BNEM-M44C

High-Purity Standards

Chemwatch Hazard Alert Code: **4**

Catalogue number: **BNEM-M44C**
Version No: **2.2**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **06/05/2017**
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S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	BNEM-M44C
Synonyms	Not Available
Proper shipping name	Dichloromethane
Other means of identification	BNEM-M44C

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	High-Purity Standards
Address	PO Box 41727 SC 29423 United States
Telephone	843-767-7900
Fax	843-767-7906
Website	highpuritystandards.com
Email	Not Available

Emergency phone number

Association / Organisation	INFOTRAC
Emergency telephone numbers	1-800-535-5053
Other emergency telephone numbers	1-352-323-3500

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Acute Toxicity (Oral) Category 4, Aspiration Hazard Category 1, Skin Sensitizer Category 1, Germ cell mutagenicity Category 1B, Carcinogenicity Category 1A, Reproductive Toxicity Category 1B, Specific target organ toxicity - repeated exposure Category 1, Acute Aquatic Hazard Category 2, Chronic Aquatic Hazard Category 2, Flammable Liquid Category 3

Label elements

Hazard pictogram(s)	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H317	May cause an allergic skin reaction.

Continued...

H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.
H226	Flammable liquid and vapour.

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

Precautionary statement(s) Storage

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

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
95-50-1	0.1	1,2-dichlorobenzene
120-82-1	0.1	1,2,4-trichlorobenzene
541-73-1	0.1	1,3-dichlorobenzene
106-46-7	0.1	1,4-dichlorobenzene
91-58-7	0.1	2-chloronaphthalene
121-14-2	0.1	2,4-dinitrotoluene
606-20-2	0.1	2,6-dinitrotoluene
101-55-3	0.1	4-bromodiphenyl ether
7005-72-3	0.1	p-chlorodiphenyl oxide
83-32-9	0.1	acenaphthene
208-96-8	0.1	acenaphthylene
120-12-7	0.1	anthracene
103-33-3	0.1	azobenzene
56-55-3	0.1	benz[a]anthracene
50-32-8	0.1	benz[a]pyrene
205-99-2	0.1	benzo[b]fluoranthene
191-24-2	0.1	benzo[ghi]perylene
207-08-9	0.1	benzo[k]fluoranthene
108-60-1	0.1	bis(2-chloroisopropyl)ether
111-91-1	0.1	dichloroethyl formal
111-44-4	0.1	dichloroethyl ether
117-81-7	0.1	di-sec-octyl phthalate
85-68-7	0.1	butyl benzyl phthalate
218-01-9	0.1	chrysene
84-74-2	0.1	dibutyl phthalate
117-84-0	0.1	di-n-octyl phthalate
53-70-3	0.1	dibenz[a,h]anthracene
84-66-2	0.1	diethyl phthalate
131-11-3	0.1	dimethyl phthalate
206-44-0	0.1	fluoranthene
86-73-7	0.1	fluorene

Continued...

118-74-1	0.1	hexachlorobenzene
87-68-3	0.1	hexachlorobutadiene
77-47-4	0.1	hexachlorocyclopentadiene
67-72-1	0.1	hexachloroethane
193-39-5	0.1	indeno[1,2,3-cd]pyrene
78-59-1	0.1	isophorone
621-64-7	0.1	N-nitrosodi-n-propylamine
62-75-9	0.1	N-nitrosodimethylamine
86-30-6	0.1	N-nitrosodiphenylamine
91-20-3	0.1	naphthalene
98-95-3	0.1	nitrobenzene
85-01-8	0.1	phenanthrene
129-00-0	0.1	pyrene
75-09-2	Balance	methylene chloride
71-43-2	40	benzene
75-05-8	20	acetonitrile

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, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
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. ▸ 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.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

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]

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 cyanide intoxication (and for certain nitriles which produce cyanide ion)

- Signs symptoms of acute cyanide poisoning reflect cellular hypoxia and are often non-specific.
- Cyanosis may be a late finding.
- *A bradycardic*, hypertensive and tachypneic patient suggests poisoning especially if CNS and cardiovascular depression subsequently occurs.
- Immediate attention should be directed towards assisted ventilation, administration of 100% oxygen, insertion of intravenous lines and institution of cardiac monitoring.
- Obtain an arterial blood gas immediately and correct any severe metabolic acidosis (pH below 7.15).
- Mildly symptomatic patients generally require supportive care alone. Nitrites should not be given indiscriminately - in all cases of moderate to severe poisoning, they should be given in conjunction with thiosulfate. As a temporizing measure supply amyl nitrite perles (0.2ml inhaled 30 seconds every minute) until intravenous lines for sodium nitrite are established. 10 ml of a 3% solution is administered over 4 minutes to produce 20% methaemoglobin in adults. Follow directly with 50 ml of 25% sodium thiosulfate, at the same rate, IV. If symptoms reappear or persist within 1/2-1 hour, repeat nitrite and thiosulfate at 50% of initial dose. As the mode of action involves the metabolic conversion of the thiosulfate to thiocyanate, renal failure may enhance thiocyanate toxicity.
- Methylene blue is not an antidote. [Ellenhorn and Barceloux: Medical Toxicology]

If amyl nitrite intervention is employed then Medical Treatment Kits should contain the following:

- One box containing one dozen amyl nitrite ampoules
- Two sterile ampoules of sodium nitrite solution (10 mL of a 3% solution in each)

Continued...

- Two sterile ampoules of sodium thiosulfate solution (50 mL of a 25% solution in each)
- One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles. One tourniquet.
- One dozen gauze pads.
- Latex gloves
- A "Biohazard" bag for disposal of bloody/contaminated equipment.
- A set of cyanide instructions on first aid and medical treatment.

- Notes on the use of amyl nitrite:-
- AN is highly volatile and flammable - do not smoke or use around a source of ignition.
- If treating patient in a windy or draughty area provide some shelter or protection (shirt, wall, drum, cupped hand etc.) to prevent amyl nitrite vapour from being blown away. Keep ampoule upwind from the nose, the objective is to get amyl nitrite into the patients lungs.
- Rescuers should avoid AN inhalation to avoid becoming dizzy and losing competence.
- Lay the patient down. Since AN dilates blood vessels and lowers blood pressure, lying down will help keep patient conscious.
- **DO NOT** overuse - excessive use might put the patient into shock. Experience at DuPont plants has not shown any serious after-effects from treatment with amyl nitrite.

ADDITIONAL NOTES:
- Major medical treatment procedures may vary e.g. US (FDA method as recommended by DuPont) uses amyl nitrite as a methaemoglobin generator, followed by treatment with sodium nitrite and then sodium thiosulfate.

MODES OF ACTION: Amyl nitrite (AN) reacts with haemoglobin (HB) to form about 5% methaemoglobin (MHB). Sodium nitrite (NaNO2) reacts with haemoglobin to form approximately 20-30% methaemoglobin. Methaemoglobin attracts cyanide ions (CN) from tissue and binds with them to become cyanmethaemoglobin (CNMHB). Sodium thiosulfate (Na2S2O3) converts cyanmethaemoglobin to thiocyanate (HSCN) which is excreted by the kidneys. i.e. AN + HB = MHB NaNO2 + HB = MHB CN + MHB = CNMHB Na2S2O3 + CNMHB + O2 = HSCN
- The administration of the antidote salts is intravenous in normal saline, Ringers lactate or other available IV fluid.
- European practice may use 4-dimethylaminophenol (DMAP) as a methaemoglobin generator. Also hydroxycobalamin (Vitamin B12a) is used. Hydroxycobalamin works by reacting with cyanide to form cyanocobalamin (Vitamin B12) which is excreted in the urine.
- European and Australian NOHSC (ASCC) propose dicobalt edetate (Kelocyanor) as antidote. This acts by chelating cyanide to form stable cobalticyanide, which is excreted in the urine. In all cases hyperbaric therapy may increase the efficiency of a cyanide antidote kit.

for naphthalene intoxication: Naphthalene requires hepatic and microsomal activation prior to the production of toxic effects. Liver microsomes catalyse the initial synthesis of the reactive 1,2-epoxide intermediate which is subsequently oxidised to naphthalene dihydrodiol and alpha-naphthol. The 2-naphthoquinones are thought to produce haemolysis, the 1,2-naphthoquinones are thought to be responsible for producing cataracts in rabbits, and the glutathione-adducts of naphthalene-1,2-oxide are probably responsible for pulmonary toxicity. Suggested treatment regime:
- Induce emesis and/or perform gastric lavage with large amounts of warm water where oral poisoning is suspected.
- Instill a saline cathartic such as magnesium or sodium sulfate in water (15 to 30g).
- Demulcents such as milk, egg white, gelatin, or other protein solutions may be useful after the stomach is emptied but oils should be avoided because they promote absorption.
- If eyes/skin contaminated, flush with warm water followed by the application of a bland ointment.
- Severe anaemia, due to haemolysis, may require small repeated blood transfusions, preferably with red cells from a non-sensitive individual.
- Where intravascular haemolysis, with haemoglobinuria occurs, protect the kidneys by promoting a brisk flow of dilute urine with, for example, an osmotic diuretic such as mannitol. It may be useful to alkalinise the urine with small amounts of sodium bicarbonate but many researchers doubt whether this prevents blockage of the renal tubules.
- Use supportive measures in the case of acute renal failure. GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, 5th Ed.

compare PCB treatment regime:
Presentation:
- Acute symptoms related to overexposure to the PCBs and dioxins (PCDDs and PCDFs) include irritation of the skin, eyes and mucous membranes and nausea, vomiting and myalgias.
- After a latency period which may be prolonged (up to several weeks or more), chloracne, porphyria cutanea tarda, hirsutism, or hyper-pigmentation may occur. Elevated levels of hepatic transaminases and blood lipids may be found. Polyneuropathies with sensory impairment and lower-extremity motor weakness may also occur.
- Useful laboratory studies might include glucose, electrolytes, BUN, creatinine, liver transaminase, and liver function tests, and uroporphyrins (where porphyria is suspected)

Treatment:
- Emergency and Supportive Measures: Treat skin, eye and respiratory irritation symptomatically
- There is no specific antidote
- Decontamination: 1. Inhalation; remove victims from exposure and give supplemental oxygen if available. 2. Eyes and Skin: remove contaminated clothing and wash affected skin with copious soap and water; irrigate exposed eyes with copious tepid water or saline. 3. Ingestion; (a) Prehospital: Administer activated charcoal if available. Ipecac-induced vomiting may be useful for initial treatment at the scene if it can be given within a few minutes exposure (b) Hospital: Administer activated charcoal. Gastric emptying is not necessary if activated charcoal can be given promptly.
- Enhanced elimination: There is no known role for these procedures.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

Special hazards arising from the substrate 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	
Fire/Explosion Hazard	▸ Liquid and vapour are flammable. ▸ Moderate fire hazard when exposed to heat or flame. ▸ Vapour forms an explosive mixture with air. ▸ Moderate explosion hazard when exposed to heat or flame. ▸ 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 (CO2) carbon monoxide (CO) nitrogen oxides (NOx) other pyrolysis products typical of burning organic material.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Continued...

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. ▸ Collect residues in a flammable waste container.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by all means available, spillage from entering drains or water courses. ▸ Consider evacuation (or protect in place). ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Water spray or fog may be used to disperse / absorb vapour. ▸ Contain or absorb spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▸ If contamination of drains or waterways occurs, advise emergency services.

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ 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. ▸ Electrostatic discharge may be generated during pumping - this may result in fire. ▸ Ensure electrical continuity by bonding and grounding (earthing) all equipment. ▸ Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). ▸ Avoid splash filling. ▸ Do NOT use compressed air for filling discharging or handling operations. ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of overexposure 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 or ignition sources. ▸ Avoid generation of static electricity. ▸ **DO NOT** use plastic buckets. ▸ Earth all lines and equipment. ▸ Use spark-free tools when handling. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions. ▸ **DO NOT** allow clothing wet with material to stay in contact with skin
Other information	▸ Store in original containers in approved flammable liquid storage area. ▸ Store away from incompatible materials in a cool, dry, well-ventilated area. ▸ **DO NOT** store in pits, depressions, basements or areas where vapours may be trapped. ▸ No smoking, naked lights, heat or ignition sources. ▸ Storage areas should be clearly identified, well illuminated, clear of obstruction and accessible only to trained and authorised personnel - adequate security must be provided so that unauthorised personnel do not have access. ▸ Store according to applicable regulations for flammable materials for storage tanks, containers, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances. ▸ Use non-sparking ventilation systems, approved explosion proof equipment and intrinsically safe electrical systems. ▸ Have appropriate extinguishing capability in storage area (e.g. portable fire extinguishers - dry chemical, foam or carbon dioxide) and flammable gas detectors. ▸ Keep adsorbents for leaks and spills readily available. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. In addition, for tank storages (where appropriate): ▸ Store in grounded, properly designed and approved vessels and away from incompatible materials. ▸ For bulk storages, consider use of floating roof or nitrogen blanketed vessels; where venting to atmosphere is possible, equip storage tank vents with flame arrestors; inspect tank vents during winter conditions for vapour/ ice build-up.

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- Storage tanks should be above ground and diked to hold entire contents.

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

Dichloroethyl ether:

- tends to form unstable peroxides on standing; elevated temperatures can cause explosive polymerisation.
- is a strong reducing agent which reacts violently with oxidisers, chlorosulfonic acid, metal powders, permanganates, peroxides, ammonium persulfate, bromine dioxide, strong acids, sulfuric acid and nitric acid, acyl halides.
- produces hydrochloride fumes on contact with water
- is incompatible with aluminium, copper, iron, mild steel, epoxy coatings, some plastics and rubber .

Acetonitrile

- forms cyanide gas on contact with steam
- reacts violently with oxidisers such as chlorine, bromine, fluorine; with chlorosulfonic acid, oleum or sulfuric acid
- is incompatible with water (especially if acid or alkaline), acids, caustics, nitrating agents, indium, nitrogen tetroxide , sulfur trioxide, iron(III) salts of perchlorate, nitrogen fluoride compounds
- attacks most rubber and plastics
- may accumulate electrical charges, causing ignition of vapours
- Contact with acids produces toxic fumes
- Nitriles may polymerise in the presence of metals and some metal compounds.
- They are incompatible with acids; mixing nitriles with strong oxidising acids can lead to extremely violent reactions.
- Nitriles are generally incompatible with other oxidising agents such as peroxides and epoxides.
- The combination of bases and nitriles can produce hydrogen cyanide. Nitriles are hydrolysed exothermally in both aqueous acid and base to give carboxylic acids (or salts of carboxylic acids).
- Nitriles can react vigorously with reducing agents.
- The covalent cyano group is endothermic and many organic nitriles are reactive under certain conditions; N-cyano derivatives are reactive or unstable.
- The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.
- Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.

BRETHERICK L.: Handbook of Reactive Chemical Hazards

WARNING:

May decompose violently or explosively on contact with other substances.

- This substance, or one of its components, is one of the relatively few compounds which are described as "endothermic" i.e. heat is absorbed into the compound, rather than released from it, during its formation.
- The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.
- Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.

BRETHERICK L.: Handbook of Reactive Chemical Hazards

- 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.

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.
- Alkali metals accelerate the oxidation while CO2 as co-oxidant enhances the selectivity.
- Microwave conditions give improved yields of the oxidation products.
- Photo-oxidation products may occur following reaction with hydroxyl radicals and NOx - these may be components of photochemical smogs.

Oxidation of Alkylaromatics: T.S.S Rao and Shubhra Awasthi: E-Journal of Chemistry Vol 4, No. 1, pp 1-13 January 2007

Benzene:

- reacts violently with iodine pentafluoride.
- hydrogenation to cyclohexane was effected in a fixed bed reactor at 210-230 deg C, but a fall in conversion was apparent; increasing the bed temp by 10 deg C and the hydrogen flow led to a large increase in reaction rate which the interbed cooling coils could not handle; an exotherm to 280 deg C developed, with a hot spot around 600 deg C which bulged the reactor wall.
- ignites in contact with iodine heptafluoride gas
- ignition may occur following addition of a small particle of dioxygenyl tetrafluoroborate (a very powerful oxidant) to small samples at ambient temp caused/ ignition.
- ignites at -78 deg C following addition of a 2% solution dioxygen difluoride in hydrogen fluoride
- ignites following simultaneous contact of sodium peroxide with benzene . (equivalent to contact with concentrated hydrogen peroxide).
- interaction with uranium hexafluoride is very vigorous, with separation of carbon
- ignites in contact with powdered chromic anhydride.
- inadvertent mixture with chlorine vapours is explosive and initiated by light.
- reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, oxygen (liquid), ozone, silver perchlorate.
- may repeatedly explode following interaction of the pentafluoride and methoxide from arsenic pentafluoride & potassium methoxide
- vapour may cause an spontaneously explosive reaction of diborane.
- forms solid complexes with silver perchlorate; a sample of the benzene complex exploded violently on crushing in a mortar.
- interaction of nitryl perchlorate gave a slight explosion and flash.
- contact with a solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid, is potentially explosive

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- may produce uncontrollable violent reaction following large-scale addition of too-cold nitrating acid without agitation followed by stirring; the vapour-air mixture produced was ignited by interaction of benzene and nitric acid at 100-170 deg C and caused an extremely violent explosion.
- may be explosive reactive followed uncontrolled addition of peroxodisulfuric acid (a very powerful oxidant)
- mixtures with liquid oxygen are specifically described as explosive.
- solutions with rubber may be explosive during ozonation -- this seems unlikely to be due to formation of benzene triozonide (which separates as a gelatinous precipitate after prolonged ozonization), since the solution remained clear; rubber ozonide may have been involved, but the benzene-oxygen system itself has high potential for hazard.
- mixtures with peroxomonosulfuric acid are explosive
- may explode following recystallisation of certain metal perchlorates
- may produce vigorous or incandescent reaction with hydrogen + Raney nickel (above 210 deg C) . and bromine trifluoride.
- can react vigorously with oxidizing materials, such as CrO_3, oxygen, $NClO_4$, ozone, perchlorates, ($AlCl_3$ + $FClO_4$), (sulfuric acid + permanganates), K_2O_2, ($AgClO_4$ + acetic acid)
- explodes on contact with diborane, bromine pentafluoride, permanganic acid, peroxomonosulfuric acid, and peroxodisulfuric acid.
- forms sensitive, explosive mixtures with iodine pentafluoride, silver perchlorate, nitryl perchlorate, nitric acid, liquid oxygen, ozone, arsenic pentafluoride + potassium methoxide (explodes above 30 deg C).
- is a moderate explosion hazard when exposed to heat or flame

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 Levels (PELs) - Table Z1	1,2-dichlorobenzene	o-Dichlorobenzene	25 ppm	50 ppm	300 mg/m3 / 50 ppm	TLV® Basis: URT & eye irr; liver dam
US NIOSH Recommended Exposure Limits (RELs)	1,2-dichlorobenzene	o-DCB; 1,2-Dichlorobenzene; ortho-Dichlorobenzene; o-Dichlorobenzol	Not Available	Not Available	300 mg/m3 / 50 ppm	Not Available
US ACGIH Threshold Limit Values (TLV)	1,2-dichlorobenzene	o-Dichlorobenzene	Not Available	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	1,2,4-trichlorobenzene	unsym-Trichlorobenzene; 1,2,4-Trichlorobenzol	Not Available	Not Available	40 mg/m3 / 5 ppm	TLV® Basis: Eye & URT irr
US ACGIH Threshold Limit Values (TLV)	1,2,4-trichlorobenzene	1, 2, 4-Trichlorobenzene	Not Available	Not Available	5 ppm	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	1,4-dichlorobenzene	p-Dichlorobenzene	450 mg/m3 / 75 ppm	Not Available	Not Available	Ca See Appendix A
US NIOSH Recommended Exposure Limits (RELs)	1,4-dichlorobenzene	p-DCB; 1,4-Dichlorobenzene; para-Dichlorobenzene; Dichlorocide	10 ppm	Not Available	Not Available	TLV® Basis: Eye irr; kidney dam
US ACGIH Threshold Limit Values (TLV)	1,4-dichlorobenzene	p-Dichlorobenzene	Not Available	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	benz[a]anthracene	Benz[a]anthracene	Not Available	Not Available	Not Available	TLV® Basis: Skin cancer; BEIP
US ACGIH Threshold Limit Values (TLV)	benz[a]pyrene	Benzo[a]pyrene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BEIp
US ACGIH Threshold Limit Values (TLV)	benzo[b]fluoranthene	Benzo[b]fluoranthene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BEIp
US OSHA Permissible Exposure Levels (PELs) - Table Z1	dichloroethyl ether	Dichloroethyl ether	30 mg/m3 / 5 ppm	60 mg/m3 / 10 ppm	90 mg/m3 / 15 ppm	Ca See Appendix A
US NIOSH Recommended Exposure Limits (RELs)	dichloroethyl ether	bis(2-Chloroethyl)ether; 2,2'-Dichlorodiethyl ether, 2,2'-Dichloroethyl ether	5 ppm	10 ppm	Not Available	TLV® Basis: URT & eye irr; nausea
US ACGIH Threshold Limit Values (TLV)	dichloroethyl ether	Dichloroethyl ether	Not Available	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	di-sec-octyl phthalate	Di-sec octyl phthalate (Di-(2-ethylhexyl) phthalate)	5 mg/m3	10 mg/m3	Not Available	Ca See Appendix A
US NIOSH Recommended Exposure Limits (RELs)	di-sec-octyl phthalate	DEHP, Di(2-ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)phthalate, Octyl phthalate	5 mg/m3	Not Available	Not Available	TLV® Basis: LRT irr
US ACGIH Threshold Limit Values (TLV)	di-sec-octyl phthalate	Di(2-ethylhexyl)phthalate	5 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	chrysene	Chrysene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BEIp
US OSHA Permissible Exposure Levels (PELs) - Table Z1	dibutyl phthalate	Dibutyl phthalate	5 mg/m3	Not Available	Not Available	TLV® Basis: Testicular dam; eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	dibutyl phthalate	DBP; Dibutyl-1,2-benzene-dicarboxylate; Di-n-butyl phthalate	5 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	dibutyl phthalate	Dibutyl phthalate	5 mg/m3	Not Available	Not Available	Not Available

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US NIOSH Recommended Exposure Limits (RELs)	diethyl phthalate	DEP, Diethyl ester of phthalic acid, Ethyl phthalate	5 mg/m3	Not Available	Not Available	TLV® Basis: URT irr
US ACGIH Threshold Limit Values (TLV)	diethyl phthalate	Diethyl phthalate	5 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	dimethyl phthalate	Dimethylphthalate	5 mg/m3	Not Available	Not Available	TLV® Basis: Eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	dimethyl phthalate	Dimethyl ester of 1,2-benzenedicarboxylic acid; DMP	5 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	dimethyl phthalate	Dimethyl phthalate	5 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	hexachlorobenzene	Hexachlorobenzene	0.002 mg/m3	Not Available	Not Available	TLV® Basis: Porphyrin eff; skin dam; CNS impair
US NIOSH Recommended Exposure Limits (RELs)	hexachlorobutadiene	HCBD; Hexachloro-1,3-butadiene; 1,3-Hexachlorobutadiene; Perchlorobutadiene	0.24 mg/m3 / 0.02 ppm	Not Available	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	hexachlorobutadiene	Hexachlorobutadiene	0.02 ppm	Not Available	Not Available	TLV® Basis: Kidney dam
US NIOSH Recommended Exposure Limits (RELs)	hexachlorocyclopentadiene	HCCPD; Hexachloro-1,3-cyclopentadiene; 1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene; Perchlorocyclopentadiene	0.1 mg/m3 / 0.01 ppm	Not Available	Not Available	TLV® Basis: URT irr
US ACGIH Threshold Limit Values (TLV)	hexachlorocyclopentadiene	Hexachlorocyclopentadiene	0.01 ppm	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	hexachloroethane	Hexachloroethane	10 mg/m3 / 1 ppm	Not Available	Not Available	Ca See Appendix A See Appendix C (Chloroethanes)
US NIOSH Recommended Exposure Limits (RELs)	hexachloroethane	Carbon hexachloride, Ethane hexachloride, Perchloroethane	10 mg/m3 / 1 ppm	Not Available	Not Available	TLV® Basis: Liver & kidney dam
US ACGIH Threshold Limit Values (TLV)	hexachloroethane	Hexachloroethane	1 ppm	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	isophorone	Isophorone	140 mg/m3 / 25 ppm	Not Available	5 ppm	TLV® Basis: Eye & URT irr; CNS impair; malaise; fatigue
US NIOSH Recommended Exposure Limits (RELs)	isophorone	Isoacetophorone; 3,5,5-Trimethyl-2-cyclohexenone; 3,5,5-Trimethyl-2-cyclo-hexen-1-one	23 mg/m3 / 4 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	isophorone	Isophorone	Not Available	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	N-nitrosodimethylamine	N-Nitrosodimethylamine	Not Available	Not Available	Not Available	see 1910.1016
US NIOSH Recommended Exposure Limits (RELs)	N-nitrosodimethylamine	Dimethylnitrosamine; N,N-Dimethylnitrosamine; DMNA; N-Methyl-N-nitroso-methanamine; NDMA; N-Nitroso-N,N-dimethylamine	Not Available	Not Available	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	N-nitrosodimethylamine	N-Nitrosodimethylamine	Not Available	Not Available	Not Available	TLV® Basis: Liver & kidney cancer; liver dam
US OSHA Permissible Exposure Levels (PELs) - Table Z1	naphthalene	Naphthalene	50 mg/m3 / 10 ppm	75 mg/m3 / 15 ppm	Not Available	TLV® Basis: URT irr; cataracts; hemolytic anemia
US NIOSH Recommended Exposure Limits (RELs)	naphthalene	Naphthalin, Tar camphor, White tar	50 mg/m3 / 10 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	naphthalene	Naphthalene	10 ppm	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	nitrobenzene	Nitrobenzene	5 mg/m3 / 1 ppm	Not Available	Not Available	[skin]
US NIOSH Recommended Exposure Limits (RELs)	nitrobenzene	Essence of mirbane, Nitrobenzol, Oil of mirbane	5 mg/m3 / 1 ppm	Not Available	Not Available	TLV® Basis: MeHb-emia
US ACGIH Threshold Limit Values (TLV)	nitrobenzene	Nitrobenzene	1 ppm	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	methylene chloride	Methylene chloride	50 ppm	Not Available	Not Available	See Table Z-2
US OSHA Permissible Exposure Levels (PELs) - Table Z2	methylene chloride	Methylene Chloride	Not Available	Not Available	Not Available	See 1919.52.
US NIOSH Recommended Exposure Limits (RELs)	methylene chloride	Dichloromethane, Methylene dichloride	Not Available	Not Available	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	methylene chloride	Dichloromethane	Not Available	Not Available	Not Available	TLV® Basis: COHb-emia; CNS impair; BEI

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US OSHA Permissible Exposure Levels (PELs) - Table Z1	benzene	Benzene	1 ppm	5 ppm	25 ppm	see 1910.1028 (See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028d)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	benzene	Benzene	10 ppm	1 ppm	Not Available	This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028;(Z37.40–1969)
US NIOSH Recommended Exposure Limits (RELs)	benzene	Benzol, Phenyl hydride	0.1 ppm	2.5 ppm	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	benzene	Benzene	0.5 ppm	Not Available	Not Available	TLV® Basis: Leukemia; BEI
US OSHA Permissible Exposure Levels (PELs) - Table Z1	acetonitrile	Acetonitrile	70 mg/m3 / 40 ppm	Not Available	Not Available	TLV® Basis: LRT irr
US NIOSH Recommended Exposure Limits (RELs)	acetonitrile	Cyanomethane, Ethyl nitrile, Methyl cyanide [Note: Forms cyanide in the body.]	34 mg/m3 / 20 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	acetonitrile	Acetonitrile	20 ppm	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
1,2-dichlorobenzene	Dichlorobenzene, o-	50 ppm	170 ppm	1,000 ppm
1,2,4-trichlorobenzene	Trichlorobenzene, 1,2,4-	0.45 ppm	5 ppm	20 ppm
1,3-dichlorobenzene	Dichlorobenzene, m-	6 ppm	66 ppm	400 ppm
1,4-dichlorobenzene	Dichlorobenzene, p-	30 ppm	170 ppm	1,000 ppm
2-chloronaphthalene	Chloronaphthalene, 2-; (beta-Chloronaphthalene)	6.2 mg/m3	69 mg/m3	410 mg/m3
2,4-dinitrotoluene	Dinitrotoluene, 2,4-	0.6 mg/m3	12 mg/m3	200 mg/m3
2,6-dinitrotoluene	Dinitrotoluene, 2,6-	0.6 mg/m3	47 mg/m3	200 mg/m3
4-bromodiphenyl ether	Bromophenyl phenyl ether, 4-	0.33 mg/m3	3.6 mg/m3	21 mg/m3
p-chlorodiphenyl oxide	Chlorophenyl phenyl ether, 4-	1.5 mg/m3	35 mg/m3	210 mg/m3
acenaphthene	Acenaphthene	3.6 mg/m3	40 mg/m3	240 mg/m3
acenaphthylene	Acenaphthylene	10 mg/m3	110 mg/m3	660 mg/m3
anthracene	Anthracene	48 mg/m3	530 mg/m3	3,200 mg/m3
benz[a]anthracene	Benzo(a)anthracene	1.2 mg/m3	13 mg/m3	79 mg/m3
benz[a]pyrene	Benzo(a)pyrene; (Coal tar pitch volatiles)	0.6 mg/m3	120 mg/m3	700 mg/m3
benzo[b]fluoranthene	Benz(e)acephenanthrylene; (Benzo(b)fluoroanthene)	0.12 mg/m3	1.3 mg/m3	7.9 mg/m3
benzo[ghi]perylene	Benzo(ghi)perylene	30 mg/m3	330 mg/m3	2,000 mg/m3
bis(2-chloroisopropyl)ether	Dichloroisopropyl ether	0.15 ppm	1.6 ppm	22 ppm
dichloroethyl formal	Dichloromethoxy ethane; (bis(2-Chloroethoxy)methane)	0.04 ppm	0.44 ppm	2.7 ppm
dichloroethyl ether	Dichloroethyl ether; (1,1'-Oxybis(2-chloro)ethane; Bis(2-chloroethyl)ether)	10 ppm	25 ppm	250 ppm
di-sec-octyl phthalate	Di-sec-octylphthalate	10 mg/m3	86 mg/m3	5,900 mg/m3
butyl benzyl phthalate	Phthalic acid, benzyl butyl ester; (Benzyl butyl phthalate)	15 mg/m3	77 mg/m3	460 mg/m3
chrysene	Chrysene	0.6 mg/m3	12 mg/m3	69 mg/m3
dibutyl phthalate	Dibutyl phthalate	15 mg/m3	84 mg/m3	9300 mg/m3
di-n-octyl phthalate	Dioctyl phthalate, n-	41 mg/m3	450 mg/m3	11000 mg/m3
dibenz[a,h]anthracene	Dibenza(a,h)anthracene	0.093 mg/m3	1 mg/m3	2.9 mg/m3
diethyl phthalate	Diethyl phthalate; (Ethyl phthalate)	15 mg/m3	240 mg/m3	1,700 mg/m3
dimethyl phthalate	Dimethylphthalate	15 mg/m3	1,600 mg/m3	9300 mg/m3
fluoranthene	Fluoranthene	4.1 mg/m3	45 mg/m3	400 mg/m3
fluorene	Fluorene, 9H-	6.6 mg/m3	72 mg/m3	430 mg/m3
hexachlorobenzene	Hexachlorobenzene	0.006 mg/m3	14 mg/m3	91 mg/m3
hexachlorobutadiene	Hexachlorobutadiene	Not Available	Not Available	Not Available
hexachlorocyclopentadiene	Hexachlorocylopentadiene	0.03 ppm	0.55 ppm	1 ppm
hexachloroethane	Hexachloroethane	3 ppm	36 ppm	300 ppm
indeno[1,2,3-cd]pyrene	Indeno(1,2,3-cd)pyrene	1.2 mg/m3	13 mg/m3	79 mg/m3
isophorone	Isophorone	12 ppm	33 ppm	200 ppm
N-nitrosodi-n-propylamine	Nitrosodipropylamine; (DPNA)	5.6 mg/m3	62 mg/m3	95 mg/m3
N-nitrosodimethylamine	Nitrosodimethylamine	0.082 mg/m3	0.9 mg/m3	10 mg/m3
N-nitrosodiphenylamine	Diphenylnitrosamine	5.5 mg/m3	60 mg/m3	360 mg/m3
naphthalene	Naphthalene	15 ppm	83 ppm	500 ppm
nitrobenzene	Nitrobenzene	3 ppm	20 ppm	200 ppm

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phenanthrene	Phenanthrene	2.1 mg/m3	23 mg/m3	360 mg/m3
pyrene	Pyrene	0.15 mg/m3	1.7 mg/m3	7.5 mg/m3
methylene chloride	Methylene chloride; (Dichloromethane)	Not Available	Not Available	Not Available
benzene	Benzene	Not Available	Not Available	Not Available
acetonitrile	Acetonitrile	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
1,2-dichlorobenzene	1,000 ppm	200 ppm
1,2,4-trichlorobenzene	Not Available	Not Available
1,3-dichlorobenzene	Not Available	Not Available
1,4-dichlorobenzene	1,000 ppm	150 ppm
2-chloronaphthalene	Not Available	Not Available
2,4-dinitrotoluene	200 mg/m3	50 mg/m3
2,6-dinitrotoluene	200 mg/m3	50 mg/m3
4-bromodiphenyl ether	Not Available	Not Available
p-chlorodiphenyl oxide	Not Available	Not Available
acenaphthene	Not Available	Not Available
acenaphthylene	Not Available	Not Available
anthracene	Not Available	Not Available
azobenzene	Not Available	Not Available
benz[a]anthracene	Not Available	Not Available
benz[a]pyrene	Not Available	Not Available
benzo[b]fluoranthene	Not Available	Not Available
benzo[ghi]perylene	Not Available	Not Available
benzo[k]fluoranthene	Not Available	Not Available
bis(2-chloroisopropyl)ether	Not Available	Not Available
dichloroethyl formal	Not Available	Not Available
dichloroethyl ether	250 ppm	100 ppm
di-sec-octyl phthalate	Unknown mg/m3 / Unknown ppm	5,000 mg/m3
butyl benzyl phthalate	Not Available	Not Available
chrysene	Not Available	Not Available
dibutyl phthalate	9,300 mg/m3	4,000 mg/m3
di-n-octyl phthalate	Not Available	Not Available
dibenz[a,h]anthracene	Not Available	Not Available
diethyl phthalate	Not Available	Not Available
dimethyl phthalate	9,300 mg/m3	2,000 mg/m3
fluoranthene	Not Available	Not Available
fluorene	Not Available	Not Available
hexachlorobenzene	Not Available	Not Available
hexachlorobutadiene	Not Available	Not Available
hexachlorocyclopentadiene	Not Available	Not Available
hexachloroethane	300 ppm	300 [Unch] ppm
indeno[1,2,3-cd]pyrene	Not Available	Not Available
isophorone	800 ppm	200 ppm
N-nitrosodi-n-propylamine	Not Available	Not Available
N-nitrosodimethylamine	Not Available	Not Available
N-nitrosodiphenylamine	Not Available	Not Available
naphthalene	500 ppm	250 ppm
nitrobenzene	200 ppm	200 [Unch] ppm
phenanthrene	Not Available	Not Available
pyrene	Not Available	Not Available
methylene chloride	10,000 ppm	2,000 ppm
benzene	3,000 ppm	500 ppm
acetonitrile	4,000 ppm	500 ppm

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

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	"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. Employers may need to use multiple types of controls to prevent employee overexposure. ▸ Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area. ▸ Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system. ▸ Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within. ▸ Open-vessel systems are prohibited. ▸ Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation. ▸ Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system. ▸ 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. ▸ Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas). ▸ Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air. ▸ Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 0.76 m/sec with a minimum of 0.64 m/sec. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ 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. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber **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. Application of a non-perfumed moisturizer is recommended. 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. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential 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. for acetonitrile: Butyl rubber, PVAL, Teflon, Saranex, Silvershield, Viton/ chlorobutyl are all highly resistant to permeation
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.

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	▸ 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. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return.
Thermal hazards	Not Available

Respiratory protection

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.
Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	A-AUS / Class 1	-
up to 50	1000	-	A-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	A-2
up to 100	10000	-	A-3
100+		-	Airline**

* - Continuous Flow
** - Continuous-flow or positive pressure demand.
A(All classes) = Organic vapours, B AUS or B1 = Acid gases, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 deg C)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colourless

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	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

Continued...

Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic 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. Inhalation of dichloroethyl ether vapour causes irritation and injury to the cells of the airway lining. In humans, a concentration of 0.055% or more causes extreme irritation and cannot be tolerated for more than a few moments. 0.026% is highly irritating but is tolerable for brief periods. Irritation is mild at 0.01% and minimal at 0.0035%. Animal testing showed that high concentrations damage the lung, liver, kidneys and brain, and delayed death is a result of lung damage. The symptoms of exposure to high vapour concentrations of benzene include confusion, dizziness, tightening of the leg muscles and pressure over the forehead followed by a period of excitement. If exposure continues, the casualty quickly becomes stupefied and lapses into a coma with narcosis. 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. 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. The inhalation of dioxins may produce respiratory tract irritation, headache, dizziness, nausea and vomiting, fatigue, sleep difficulties, sexual dysfunction, and intolerance to cold. Muscular pains and weakness may be present as well as behavioural disturbances. Inhalation of naphthalene vapour is linked with headache, loss of appetite, nausea, damage to the eyes and kidneys. According to animal testing, long term exposure may cause excessive weakness and increased salivation, weight loss,difficulty breathing, collapse, and evidence of damage to the skin, liver and lungs.
Ingestion	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. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) Dioxin TCDD has been associated with a range of toxic effects. These include loss of body fat, inflammation of the eyelids, kidney damage, depression, loss of hair and nails, anaemia, decreased cholesterol and increased triglycerides, and degeneration of the thymus glands. The toxicity of phthalates is not excessive due to slow oral absorption and metabolism. Absorption is affected by fat in the diet. Repeated doses can cause cumulative toxic effects, and symptoms include an enlarged liver which often reverses if exposure is maintained. Carbohydrate metabolism is disrupted, and cholesterol and triglyceride levels in the blood falls. In rats, there is also strong evidence of withering of the testicles. Some phthalates can increase the effects of antibiotics, thiamine (vitamin B1) and sulfonamides. Ingestion of naphthalene and related compounds may produce abdominal cramps with nausea, vomiting, diarrhoea, headache, profuse sweating, listlessness, confusion, and in severe poisonings, coma with or without convulsions. Irritation of the bladder may also occur, producing urgency, painful urination, and the passage of brown or black urine with or without albumin or casts.
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. Skin absorption of TCDD may result in redness and swelling, followed by acne. Exposure to the material may result in a skin inflammation called chloracne. This is characterised by white- and blackheads, keratin cysts, spots, excessive discolouration. Workers sensitised to naphthalene and related compounds show an inflammation of the skin with scaling and reddening. Some individuals show an allergic reaction. 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.
Eye	This material can cause eye irritation and damage in some persons. Direct eye contact with dichloroethyl ether causes moderate pain, irritation of the conjunctiva and injury to the cornea which generally heals within a day. Immediate flushing of the eye limits the damage. Application of dioxins to the eye may produce irritation, inflammation of eyelids and conjunctiva, and irritation of other mucous membranes. Long term exposure to naphthalene has produced clouding of the lens (cataracts) in workers.
Chronic	Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. 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. 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. Toxic: danger of serious damage to health by prolonged exposure through inhalation. 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 from experimentation that reduced human fertility is directly caused by exposure to the material. Dichloroethyl ether possibly causes effects similar to carbon tetrachloride. Exposure to large amounts or repeated exposure may cause liver and kidney injury. In animal studies, liver cancer occurred with long-term administration by mouth. A low incidence of sarcomas occurred at the site of injection if given in this method under the skin. Exposure to PHAHs, including TCDD, can result in acne, fatigue, decreased libido, sleep trouble, loss of appetite and weight and sensory dysfunction. Skin changes are also possible including pigmentation disorders and excess hair growth. Exposure to polychlorinated biphenyls (PCBs) over a long time can cause eczema and internal effects; various systems may be affected. On the skin, there may be thickening, swelling of the eyelids, feet and hands, itchy red eruptions, discolouration of nails and changes in hair follicles, hair loss, acne, eye discharge, and discolouration of the oral cavity. Animal testing indicates that inhalation of naphthalene may increase the incidence of respiratory tumours and may aggravate chronic inflammation. 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.

BNEM-M44C	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
1,2-dichlorobenzene	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: 500 mg/kgd[2]	Eye(rabbit):100mg/30s rinse-mild

Continued...

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*

1,2-DICHLOROBENZENE	Diffuse and zonal hepatocellular necrosis, lachrymation, general anaesthesia, paternal effects, specific developmental anormalities (musculoskeletal sysytem) recorded.
1,2,4-TRICHLOROBENZENE	Trichlorobenzenes (TCBs) are moderately toxic if swallowed or inhaled. Altered sleep times, somnolence, convulsions, ataxia, maternal effects, effects on embryo, foetotoxicity, foetolethality recorded.
1,4-DICHLOROBENZENE	Eye effects, respiratory tract changes, diarrhoea, specific developmental effects (cardiovascular system) recorded.
2-CHLORONAPHTHALENE	for polychlorinated naphthalenes (PCN): Chlorinated naphthalenes can be absorbed via oral, inhalative, and dermal routes, with absorption and distribution over the whole body after oral administration.
2,6-DINITROTOLUENE	Oral (rat) TDLo: 13500 mg/kg/90D-I
4-BROMODIPHENYL ETHER	For monobromodiphenyl ether (MBDE): MBDE does not appear to cause reproductive toxicity, birth defects or harm to the embryo.
ANTHRACENE	Oral (rat) TDLo: 20000 m g/kg/79w -I Skin (mouse): 0.118 mg - mild Equivocal tumorigen by RTECS criteria
AZOBENZENE	WARNING: Azobenzene has shown carcinogenicity and mutagenic activity in non human test systems and because of its potential to be metabolised to benzidine, azobenzene should be considered hazardous to human health.
BENZO[B]FLUORANTHENE	Lung, kidney, skin tumors and tumors at site of application recorded.
BENZO[K]FLUORANTHENE	Tumours at site of application.
BIS(2-CHLOROISOPROPYL)ETHER	Iritis, dyspnea, liver changes, changes in spleen, reproductive system tumours recorded.
DICHLOROETHYL ETHER	For dichloroethyl ether: One fatal case in humans due to inhaling BCEE has occurred but no details were provided. .
DI-SEC-OCTYL PHTHALATE	Di-sec-octyl phthalate (DEHP) in animal testing has not been shown to be acutely toxic when swallowed. Oral (rat) NOAEL: 28.9-36.1 mg/kg/day Gastrointestinal changes, respiratory system changes, somnolence, haemorrhage, necrotic changes in GI tract, lowered blood pressure, liver, endocrine tumours, foetotoxicity, paternal effects, maternal effects, specific developmental abnormalities (hepatobiliary system, musculoskeletal system, cardiovascular system, urogenital system, central nervous system, eye/ear), foetolethality recorded.
BUTYL BENZYL PHTHALATE	For benzyl butyl phthalate (BBP): Repeat dose toxicity: Animal studies show that BBP may affect the pancreas, kidney, liver and blood, and the testes at higher doses. Reproductive effector in rats.
CHRYSENE	Target organs in include skin (tumours at site of application).
DIBUTYL PHTHALATE	For dibutyl phthalate (DBP): In studies on rats, DBP is absorbed through the skin, although studies have shown human skin is less permeable.
DI-N-OCTYL PHTHALATE	High Molecular Weight Phthalate Esters (HMWPEs) Category The HMWPE group includes chemically similar substances produced from alcohols.
DIETHYL PHTHALATE	When diethyl phthalate is applied to the skin, it is widely distributed in the body but it does not accumulate in tissue.
DIMETHYL PHTHALATE	For low molecular weight phthalate esters) **Acute toxicity:** Dimethyl phthalate (DMP) and diethyl phthalate (DEP) exhibit low acute toxicity by oral, dermal and inhalation routes of exposure.
FLUORANTHENE	Equivocal tumorigen bt RTECS criteria. Tumors at site of application recorded.
HEXACHLOROBENZENE	Side-reactions during manufacture of the parent compound may result in the production of trace amounts of polyhalogenated aromatic hydrocarbon(s). Polyhalogenated aromatic hydrocarbons (PHAHs) can cause effects on hormones and mimic thyroid hormone. Neoplastic by RTEC criteria Carcinogenic by RTEC criteria
HEXACHLOROBUTADIENE	Somnolence, irritability, effects on fertility, foetotoxicity, specific developmental abnormalities (central nervous system), effects on newborn recorded.
ISOPHORONE	For isophorone: Acute toxicity: In animals, the acute toxicity of isophorone is low to moderate. A member or analogue of a group of aliphatic and alicyclic terpenoid tertiary alcohols and structurally related substances generally regarded as safe.
N-NITROSODI-N-PROPYLAMINE	For N-nitrosodi-n-propylamine: Although, at lethal doses, in animals, this substance causes liver toxicity and bleeding in the lungs, stomach, kidney and heart, there is only limited information regarding the threshold for these effects following acute exposure and there is no information regarding these effects occurring with longer exposure.
PHENANTHRENE	Tumors at site of application. Neoplastic and tumorigenic by RTECS criteria.
PYRENE	Conjunctival irritation, excitement and muscle contraction recorded.
METHYLENE CHLORIDE	The material may produce moderate eye irritation leading to inflammation. Inhalation (human) TCLo: 500 ppm/ 1 y - I Eye(rabbit): 10 mg - mild
BENZENE	Inhalation (man) TCLo: 150 ppm/1y - I
ACETONITRILE	Absorption of acetonitrile occurs after oral, skin, or inhalation exposure.
1,2-DICHLOROBENZENE & 1,2,4-TRICHLOROBENZENE & P-CHLORODIPHENYL OXIDE & ACENAPHTHENE & ACENAPHTHYLENE & ANTHRACENE & DI-N-OCTYL PHTHALATE & DIETHYL PHTHALATE & DIMETHYL PHTHALATE & FLUORANTHENE & HEXACHLOROCYCLOPENTADIENE & HEXACHLOROETHANE & ISOPHORONE & PHENANTHRENE & PYRENE	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
1,2-DICHLOROBENZENE & 1,2,4-TRICHLOROBENZENE & 1,3-DICHLOROBENZENE & 1,4-DICHLOROBENZENE &	Chlorobenzenes produce several clinical symptoms including eye and airway irritation, blood disorders, abnormal skin changes and foetal defects at levels toxic to the mother.

Continued...

HEXACHLOROBENZENE	
1,2-DICHLOROBENZENE & 1,3-DICHLOROBENZENE & 1,4-DICHLOROBENZENE	1,2-DCB is quickly and extensively absorbed through both the gastrointestinal tract and the respiratory tract.
1,2-DICHLOROBENZENE & BIS(2-CHLOROISOPROPYL)ETHER & DICHLOROETHYL FORMAL & DI-SEC-OCTYL PHTHALATE & HEXACHLOROBUTADIENE & NAPHTHALENE & NITROBENZENE	The material may be irritating to the eye, with prolonged contact causing inflammation.
1,2-DICHLOROBENZENE & HEXACHLOROCYCLOPENTADIENE & METHYLENE CHLORIDE	The material may cause severe 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.
1,2-DICHLOROBENZENE & 1,3-DICHLOROBENZENE & ACENAPHTHENE & ANTHRACENE & AZOBENZENE & BENZO[GHI]PERYLENE & BIS(2-CHLOROISOPROPYL)ETHER & DICHLOROETHYL ETHER & BUTYL BENZYL PHTHALATE & FLUORANTHENE & FLUORENE & HEXACHLOROBUTADIENE & PHENANTHRENE & PYRENE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans.
1,2,4-TRICHLOROBENZENE & 2,4-DINITROTOLUENE & 2,6-DINITROTOLUENE & ANTHRACENE & BENZ[A]PYRENE & BIS(2-CHLOROISOPROPYL)ETHER & DI-SEC-OCTYL PHTHALATE & DI-N-OCTYL PHTHALATE & HEXACHLOROBUTADIENE & ISOPHORONE & NAPHTHALENE & NITROBENZENE & PYRENE & BENZENE & ACETONITRILE	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.
1,2,4-TRICHLOROBENZENE & DIMETHYL PHTHALATE	Bacterial mutagen
1,4-DICHLOROBENZENE & 2,4-DINITROTOLUENE & 2,6-DINITROTOLUENE & BENZ[A]ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & DI-SEC-OCTYL PHTHALATE & CHRYSENE & HEXACHLOROBENZENE & HEXACHLOROETHANE & INDENO[1,2,3-CD]PYRENE & N-NITROSODI-N-PROPYLAMINE & NAPHTHALENE & NITROBENZENE	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
1,4-DICHLOROBENZENE & BENZ[A]ANTHRACENE & BENZ[A]PYRENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & DI-SEC-OCTYL PHTHALATE & DIBENZ[A,H]ANTHRACENE & HEXACHLOROETHANE & INDENO[1,2,3-CD]PYRENE & N-NITROSODI-N-PROPYLAMINE & N-NITROSODIMETHYLAMINE	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep.*
2-CHLORONAPHTHALENE & 4-BROMODIPHENYL ETHER & P-CHLORODIPHENYL OXIDE & BENZ[A]PYRENE & BIS(2-CHLOROISOPROPYL)ETHER	The following information refers to contact allergens as a group and may not be specific to this product.
2,4-DINITROTOLUENE & 2,6-DINITROTOLUENE	For dinitrotoluene (dinitromethylbenzene; DNT): In humans, heavy DNT exposure causes signs of methaemoglobin in the blood, which are reversible 2-3 days after removal from exposure.
4-BROMODIPHENYL ETHER & P-CHLORODIPHENYL OXIDE & ACENAPHTHENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & DIBENZ[A,H]ANTHRACENE & HEXACHLOROBENZENE & INDENO[1,2,3-CD]PYRENE & ISOPHORONE	No significant acute toxicological data identified in literature search.

Continued...

ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & BIS(2-CHLOROISOPROPYL)ETHER & DI-SEC-OCTYL PHTHALATE & CHRYSENE & DIBENZ[A,H]ANTHRACENE & FLUORANTHENE & INDENO[1,2,3-CD]PYRENE & PHENANTHRENE & PYRENE	**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.
BENZ[A]PYRENE & BENZENE	**WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**.
BENZ[A]PYRENE & BUTYL BENZYL PHTHALATE & HEXACHLOROBENZENE	Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
DI-SEC-OCTYL PHTHALATE & BUTYL BENZYL PHTHALATE & DIBUTYL PHTHALATE & DI-N-OCTYL PHTHALATE & DIETHYL PHTHALATE & DIMETHYL PHTHALATE	The material may produce peroxisome proliferation.
DI-SEC-OCTYL PHTHALATE & DIBUTYL PHTHALATE	Available data indicate that phthalate esters are minimally toxic by swallowing, inhalation and skin contact.
DI-N-OCTYL PHTHALATE & HEXACHLOROCYCLOPENTADIENE & ACETONITRILE	The material may produce severe irritation to the eye causing pronounced inflammation.
DIBENZ[A,H]ANTHRACENE & N-NITROSODIMETHYLAMINE & METHYLENE CHLORIDE	**WARNING:** This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.
DIMETHYL PHTHALATE & HEXACHLOROBENZENE	Reproductive effector in rats

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 available but does not fill the criteria for classification*
✔ *– Data available to make classification*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

BNEM-M44C

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

1,2-dichlorobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	1.58mg/L	2
EC50	48	Crustacea	0.66mg/L	2
EC50	96	Algae or other aquatic plants	2.2mg/L	4
BCF	24	Algae or other aquatic plants	10mg/L	4
EC50	336	Crustacea	0.55mg/L	4
NOEC	48	Crustacea	0.36mg/L	4

1,2,4-trichlorobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	1.202mg/L	3
EC50	48	Crustacea	1.2mg/L	5
EC50	96	Algae or other aquatic plants	1.4mg/L	1
BCF	768	Fish	0.92mg/L	4
EC50	384	Crustacea	0.269mg/L	5
NOEC	504	Fish	0.04mg/L	2

Continued...

1,3-dichlorobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	2.904mg/L	3
EC50	48	Crustacea	1.2mg/L	4
EC50	96	Algae or other aquatic plants	5.28mg/L	4
EC50	384	Crustacea	0.717mg/L	3
NOEC	384	Crustacea	=0.3mg/L	1

1,4-dichlorobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.88mg/L	4
EC50	48	Crustacea	0.0007mg/L	4
EC50	96	Algae or other aquatic plants	1.6mg/L	5
BCF	48	Fish	0.1381mg/L	4
EC50	96	Fish	0.0011mg/L	4
NOEC	336	Fish	>=0.2- <=0.23mg/L	2

2-chloronaphthalene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	3.954mg/L	3
EC50	48	Crustacea	1642.462mg/L	4
EC50	96	Algae or other aquatic plants	7.724mg/L	3
EC50	384	Crustacea	0.973mg/L	3

2,4-dinitrotoluene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	1.416mg/L	3
EC50	48	Crustacea	26.2mg/L	4
EC50	96	Algae or other aquatic plants	0.08mg/L	4
BCF	12.0	Fish	0.6135mg/L	4
EC50	96	Algae or other aquatic plants	0.08mg/L	4
NOEC	504	Crustacea	0.02mg/L	4

2,6-dinitrotoluene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	18.5mg/L	4
EC50	48	Crustacea	21.7mg/L	4
EC50	72	Algae or other aquatic plants	11mg/L	4
EC50	384	Crustacea	5.414mg/L	3
NOEC	504	Crustacea	0.06mg/L	4

4-bromodiphenyl ether

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.302mg/L	3
EC50	96	Algae or other aquatic plants	0.309mg/L	3
EC50	384	Crustacea	0.078mg/L	3
NOEC	48	Crustacea	<0.046mg/L	4

p-chlorodiphenyl oxide

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.378mg/L	3
EC50	96	Algae or other aquatic plants	0.423mg/L	3
EC50	384	Crustacea	0.096mg/L	3

acenaphthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.58mg/L	4
EC50	48	Crustacea	1.275mg/L	4
EC50	96	Algae or other aquatic plants	0.5mg/L	1
EC50	384	Crustacea	0.178mg/L	3
NOEC	768	Fish	0.208-0.226mg/L	1

Continued...

acenaphthylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.991mg/L	3
EC50	96	Algae or other aquatic plants	1.450mg/L	3
EC50	384	Crustacea	0.249mg/L	3

anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.00127mg/L	4
EC50	48	Crustacea	0.01119096mg/L	4
EC50	72	Algae or other aquatic plants	>0.0078mg/L	2
BCF	48	Fish	1.0mg/L	4
EC50	24	Crustacea	ca.0.0012mg/L	2
NOEC	22	Algae or other aquatic plants	0.0015-0.0017mg/L	2

azobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.892mg/L	3
EC50	96	Algae or other aquatic plants	1.228mg/L	3
EC50	384	Crustacea	0.225mg/L	3
NOEC	504	Crustacea	0.009mg/L	4

benz[a]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	48	Crustacea	0.000958776mg/L	4
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	24	Crustacea	0.006mg/L	4
EC50	48	Crustacea	0.0014815372mg/L	4

benz[a]pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	48	Crustacea	0.0009815248mg/L	4
EC50	72	Algae or other aquatic plants	0.005mg/L	4
BCF	12	Fish	7.51mg/L	4
EC50	48	Crustacea	0.0016249408mg/L	4
NOEC	360	Fish	0.00102mg/L	4

benzo[b]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	96	Algae or other aquatic plants	0.029mg/L	3
EC50	384	Crustacea	0.011mg/L	3

benzo[ghi]perylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0001326432mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	24	Crustacea	0.0002mg/L	4
EC50	48	Crustacea	0.0010418018mg/L	4

benzo[k]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
BCF	24	Crustacea	0.0014mg/L	4
NOEC	144	Fish	0.01mg/L	4

bis(2-chloroisopropyl)ether

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	15.082mg/L	3
EC50	96	Algae or other aquatic plants	38.372mg/L	3
EC50	384	Crustacea	3.651mg/L	3

Continued...

dichloroethyl formal

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	95.312mg/L	3
EC50	48	Crustacea	=175231mg/L	1
EC50	96	Algae or other aquatic plants	357.806mg/L	3
EC50	384	Crustacea	22.498mg/L	3

dichloroethyl ether

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	50.884mg/L	3
EC50	96	Algae or other aquatic plants	174.092mg/L	3
EC50	384	Crustacea	12.083mg/L	3
NOEC	48	Crustacea	<7.8mg/L	4

di-sec-octyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.023mg/L	3
EC50	48	Crustacea	0.133mg/L	4
EC50	96	Algae or other aquatic plants	0.002mg/L	3
BCF	24	Fish	50mg/L	4
EC60	504	Crustacea	=0.003mg/L	1
NOEC	2400	Fish	=0.005mg/L	1

butyl benzyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.51mg/L	4
EC50	48	Crustacea	0.017mg/L	4
EC50	96	Algae or other aquatic plants	0.1mg/L	4
BCF	78.48	Fish	0.034mg/L	4
EC50	96	Algae or other aquatic plants	0.12mg/L	4
NOEC	336	Algae or other aquatic plants	<0.02mg/L	1

chrysene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	240	Crustacea	0.00136968mg/L	4
EC50	384	Crustacea	0.027mg/L	3
NOEC	2016	Fish	0.116331488mg/L	4

dibutyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.35mg/L	4
EC50	48	Crustacea	2.99mg/L	4
EC50	96	Algae or other aquatic plants	0.0034mg/L	4
BCF	24	Algae or other aquatic plants	10mg/L	4
EC0	240	Crustacea	=0.1mg/L	1
NOEC	144	Fish	0.025mg/L	4

di-n-octyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.019mg/L	3
EC50	96	Algae or other aquatic plants	0.0019mg/L	3
BCF	1728	Algae or other aquatic plants	0.00345mg/L	4
NOEC	384	Crustacea	0.32mg/L	5

dibenz[a,h]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0005510934mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	6	Crustacea	0.00072mg/L	4
EC50	48	Crustacea	0.001558648mg/L	4

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	NOEC	144	Fish	0.01mg/L	4

diethyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	12mg/L	4
EC50	48	Crustacea	=52mg/L	1
EC50	96	Algae or other aquatic plants	1.232mg/L	3
BCF	12	Algae or other aquatic plants	50mg/L	4
EC10	72	Algae or other aquatic plants	1.02mg/L	4
NOEC	96	Fish	1.65mg/L	4

dimethyl phthalate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	29mg/L	4
EC50	48	Crustacea	=33mg/L	1
EC50	96	Algae or other aquatic plants	3.513mg/L	3
BCF	24	Algae or other aquatic plants	100mg/L	4
EC50	96	Algae or other aquatic plants	26.1mg/L	4
NOEC	24	Crustacea	<1.7mg/L	1

fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.0001mg/L	4
EC50	48	Crustacea	0.003984522mg/L	4
EC50	72	Algae or other aquatic plants	0.103mg/L	4
BCF	672	Crustacea	0.125mg/L	4
EC10	144	Crustacea	0.0078mg/L	4
NOEC	744	Crustacea	0.0006mg/L	4

fluorene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.76mg/L	4
EC50	48	Crustacea	0.212mg/L	4
EC50	96	Algae or other aquatic plants	1.346mg/L	3
BCF	576	Crustacea	1.055mg/L	4
EC50	384	Crustacea	0.238mg/L	3
NOEC	336	Crustacea	0.0625mg/L	4

hexachlorobenzene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	>=0.0133mg/L	1
EC50	48	Crustacea	>1mg/L	4
EC50	96	Algae or other aquatic plants	>0.01mg/L	1
BCF	408	Fish	1mg/L	4
EC0	504	Crustacea	=0.00004mg/L	4
NOEC	504	Crustacea	=0.00013mg/L	4

hexachlorobutadiene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.089mg/L	3
EC50	48	Crustacea	0.9mg/L	4
EC50	96	Algae or other aquatic plants	0.415mg/L	3
BCF	24	Fish	0.0591mg/L	4
EC50	168	Fish	0.08mg/L	4
NOEC	336	Fish	=0.005mg/L	4

hexachlorocyclopentadiene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	=0.0037mg/L	1
EC50	96	Algae or other aquatic plants	=0.19mg/L	1
BCF	24	Algae or other aquatic plants	0.05mg/L	4
EC50	168	Algae or other aquatic plants	=0.0066mg/L	1
NOEC	672	Crustacea	0.0003mg/L	4

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Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

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.
Environmental Fate: Dichloroethyl ether or Bis(2-chloroethyl)ether (BCEE) may be released to the environment from the use of products containing the chemical.
Terrestrial Fate: If released to soil, BCEE is expected to be highly mobile in soil and is soluble in water but is not likely to adsorb onto soil thus will likely leach extensively to groundwater. BCEE will undergo volatilization from moist and dry soil surfaces based upon its physico-chemical properties. However, the compound is found to be resistant to biodegradation based on the screening test conducted.
Aquatic Fate: If released to water, BCEE is not expected to adsorb to suspended particles and sediment from the water column. But volatilization of the compound from surface waters is found to be a significant fate process. Hydrolysis of BCEE is not likely to occur since most ethers are very resistant to hydrolysis
Atmospheric Fate: The model of gas/particle partitioning of semivolatile organic compounds in the atmosphere demonstrate that BCEE will exist solely as vapor in the ambient atmosphere. Vapor-phase BCEE is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals. Since BCEE is quite soluble in water, it is expected that BCEE in air will likely be removed by wet deposition. Direct photolysis of BCEE in the atmosphere is not likely to occur because the compound does not absorb visible or near UV light.
Ecotoxicity:
Fish LC50 (96h): 600 mg/l
Invertebrate LC50 (48h): 240 mg/l
Nitrif. Inhib.: nil at 100 mg/l

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. UV light greatly increases the toxicity of anthracene to bluegill sunfish. Biological resources in strong sunlight are at more risk than those that are not. PAHs in general are more frequently associated with chronic risks.
Soil Guidelines: Dutch Criteria:
free cyanide: 1 mg/kg (target)
20 mg/kg (intervention)
complex cyanide (pH 5): 5 mg/kg (target)
50 mg/kg (intervention)
Air Quality Standards: no safe guidelines recommended due to carcinogenic properties.
90dioxin
For Polychlorinated Biphenyls (PCBs):
Environmental Limits: Limit for Marine Water: 0.004 ugm/L (equals 0.000004 mg/L). Classification of waste materials contaminated by PCB's are - PCB Materials: PCB content greater than 10%, Scheduled Wastes; PCB content greater than 0.005% = 50 mg/kg or 50 ppm; Non Scheduled Wastes: PCB content greater than 0.0002% = 2 mg/kg or 2ppm; PCB Free Wastes: PCB content less than 0.0002% = 2 mg/kg or 2 ppm.
Environmental Fate: Most PCBs are volatile enough to cycle between the air, water, and soil at environmental temperatures, and atmospheric transport is the most important mechanism for the global movement. Biodegradation in the environment is slow, occurring under both aerobic and anaerobic conditions. Transformation and degradation of PCBs in the environment depends on the degree of chlorination of the biphenyl molecule as well as on the isomeric substitution pattern.
Atmospheric Fate: Atmospheric transport is the most important mechanism for global dispersion of PCBs. The vapor-phase reaction of PCBs with hydroxyl radicals is the dominant transformation. Biphenyls with 0-1 chlorine atoms remain in the atmosphere, those with 1-4 chlorines gradually migrate toward polar latitudes, those with 4-8 chlorines remain in mid-latitudes, and those with 8-9 chlorines remain close to the source of contamination. PCBs enter the atmosphere from volatilization from both soil and water surfaces. The tropospheric lifetime values are: 5-11 days for monochlorobiphenyls, 8-17 days for dichlorobiphenyls, 14-30 days for trichlorobiphenyls, 25-60 days for tetrachlorobiphenyls, and 60-120 days for pentachlorobiphenyls. PCBs in the vapor phase are more mobile and transported further than particle-bound PCBs. Wet and dry deposition removes PCBs from the atmosphere.
Aquatic Fate: Photolysis appears to be the only viable abiotic degradation process in water. The dominant source of PCBs in surface waters is atmospheric deposition; however, re-dissolved, sediment-bound PCBs also accounts for water concentrations. PCBs in water are transported by diffusion and currents and are removed from the water column by sorption to suspended solids and sediments as well as from volatilization from water surfaces. Higher chlorinated members of the same class are more likely to sorb, while lower chlorinated members are more likely to volatilize. PCBs also leave the water column by concentrating in biota. In sediments, anaerobic microbial degradation will be the primary means of transformation, particularly in the more highly chlorinated classes.
Terrestrial Fate: Soil - PCBs bind strongly with soil and will not leach extensively with leaching expected to be higher in soils low in organic matter. Volatilization from soil appears to be an important loss mechanism; it is more important for the lower chlorinated classes than for the higher chlorinated classes. PCBs transfer in soil via a combination of direct soil organic matter-to-air transfer and soil pore water-to-air transfer processes. Volatilization rates are greatest in moist soils. Plants - Vapor-phase PCBs accumulate in the aerial parts of terrestrial vegetation and food crops by vapor-to-plant transfer.
Ecotoxicity: PCBs are resistant to chemical and biological degradation and, because of their solubility in fats and oils; tend to bioconcentrate. This is presumably true of other halogenated species and halogenated polyaromatic systems. PCBs have become widely dispersed in the world environment and in the food-chain since their introduction and are now recognized internationally to be a major environmental pollutant, their persistence causing ecological damage via water pollution. Consequently, the loss of these materials to the environment is to be avoided at all costs. PCBs are exceptionally persistent in the food chain, some even more so than the organochlorine insecticides with which they are often confused. In general the higher the degree of chlorination, the more resistant to degradation and more persistent they become. Bioconcentration factors of PCBs in aquatic species such as fish, shrimp, and oysters range from 26000 to 60000. PCBs interfere with reproduction in wildlife and experimental animals and effects in birds and mammals. The potential for bioaccumulation is great and long-term effects may be significant.
For naphthalene:
Environmental Fate: Naphthalene may be reach surface water and soil through transportation in water or being carried by air. Most airborne naphthalene is in a vapour form and hence deposition is expected to be slow. A minimal amount of naphthalene emitted to the air is transported to other environmental components mostly by dry deposition. Naphthalene in surface water may volatililize into the atmosphere, depending on environmental condiditons. It remains in solution in water, with only small amounts associated with suspended material and benthic sediments. While naphthalene is readily volatilized from aerated soils, it adheres to soils with a high organic content. Adsorption to aquifer material reduces transportation of naphthalene through groundwater, and the presence of nonionic organic compounds such as tetrachloroethene may enhance sorption to materials that contain low carbon content. Bioconcentration of naphthalene is moderate in aquatic organisms. It is readily metabolized by fish, and invertebrates that are placed in pollutant free water rapidly eliminate any traces of the pollutant. While bioaccumulation in the food chain is unlikely, exposure of cows and chickens to naphthalene could lead to naphthalene being present in milk and eggs. While the data on the transport and partitioning of methylnaphthalenes in the environment is limited, the characteristics of these chemicals are similar to naphthalene, so they are expected to behave in a similar manner to naphthalene in the environment, and produce the same effects on aquatic organisms. Biodegradation of naphthalene occurs relatively quickly in aquatic systems. Methylnaphthalenes are biodegraded under aerobic conditions after adaptation. Degradation rates are highest in water constantly polluted with petroleum. Naphthalene biodegradation rates are higher in sediment than in the water column above it. Methylnaphthalenes biodegrades more slowly. Reported half-lives in sediments were 46 weeks for 1-methylnaphthalene and ranged from 14 to 50 weeks for 2-methylnaphthalene. In soils, the potential for biodegradation is an important factor for biological remediation of soil. Studies on biodegradation of PAHs suggest that adsorption to the organic matter significantly reduces the bioavailability for microorganisms, and thus the biodegradability, of PAHs, including naphthalene. Biodegradation is accomplished through the action of aerobic microorganisms and is reduced in anaerobic soil conditions. Naphthalene biodegrades to carbon dioxide in aerobic soils, with salicylate as an intermediate product. Abiotic degradation of naphthalene seldom occurs in soils. As with naphthalene, 1-Methylnaphthalene is easily volatilised from aerated soil, and the biodegradation half-life averages between 1.7 and 2.2 days.
Ecotoxicity: Acute toxicity data on naphthalene for several fish species (freshwater and marine), show 96h LC50 values range from 1.8 to 7.8 mg/L. Comparable results were obtained with other vertebrates (amphibians). From chronic toxicity tests, a precise NOEL is not clearly determined. A NOEC of 0.12 mg/L was observed in a 40 days test on juvenile pink salmon, but 50% mortality at 0.11 mg/L was calculated for trout fry exposed during hatching.Several data are also available for invertebrates, showing 48h EC50 values ranging from 2.1 to 24 mg/L. While chronic data on freshwater invertebrates and algae are questionable, a 50% photosynthesis reduction was observed at 2.8 mg/L in 4 hours experiments.QSAR prediction models give results consistent with experimental short-term data on fish daphnia and algae.
For benzene:
log Kow: 1.95-2.15
log Koc: 1.7-2
Koc: 85

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log Kom: 1.04-2.56
Half-life (hr) air: 2.4-501
Half-life (hr) H2O surface water: 4.81-384
Half-life (hr) H2O ground: 240-17280
Half-life (hr) soil: 48-922
Henry's Pa m3 /mol: 441-595
Henry's atm m3 /mol: 5.43E-03
BOD 5 if unstated: 2.18
COD: 0.25-2.8
ThOD: 3.1
BCF: 3.5-3.9
Log BCF: 0.54-1.48
Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.); benzene: 10 ug/l (WHO guideline)
Soil Guidelines: Dutch Criteria: 0.05 mg/kg (detection limit) target; 1 mg/kg (intervention)
Air Quality Standards: 1 ppb averaging time 1 year (UK)
No safe level recommended due to carcinogenic properties (WHO Guideline)
If benzene is released to the atmosphere it remains predominantly in the vapour phase.
Vapour phase benzene is not subject to direct photolysis but reacts with photochemically produced hydroxyl radicals (half-life approximately 13.4 days). Reaction time in polluted atmospheres which contain nitrogen oxide (NO) or sulfur dioxide (SO2) is accelerated (half-life 4-6 hours); products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrates.
In water, benzene is rapidly volatilised (half-life 2.7 hours).
In soil benzene undergoes rapid volatilisation; it is not absorbed, to any appreciable degree, by sediments.
Benzene does not bioaccumulate in the food chain.
Environmental Fate
Terrestrial fate: Benzene is expected to have high mobility in soil. Volatilisation of benzene from moist soil surfaces is expected to be an important fate process, and there is also some potential for volatilisation of benzene from dry soil. Benzene is expected to biodegrade in soils.
Aquatic fate: Benzene is not expected to adsorb to sediment and suspended solids in water. Volatilisation from water surfaces is expected, with volatilisation half-lives for a model river and model lake estimated to be 1 hr and 3.5 days, respectively. Anaerobic degradation of benzene in water is not expected to be an important loss process. In aqueous solution, benzene will react with hydroxyl radical with an anticipated half-life of 103 days. A BCF ranging from 1.1-20 suggests the potential for bioconcentration in aquatic organisms is low.
Aquatic fate: Simulated experiments indicate evaporation to be the primary loss mechanism in winter with a half-life of 13 days. In spring and summer the half-lives were 23 and 3.1 days, respectively. In these cases biodegradation plays a major role and takes about 2 days. However, acclimation is critical and this takes much longer in the colder water in spring. According to one experiment, benzene has a half-life of 17 days due to photodegradation which could contribute to benzene's removal. In situations of cold water, poor nutrients, or other conditions less conducive to microbial growth, photolysis will play a important role in degradation. The half-life of benzene in sea water is expected to be about 5 hrs.
Atmospheric fate: Models predict benzene to exist solely as a vapor in the ambient atmosphere, where it is degraded by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days. The half-life in polluted atmospheres which contain nitrogen oxides or sulfur dioxide has been observed to shorten to 4-6 hrs. Vapour-phase benzene is also degraded in the atmosphere by atmospheric ozone radicals at an extremely slow rate; the half-life for this reaction in air is estimated to be 170,000 days. The half-life of the reaction of benzene with nitrate radical in the atmosphere is estimated to be greater than or equal to 111 days. Direct photolysis is not likely to be an important degradation process of benzene. Due to benzene's high water solubility, it may be removed from the atmosphere by rainfall.
Ecotoxicity:
Fish LC50 (96 h): bass (Morone saxatilis) 5.8-11 mg/l
Fish LC50 24-96 h) fathead minnow (Pimephales promelus) 33-35 mg/l (softwater); 24-32 mg/l (hardwater);
bluegill sunfish (Lepomis macrochirus) 22 mg/l; goldfish (Carassius auratus) 36 mg/l (softwater); mosquito fish (Gambusia affinis) 395 mg/l
Fish LC50 (24-48 h): bluegill sunfish (Lepomis macrochirus) 20 mg/l
Fish LC50 (24 h): goldfish (Carassius auratus) 46 mg/l; blue gill sunfish (Lepomis macrochirus) 34 mg/l
Fish LC100 (2 h): blue gill sunfish (Lepomis macrochirus) 60 mg/l
Fish LC50 (14 d): guppy (Poecilia reticulata) 63 mg/l
Fish LC50 (1 h): brown trout yearlings (Salmo trutta) 12 mg/l (static assay)
Ciliate LC100 (24 h): Tetrahymena pyriformis 12.8 mmole/l
Grass shrimp (Palaemonetes pugio) LC50 (96 h): 27 ppm
Shrimp (Crangon fransicorum) LC50 (96 h): 20 mg/l
Crab larvae (Cancer magister) LC50 (96 h): 108 ppm
Mexican axolotl (Ambystoma mexicanum) LC50 (48 h): 370 mg/l (3-4 weeks after hatching)
Clawed toad LC50 (48 h): 190 mg/l (3-4 weeks after hatching)
for N-Nitrosodimethylamine (NDMA): Log Kow: -0.57; Henry's Law Constant: 2.63x10-7 atm-m3/mol @ 20C; Vapor Pressure: 2.7 mm Hg @ 20C; BCF: 0.2.
Atmospheric Fate: NDMA is an organic compound that is expected to exist almost entirely as a vapor in the atmosphere. This compound should not partition to particles in the atmosphere. NDMA vapor rapidly degrades by direct breakdown in sunlight to form dimethylnitramine. Based on experimental data, the half-life of NDMA vapor exposed to sunlight has been determined to be about 5-30 minutes. Reaction of NDMA with hydroxyl radicals/ozone molecules in the atmosphere is too slow to be environmentally significant.
Terrestrial Fate: NDMA is expected to be highly mobile in soil and may leach into groundwater supplies. If NDMA were released to soil surfaces, as might be the case during application of contaminated pesticides, a substantial amount of the nitrosamine in the substance would evaporate. The evaporation half-life from soil surfaces is estimated to be on the order of l-2 hours. If NDMA is incorporated into subsurface soil, far less of the nitrosamine would enter the atmosphere by evaporation and the rate of evaporation would be greatly reduced. Under these circumstances, evaporation would be of minor importance. Microbial breakdown in soil occurs slowly. Direct breakdown by sunlight on soil may be an important fate process.
Aquatic Fate: NDMA is completely insoluble in water and adsorption to suspended particles/sediments in water is not an important fate process. Evaporation of the chemical from water is not expected to occur. NDMA may be subject to slow breakdown in natural waters exposed to sunlight. In unlit waters, it appears that NDMA would be rather persistent, eventually degrading as a result of microbial transformation. Formaldehyde and methylamine may form as biological breakdown products of NDMA. NDMA is not expected to chemically react under the conditions found in natural waters.
Ecotoxicity: Accumulation of NDMA in aquatic organisms is not an important fate process. NDMA is toxic to fathead minnow, bluegill sunfish, rainbow trout, sheepshead minnow, Daphnia magna water fleas and mysid shrimp. The substance is non-toxic to mallard duck, and bobwhite quail.

Abiotic Effects: Acetonitrile is a volatile organic compound (VOC) substance, thus it is a contributor to the formation of photochemical smog in the presence of other VOCs.
Transport: Acetonitrile is primarily removed by volatilization and leaching into groundwater. It has low adsorption potential to soils. Air - Acetonitrile may persist in the troposphere and can be transported over long distances. It is degraded through reaction with hydroxyl radicals and ozone. Soil - Acetonitrile is mobile, highly volatile and can undergo biodegradation with the presence of oxygen. Water - Several microorganisms are able to degrade acetonitrile in water environment.
Ecotoxicity: Toxicity tests conducted on fathead minnow, bluegill, guppy and invertebrate show that acetonitrile has low acute toxicity to aquatic organisms. Acetonitrile inhibits cellular multiplication of invertebrates.
Fish LC50 (96 h): fathead minnow (Pimephales promelas) 1020 mg/l, 1000 mg/l (hard and soft water respectively); bluegill (Lepomis macrochirus) 1850 mg/l; guppy (Lebistes reticulatus) 1650 mg/l
Invertebrate EC50:520-7300 mg/l
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
1,2-dichlorobenzene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 63.67 days)
1,2,4-trichlorobenzene	HIGH (Half-life = 360 days)	LOW (Half-life = 53.5 days)
1,3-dichlorobenzene	HIGH (Half-life = 360 days)	LOW (Half-life = 37.13 days)
1,4-dichlorobenzene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 83.58 days)

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2-chloronaphthalene	HIGH	HIGH
2,4-dinitrotoluene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 118.33 days)
2,6-dinitrotoluene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 118.33 days)
4-bromodiphenyl ether	HIGH	HIGH
p-chlorodiphenyl oxide	HIGH	HIGH
acenaphthene	HIGH (Half-life = 204 days)	LOW (Half-life = 0.37 days)
acenaphthylene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 0.05 days)
anthracene	HIGH (Half-life = 920 days)	LOW (Half-life = 0.21 days)
azobenzene	HIGH	HIGH
benz[a]anthracene	HIGH (Half-life = 1360 days)	LOW (Half-life = 0.33 days)
benz[a]pyrene	HIGH (Half-life = 1060 days)	LOW (Half-life = 0.18 days)
benzo[b]fluoranthene	HIGH (Half-life = 1220 days)	LOW (Half-life = 0.6 days)
benzo[ghi]perylene	HIGH (Half-life = 1300 days)	LOW (Half-life = 0.13 days)
benzo[k]fluoranthene	HIGH (Half-life = 4280 days)	LOW (Half-life = 0.46 days)
bis(2-chloroisopropyl)ether	HIGH (Half-life = 360 days)	LOW (Half-life = 1.92 days)
dichloroethyl formal	HIGH	HIGH
dichloroethyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 4.02 days)
di-sec-octyl phthalate	HIGH (Half-life = 389 days)	LOW (Half-life = 1.21 days)
butyl benzyl phthalate	HIGH (Half-life = 180 days)	LOW (Half-life = 2.5 days)
chrysene	HIGH (Half-life = 2000 days)	LOW (Half-life = 0.33 days)
dibutyl phthalate	LOW (Half-life = 23 days)	LOW (Half-life = 3.08 days)
di-n-octyl phthalate	HIGH (Half-life = 365 days)	LOW (Half-life = 1.87 days)
dibenz[a,h]anthracene	HIGH (Half-life = 1880 days)	LOW (Half-life = 0.18 days)
diethyl phthalate	MEDIUM (Half-life = 112 days)	LOW (Half-life = 8.83 days)
dimethyl phthalate	LOW (Half-life = 14 days)	LOW (Half-life = 46.58 days)
fluoranthene	HIGH (Half-life = 880 days)	LOW (Half-life = 0.84 days)
fluorene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 2.84 days)
hexachlorobenzene	HIGH (Half-life = 4178 days)	HIGH (Half-life = 1563.75 days)
hexachlorobutadiene	HIGH (Half-life = 360 days)	HIGH (Half-life = 1193.75 days)
hexachlorocyclopentadiene	LOW (Half-life = 56 days)	Not Available
hexachloroethane	HIGH (Half-life = 360 days)	Not Available
indeno[1,2,3-cd]pyrene	HIGH (Half-life = 1460 days)	LOW (Half-life = 0.26 days)
isophorone	LOW (Half-life = 56 days)	LOW (Half-life = 0.13 days)
N-nitrosodi-n-propylamine	HIGH (Half-life = 360 days)	LOW (Half-life = 1.11 days)
N-nitrosodimethylamine	HIGH (Half-life = 360 days)	LOW (Half-life = 10.58 days)
N-nitrosodiphenylamine	MEDIUM (Half-life = 68 days)	LOW (Half-life = 0.29 days)
naphthalene	HIGH (Half-life = 258 days)	LOW (Half-life = 1.23 days)
nitrobenzene	HIGH (Half-life = 394 days)	LOW (Half-life = 0.23 days)
phenanthrene	HIGH (Half-life = 400 days)	LOW (Half-life = 0.84 days)
pyrene	HIGH (Half-life = 3800 days)	LOW (Half-life = 0.33 days)
methylene chloride	LOW (Half-life = 56 days)	HIGH (Half-life = 191 days)
benzene	HIGH (Half-life = 720 days)	LOW (Half-life = 20.88 days)
acetonitrile	HIGH (Half-life = 360 days)	HIGH (Half-life = 541.29 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
1,2-dichlorobenzene	LOW (BCF = 260)
1,2,4-trichlorobenzene	HIGH (BCF = 4420)
1,3-dichlorobenzene	HIGH (BCF = 6918)
1,4-dichlorobenzene	LOW (BCF = 190)
2-chloronaphthalene	LOW (LogKOW = 3.1293)
2,4-dinitrotoluene	HIGH (BCF = 2507)
2,6-dinitrotoluene	LOW (LogKOW = 2.1757)
4-bromodiphenyl ether	HIGH (LogKOW = 4.9393)
p-chlorodiphenyl oxide	HIGH (LogKOW = 4.7)
acenaphthene	LOW (BCF = 387)
acenaphthylene	MEDIUM (BCF = 545)
anthracene	HIGH (BCF = 10500)
azobenzene	MEDIUM (LogKOW = 3.82)

Continued...

benz[a]anthracene	HIGH (LogKOW = 5.76)
benz[a]pyrene	HIGH (LogKOW = 6.13)
benzo[b]fluoranthene	HIGH (LogKOW = 5.78)
benzo[ghi]perylene	HIGH (LogKOW = 6.697)
bis(2-chloroisopropyl)ether	LOW (BCF = 12)
dichloroethyl formal	LOW (LogKOW = 1.2953)
dichloroethyl ether	LOW (BCF = 10)
di-sec-octyl phthalate	HIGH (BCF = 24500)
butyl benzyl phthalate	MEDIUM (BCF = 663)
chrysene	HIGH (LogKOW = 5.81)
dibutyl phthalate	LOW (BCF = 176)
di-n-octyl phthalate	LOW (LogKOW = 8.1)
dibenz[a,h]anthracene	HIGH (LogKOW = 6.697)
diethyl phthalate	LOW (BCF = 117)
dimethyl phthalate	LOW (BCF = 57)
fluoranthene	HIGH (LogKOW = 5.16)
fluorene	MEDIUM (BCF = 830)
hexachlorobenzene	HIGH (BCF = 575440)
hexachlorobutadiene	HIGH (LogKOW = 4.78)
hexachlorocyclopentadiene	MEDIUM (BCF = 1634)
hexachloroethane	LOW (BCF = 8.5)
isophorone	LOW (BCF = 7)
N-nitrosodi-n-propylamine	LOW (LogKOW = 1.36)
N-nitrosodimethylamine	LOW (LogKOW = -0.57)
N-nitrosodiphenylamine	LOW (BCF = 42)
naphthalene	HIGH (BCF = 18000)
nitrobenzene	LOW (BCF = 7.7)
phenanthrene	MEDIUM (LogKOW = 4.46)
pyrene	HIGH (LogKOW = 4.88)
methylene chloride	LOW (BCF = 40)
benzene	HIGH (BCF = 4360)
acetonitrile	LOW (BCF = 0.4)

Mobility in soil

Ingredient	Mobility
1,2-dichlorobenzene	LOW (KOC = 443.1)
1,2,4-trichlorobenzene	LOW (KOC = 717.6)
1,3-dichlorobenzene	LOW (KOC = 434)
1,4-dichlorobenzene	LOW (KOC = 434)
2-chloronaphthalene	LOW (KOC = 2976)
2,4-dinitrotoluene	LOW (KOC = 363.8)
2,6-dinitrotoluene	LOW (KOC = 371.4)
4-bromodiphenyl ether	LOW (KOC = 4160)
p-chlorodiphenyl oxide	LOW (KOC = 4160)
acenaphthene	LOW (KOC = 6123)
acenaphthylene	LOW (KOC = 6123)
anthracene	LOW (KOC = 20400)
azobenzene	LOW (KOC = 1954)
benz[a]anthracene	LOW (KOC = 231300)
benz[a]pyrene	LOW (KOC = 786800)
benzo[b]fluoranthene	LOW (KOC = 803100)
benzo[ghi]perylene	LOW (KOC = 2676000)
bis(2-chloroisopropyl)ether	LOW (KOC = 21.4)
dichloroethyl formal	MEDIUM (KOC = 2.767)
dichloroethyl ether	LOW (KOC = 14.95)
di-sec-octyl phthalate	LOW (KOC = 165400)
butyl benzyl phthalate	LOW (KOC = 9359)
chrysene	LOW (KOC = 236100)
dibutyl phthalate	LOW (KOC = 1460)

Continued...

di-n-octyl phthalate	LOW (KOC = 195500)
dibenz[a,h]anthracene	LOW (KOC = 2622000)
diethyl phthalate	LOW (KOC = 126.2)
dimethyl phthalate	LOW (KOC = 37.09)
fluoranthene	LOW (KOC = 70850)
fluorene	LOW (KOC = 11290)
hexachlorobenzene	LOW (KOC = 3380)
hexachlorobutadiene	LOW (KOC = 993.5)
hexachlorocyclopentadiene	LOW (KOC = 1667)
hexachloroethane	LOW (KOC = 224.7)
isophorone	LOW (KOC = 58.32)
N-nitrosodi-n-propylamine	LOW (KOC = 485.3)
N-nitrosodimethylamine	LOW (KOC = 38.21)
N-nitrosodiphenylamine	LOW (KOC = 6154)
naphthalene	LOW (KOC = 1837)
nitrobenzene	LOW (KOC = 190.8)
phenanthrene	LOW (KOC = 20830)
pyrene	LOW (KOC = 69410)
methylene chloride	LOW (KOC = 23.74)
benzene	LOW (KOC = 165.5)
acetonitrile	LOW (KOC = 4.5)

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. 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 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. ▸ Due to their environmental persistence and potential health hazards, PCBs, PBBs, dioxins and their derivatives or congeners (including chlorinated diphenyl ethers), cannot be disposed of in landfills or dumped at sea. ▸ Environmentally acceptable method of disposal include high temperature incineration. However this option is costly and uncertain. ▸ Other acceptable disposal technologies include base-catalysed dechlorination in the BCD (Base-Catalyzed Decomposition) Process. ▸ Currently, most wastes must be stored in an approved manner until satisfactory arrangements can be made for their disposal. All wastes and residues containing these substances (e.g. wiping clothes, absorbent materials, used disposable protective gloves, contaminated clothing, etc.) should be collected, placed in proper containers, labelled and disposed of in the manner prescribed by government regulations. ▸ Regulations may require the compulsory reporting of all spills. ▸ 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

	

Continued...

Marine Pollutant	

Land transport (DOT)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	Class: 6.1 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Hazard Label: 6.1 Special provisions: IB3, IP8, N36, T7, TP2

Air transport (ICAO-IATA / DGR)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	ICAO/IATA Class: 6.1 ICAO / IATA Subrisk: Not Applicable ERG Code: 6L
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 663 Cargo Only Maximum Qty / Pack: 220 L Passenger and Cargo Packing Instructions: 655 Passenger and Cargo Maximum Qty / Pack: 60 L Passenger and Cargo Limited Quantity Packing Instructions: Y642 Passenger and Cargo Limited Maximum Qty / Pack: 2 L

Sea transport (IMDG-Code / GGVSee)

UN number	1593
UN proper shipping name	DICHLOROMETHANE
Transport hazard class(es)	IMDG Class: 6.1 IMDG Subrisk: Not Applicable
Packing group	III
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number: F-A, S-A Special provisions: Not Applicable Limited Quantities: 5 L

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

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

1,2-DICHLOROBENZENE(95-50-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

1,2,4-TRICHLOROBENZENE(120-82-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US ACGIH Threshold Limit Values (TLV)
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

1,3-DICHLOROBENZENE(541-73-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

1,4-DICHLOROBENZENE(106-46-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

2-CHLORONAPHTHALENE(91-58-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

2,4-DINITROTOLUENE(121-14-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Minnesota Permissible Exposure Limits (PELs)
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): Mutagens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

2,6-DINITROTOLUENE(606-20-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Minnesota Permissible Exposure Limits (PELs)
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): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

4-BROMODIPHENYL ETHER(101-55-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

P-CHLORODIPHENYL OXIDE(7005-72-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - Priority Pollutants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ACENAPHTHENE(83-32-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ACENAPHTHYLENE(208-96-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ANTHRACENE(120-12-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AZOBENZENE(103-33-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US EPA Carcinogens Listing
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]ANTHRACENE(56-55-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
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): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]PYRENE(50-32-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
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): Mutagens
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 Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZO[B]FLUORANTHENE(205-99-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.

BENZO[GHI]PERYLENE(191-24-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List

BENZO[K]FLUORANTHENE(207-08-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity

BIS(2-CHLOROISOPROPYL)ETHER(108-60-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US AIHA Workplace Environmental Exposure Levels (WEELs)
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPCRA Section 313 Chemical List
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DICHLOROETHYL FORMAL(111-91-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - Priority Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DICHLOROETHYL ETHER(111-44-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DI-SEC-OCTYL PHTHALATE(117-81-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BUTYL BENZYL PHTHALATE(85-68-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

CHRYSENE(218-01-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIBUTYL PHTHALATE(84-74-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DI-N-OCTYL PHTHALATE(117-84-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIBENZ[A,H]ANTHRACENE(53-70-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
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): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIETHYL PHTHALATE(84-66-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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 ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - Priority Pollutants
US EPA Carcinogens Listing
US NIOSH Recommended Exposure Limits (RELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIMETHYL PHTHALATE(131-11-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

FLUORANTHENE(206-44-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

FLUORENE(86-73-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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HEXACHLOROBENZENE(118-74-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

HEXACHLOROBUTADIENE(87-68-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

HEXACHLOROCYCLOPENTADIENE(77-47-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

HEXACHLOROETHANE(67-72-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA New Chemical Exposure Limits (NCEL)

INDENO[1,2,3-CD]PYRENE(193-39-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ISOPHORONE(78-59-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

N-NITROSODI-N-PROPYLAMINE(621-64-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
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): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

N-NITROSODIMETHYLAMINE(62-75-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Regulated Carcinogens
US - Connecticut Carcinogenic Substances
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
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): Mutagens
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 General Occupational Health Standards - List of Carcinogens
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

N-NITROSODIPHENYLAMINE(86-30-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US CWA (Clean Water Act) - Priority Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NAPHTHALENE(91-20-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NITROBENZENE(98-95-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PHENANTHRENE(85-01-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - 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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PYRENE(129-00-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - 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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

METHYLENE CHLORIDE(75-09-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Acceptable Maximum Peak Concentrations
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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): Mutagens
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA New Chemical Exposure Limits (NCEL)

BENZENE(71-43-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Connecticut Carcinogenic Substances
US - Hawaii Air Contaminant Limits
US - Idaho - Acceptable Maximum Peak Concentrations
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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): Mutagens
US - Oregon Permissible Exposure Limits (Z-1)
US - Oregon Permissible Exposure Limits (Z-2)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont 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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ACETONITRILE(75-05-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
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 Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Immediate (acute) health hazard	Yes

Continued...

Delayed (chronic) health hazard	Yes
Fire hazard	Yes
Pressure hazard	No
Reactivity hazard	No

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

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
Benzene, 1,2-dichloro-	100	45.4
1,2,4-Trichlorobenzene	100	45.4
Benzene, 1,3-dichloro-	100	45.4
Benzene, 1,4-dichloro-	100	45.4
beta-Chloronaphthalene	5000	2270
Benzene, 1-methyl-2,4-dinitro-	10	4.54
Benzene, 2-methyl-1,3-dinitro-	100	45.4
Benzene, 1-bromo-4-phenoxy-	100	45.4
4-Chlorophenyl phenyl ether	5000	2270
Acenaphthene	100	45.4
Acenaphthylene	5000	2270
Anthracene	5000	2270
Benz[a]anthracene	10	4.54
Benzo[a]pyrene	1	0.454
Benzo[b]fluoranthene	1	0.454
Benzo[ghi]perylene	5000	2270
Benzo(k)fluoranthene	5000	2270
Dichloroisopropyl ether	1000	454
Propane, 2,2'-oxybis[2-chloro-	1000	454
Bis(2-chloroethoxy) methane	1000	454
Bis(2-chloroethyl) ether	10	4.54
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	100	45.4
Butyl benzyl phthalate	100	45.4
Chrysene	100	45.4
1,2-Benzenedicarboxylic acid, dibutyl ester	10	4.54
Di-n-octyl phthalate	5000	2270
Dibenz[a,h]anthracene	1	0.454
1,2-Benzenedicarboxylic acid, diethyl ester	1000	454
1,2-Benzenedicarboxylic acid, dimethyl ester	5000	2270
Fluoranthene	100	45.4
Fluorene	5000	2270
Benzene, hexachloro-	10	4.54
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	1	0.454
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	10	4.54
Ethane, hexachloro-	100	45.4
Indeno(1,2,3-cd)pyrene	100	45.4
Isophorone	5000	2270
Di-n-propylnitrosamine	10	4.54
Methanamine, N-methyl-N-nitroso-	10	4.54
N-Nitrosodiphenylamine	100	45.4
Naphthalene	100	45.4
Benzene, nitro-	1000	454
Phenanthrene	5000	2270
Pyrene	5000	2270
Dichloromethane	1000	454
Benzene	10	4.54
Acetonitrile	5000	2270

Continued...

State Regulations

US. CALIFORNIA PROPOSITION 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm

US - CALIFORNIA PREPOSITION 65 - CARCINOGENS & REPRODUCTIVE TOXICITY (CRT): LISTED SUBSTANCE

p-Dichlorobenzene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, Azobenzene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Bis(2-chloro-1-methylethyl)ether, technical grade, Bis(2-chloroethyl)ether, Di(2-ethylhexyl)phthalate (DEHP), Butyl benzyl phthalate (BBP), Chrysene, Di-n-butyl phthalate (DBP), Dibenz[a,h]anthracene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Indeno[1,2,3-cd]pyrene, N-Nitrosodi-n-propylamine, N-Nitrosodimethylamine, N-Nitrosodiphenylamine, Naphthalene, Nitrobenzene, Dichloromethane (Methylene chloride), Benzene Listed

National Inventory	Status
Australia - AICS	N (N-nitrosodi-n-propylamine; bis(2-chloroisopropyl)ether; dichloroethyl formal)
Canada - DSL	N (p-chlorodiphenyl oxide; N-nitrosodi-n-propylamine; 4-bromodiphenyl ether; fluoranthene; bis(2-chloroisopropyl)ether; benz[a]anthracene; dibenz[a,h]anthracene; dichloroethyl formal; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene; N-nitrosodimethylamine)
Canada - NDSL	N (benz[a]pyrene; 2,4-dinitrotoluene; acenaphthene; pyrene; di-n-octyl phthalate; nitrobenzene; naphthalene; di-sec-octyl phthalate; chrysene; hexachlorobutadiene; 1,2-dichlorobenzene; isophorone; phenanthrene; dimethyl phthalate; hexachlorocyclopentadiene; dichloroethyl ether; acetonitrile; methylene chloride; benzene; 1,4-dichlorobenzene; fluorene; benzo[k]fluoranthene; 1,2,4-trichlorobenzene; 2,6-dinitrotoluene; hexachloroethane; azobenzene; benzo[b]fluoranthene; N-nitrosodiphenylamine; 2-chloronaphthalene; 1,3-dichlorobenzene; benzo[ghi]perylene; butyl benzyl phthalate; hexachlorobenzene; anthracene; dibutyl phthalate; diethyl phthalate)
China - IECSC	N (p-chlorodiphenyl oxide; N-nitrosodi-n-propylamine; 4-bromodiphenyl ether; chrysene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; 2-chloronaphthalene; benzo[ghi]perylene)
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (benz[a]pyrene; p-chlorodiphenyl oxide; 2,4-dinitrotoluene; N-nitrosodi-n-propylamine; pyrene; 4-bromodiphenyl ether; di-n-octyl phthalate; fluoranthene; chrysene; bis(2-chloroisopropyl)ether; hexachlorobutadiene; benz[a]anthracene; isophorone; phenanthrene; dimethyl phthalate; dichloroethyl ether; dibenz[a,h]anthracene; dichloroethyl formal; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; 2,6-dinitrotoluene; acenaphthylene; azobenzene; benzo[b]fluoranthene; 2-chloronaphthalene; benzo[ghi]perylene; butyl benzyl phthalate; hexachlorobenzene; dibutyl phthalate; N-nitrosodimethylamine; diethyl phthalate)
Korea - KECI	N (p-chlorodiphenyl oxide; N-nitrosodi-n-propylamine; 4-bromodiphenyl ether; fluoranthene; benz[a]anthracene; dibenz[a,h]anthracene; dichloroethyl formal; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; azobenzene; benzo[b]fluoranthene; 2-chloronaphthalene; benzo[ghi]perylene; hexachlorobenzene)
New Zealand - NZIoC	N (p-chlorodiphenyl oxide; N-nitrosodi-n-propylamine; 4-bromodiphenyl ether; bis(2-chloroisopropyl)ether; hexachlorobutadiene; dichloroethyl formal; 2,6-dinitrotoluene; 2-chloronaphthalene; hexachlorobenzene)
Philippines - PICCS	N (p-chlorodiphenyl oxide; N-nitrosodi-n-propylamine; 4-bromodiphenyl ether; fluoranthene; chrysene; benz[a]anthracene; dibenz[a,h]anthracene; dichloroethyl formal; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; 2,6-dinitrotoluene; benzo[b]fluoranthene; N-nitrosodiphenylamine; 2-chloronaphthalene; benzo[ghi]perylene)
USA - TSCA	N (benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene)
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
bis(2-chloroisopropyl)ether	108-60-1, 52438-91-2, 39638-32-9
di-n-octyl phthalate	117-84-0, 8031-29-6

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.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

end of SDS