEDIUM (KOC = 3.827)

ethylbenzene	LOW (KOC = 517.8)

Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	• Containers may still present a chemical hazard/ danger when empty. • Return to supplier for reuse/ recycling if possible. Otherwise: • If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. • Where possible retain label warnings and SDS and observe all notices pertaining to the product. 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. • **DO NOT** allow wash water from cleaning or process equipment to enter drains. • It may be necessary to collect all wash water for treatment before disposal. • In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. • Where in doubt contact the responsible authority. • Recycle wherever possible. • Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. • Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material). • Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	

Shipping container, transport vehicle placarding, and labeling may vary from the below information. This depends on the quantity shipped, the applicability of excepted quantity requirements, limited quantity requirements, and/or special provisions according to US DOT, IATA and IMDG regulations. In case of reshipment, it is the responsibility of the shipper to determine the appropriate labels and markings in accordance with applicable transport regulations.

Land transport (DOT)

14.1. **UN number or ID number**	1993
14.2. **UN proper shipping name**	Flammable liquids, n.o.s. (contains 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone and ethylbenzene)
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Hazard Label: 3 Special provisions: IB2, T7, TP1, TP8, TP28 Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1993
14.2. **UN proper shipping name**	Flammable liquid, n.o.s. * (contains 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone and ethylbenzene)
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II

14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: A3 Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

14.1. **UN number**	1993
14.2. **UN proper shipping name**	FLAMMABLE LIQUID, N.O.S. (contains 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone and ethylbenzene)
14.3. **Transport hazard class(es)**	IMDG Class: 3 IMDG Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Marine Pollutant
14.6. **Special precautions for user**	EMS Number: F-E, S-E Special provisions: 274 Limited Quantities: 1 L

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
coal tar pitch, high temperature	Not Applicable
4-chlorobenzotrifluoride	Not Applicable
xylene	Not Applicable
toluene	Not Applicable
methyl ethyl ketone	Not Applicable
bisphenol A/ bisphenol A diglyci dyl ether polymer	Not Applicable
ethylbenzene	Not Applicable

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
coal tar pitch, high temperature	Not Applicable
4-chlorobenzotrifluoride	Not Applicable
xylene	Not Applicable
toluene	Not Applicable
methyl ethyl ketone	Not Applicable
bisphenol A/ bisphenol A diglyci dyl ether polymer	Not Applicable
ethylbenzene	Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

COAL TAR PITCH, HIGH TEMPERATURE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US OSHA Permissible Exposure Limits (PELs) Table Z-1
- US OSHA Permissible Exposure Limits (PELs) Table Z-3
- US ACGIH Threshold Limit Values (TLV)
- US NIOSH Recommended Exposure Limits (RELs)
- US DOE Temporary Emergency Exposure Limits (TEELs)
- US Clean Air Act - Hazardous Air Pollutants
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Flammables
- US - New Jersey Right to Know Hazardous Substances
- US - Massachusetts - Right To Know Listed Chemicals
- International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
- Chemical Footprint Project - Chemicals of High Concern List
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- US - California Proposition 65 - Carcinogens
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans
- US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List
- US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5
- US - Pennsylvania - Hazardous Substance List

4-CHLOROBENZOTRIFLUORIDE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US TSCA Section 4/12 (b) - Sunset Dates/Status
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
- US - California Proposition 65 - Carcinogens
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
- US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List

XYLENE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US CWA (Clean Water Act) - List of Hazardous Substances
- US OSHA Permissible Exposure Limits (PELs) Table Z-1
- US ACGIH Threshold Limit Values (TLV)
- Responsible Business Alliance Industry Focus Process Chemicals Policy (RBA IFPC Policy) - Table 1: Industry Focus Process Chemicals List
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
- US DOE Temporary Emergency Exposure Limits (TEELs)
- US Clean Air Act - Hazardous Air Pollutants
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Flammables
- US EPCRA Section 313 Chemical List
- US - New Jersey Right to Know Hazardous Substances
- US EPA Integrated Risk Information System (IRIS)
- US - Massachusetts - Right To Know Listed Chemicals
- US New York City Community Right-to-Know: List of Hazardous Substances
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants
- US EPA Pesticide Chemical Search - Conventional Chemical
- US EPA Pesticide Chemical Search - Antimicrobial
- US EPA Pesticide Chemical Search - Biopesticides
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
- US - Pennsylvania - Hazardous Substance List

TOLUENE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US CWA (Clean Water Act) - List of Hazardous Substances
- US OSHA Permissible Exposure Limits (PELs) Table Z-2
- US ACGIH Threshold Limit Values (TLV)
- US NIOSH Recommended Exposure Limits (RELs)
- Responsible Business Alliance Industry Focus Process Chemicals Policy (RBA IFPC Policy) - Table 1: Industry Focus Process Chemicals List
- EAEU Narcotic drugs, psychotropic substances and their precursors - II. Precursors of narcotic drugs and psychotropic substances - List II (Russian)
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
- US DOE Temporary Emergency Exposure Limits (TEELs)
- US Clean Air Act - Hazardous Air Pollutants
- US CWA (Clean Water Act) - Priority Pollutants
- US CWA (Clean Water Act) - Toxic Pollutants
- US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals
- US EPCRA Section 313 Chemical List
- US - New Jersey Right to Know Hazardous Substances
- US EPA Integrated Risk Information System (IRIS)
- US - Massachusetts - Right To Know Listed Chemicals
- US New York City Community Right-to-Know: List of Hazardous Substances
- Chemical Footprint Project - Chemicals of High Concern List
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants
- US - California Proposition 65 - Reproductive Toxicity
- US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
- US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List
- US EPA Pesticide Chemical Search - Conventional Chemical
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
- US - Pennsylvania - Hazardous Substance List

METHYL ETHYL KETONE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US OSHA Permissible Exposure Limits (PELs) Table Z-1
- US ACGIH Threshold Limit Values (TLV)
- US NIOSH Recommended Exposure Limits (RELs)
- EAEU Narcotic drugs, psychotropic substances and their precursors - II. Precursors of narcotic drugs and psychotropic substances - List II (Russian)
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
- US DOE Temporary Emergency Exposure Limits (TEELs)
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Flammables
- US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals
- US - New Jersey Right to Know Hazardous Substances
- US EPA Integrated Risk Information System (IRIS)
- US - Massachusetts - Right To Know Listed Chemicals
- US New York City Community Right-to-Know: List of Hazardous Substances
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants
- US - Pennsylvania - Hazardous Substance List

BISPHENOL A/ BISPHENOL A DIGLYCIDYL ETHER POLYMER IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US DOE Temporary Emergency Exposure Limits (TEELs)
- Chemical Footprint Project - Chemicals of High Concern List
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ETHYLBENZENE IS FOUND ON THE FOLLOWING REGULATORY LISTS

- US CWA (Clean Water Act) - List of Hazardous Substances
- US OSHA Permissible Exposure Limits (PELs) Table Z-1
- US ACGIH Threshold Limit Values (TLV)
- US NIOSH Recommended Exposure Limits (RELs)
- Responsible Business Alliance Industry Focus Process Chemicals Policy (RBA IFPC Policy) - Table 1: Industry Focus Process Chemicals List
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
- US DOE Temporary Emergency Exposure Limits (TEELs)
- US Clean Air Act - Hazardous Air Pollutants
- US CWA (Clean Water Act) - Priority Pollutants
- US CWA (Clean Water Act) - Toxic Pollutants
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
- US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Flammables
- US EPCRA Section 313 Chemical List
- US - New Jersey Right to Know Hazardous Substances
- US EPA Integrated Risk Information System (IRIS)

- US - Massachusetts - Right To Know Listed Chemicals
- US New York City Community Right-to-Know: List of Hazardous Substances
- Chemical Footprint Project - Chemicals of High Concern List
- US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
- US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants
- US - California Proposition 65 - Carcinogens
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
- US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List
- US - Pennsylvania - Hazardous Substance List

Additional Regulatory Information

Not Applicable

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Flammable (Gases, Aerosols, Liquids, or Solids)	Yes
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	Yes
Acute toxicity (any route of exposure)	No
Reproductive toxicity	Yes
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	Yes
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	Yes
Aspiration Hazard	No
Germ cell mutagenicity	Yes
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
xylene	100	45.4
toluene	1000	454
methyl ethyl ketone	5000	2270
methyl ethyl ketone	5000	2270
ethylbenzene	1000	454

Additional Federal Regulatory Information

Not Available

US. EPCRA SECTION 313 TOXIC RELEASE INVENTORY (TRI) (40 CFR 372)

This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know-Act of 1986 (40 CFR 372):

CAS No	%[weight]	Name
1330-20-7	1-10	xylene
108-88-3	1-10	toluene
100-41-4	<5	ethylbenzene

This information must be included in all SDSs that are copied and distributed for this material.

State Regulations

US. CALIFORNIA PROPOSITION 65

WARNING: This product can expose you to chemicals including **coal tar pitch, high temperature, 4-chlorobenzotrifluoride, ethylbenzene**, which are known to the State of California to cause cancer, and **toluene**, which is known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Additional State Regulatory Information

Not Available

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (coal tar pitch, high temperature, 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone, bisphenol A/ bisphenol A diglycidyl ether polymer, ethylbenzene)
China - IECSC	Yes
Colombia - Colombia National Industrial Chemicals Inventory	No (coal tar pitch, high temperature, 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone, bisphenol A/ bisphenol A diglycidyl ether polymer, ethylbenzene)
Europe - EINEC / ELINCS / NLP	No (bisphenol A/ bisphenol A diglycidyl ether polymer)
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	No (4-chlorobenzotrifluoride, bisphenol A/ bisphenol A diglycidyl ether polymer)
Vietnam - NCI	Yes
Russia - FBEPH	Yes
UAE - Control List (Banned/Restricted Substances)	No (coal tar pitch, high temperature, 4-chlorobenzotrifluoride, xylene, toluene, methyl ethyl ketone, bisphenol A/ bisphenol A diglycidyl ether polymer, ethylbenzene)
Legend:	***Yes = All CAS declared ingredients are on the inventory*** ***No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.***

SECTION 16 OTHER INFORMATION

Revision Date	03/09/2026
Initial Date	03/09/2026

SDS Version Summary

Version	Issue Date	Sections Updated
0.0	01/01/0001	

Other information

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.

The 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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