Chlorinated Hydrocarbons in Hexane

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

Version No: **1.1**
Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Issue Date: **11/07/2023**
Print Date: **14/07/2023**
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SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Chlorinated Hydrocarbons in Hexane
Synonyms	Not Available
Proper shipping name	HEXANES
Other means of identification	M-8120

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Laboratory Chemical Reference Material

Details of the manufacturer or supplier of the safety data sheet

Registered company name	**Novachem Pty Ltd**	**Novachem Pty Ltd**
Address	25 Crissane Road, Heidelberg West Victoria 3081 Australia	25 Crissane Road, Heidelberg West Victoria 3081 Australia
Telephone	+61384151255	+61384151255
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Emergency telephone number

Association / Organisation	**Victorian Poisons Information Centre**	**Victorian Poisons Information Centre**
Emergency telephone numbers	13 11 26	13 11 26
Other emergency telephone numbers	Not Available	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Flammable Liquids Category 2, Acute Toxicity (Oral) Category 4, Aspiration Hazard Category 1, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Acute Toxicity (Inhalation) Category 4, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Germ Cell Mutagenicity Category 1B, Carcinogenicity Category 2, Reproductive Toxicity Category 1A, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 2
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Label elements

Hazard pictogram(s)	
Signal word	**Danger**

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.

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H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P331	Do NOT induce vomiting.
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.

Precautionary statement(s) Storage

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

Precautionary statement(s) Disposal

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

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
91-58-7	0.2	2-chloronaphthalene
95-50-1	0.2	1,2-dichlorobenzene
541-73-1	0.2	1,3-dichlorobenzene
106-46-7	0.2	1,4-dichlorobenzene
118-74-1	0.2	hexachlorobenzene
87-68-3	0.2	hexachlorobutadiene
77-47-4	0.2	hexachlorocyclopentadiene
67-72-1	0.2	hexachloroethane
95-94-3	0.2	1,2,4,5-tetrachlorobenzene
120-82-1	0.2	1,2,4-trichlorobenzene
110-54-3	98	n-hexane
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*	

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.

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Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. ▸ 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.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.
Chlorobenzenes are readily adsorbed from the gastrointestinal tract; they are distributed into highly perfused tissues and accumulate in lipid tissues. Lipid accumulation is greatest for the more highly chlorinated chlorobenzene compounds. Chlorobenzenes are metabolised by microsomal oxidation to form arene oxide intermediates and then further to their corresponding chlorophenols which are excreted in the urine as mercapturic acids after conjugation with glutathione or as glucuronic acid or sulfate conjugates. A small percentage are eliminated unchanged in expired air or faeces.
Following acute or short term repeated exposures to n-hexane:

- Large quantities of n-hexane are expired by the lungs after vapour exposure (50-60%). Humans exposed to 100 ppm demonstrate an n-hexane biological half life of 2 hours.
- Initial attention should be directed towards evaluation and support of respiration. Cardiac dysrhythmias are a potential complication.

INGESTION:

- Ipecac syrup should be considered for ingestion of pure hexane exceeding 2-3ml/kg. Extreme caution must be taken to avoid aspiration since small amounts of n-hexane intratracheally, produce a severe chemical pneumonitis.

[*Ellenhorn and Barceloux: Medical Toxicology*]
BIOLOGICAL EXPOSURE INDEX - BEI
BEIs represent the levels of determinants which are most likely to be observed in specimens collected in a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the Exposure Standard (ES or TLV).

Determinant	Index	Sampling Time	Comments
1. 2,5-hexanedione in urine	5 mg/gm creatinine	End of shift	NS
2. n-Hexane in end-exhaled air			SQ

NS: Non-specific determinant; Metabolite observed following exposure to other materials.
SQ: Semi-quantitative determinant; Interpretation may be ambiguous - should be used as a screening test or confirmatory test.
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
If large amounts are ingested, gastric lavage is suggested. In the case of splashes in the eyes, a petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.
If electrical equipment arcs over, PCB dielectric fluids may decompose to produce hydrogen chloride (HCl), a respiratory irritant. [Monsanto]
Preplacement and annual medical examinations of workers, with emphasis on liver function, skin condition, reproductive history, are recommended.[ILO]

SECTION 5 Firefighting 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

Advice for firefighters

Fire Fighting	
Fire/Explosion Hazard	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. May emit clouds of acrid smoke
HAZCHEM	3YE

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SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** allow clothing wet with material to stay in contact with skin
Other information	▸ Store in original containers in approved flame-proof area. ▸ No smoking, naked lights, heat or ignition sources. ▸ **DO NOT** store in pits, depression, basement or areas where vapours may be trapped. ▸ Keep containers securely sealed.

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.
Storage incompatibility	Haloaryl compounds (halogenated aromatics), though normally not very reactive, may be sufficiently activated by other substituents or by a few specific reaction conditions, to undergo violent reactions. BRETHERICK L.: Handbook of Reactive Chemical Hazards ▸ Avoid contact with aluminium and its alloys (including storage containers). Formation of aluminium chloride may catalyse further self-accelerating attack on the metal (Friedel-Crafts reaction) leading to violent explosion. ▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	1,2-dichlorobenzene	o-Dichlorobenzene	25 ppm / 150 mg/m3	301 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	1,4-dichlorobenzene	p-Dichlorobenzene	25 ppm / 150 mg/m3	300 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	hexachlorobutadiene	Hexachlorobutadiene	0.02 ppm / 0.21 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	hexachlorocyclopentadiene	Hexachlorocyclopentadiene	0.01 ppm / 0.11 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	hexachloroethane	Hexachloroethane	1 ppm / 9.7 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	1,2,4-trichlorobenzene	1,2,4-Trichlorobenzene	Not Available	Not Available	5 ppm / 37 mg/m3	Not Available
Australia Exposure Standards	n-hexane	Hexane (n-Hexane)	20 ppm / 72 mg/m3	Not Available	Not Available	Not Available

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Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
2-chloronaphthalene	6.2 mg/m3	69 mg/m3	410 mg/m3
1,2-dichlorobenzene	50 ppm	170 ppm	1,000 ppm
1,3-dichlorobenzene	6 ppm	66 ppm	400 ppm
1,4-dichlorobenzene	30 ppm	170 ppm	1,000 ppm
hexachlorobenzene	0.006 mg/m3	14 mg/m3	91 mg/m3
hexachlorobutadiene	Not Available	Not Available	Not Available
hexachlorocyclopentadiene	0.03 ppm	0.55 ppm	1 ppm
hexachloroethane	3 ppm	36 ppm	300 ppm
1,2,4,5-tetrachlorobenzene	0.66 mg/m3	7.2 mg/m3	340 mg/m3
1,2,4-trichlorobenzene	0.45 ppm	5 ppm	20 ppm
n-hexane	260 ppm	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
2-chloronaphthalene	Not Available	Not Available
1,2-dichlorobenzene	200 ppm	Not Available
1,3-dichlorobenzene	Not Available	Not Available
1,4-dichlorobenzene	150 ppm	Not Available
hexachlorobenzene	Not Available	Not Available
hexachlorobutadiene	Not Available	Not Available
hexachlorocyclopentadiene	Not Available	Not Available
hexachloroethane	300 ppm	Not Available
1,2,4,5-tetrachlorobenzene	Not Available	Not Available
1,2,4-trichlorobenzene	Not Available	Not Available
n-hexane	1,100 ppm	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
2-chloronaphthalene	D	> 0.01 to ≤ 0.1 mg/m³
1,3-dichlorobenzene	E	≤ 0.1 ppm
1,2,4,5-tetrachlorobenzene	E	≤ 0.01 mg/m³
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Individual protection measures, such as personal protective equipment	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
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.
Body protection	See Other protection below

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Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety 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.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Chlorinated Hydrocarbons in Hexane

Material	CPI
BUTYL	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/CHLOROBUTYL	C
VITON/NITRILE	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

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

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AX-AUS P2	-	AX-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AX-AUS / Class 1 P2	-
up to 100 x ES	-	AX-2 P2	AX-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, 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 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Contains a chemical subject to Prior Informed Consent (PIC) Regulation which administers the import and export of certain hazardous chemicals and places obligations on companies who wish to export these chemicals to non-EU countries. It aims to promote shared responsibility and cooperation in the international trade of hazardous chemicals, and to protect human health and the environment by providing developing countries with information on how to store, transport, use and dispose of hazardous chemicals safely. This Regulation implements, within the European Union, the Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade. The PIC Regulation applies to banned or severely restricted chemicals listed in Annex I, containing industrial chemicals, pesticides and biocides. The export of these chemicals is subject to two types of requirement: export notification and explicit consent. The PIC Regulation also applies to chemicals that are banned for export as listed in Annex V and to all chemicals when exported regarding their packaging and labelling, which must comply with relevant EU legislation. Clear liquid

Physical state	Liquid	**Relative density (Water = 1)**	0.660
Odour	Characteristic	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	234
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	-95	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	68 - 70	**Molecular weight (g/mol)**	Not Available

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Flash point (°C)	-26	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	HIGHLY FLAMMABLE.	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	7.7	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	1.2	**Volatile Component (%vol)**	>99
Vapour pressure (kPa)	16.67	**Gas group**	Not Available
Solubility in water	Immiscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	3.0	**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
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Intoxication, depression of the central nervous system and death can occur at high concentrations. Individuals exposed to higher concentrations may show anaemia, weakness, dizziness, weight loss, vomiting, liver and kidney damage. Long term inhalational exposure causes lung damage and painful irritation of the nose and eyes at higher doses. There may be tremors, eye cataracts and distortion of smell. 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. 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 vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.
Ingestion	Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. Inhalation and oral exposure to dichlorobenzene causes increase in liver weight at low levels and severe liver degeneration, tremors, central nervous system depression and death at higher levels. It is readily absorbed through the gut and airways. Absorption through the skin is unknown. Repeated and long term use may cause blurred vision, kidney damage, poor development of the bone marrow, damage to the lining of the nose and small bowel, as well as deposits in the heart and skeletal muscle. 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. Chronic inhalation or skin exposure to n-hexane may cause damage to nerve ends in extremities, e.g. finger, toes with loss of sensation.
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. 1,2-dichlorobenzene (DCB) can be irritating when applied to the skin. Skin inflammation has been noted after a follow-up patch test. Skin lesions may be characterised by a burning sensation and diffuse redness of the treated area which progresses to a darker red colour and blisters within 24 hours and a brown pigment after 3 months. 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. 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. The liquid may be able to be mixed with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives.
Eye	Undiluted 1,2-dichlorobenzene (DCB) applied to the eye may cause pain and slight eye irritation which may clear within 5 days without residual injury. Vapours from heated 1,4-DCB may cause mild corneal damage. Solid particles in the eye are reported to be very painful. However, a workplace study showed no evidence of adverse effects in workers with particular reference to eye lesions including cataracts though painful irritation of eyes and nose were recorded. Application of dioxins to the eye may produce irritation, inflammation of eyelids and conjunctiva, and irritation of other mucous membranes.

Continued...

	Limited evidence or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals. Prolonged eye contact may cause inflammation characterised by a temporary redness of the conjunctiva (similar to windburn).
Chronic	There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. 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, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Ample evidence exists that this material directly causes reduced fertility Ample evidence exists that developmental disorders are directly caused by human exposure to the material. Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Chronic inhalation or skin exposure to n-hexane may cause damage to nerve ends in extremities, e.g. finger, toes with loss of sensation. Long term inhalation of dichlorobenzenes may cause cancerous changes to liver, kidney, thyroid gland and blood. Some evidence suggests a link between exposure and blood cancer (leukaemia). Workers exposed to the vapour experienced nose and eye irritation. The liver, nervous system and blood are systemic targets. 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.

Chlorinated Hydrocarbons in Hexane	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

2-chloronaphthalene	**TOXICITY**	**IRRITATION**
	Oral (Mouse) LD50; 886 mg/kg[2]	Not Available

1,2-dichlorobenzene	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: 5000 mg/kg[2]	Eye(rabbit):100mg/30s rinse-mild
	Inhalation(Rat) LC50: 8.15 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: 500 mg/kg[2]	Skin: adverse effect observed (irritating)[1]

1,3-dichlorobenzene	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation(Rat) LC50: >17.6 mg/l4h[2]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: ~580 mg/kg[2]	

1,4-dichlorobenzene	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye (human): 80 ppm
	Inhalation(Rat) LC50: >5.07 mg/l4h[1]	
	Oral (Rat) LD50: 500 mg/kg[2]	

hexachlorobenzene	**TOXICITY**	**IRRITATION**
	Inhalation(Rat) LC50: 3.6 mg/L4h[2]	Not Available
	Oral (Cat) LD50; 1700 mg/kg[2]	

hexachlorobutadiene	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 100 mg/kg[2]	Eye (rabbit): 162 mg - mild
	Inhalation(Mouse) LC50; 0.37 mg/L4h[2]	Eye (rabbit): 500 mg/24h
	Oral (Mouse) LD50; 51 mg/kg[2]	Skin (rabbit): 500 mg/24h - mild
		SKIN (RABBIT): 810 MG/24H -moderate

hexachlorocyclopentadiene	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 430 mg/kg[2]	Eye (rabbit): 100 mg/5m - SEVERE
	Inhalation(Rat) LC50: 0.018 mg/L4h[2]	EYE (RABBIT): 20 MG/24H - moderate
	Oral (Mouse) LD50; 505 mg/kg[2]	Eye: adverse effect observed (irreversible damage)[1]
		Skin (g.pig): 20 mg - mild
		Skin (monkey): 10 mg - SEVERE
		Skin (rabbit): 500 mg/4h - SEVERE
		Skin: adverse effect observed (corrosive)[1]

Continued...

hexachloroethane	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 32000 mg/kg[2]	Not Available
	Oral (Rat) LD50: 4460 mg/kg[2]	
1,2,4,5-tetrachlorobenzene	**TOXICITY**	**IRRITATION**
	Oral (Mouse) LD50; 1035 mg/kg[2]	Not Available
1,2,4-trichlorobenzene	**TOXICITY**	**IRRITATION**
	dermal (mouse) LD50: 300 mg/kg[2]	Skin (rabbit): 1950 mg/13w - I- moderate
	Oral (Rat) LD50: 756 mg/kg[2]	
n-hexane	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye(rabbit): 10 mg - mild
	Inhalation(Rat) LC50: 48000 ppm4h[2]	
	Oral (Rat) LD50: 28710 mg/kg[2]	
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

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. The main target organs are liver and fat tissue (besides kidney and lung), both showing a high retention, especially for higher chlorinated congeners such as 1,2,3,4,6,7/1,2,3,5,6,7-hexachloronaphthalene. Half-lives of 1,2,3,4,6,7/1,2,3,5,6,7-hexachloronaphthalene were calculated to be 41 days in adipose tissue and 26 days in the liver of rats. Calculations with monitoring data from human blood samples suggested half-lives of 1.5-2.4 years for these hexa-isomers in humans.
1,2-DICHLOROBENZENE	Diffuse and zonal hepatocellular necrosis, lachrymation, general anaesthesia, paternal effects, specific developmental anormalities (musculoskeletal sysytem) recorded.
1,4-DICHLOROBENZENE	Eye effects, respiratory tract changes, diarrhoea, specific developmental effects (cardiovascular system) recorded.
HEXACHLOROBENZENE	Neoplastic by RTEC criteria Carcinogenic by RTEC criteria Reproductive effector in rats No significant acute toxicological data identified in literature search. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
HEXACHLOROBUTADIENE	Somnolence, irritability, effects on fertility, foetotoxicity, specific developmental abnormalities (central nervous system), effects on newborn recorded.
HEXACHLOROCYCLOPENTADIENE	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
1,2,4,5-TETRACHLOROBENZENE	General anaesthesia, somnolence, convulsions, changes in motor activity, muscle weakness recorded. Animal testing shows that tetrachlorobenzene can affect the blood, increase organ weight and cause dose-dependent damage to the kidney and liver. The tolerable daily intake based on animal data is about 3.4 micrograms/kilogram body weight/day.
1,2,4-TRICHLOROBENZENE	Bacterial mutagen Altered sleep times, somnolence, convulsions, ataxia, maternal effects, effects on embryo, foetotoxicity, foetolethality recorded. Trichlorobenzenes (TCBs) are moderately toxic if swallowed or inhaled. They produce irritation of the skin, eyes and airways. Chronic exposure has caused aplastic anaemia. They are toxic to the liver, and it is currently unknown whether they cause long-term toxicity or cancer. Animal testing showed that skin contact was associated with toxicity, with skin damage and decreased survival, often due to airway infection, tumours and accumulation of amyloid.
Chlorinated Hydrocarbons in Hexane & 1,2-DICHLOROBENZENE & HEXACHLOROCYCLOPENTADIENE & HEXACHLOROETHANE & 1,2,4-TRICHLOROBENZENE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
Chlorinated Hydrocarbons in Hexane & 2-CHLORONAPHTHALENE & 1,2,4,5-TETRACHLOROBENZENE	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions.
Chlorinated Hydrocarbons in Hexane & 1,2-DICHLOROBENZENE & 1,3-DICHLOROBENZENE & 1,4-DICHLOROBENZENE & HEXACHLOROBENZENE & 1,2,4,5-TETRACHLOROBENZENE & 1,2,4-TRICHLOROBENZENE	Chlorobenzenes produce several clinical symptoms including eye and airway irritation, blood disorders, abnormal skin changes and foetal defects at levels toxic to the mother. They are well absorbed in the stomach, gut and airways, and well metabolised and excreted in the urine. Lethal doses may produce breathing failure and damage to the liver, kidneys, adrenal glands, mucous membranes, and brain.
Chlorinated Hydrocarbons in Hexane & 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. Dermal absorption is believed to be very low. Following absorption, it is distributed throughout the body. Greatest levels have been found in the fat, kidney, and liver.
Chlorinated Hydrocarbons in Hexane & HEXACHLOROBENZENE	Side-reactions during manufacture of the parent compound may result in the production of trace amounts of polyhalogenated aromatic hydrocarbon(s). Halogenated phenols, and especially their alkali salts, can condense above 300 deg. Polyhalogenated aromatic hydrocarbons (PHAHs) can cause effects on hormones and mimic thyroid hormone. Acne, discharge in the eye, eyelid swellings and visual disturbances may occur.

Continued...

1,2-DICHLOROBENZENE & HEXACHLOROBUTADIENE & N-HEXANE	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
1,2-DICHLOROBENZENE & HEXACHLOROCYCLOPENTADIENE	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. Repeated exposures may produce severe ulceration.
1,2-DICHLOROBENZENE & 1,3-DICHLOROBENZENE & HEXACHLOROBUTADIENE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
1,4-DICHLOROBENZENE & HEXACHLOROBENZENE & HEXACHLOROETHANE	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
1,4-DICHLOROBENZENE & HEXACHLOROETHANE	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep. of Health & Human Services 2002*]
HEXACHLOROBUTADIENE & 1,2,4-TRICHLOROBENZENE	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.

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

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

SECTION 12 Ecological information

Toxicity

Chlorinated Hydrocarbons in Hexane

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

2-chloronaphthalene

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

1,2-dichlorobenzene

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	0.441-0.985mg/L	4
NOEC(ECx)	504h	Crustacea	0.005mg/l	4
LC50	96h	Fish	1.4mg/l	4
BCF	1344h	Fish	90-260	7
EC50	72h	Algae or other aquatic plants	12.8mg/l	4
EC50	96h	Algae or other aquatic plants	2.2mg/L	5

1,3-dichlorobenzene

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96h	Fish	12.7mg/l	Not Available
BCF	1344h	Fish	57-229	7
EC50	72h	Algae or other aquatic plants	5.9mg/l	2
EC50	48h	Crustacea	1.2mg/l	2
EC50	96h	Algae or other aquatic plants	36.708-97.888mg/L	4
NOEC(ECx)	504h	Crustacea	<0.1mg/l	2

1,4-dichlorobenzene

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	1.6mg/L	5
BCF	840h	Fish	33-72	7
EC50	72h	Algae or other aquatic plants	31mg/l	2
EC50	48h	Crustacea	0.7mg/l	2
LC50	96h	Fish	0.88mg/l	4
EC50(ECx)	24h	Algae or other aquatic plants	<0.001mg/L	4

hexachlorobenzene

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	0.005mg/l	Not Available
EC50	96h	Algae or other aquatic plants	>0.01mg/l	1

Continued...

	LC50	96h	Fish	7.6mg/l	Not Available
	EC50(ECx)	48h	Crustacea	0.005mg/l	Not Available

hexachlorobutadiene					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	BCF	1440h	Fish	4020-9240	7
	NOEC(ECx)	336h	Fish	0.005mg/l	4
	LC50	96h	Fish	0.06-0.14mg/l	4

hexachlorocyclopentadiene					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	96h	Algae or other aquatic plants	0.19mg/l	1
	LC50	96h	Fish	0.0037mg/l	1
	NOEC(ECx)	672h	Crustacea	0.0003mg/l	4

hexachloroethane					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	0.88mg/l	2
	EC50	48h	Crustacea	1.359mg/L	4
	EC50	96h	Algae or other aquatic plants	8.05-35.756mg/L	4
	LC50	96h	Fish	0.712-1.03mg/l	4
	NOEC(ECx)	768h	Fish	0.069mg/l	4
	BCF	1008h	Fish	1-6.8	7

1,2,4,5-tetrachlorobenzene					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	BCF	1344h	Fish	1650-3930	7
	EC50	72h	Algae or other aquatic plants	4.21-30mg/L	4
	EC50	96h	Algae or other aquatic plants	4.3-11mg/L	4
	EC10(ECx)	96h	Fish	0.05-0.09mg/l	4
	LC50	96h	Fish	>0.089mg/l	4

1,2,4-trichlorobenzene					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	>=1.46<=2.63mg/l	2
	EC50	48h	Crustacea	0.49-1.016mg/L	4
	EC50	96h	Algae or other aquatic plants	0.63mg/l	2
	ErC50	72h	Algae or other aquatic plants	36.7mg/l	1
	LC50	96h	Fish	0.6715-0.88976mg/l	4
	EC50(ECx)	24h	Crustacea	0.0012mg/l	4

n-hexane					
	Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96h	Fish	113mg/l	4
	EC50(ECx)	4h	Algae or other aquatic plants	0.1202mg/l	4

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 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.
For n-Hexane: Log Kow: 3.17-3.94; Henry s Law Constant: 1.69 atm-m3 mol; Vapor Pressure: 150 mm Hg @ 25 C; Log Koc: 2.90 to 3.61. BOD 5, (if unstated): 2.21; COD: 0.04; ThOD: 3.52.
Atmospheric Fate: n-Hexane is not expected to be directly broken down by sunlight. The main atmospheric removal mechanism is through reactions with hydroxyl radicals, with an approximant half-life of 2.9 days.
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.
For Chlorobenzines:
Environmental Fate: Chlorobenzenes are removed from the environment principally by biological mechanisms; however, they are considered moderately persistent in water, air, and sediments. Residence times of 1 day in rivers and over 100 days in ground water have been reported.
Atmospheric Fate: Chemical and photolytic reactions are presumed to be the predominant pathways for chlorobenzene degradation, with residence times in the range of 13-116 days.
Aquatic Fate: Many microorganisms from sediments and sewage sludge have been shown to degrade chlorobenzenes; however, higher chlorinated compounds are less readily degraded and such degradation occurs only under aerobic conditions.
Whereas 1,2- and 1,3-dichlorobenzene (DCB) are liquids at room temperature, 1,4-DCB is a solid that sublimes readily. Sublimation rates of 1,4-DCB from consumer products were measured at 1.6x10-3 to 4.6x10-3 g/minute at temperatures ranging from 21 to 24 °C during a 19-day test period. DCBs tend to volatilise to the atmosphere from soil and water at a relatively rapid rate. Volatilisation from surface soil may be an important transport mechanism for DCBs but adsorption to soil particulates may inhibit volatilisation.
DO NOT discharge into sewer or waterways.

Continued...

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
2-chloronaphthalene	HIGH	HIGH
1,2-dichlorobenzene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 63.67 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)
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
1,2,4,5-tetrachlorobenzene	HIGH (Half-life = 360 days)	HIGH (Half-life = 317.96 days)
1,2,4-trichlorobenzene	HIGH (Half-life = 360 days)	LOW (Half-life = 53.5 days)
n-hexane	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
2-chloronaphthalene	LOW (LogKOW = 3.1293)
1,2-dichlorobenzene	LOW (BCF = 260)
1,3-dichlorobenzene	HIGH (BCF = 6918)
1,4-dichlorobenzene	LOW (BCF = 190)
hexachlorobenzene	HIGH (BCF = 575440)
hexachlorobutadiene	HIGH (BCF = 9240)
hexachlorocyclopentadiene	MEDIUM (BCF = 1634)
hexachloroethane	LOW (BCF = 8.5)
1,2,4,5-tetrachlorobenzene	HIGH (BCF = 4830)
1,2,4-trichlorobenzene	HIGH (BCF = 4420)
n-hexane	MEDIUM (LogKOW = 3.9)

Mobility in soil

Ingredient	Mobility
2-chloronaphthalene	LOW (KOC = 2976)
1,2-dichlorobenzene	LOW (KOC = 443.1)
1,3-dichlorobenzene	LOW (KOC = 434)
1,4-dichlorobenzene	LOW (KOC = 434)
hexachlorobenzene	LOW (KOC = 3380)
hexachlorobutadiene	LOW (KOC = 993.5)
hexachlorocyclopentadiene	LOW (KOC = 1667)
hexachloroethane	LOW (KOC = 224.7)
1,2,4,5-tetrachlorobenzene	LOW (KOC = 1186)
1,2,4-trichlorobenzene	LOW (KOC = 717.6)
n-hexane	LOW (KOC = 149)

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. ▸ **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.

Continued...

	▸ 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. ▸ 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.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

UN number or ID number	1208
UN proper shipping name	HEXANES
Transport hazard class(es)	Class: 3 Subsidiary risk: Not Applicable
Packing group	II
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

UN number	1208
UN proper shipping name	Hexanes
Transport hazard class(es)	ICAO/IATA Class: 3 ICAO / IATA Subrisk: Not Applicable ERG Code: 3H
Packing group	II
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1208
UN proper shipping name	HEXANES
Transport hazard class(es)	IMDG Class: 3 IMDG Subrisk: Not Applicable
Packing group	II
Environmental hazard	Marine Pollutant

Continued...

Special precautions for user	EMS Number	F-E, S-D
	Special provisions	Not Applicable
	Limited Quantities	1 L

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

Not Applicable

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

Product name	Group
2-chloronaphthalene	Not Available
1,2-dichlorobenzene	Not Available
1,3-dichlorobenzene	Not Available
1,4-dichlorobenzene	Not Available
hexachlorobenzene	Not Available
hexachlorobutadiene	Not Available
hexachlorocyclopentadiene	Not Available
hexachloroethane	Not Available
1,2,4,5-tetrachlorobenzene	Not Available
1,2,4-trichlorobenzene	Not Available
n-hexane	Not Available

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
2-chloronaphthalene	Not Available
1,2-dichlorobenzene	Not Available
1,3-dichlorobenzene	Not Available
1,4-dichlorobenzene	Not Available
hexachlorobenzene	Not Available
hexachlorobutadiene	Not Available
hexachlorocyclopentadiene	Not Available
hexachloroethane	Not Available
1,2,4,5-tetrachlorobenzene	Not Available
1,2,4-trichlorobenzene	Not Available
n-hexane	Not Available

SECTION 15 Regulatory information

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

2-chloronaphthalene is found on the following regulatory lists

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

1,2-dichlorobenzene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

1,3-dichlorobenzene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

1,4-dichlorobenzene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

hexachlorobenzene is found on the following regulatory lists

Continued...

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination
Stockholm Convention on Persistent Organic Pollutants (POPs) - Annex C: Unintentional Production
United Nations List of Prior Informed Consent Chemicals
WHO Recommended Classification of Pesticides by Hazard - Table 7. Pesticides subject to the Rotterdam Convention

hexachlorobutadiene is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination
Stockholm Convention on Persistent Organic Pollutants (POPs) - Annex C: Unintentional Production

hexachlorocyclopentadiene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)

hexachloroethane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

1,2,4,5-tetrachlorobenzene is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

1,2,4-trichlorobenzene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List

n-hexane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (2-chloronaphthalene; 1,2,4,5-tetrachlorobenzene)
Canada - DSL	Yes
Canada - NDSL	No (2-chloronaphthalene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; hexachlorobenzene; hexachlorobutadiene; hexachlorocyclopentadiene; hexachloroethane; 1,2,4,5-tetrachlorobenzene; 1,2,4-trichlorobenzene; n-hexane)
China - IECSC	No (2-chloronaphthalene)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	No (2-chloronaphthalene; hexachlorobenzene; 1,2,4,5-tetrachlorobenzene)
New Zealand - NZIoC	No (2-chloronaphthalene; hexachlorobenzene; hexachlorobutadiene; 1,2,4,5-tetrachlorobenzene)
Philippines - PICCS	No (2-chloronaphthalene; 1,2,4,5-tetrachlorobenzene)
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	No (2-chloronaphthalene)
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	11/07/2023
Initial Date	11/07/2023

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average

Continued...

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
ES: Exposure Standard
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
AIIC: Australian Inventory of Industrial Chemicals
DSL: Domestic Substances List
NDSL: Non-Domestic Substances List
IECSC: Inventory of Existing Chemical Substance in China
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European List of Notified Chemical Substances
NLP: No-Longer Polymers
ENCS: Existing and New Chemical Substances Inventory
KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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end of SDS