

# Isooctane Blank Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code: 3

Issue Date: **06/03/2025** Print Date: **06/03/2025** S.GHS.AUS.EN

### SECTION 1 Identification of the substance / mixture and of the company / undertaking

#### **Product Identifier**

Product name	Isooctane Blank
Chemical Name	2,2,4-trimethylpentane
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-BL

#### 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

### Emergency telephone number

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	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, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H410	Very toxic to aquatic life with long lasting effects.

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#### Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.

#### Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

#### Precautionary statement(s) Storage

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

#### Precautionary statement(s) Disposal

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
540-84-1	100	2,2,4-trimethylpentane
Legend:	Classified by Chemwatch; 2. Classification drav Classification drawn from C&L * EU IOELVs avail	vn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4.

#### **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	<ul> <li>If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li> <li>Other measures are usually unnecessary.</li> </ul>
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

# 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]

# **SECTION 5 Firefighting measures**

## Extinguishing media

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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 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. Fire/Explosion Hazard Combustion products include: carbon dioxide (CO2) other pyrolysis products typical of burning organic material. Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions. **HAZCHEM** 3YE

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

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

#### **SECTION 7 Handling and storage**

#### Precautions for 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. Contains low boiling substance: Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately. ▶ Check for bulging containers Safe handling Vent periodically ▶ Always release caps or seals slowly to ensure slow dissipation of vapours · Electrostatic discharge may be generated during pumping - this may result in fire. $\boldsymbol{\cdot}$ 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. 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 Store in original containers in approved flame-proof area No smoking, naked lights, heat or ignition sources. Other information 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	<ul> <li>Glass container is suitable for laboratory quantities</li> <li>Packing as supplied by manufacturer.</li> <li>Plastic containers may only be used if approved for flammable liquid.</li> <li>Check that containers are clearly labelled and free from leaks.</li> <li>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.</li> <li>For materials with a viscosity of at least 2680 cSt. (23 deg. C)</li> <li>For manufactured product having a viscosity of at least 250 cSt.</li> </ul>		
Storage incompatibility	<ul> <li>Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:</li> <li>Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.</li> <li>Are incompatible with halogens.</li> <li>Can create static charges due to their low conductivity, leading to an accumulation of static charge.</li> <li>Avoid reaction with oxidising agents</li> </ul>		

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n-Octane/ iso-octane:

- reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- may generate electrostatic charges on agitation or flow, due to low conductivity.

#### SECTION 8 Exposure controls / personal protection

#### **Control parameters**

Occupational Exposure Limits (OEL)

#### INGREDIENT DATA

Not Available

Ingredient	Original IDLH	Revised IDLH
2,2,4-trimethylpentane	Not Available	Not Available

#### **Exposure controls**

#### Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

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

#### ▶ Wear chemical protective gloves, e.g. PVC. Wear safety footwear or safety gumboots, e.g. Rubber

# Hands/feet protection

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.

Neoprene rubber gloves

# **Body protection**

# See Other protection below

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

# Other protection

- ▶ 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 computergenerated selection:

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Material	CPI
NITRILE	A
NEOPRENE	В
PVA	В
NATURAL RUBBER	С

- \* 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.

# Ansell Glove Selection

#### Respiratory protection

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

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 / Class1	-
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 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 = 
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Glove — In order of recommendation	
AlphaTec® 58-530B	
AlphaTec® 58-530W	
AlphaTec® 79-700	
AlphaTec® Solvex® 37-675	
TouchNTuff® 92-500	
TouchNTuff® 92-600	
TouchNTuff® 92-605	
TouchNTuff® 93-250	
TouchNTuff® 93-700	
AlphaTec® 15-554	

The suggested gloves for use should be confirmed with the glove supplier.

Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

**Enclosed Space Ignition** 

Deflagration Density (g/m3)

Not Available

- 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**

Appearance	Clear		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.9	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available

# **SECTION 10 Stability and reactivity**

**Enclosed Space Ignition** 

Time Equivalent (s/m3)

Not Available

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
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 ef	fects
a) Acute Toxicity	There is sufficient evidence to classify this material as acutely toxic.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	Based on available data, the classification criteria are not met.
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	Based on available data, the classification criteria are not met.

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h) STOT - Single Exposure	There is sufficient evidence to classify this material a	as toxic to specific organs through si	ngle exposure
i) STOT - Repeated Exposure	Based on available data, the classification criteria are not met.		
j) Aspiration Hazard	There is sufficient evidence to classify this material as an aspiration hazard		
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 vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.  Inhalation of 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.  Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.  Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.		
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.  Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea.  Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed.  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.		
Skin Contact	This material can cause inflammation of the skin on a The material may accentuate any pre-existing derma Skin exposure to isoparaffins may produce slight to roccurred.  Open cuts, abraded or irritated skin should not be exentry into the blood-stream, through, for example, conskin prior to the use of the material and ensure that a The liquid may be able to be mixed with fats or oils a dermatitis. The material is unlikely to produce an irrit	atitis condition moderate irritation in animals and husposed to this material ats, abrasions or lesions, may produany external damage is suitably protend may degrease the skin, producir	ce systemic injury with harmful effects. Examine the ected.  g a skin reaction described as non-allergic contact
Еуе	This material can cause eye irritation and damage in some persons.  Instillation of isoparaffins into rabbit eyes produces only slight irritation.		
Chronic	Long-term exposure to the product is not thought to animal models); nevertheless exposure by all routes		
Isooctane Blank	TOXICITY  Not Available	IRRITATION	
	Not / Wallable	Not Available	
2,2,4-trimethylpentane	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>	IRRITATION  Eye: no adverse effect of Skin: adverse effect obs	observed (not irritating) <sup>[1]</sup> erved (irritating) <sup>[1]</sup> observed (not irritating) <sup>[1]</sup>
2,2,4-trimethylpentane  Legend:	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>	IRRITATION  Eye: no adverse effect of Skin: adverse effect obs Skin: no adverse effect	erved (irritating) <sup>[1]</sup> observed (not irritating) <sup>[1]</sup>
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Legend:	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup> 1. Value obtained from Europe ECHA Registered Suspecified data extracted from RTECS - Register of Toxicological Condition known as reactive airways dysfunction syncompound. Main criteria for diagnosing RADS include of persistent asthma-like symptoms within minutes to include a reversible airflow pattern on lung function to	IRRITATION  Eye: no adverse effect observer of the management of the months of the color of the col	berved (irritating) <sup>[1]</sup> cobserved (not irritating) <sup>[1]</sup> cotained from manufacturer's SDS. Unless otherwise  cerial ends. This may be due to a non-allergic  cer exposure to high levels of highly irritating  disease in a non-atopic individual, with sudden onse  co the irritant. Other criteria for diagnosis of RADS  expoperreactivity on methacholine challenge testing,  forgredient Review (CIR) Expert Panel.  1% to 90% concentration range. The CIR Expert  certains are safe in the present practices of use and  exposure to isoparaffins, but the dermal and ocular  con, no sensitization or photosensitization, and no  for the following end points: genotoxicity, reproductive  the Expert Panel noted the involvement of a2u-  ation in male rats of various strains in oral and  exposure to the carbon chain lengths likely  cyclo-paraffins.  rious species. In many cases, the hydrophobic  dappear unchanged as in the lipoprotein particles in
Legend:  2,2,4-TRIMETHYLPENTANE  Isooctane Blank & 2,2,4-	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup> 1. Value obtained from Europe ECHA Registered Suspecified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of the specified of the specified data extracted from RTECS - Register of Technologies of Tech	IRRITATION  Eye: no adverse effect observer of the management of the months of the color of the col	berved (irritating) <sup>[1]</sup> cobserved (not irritating) <sup>[1]</sup> cotained from manufacturer's SDS. Unless otherwise  cerial ends. This may be due to a non-allergic  cer exposure to high levels of highly irritating  disease in a non-atopic individual, with sudden onse  co the irritant. Other criteria for diagnosis of RADS  expoperreactivity on methacholine challenge testing,  forgredient Review (CIR) Expert Panel.  1% to 90% concentration range. The CIR Expert  certains are safe in the present practices of use and  exposure to isoparaffins, but the dermal and ocular  con, no sensitization or photosensitization, and no  for the following end points: genotoxicity, reproductive  the Expert Panel noted the involvement of a2u-  ation in male rats of various strains in oral and  exposure to the carbon chain lengths likely  cyclo-paraffins.  rious species. In many cases, the hydrophobic  dappear unchanged as in the lipoprotein particles in
Legend:  2,2,4-TRIMETHYLPENTANE  Isooctane Blank & 2,2,4- TRIMETHYLPENTANE  Acute Toxicity Skin Irritation/Corrosion	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup> 1. Value obtained from Europe ECHA Registered Suspecified data extracted from RTECS - Register of Total (Rat) LD50: >5000 mg/kg <sup>[1]</sup> Asthma-like symptoms may continue for months or econdition known as reactive airways dysfunction syncompound. Main criteria for diagnosing RADS included persistent asthma-like symptoms within minutes to include a reversible airflow pattern on lung function that the lack of minimal lymphocytic inflammation, with the safety of isoparaffins as used in cosmetic productions in the safety of isoparaffins as used in cosmetic productions in the safety of isoparaffins as used in cosmetic productions in the cliR Expert Panel noted that most of the available exposure data that were available, suggested mild on phototoxicity. No significant toxicity was identified in and developmental toxicity, or carcinogenicity. Nephroglobulin in the mechanism for isoparaffin-induced ne inhalation exposure studies.  Animal studies indicate that normal, branched and coparaffins is inversely proportional to the carbon chair to be present in mineral oil, n-paraffins may be absorted the paraffins is inversely proportional to the carbon chair to be present in mineral oil, n-paraffins may be absorted the paraffins is inversely proportional to the carbon chair to be present in mineral oil, n-paraffins may be absorted the paraffins is inversely proportional to the carbon chair to be present in mineral oil, n-paraffins may be absorted the major classes of hydrocarbons are well absorbed hydrocarbons are ingested in association with fats in the gut lymph, but most hydrocarbons partly separations.	IRRITATION  Eye: no adverse effect observer of the same of the sam	between the content of the content o
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#### **SECTION 12 Ecological information**

#### Toxicity

Isooctane Blank	Endpoint	Test Duration (hr)	Species	Value		Source
	Not Available	Not Available	Not Available	Not Avai	ilable	Not Available
	Endpoint	Test Duration (hr)	Specie	es	Value	Source
2,2,4-trimethylpentane	BCF	672h	Fish		440-580	7
	EC50	48h	Crusta	icea	0.4mg/l	2
	NOEC(ECx)	504h	Crusta	icea	0.17mg/l	2
	LC50	96h	Fish		0.11mg/l	2
						·
Legend:	Extracted from 1. IUC	CLID Toxicity Data 2. Europe ECH	A Registered Substances	- Ecotoxicologica	I Information - A	Aquatic Toxicity 4. US

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

(Japan) - Bioconcentration Data 8. Vendor Data

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.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

# DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air	
2,2,4-trimethylpentane	HIGH	HIGH	

# Bioaccumulative potential

Ingredient	Bioaccumulation
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

#### Mobility in soil

Ingredient	Mobility
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

#### **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.

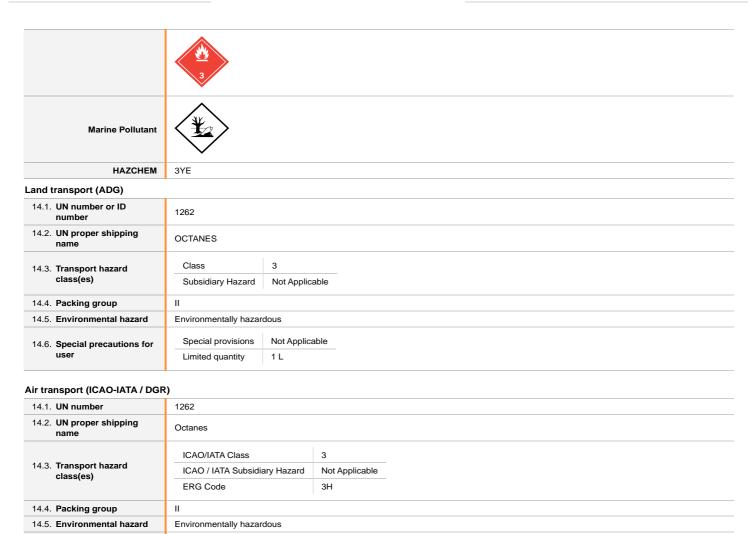
- ▶ DO NOT allow wash water from cleaning or process equipment to enter drains
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers.

#### **SECTION 14 Transport information**

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#### Sea transport (IMDG-Code / GGVSee)

14.6. Special precautions for

user

14.1. UN number	1262	
14.2. UN proper shipping name	OCTANES	
14.3. Transport hazard class(es)	IMDG Class IMDG Subsidiary Haz	ard Not Applicable
14.4. Packing group	II	
14.5 Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number Special provisions Limited Quantities	F-E , S-E Not Applicable 1 L

Not Applicable

364

60 L

353

5 L

1 L

Y341

# 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Special provisions

Cargo Only Packing Instructions

Cargo Only Maximum Qty / Pack

Passenger and Cargo Packing Instructions

Passenger and Cargo Maximum Qty / Pack

Passenger and Cargo Limited Quantity Packing Instructions

Passenger and Cargo Limited Maximum Qty / Pack

Product name	Group
2,2,4-trimethylpentane	Not Available

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Product name	Ship Type
2,2,4-trimethylpentane	Not Available

### **SECTION 15 Regulatory information**

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

### 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

# **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status
Australia - AIIC / Australia Non- Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (2,2,4-trimethylpentane)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
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	06/03/2025
Initial Date	06/03/2025

# Other information

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
- 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
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships
- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- IBC: International Bulk Chemical Code
- ▶ 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

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- 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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# ASTM D7423 Calibration Standard - Level 1 Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code: 3

Issue Date: **06/03/2025** Print Date: **06/03/2025** S.GHS.AUS.EN

### SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier	
Product name	ASTM D7423 Calibration Standard - Level 1
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-01

# 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

# **SECTION 2 Hazards identification**

# Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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H225	Highly flammable liquid and vapour.		
H302	Harmful if swallowed.		
H304	May be fatal if swallowed and enters airways.		
H315	Causes skin irritation.		
H319	Causes serious eye irritation.		
H335	May cause respiratory irritation.		
H336	May cause drowsiness or dizziness.		
H410	Very toxic to aquatic life with long lasting effects.		
Precautionary statement(s) Pre	Precautionary statement(s) Prevention		
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.		
P271	Use only outdoors or in a well-ventilated area.		
P240	Ground and bond container and receiving equipment.		
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.		

### Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

# 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
75-07-0	0.001	<u>acetaldehyde</u>
67-64-1	0.001	<u>acetone</u>
107-18-6	0.001	allyl alcohol
123-72-8	0.001	<u>butyraldehyde</u>
71-36-3	0.001	n-butanol
75-65-0	0.001	tertiary butanol
78-92-2	0.001	2-butanol
60-29-7	0.001	diethyl ether
115-10-6	0.001	dimethyl ether
637-92-3	0.001	tert-butyl ethyl ether
64-17-5	0.001	<u>ethanol</u>
78-83-1	0.001	isobutanol
78-84-2	0.001	iso-butyraldehyde
67-63-0	0.001	isopropanol
108-20-3	0.001	di-iso-propyl ether
590-86-3	0.001	iso-valeraldehyde
67-56-1	0.001	methanol
78-93-3	0.001	methyl ethyl ketone
1634-04-4	0.001	methyl tert-butyl ether
110-62-3	0.001	<u>valeraldehyde</u>
123-38-6	0.001	<u>propionaldehyde</u>
71-23-8	0.001	n-propanol
111-43-3	0.001	dipropyl ether
994-05-8	0.001	tert-amyl methyl ether
540-84-1	99.976	2,2,4-trimethylpentane
Legend	1. Classified by Chemwatch; 2. Classificat Classification drawn from C&L * EU IOEL	tion drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4.

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

# **SECTION 7 Handling and storage**

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#### **ASTM D7423 Calibration Standard - Level 1**

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#### Precautions for 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.

# Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Safe handling

- 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

- Glass container is suitable for laboratory quantities
- 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.

#### and heat present.

- ▶ Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen
- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge. Acetic acid:

- ▶ vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide

Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

#### reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene

- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- Avoid reaction with oxidising agents

#### n-Octane/ iso-octane:

- ▶ reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- may generate electrostatic charges on agitation or flow, due to low conductivity.

### SECTION 8 Exposure controls / personal protection

#### Control parameters

# Occupational Exposure Limits (OEL)

Storage incompatibility

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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**ASTM D7423 Calibration Standard - Level 1** 

Australia Exposure Standards isobutanol Isobutyl alcohol 50 ppm / 152 mg/m3 Not Available Not Available Available  Australia Exposure Standards isopropanol Isopropyl alcohol 400 ppm / 983 mg/m3 1230 mg/m3 / 500 ppm Not Available Not Available Not Available  Australia Exposure Standards di-iso-propyl ether Isopropyl ether 250 ppm / 1040 ppm Not Available Not Available Not Available  Australia Exposure Standards methanol Methyl alcohol 200 ppm / 262 mg/m3 28 mg/m3 / 250 ppm / Not Available Not Available  Australia Exposure Standards methyl ethyl ketone (MEK) Methyl ethyl ketone (MEK) 150 ppm / 445 mg/m3 275 mg/m3 / 300 ppm Not Available Not Available  Australia Exposure Standards valeraldehyde n-Valeraldehyde 50 ppm / 176 mg/m3 Not Available Not Avai	Source	Ingredient	Material name	TWA		STEL	Peak	Notes
Australia Exposure Standards   sobutant   s	Australia Exposure Standards	ethanol	Ethyl alcohol		)	Not Available	Not Available	Not Available
Available Exposure Standards   4-liso-propyl ether   1-sopropyl ether	Australia Exposure Standards	isobutanol	Isobutyl alcohol	50 ppm / 152 mg	<sub>J</sub> /m3	Not Available	Not Available	Not Available
Australia Exposure Standards	Australia Exposure Standards	isopropanol	Isopropyl alcohol			_	Not Available	Not Available
Available Apustrus Standards   methyl ethyl ketone   Methyl ethyl ketone   mg/m3   pm   Not Available   Available   Available   Available   Methyl ethyl ketone   Methyl ethyl ketone   mg/m3   pm   Not Available   Not Available   Available   Available   Available   Methyl ethyl eth	Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether				Not Available	Not Available
Available xposure Standards   methyl tert-butyl   methyl tert-butyl tert-butyl tert-butyl tert-butyl   methyl tert-butyl   methyl tert-butyl   methyl tert-butyl   methyl tert-butyl   methyl tert-butyl te	Australia Exposure Standards	methanol	Methyl alcohol			_	Not Available	Not Available
Available	Australia Exposure Standards	methyl ethyl ketone				_	Not Available	Not Available
Australia Exposure Standards         valeraldenyde         6-0 ppm / 148 mg/m3         Not Available         Available         Available           Australia Exposure Standards         n-propanol         Propyl alcohol         200 ppm / 492 mg/m3         614 mg/m3 / 250 ppm         Not Available         Not Available           acetaldehyde         2,000 ppm         1,600 ppm         Not Available         1,600 ppm         Not Available           butyraldehyde         1,400 ppm         1,400 ppm         Not Available         Not Available           2-butanol         2,000 ppm         Not Available         Not Available           2-butanol         1,600 ppm         Not Available         Not Available           2-butanol         2,000 ppm         Not Available         Not Available           4 tert-butyl ether         Not Available         Not Available         Not Available           4 tert-butyl ethyl ether         Not Available         Not Available         Not Available           4 ethanol         1,600 ppm         Not Available         Not Available           4 ethanol         Not Available         Not Available         Not Available           4 ethanol         Not Available         Not Available         Not Available           4 ethanol         Not Available         Not Ava	Australia Exposure Standards		Methyl-tert butyl ether	25 ppm / 92 mg/s	m3	275 mg/m3 / 75 ppm	Not Available	Not Available
Available Exposure Standards         Pyropy alone         mg/m3         ppm of Not Available         Available           Ingredient         Original IDLH         Revised IDLH           acetaldehyde         2,000 ppm         Not Available         Not Available           acetone         2,500 ppm         Not Available         Not Available           butyraldehyde         Not Available         Not Available         Not Available           tertiary butanol         1,600 ppm         Not Available         Not Available           diethyl ether         Not Available         Not Available         Not Available           dimethyl ether         Not Available         Not Available         Not Available           ethanol         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-propyl ether         Not Available         Not Available         Not Available           iso-propyl ether         Not Available         Not Available         Not Available           iso-propyl ether </td <td>Australia Exposure Standards</td> <td>valeraldehyde</td> <td>n-Valeraldehyde</td> <td>50 ppm / 176 mg</td> <td>g/m3</td> <td>Not Available</td> <td>Not Available</td> <td>Not Available</td>	Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	g/m3	Not Available	Not Available	Not Available
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propionaldehyde Not Available Not Available	methyl tert-butyl ether	Not Available	Not Available		Not Available			
	valeraldehyde	Not Available			Not Available			
n-propanol 800 ppm Not Available	propionaldehyde	Not Available			Not Available			
	n-propanol	800 ppm			Not Available			

#### **Exposure controls**

tert-amyl methyl ether

2,2,4-trimethylpentane

dipropyl ether

# Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

Not Available

Not Available

Not Available

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



Not Available

Not Available

Not Available







# Eye and face protection

- ▶ Safety glasses with side shields
- ► Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]

advance and has therefore to be checked prior to the application.

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

#### tection See Hand protection below

## Hands/feet protection

▶ Wear chemical protective gloves, e.g. PVC.

• Wear safety footwear or safety gumboots, e.g. Rubber
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

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.

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	Personal hygiene is a key element of effective hand care.  ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

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Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> 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.

# **Ansell Glove Selection**

Glove — In order of recommendation
AlphaTec® 38-612
BioClean™ Ultimate BUPS
AlphaTec® 53-001
AlphaTec® 58-005
MICROFLEX® LifeStar EC™ 93-868
MICROFLEX® MidKnight® XTRA 93-862
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS
MICROFLEX® 93-732
MICROFLEX® SafeGrip™ SG-375

The suggested gloves for use should be confirmed with the glove supplier.

# **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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A	Clear		
Appearance	Clear		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	Enclosed Space Ignition Deflagration Density (g/m3)	Not Available

### **SECTION 10 Stability and reactivity**

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

# **SECTION 11 Toxicological information**

Information on toxicological effects

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

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.

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.

**Inhaled** Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose.

The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

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.

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#### **ASTM D7423 Calibration Standard - Level 1**

Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 1 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)[1]

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	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 20mg/24H - Moderate
butyraldehyde	Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
butyruidenyde	Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 410mg - Mild
	Crar (rat) 2500: 0000 mg/kg	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
		Chin. To datable check described (flot initiality)
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>	Eye (Human): 50ppm
	Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>	Eye (Human): 990ppm/1H
	Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.005mL - Severe
	(,	Eye (Rodent - rabbit): 0.1mL
n-butanol		Eye (Rodent - rabbit): 1.62mg - Severe
		Eye (Rodent - rabbit): 2mg/24H - Severe
		Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>
		Skin (Human): 20uL/20M
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin: adverse effect observed (irritating)[1]
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100uL/24H - Severe
tertiary butanol	Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 500uL/24H - Mild
		Skin: adverse effect observed (irritating) <sup>[1]</sup>
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe
2-butanol	Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	oral (nat) 22001 2001 mg/ng	Chair to de coso chect oscol to (the annual g)
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup>	Eye (Human): 100ppm
	Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL
	Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe
		Eye (Rodent - rabbit): 100mg - Moderate
diethyl ether		Eye (Rodent - rabbit): 100mg/24H - Moderate
		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
		Skin (Rodent - guinea pig): 50mg/24H - Severe
		Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
		Chin. To devote direct observed (Not initialing)
	TOXICITY	IRRITATION
dimethyl ether	Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 100uL/24H - Moderate
	Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
tert-butyl ethyl ether	milatation (rtat) 2000: Folloo mg/rm	
tert-butyl ethyl ether	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Moderate
tert-butyl ethyl ether	<u> </u>	Skin (Rodent - rabbit): 500uL/4H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
tert-butyl ethyl ether	<u> </u>	, , ,
	<u> </u>	, , ,
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100uL - Moderate		
		Eye	(Rodent - rabbit): 500mg - Severe	
		Eye	(Rodent - rabbit): 500mg/24H - Mild	
		Eye	: adverse effect observed (irritating) <sup>[1]</sup>	
		Eye	: no adverse effect observed (not irritating) <sup>[1]</sup>	
		Skin	(Human): 70%/2D	
		Skin	n (Rodent - rabbit): 20mg/24H - Moderate	
		Skir	(Rodent - rabbit): 400mg - Mild	
		Skin	n: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY		IRRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>	
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>			
	3 3			
	TOXICITY	IRRI	TATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye:	adverse effect observed (irritating) <sup>[1]</sup>	
iso-butyraldehyde	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>	Skin	(Rodent - rabbit): 397mg - Mild	
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin	no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IRR	ITATION	
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100mg - Severe	
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate	
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>		(Rodent - rabbit): 10mg - Moderate	
ioop.opuiio.	Otal (wouse) LD30, 3000 Hg/kg-		<u> </u>	
			: adverse effect observed (irritating) <sup>[1]</sup>	
			n (Rodent - rabbit): 500mg - Mild	
		SKIF	n: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IR	RITATION	
di-iso-propyl ether	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey	RITATION  ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E <sub>y</sub>	ye: no adverse effect observed (not irritating) <sup>[1]</sup>	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	E <sub>y</sub>	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey SH	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Ey SH SH	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup>	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY	Ey SH SH IRF Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild  xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Ey SH SH IRR Eye Eye Skir	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Ey SH SH IRF Eye Skii Skii	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Eye Skin Skin IRR	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup>	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Ey SH IRF Eye Skii Skii IRR Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Ski Ski IRR Eye Skii Skii Eye Eye Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Ski Ski Ski Ski Ski Ski Eye Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Eye Eye Eye Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	Eye Eye Eye Skirr Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye Eye Eye Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION (Human): 350ppm (Rodent - rabbit): 80mg	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Ey SH SH SH IRR Eye Skin Skin IRR Eye Eye Eye Eye Eye Eye Skir Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  n: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>	

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			Skin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	тохісіту	IRF	RITATION		
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eve	e: no adverse effect observed (not irritating) <sup>[1]</sup>		
methyl tert-butyl ether	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>		n: adverse effect observed (irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>		n: no adverse effect observed (not irritating) <sup>[1]</sup>		
	TOXICITY		RRITATION		
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>		Eye (Rodent - rabbit): 100mg/24H - Severe		
	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>		
valeraldehyde	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>		Skin (Rodent - guinea pig): 100% - Severe		
	Olai (Kat) LD50. 4561 Hig/kg <sup>c 2</sup>		Skin (Rodent - rabbit): 500mg/24H - Moderate		
			Skin: adverse effect observed (irritating) <sup>[1]</sup>		
	TOWNTY				
	TOXICITY		IRRITATION		
propionaldehyde	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>		Eye (Rodent - rabbit): 20mg/24H - Moderate		
	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>		Eye (Rodent - rabbit): 41mg - Severe		
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>		Skin (Rodent - rabbit): 500mg - Mild		
	TOXICITY	IRR	ITATION		
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 20mg/24H - Moderate		
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>	Eye	: adverse effect observed (irreversible damage) <sup>[1]</sup>		
	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>	Skir	n (Human): 100%/24H - Mild		
n-propanol		Skir	n (Human): 100%/47H - Mild		
		Skir	n (Human): 60%/24H		
		Skir	n (Rodent - rabbit): 500mg - Mild		
		Skir	n: no adverse effect observed (not irritating) <sup>[1]</sup>		
dipropyl ether	TOXICITY		IRRITATION		
dipropyi etner	Not Available		Not Available		
	TOXICITY	II	RRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E	ye (Rodent - rabbit): 100uL/24H - Severe		
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>	E	ye: no adverse effect observed (not irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Severe			
		S	kin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	TOXICITY		IRRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
2,2,4-trimethylpentane	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>		
	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: adverse effect observed (irritating)[1]  Skin: no adverse effect observed (not irritating)[1]		
Legend:	Value obtained from Europe ECHA Registered S     specified data extracted from RTECS - Register of				
Legend:	specified data extracted from RTECS - Register of	Toxic Effect of	f chemical Substances		
Legend:	specified data extracted from RTECS - Register of	Toxic Effect of	f chemical Substances		
Legend:	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, export producing mutation.  WARNING: This substance has been classified by	osure to the m	aterial may result in a possible risk of irreversible effects, with the possibilit		
•	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, export of producing mutation.	osure to the m	of chemical Substances  aterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans.		
•	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, experience of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia	osure to the most the IARC as anticipated to law a kin irritant as Studies in h	of chemical Substances  Interial may result in a possible risk of irreversible effects, with the possibility of the possibility		
ACETALDEHYDE	specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, expension of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional regulational studies show that allyl alcohol is broken down.	osure to the man the IARC as anticipated to law a kin irritant at Studies in hulation, behavior in the liver	of chemical Substances  Interial may result in a possible risk of irreversible effects, with the possibility of the possibility		

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 1 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 1 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.					
ISOPROPANOL & METHYL TERT-BUTYL ETHER	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.					
Acute Toxicity	✓ Carcinogenicity	×				
Skin Irritation/Corrosion	✓ Reproductivity	×				
Serious Eye Damage/Irritation	✓ STOT - Single Exposure	<b>~</b>				
Respiratory or Skin sensitisation	X STOT - Repeated Exposure	×				
Mutagenicity	X Aspiration Hazard	✓				

Legend:

Z - Data either not available or does not fill the criteria for classification
 Z - Data available to make classification

# SECTION 12 Ecological information

ASTM D7423 Calibration	Endpoint	Test Duration (hr)	Test Duration (hr)		Value		S	ource	
Standard - Level 1	Not Available	Not Available		Not Available	Not Availa	able	N	lot Avail	able
	Endpoint	Test Duration (hr)	Spe	ecies		Value	)		Source
	EC50	72h	Alg	ae or other aquatic plants		>100r	mg/l		2
	EC50	96h	Alg	ae or other aquatic plants		236.6	mg/L		4
acetaldehyde	EC50(ECx)	48h	Alg	ae or other aquatic plants		0.02m	ng/l		4
	EC50	48h	Cru	stacea		39.4-	59.1mg/L		4
	LC50	96h	Fisl	١		28-34	mg/L		4
	Endpoint	Test Duration (hr)	Spec	ies	Va	ilue			Source
	EC50	96h	Algae	or other aquatic plants	9.8	373-27.6	884mg/l		4
	EC50	72h	Algae	or other aquatic plants	56	00-1000	00mg/L		4
acetone	NOEC(ECx)	12h	Fish		0.0	001mg/L	_		4
	LC50	96h	Fish		37	44.6-50	00.7mg/L		4
	EC50	48h	Crust	acea	60	98.4mg	/L		5
	Enduciat	Took Duration (by)		Cassian			Value		Cauras
	Endpoint	Test Duration (hr)		Species	nata .				Source
allud alaabad	EC50	72h		Algae or other aquatic pla	ants		2.25mg/l		2
allyl alcohol	EC50(ECx)	96h		Crustacea			0.25mg/l		1
	EC50	48h		Crustacea			1.65mg/l		2
	LC50	96h		Fish			0.32mg/l		2
	Endpoint	Test Duration (hr)	Sp	ecies		Valu	е	Source	e:e
	EC50	72h	Ale	gae or other aquatic plant	s	7.3m	ıg/l	2	
butyraldehyde	NOEC(ECx)	72h	Ale	gae or other aquatic plant	S	0.89	mg/l	2	
	EC50	48h	Cr	Crustacea 2		20m	20mg/l 2		
	LC50	96h	Fis	sh		25.8	mg/l	Not A	/ailable
	Endpoint	Test Duration (hr)		pecies			lue		Source
	EC50	96h		lgae or other aquatic plan			5mg/l		2
n-butanol	EC50	72h 504h		lgae or other aquatic plan	TS		00mg/l		2
	NOEC(ECx) EC50	48h		Crustacea Crustacea			4.1mg/l		1
	LC50	96h		ish			00mg/l		4
	LC30	9011		1511		100	0-500mg/l		4
tertiary butanol	Endpoint	Test Duration (hr)	Sp	pecies		V	alue		Source
	BCF	1008h	Fis	sh		<	0.5		7
	-						1000==/		1
	EC50	72h	Al	gae or other aquatic plant	5	>	1000mg/l		ļ !
	EC50	72h 96h		gae or other aquatic plant gae or other aquatic plant			976mg/l		2

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2-butanol  2-butanol  2-butanol  EC  NO  EC  LC:  BC  NO  EC  NO  EC  NO  LC:  EC  NO  EC  NO  LC:  EC  NO  EC  LC:  En  EC  NO  EC  LC:  EC  LC:  En  EC  LC:  EC  LC:  EC  LC:  EC  LC:  EC  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50	Test Duration (hr)  72h  96h  24h  48h  96h  Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Crustacea Fish  Crustacea Crustacea Fish  Crustacea Fish  Crustacea Fish Crustacea Crustacea Fish Crustacea	Value   1972mg/l   2029mg/l   5mg/L   308mg/l   2993mg/l   2993mg/l     2993mg/l     100mg/l   2560mg/l   1378.63mg/L     154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     1783.04mg/l   380.68mg/l   3.39mg/l   574mg/l   110mg/l     110mg/l       110mg/l	Source   2   2   1   2   2     5
2-butanol  2-butanol  EC NO EC LC:  BC NO EC NO LC: EC NO LC: EC NO EC LC: EC  LC:  Enter-butyl ethyl ether  Enter-butyl ethyl ether  Ecc LC: Ecc LC: Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ec	C50 OEC(ECx) C50 C50 C50  ndpoint CF C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50	96h 24h 48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h  Test Duration (hr) 96h 48h 48h 96h	Algae or other aquatic plants Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	2029mg/l 5mg/L 308mg/l 2993mg/l 2993mg/l  Value 0.9-1.4 >100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2
2-butanol NO EC LC:  diethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol  EC EC LC:  En EC NO EC LC:  En EC EC LC:  LC:  En EC LC:  LC:  En EC LC:  LC:  LC:  LC:  LC:  LC:  LC:  L	OEC(ECx) C50 C50 C50 C60 CF C50 OEC(ECx) C50	24h 48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Crustacea  Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	5mg/L 308mg/l 2993mg/l 2993mg/l  Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	1
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  ethanol	C50 C50  ndpoint CF C50 OEC(ECx) C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 C50 C50  ndpoint C50 C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx)	48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	308mg/l 2993mg/l  Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2   2   2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  dimethyl ether  End EC  NO  EC  LC:  End EC  NO  LC: EC  LC:  End EC  LC:  End EC  LC:  End EC  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	C50  ndpoint  CF  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)  C50  Odo oec(ECx)  C50  Oec(ECx)  C50  Oec(ECx)  C50  Oec(ECx)	96h  Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Fish	Value   0.9-1.4   >100mg/l   100mg/l   2560mg/l   1378.63mg/L     Value   154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     Value   380.68mg/l   3.39mg/l   574mg/l	2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  dimethyl ether  End EC  NO  EC  LC:  End EC  NO  LC: EC  LC:  End EC  LC:  End EC  LC:  End EC  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	C50  ndpoint  CF  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)  C50  Odo oec(ECx)  C50  Oec(ECx)  C50  Oec(ECx)  C50  Oec(ECx)	96h  Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Fish	Value   0.9-1.4   >100mg/l   100mg/l   2560mg/l   1378.63mg/L     Value   154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     Value   380.68mg/l   3.39mg/l   574mg/l	2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol	ndpoint  CF  C50  OEC(ECx)  C50  ndpoint  C50  OEC(ECx)  C50  C50  C50  ndpoint  C50  C50  C50  ndpoint  C50  C50  C50  C50	Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	Source
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol	CF C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx)	1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	7 2 2 2 5 5 Source 2 1 2 2 2 2 2 2 2 2 2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol  EC  NO  EC  LC:  En  EC  NO  LC:  EC  LC:  CC  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50	72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants  Crustacea  Fish  Crustacea  Species  Algae or other aquatic plants  Crustacea  Crustacea  Fish  Species  Algae or other aquatic plants  Crustacea  Fish	>100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 2 2 5 5 Source 2 2 2 2 2 2 2
diethyl ether  NO LC: EC  dimethyl ether  NO EC LC: Entert-butyl ethyl ether  tert-butyl ethyl ether  ethanol  ethanol  Entert-butyl ethyl ether  EC LC: EC  LC: EC  EC  EC  EC  EC  EC  EC  EC  EC  E	OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 OEC(ECx) C50	504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 2 5 5 Source 2 1 1 2 2 2 2 2 2 2 2
dimethyl ether  dimethyl ether  dimethyl ether  Entert-butyl ethyl ether  tert-butyl ethyl ether  ethanol  ethanol	C50 C50  ndpoint C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 OEC(ECx) C50 C50	96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 5 5 Source 2 2 2 2 2 2 2 2
dimethyl ether  dimethyl ether  Enn EC LC:  tert-butyl ethyl ether  ethanol  ethanol	ndpoint C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 C50 OEC(ECx) C50 C50 C50	48h  Test Duration (hr)  96h  48h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	Source   2   2   2   2   2   2   2
dimethyl ether  End EC  LC:  tert-butyl ethyl ether  ethanol  ethanol	ndpoint C50 OEC(ECx) C50 C50 ndpoint C50 OEC(ECx) C50 OEC(ECx) C50 C50	Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Species  Algae or other aquatic plants  Crustacea  Crustacea  Fish  Species  Algae or other aquatic plants  Crustacea  Fish	Value  154.917mg/l >4000mg/l >4400mg/L  1783.04mg/l  Value  380.68mg/l 3.39mg/l 574mg/l	Source   2   2   2   2   2   2   2
dimethyl ether  EC LC:  tert-butyl ethyl ether  ethanol  ethanol  EC LC:  En EC EC LC:  EC LC:	C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50 OEC(ECx) C50	96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 1 2 2 Source 2 2 2 2
dimethyl ether  EC LC:  tert-butyl ethyl ether  ethanol  ethanol  EC LC:  En EC EC LC:  EC LC:	C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50 OEC(ECx) C50	96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 1 2 2 Source 2 2 2 2
dimethyl ether  EC  LC:  tert-butyl ethyl ether  Ether  EC  EC  EC  EC  EC  EC  EC  EC  EC  E	OEC(ECx) C50 C50 ndpoint C50 OEC(ECx) C50 C50 C50	48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	>4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	1 2 2 2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  tert-butyl ethyl ether  EC  EC  EC  Ethanol	C50  ndpoint C50  OEC(ECx) C50  C50  C50	48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	>4400mg/L 1783.04mg/l Value 380.68mg/l 3.39mg/l 574mg/l	2 2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc	ndpoint C50 OEC(ECx) C50 C50 Characteristics	96h  Test Duration (hr) 72h 672h 96h 48h	Species Algae or other aquatic plants Crustacea Fish	1783.04mg/l  Value  380.68mg/l  3.39mg/l  574mg/l	2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  EC  NO  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	ndpoint C50 OEC(ECx) C50 C50	Test Duration (hr) 72h 672h 96h 48h	Species Algae or other aquatic plants Crustacea Fish	Value 380.68mg/l 3.39mg/l 574mg/l	Source 2 2 2
tert-butyl ethyl ether  EC  NO  LC:  EC  En  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50	72h 672h 96h 48h	Algae or other aquatic plants Crustacea Fish	380.68mg/l 3.39mg/l 574mg/l	2 2 2
tert-butyl ethyl ether  EC  NO  LC:  EC  En  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50	72h 672h 96h 48h	Algae or other aquatic plants Crustacea Fish	380.68mg/l 3.39mg/l 574mg/l	2 2 2
tert-butyl ethyl ether  LC: EC  ethanol  ethanol	OEC(ECx) C50 C50 ndpoint	672h 96h 48h	Crustacea Fish	3.39mg/l 574mg/l	2
ethanol	C50 C50 ndpoint	96h 48h	Fish	574mg/l	2
ethanol EC  ethanol	C50	48h			
ethanol EC	ndpoint		Crustacea	110mg/l	2
ethanol EC EC EC LC:		Toet Duration /hr\			
ethanol EC EC LC:	C50	Test Duration (hr)	Species	Value	Source
ethanol EC		96h	Algae or other aquatic plants	<0.001mg/L	4
ethanol EC	C50	72h	Algae or other aquatic plants	275mg/l	2
LC	C50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	· ,	96h	Fish	42mg/L	4
LO	C50	48h	Crustacea	2mg/L	4
En	ndpoint	Test Duration (hr)	Species	Value	Source
EC	C50	72h	Algae or other aquatic plants	593mg/l	2
<b>isobutanol</b> NO	OEC(ECx)	504h	Crustacea	4mg/L	5
EC	C50	48h	Crustacea	ca.600mg/l	1
LC	C50	96h	Fish	901-1000mg/L	4
F-	ndnoint	Test Duration (hr)	Species	Value	Source
	ndpoint	. ,	Species		
	C50	48h	Crustacea	50-100mg/l	4
	C50	96h	Fish	23mg/l	2
	OEC(ECx)	72h 48h	Algae or other aquatic plants  Crustacea	83.7mg/l 10mg/l	4
	ndpoint	Test Duration (hr)	Species	Value	Source
EC	C50	96h	Algae or other aquatic plants	>1000mg/l	1
isopropanol	C50	72h	Algae or other aquatic plants	>1000mg/l	1
EC	C50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC	C50	96h	Fish	>1400mg/L	4
EC	C50	48h	Crustacea	7550mg/l	4
	n du alt	Took Describes # \	Currier	V-1.	0-
	ndpoint	Test Duration (hr)	Species	Value	Source
	C50	96h	Algae or other aquatic plants	134.9mg/l	2
	OEC(ECx)	48h	Crustacea	46mg/l	1
EC	C50	48h	Crustacea	190mg/l	1

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	Endpoint	Test C	Ouration (hr)	Spe	ecies			Value	<b>e</b>		Source
	EC50	96h		Algae or other aquatic plants			77.98mg/l			2	
iso-valeraldehyde	EC50	72h		Alga	Algae or other aquatic plants			80mg/l			1
ioo valoralaeriyae	EC50	48h		Crus	Crustacea			177m	ng/l		1
	EC50(ECx)	96h		Fish	1			3.25r	mg/l		2
	LC50	96h		Fish	1			2.98-	3.54mg/L		4
	Endpoint	Test I	Ouration (hr)	Spec	cies		V	alue			Source
	EC50	96h			e or other aqu	atic plants			0.623mg/l		4
methanol	NOEC(ECx)	720h		Fish				.007m			4
	LC50	96h		Fish				90mg/			2
	EC50	48h			tacea			10000			2
	Endpoint		t Duration (hr)		Species				Value		Source
	EC50	72h				aquatic plants			1220mg/l		2
methyl ethyl ketone	EC50	96h				aquatic plants			>500mg/L		4
	NOEC(ECx)	48h			Crustacea				68mg/l		2
	EC50	48h			Crustacea				308mg/l		2
	LC50	96h			Fish				>324mg/L		4
	Endpoint	Tes	t Duration (hr)		Species				Value		Source
	EC50	96h			Algae or other	aquatic plants			184mg/l		1
	EC50	72h			Algae or other aquatic plants				>800mg/l		1
methyl tert-butyl ether	NOEC(ECx)	96h			Crustacea				15mg/l		1
	EC50	48h			Crustacea				>100mg/l		1
	LC50	96h	96h		Fish				187mg/l		1
	- 1		D (1)		•						_
	Endpoint		Duration (hr)	-	ecies			Valu			Source
volovoldobydo	EC50	72h			gae or other ac	juatic plants		>9.3			2
valeraldehyde	NOEC(ECx)	504h		_	ustacea			2.5m			2
	EC50	48h		_	ustacea			31.5			2
	LC50	96h		Fis	sn			11.3	-13.6mg/L		4
	Endpoint	Test	Duration (hr)		Species				Value	8	Source
	EC50	96h			Algae or other	aquatic plants			40mg/l	1	
propionaldehyde	EC50	72h			Algae or other	aquatic plants			58mg/l	1	
propionaldenyde	EC10(ECx)	96h			Algae or other	aquatic plants			4mg/l	1	
	EC50	48h		(	Crustacea				88.7mg/l	1	
	LC50	96h		ı	Fish				14mg/l	2	2
	Endpoint	Test	Duration (hr)	Spe	ecies			Value			Source
	EC50	96h			ae or other aqu	uatic plants		4480n			4
	EC50	72h			Algae or other aquatic plants				5600mg/L		4
n-propanol	NOEC(ECx)	504h			Crustacea			68.3mg/l			2
	EC50	48h		Cru	Crustacea			3339-3977mg/l			4
	LC50	96h		Fish	Fish			3000-4000mg/L			4
	Fordering	-	F4 D		0		Value				
dipropyl ether	Endpoint  Not Available		Test Duration (hr)		Species Not Avail		Value	olo.		ource	do
	Not Available		Not Available		Not Avail	able	Not Availab	ole	N	ot Availab	ole
	Endpoint	Test	Duration (hr)	S	Species				Value		Source
	EC50	72h		Α	Algae or other a	aquatic plants			>100mg/L	4	1
tert-amyl methyl ether	LC50	96h		F	ish				>100mg/l	2	2
tert-amyl methyl ether	EC50	48h		С	Crustacea				100mg/l	2	2
		24h		С	Crustacea				1.4mg/l	1	I
, ,	EC50(ECx)	24h									
2,2,4-trimethylpentane		2411	Test Duration (hr)			Species	1	/alue		Sour	'Ce
	EC50(ECx)  Endpoint BCF	2411	Test Duration (hr)			Species Fish		<b>/alue</b> 140-58	sO	Sour	се

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#### **ASTM D7423 Calibration Standard - Level 1**

NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

#### 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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Bioaccumulative potential	
Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

#### Mobility in soil

Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

# **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
- 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.
- ► 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**

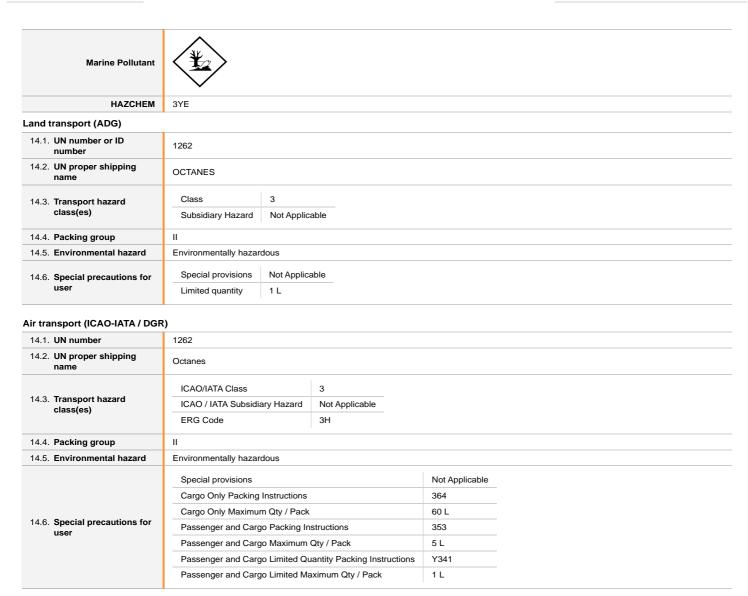
#### **Labels Required**



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# Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262	
14.2. UN proper shipping name	OCTANES	
14.3. Transport hazard class(es)	IMDG Class	3
	IMDG Subsidiary Ha	zard Not Applicable
14.4. Packing group	II	
14.5 Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number	F-E, S-E
	Special provisions	Not Applicable
	Limited Quantities	1L

# 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name	Group
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### 14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

# **SECTION 15 Regulatory information**

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

# acetaldehyde is found on the following regulatory lists

 $\label{eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

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 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

#### acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol 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 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

# isopropanol is found on the following regulatory lists

 $\label{eq:Australia} \mbox{ Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:continuous} \textbf{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

# methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5  $\,$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

# valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

# tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status	
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ethyl ether)	
Canada - DSL	No (tert-butyl ether; dipropyl ether)	
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)	
China - IECSC	No (tert-butyl ethyl ether; tert-amyl methyl ether)	
Europe - EINEC / ELINCS / NLP	Yes	
Japan - ENCS	No (tert-amyl methyl ether)	
Korea - KECI	Yes	
New Zealand - NZIoC	No (tert-amyl methyl ether)	
Philippines - PICCS	No (tert-butyl ethyl ether)	
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'	
Taiwan - TCSI	Yes	
Mexico - INSQ	No (tert-butyl ethyl ether)	
Vietnam - NCI	Yes	
Russia - FBEPH	Yes	
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**

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Initial Date	06/03/2025

#### Other information

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
- 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
- ▶ DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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

Powered by AuthorITe, from Chemwatch.



# ASTM D7423 Calibration Standard - Level 2 Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code:

Issue Date: **06/03/2025** Print Date: **07/03/2025** S.GHS.AUS.EN

### SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier	
Product name	ASTM D7423 Calibration Standard - Level 2
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-02

### 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

# **SECTION 2 Hazards identification**

# Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s) Pre	evention
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.

# Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

# 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
75-07-0	0.002	acetaldehyde
67-64-1	0.002	acetone
107-18-6	0.002	allyl alcohol
123-72-8	0.002	<u>butyraldehyde</u>
71-36-3	0.002	<u>n-butanol</u>
75-65-0	0.002	tertiary butanol
78-92-2	0.002	2-butanol
60-29-7	0.002	<u>diethyl ether</u>
115-10-6	0.002	dimethyl ether
637-92-3	0.002	tert-butyl ethyl ether
64-17-5	0.002	ethanol
78-83-1	0.002	isobutanol
78-84-2	0.002	<u>iso-butyraldehyde</u>
67-63-0	0.002	isopropanol
108-20-3	0.002	di-iso-propyl ether
590-86-3	0.002	<u>iso-valeraldehyde</u>
67-56-1	0.002	methanol
78-93-3	0.002	methyl ethyl ketone
1634-04-4	0.002	methyl tert-butyl ether
110-62-3	0.002	<u>valeraldehyde</u>
123-38-6	0.002	<u>propionaldehyde</u>
71-23-8	0.002	n-propanol
111-43-3	0.002	dipropyl ether
994-05-8	0.002	tert-amyl methyl ether
540-84-1	99.952	2.2.4-trimethylpentane
Legend:	Classified by Chemwatch; 2. Classification drawn classification drawn from C&L * EU IOELVs avaitable.	vn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. lable

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

# **SECTION 7 Handling and storage**

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#### **ASTM D7423 Calibration Standard - Level 2**

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#### Precautions for 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.

# Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Safe handling

- 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

- Glass container is suitable for laboratory quantities
- Packing as supplied by manufacturer

#### Suitable container

- 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.

▶ Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.

- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge.

# Acetic acid:

- ▶ vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide

Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

## Storage incompatibility

- reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene
- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- Avoid reaction with oxidising agents

#### n-Octane/ iso-octane:

- ▶ reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- may generate electrostatic charges on agitation or flow, due to low conductivity.

### SECTION 8 Exposure controls / personal protection

#### Control parameters

# Occupational Exposure Limits (OEL)

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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Australia Exposure Standards ethanol Ethyl alcohol 1000 ppm / 1880 mg/m3 Not Available Not Available Not Available Not Available Not Available Australia Exposure Standards isobutanol Isobutyl alcohol 50 ppm / 152 mg/m3 Not Available Not Available Not Available Australia Exposure Standards isopropanol Isopropyl alcohol 400 ppm / 983 mg/m3 1230 mg/m3 / 500 ppm Not Available Not Available Not Available Not Available Australia Exposure Standards di-iso-propyl ether Isopropyl ether mg/m3 ppm Not Available Not Available Available Australia Exposure Standards methanol Methyl alcohol 200 ppm / 262 mg/m3 238 mg/m3 / 250 ppm / Not Available Not Available Not Available Exposure Standards methyl ethyl ketone (MEK) mg/m3 275 mg/m3 / 300 ppm Not Available Not Available Not Available Exposure Standards valeralia Exposure Standards valeraldehyde n-Valeraldehyde 50 ppm / 176 mg/m3 Not Available Not Ava	Source	Ingredient	Material name	TWA		STEL	Peak	Notes
Australia Exposure Standards isopropanol isopoty alcohol gloppy a	Australia Exposure Standards		Ethyl alcohol		)	Not Available	Not Available	Not Available
Australia Exposure Standards   4-iso-propyl ether   1-sopropyl ether	Australia Exposure Standards	isobutanol			<sub>J</sub> /m3	Not Available	Not Available	Not Available
Australia Exposure Standards   methanol   methanol   methyl etchol   mg/m3   328 mg/m3 / 250   Not Available   Available   Available   Methyl ethyl ketone   (Methyl ethyl ketone   mg/m3   250 ppm / 455 ppm   Not Available   Not Available   Available   Methyl ethyl ketone   (Methyl ethyl ketone   mg/m3   250 ppm / 455 ppm /	Australia Exposure Standards	isopropanol	Isopropyl alcohol				Not Available	Not Available
Available   Ava	Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether			_	Not Available	Not Available
Available xposure Standards   methyl terr-butyl either   methyl terr-butyl either   methyl terr-butyl either   delter   methyl terr-butyl either   25 pm / 92 mg / 37 5 pm / 37 5 pm   Not Available   Not Available   Available   Available   Available   Available   Not Av	Australia Exposure Standards	methanol	Methyl alcohol			_	Not Available	Not Available
Available	Australia Exposure Standards	methyl ethyl ketone				_	Not Available	Not Available
Australia Exposure Standards	Australia Exposure Standards		Methyl-tert butyl ether	25 ppm / 92 mg/s	m3	275 mg/m3 / 75 ppm	Not Available	Not Available
Australia Exposure Standards         n-propanol         mg/m3         pmm         Not Available         Available           acetaldehyde         2,000 ppm         Not Available         Not Available         Not Available         Sevised IDLH         <	Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	g/m3	Not Available	Not Available	Not Available
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iso-valeraldehyde Not Available Not Available methanol 6,000 ppm Not Available methyl ketone 3,000 ppm Not Available methyl tert-butyl ether Not Available Not Available valeraldehyde Not Available Not Available propionaldehyde Not Available Not Available	isopropanol	Not Available			Not Available			
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valeraldehyde     Not Available     Not Available       propionaldehyde     Not Available     Not Available	methyl ethyl ketone	3,000 ppm	3,000 ppm		Not Available			
propionaldehyde Not Available Not Available	methyl tert-butyl ether	Not Available			Not Available			
	valeraldehyde	Not Available		Not Available				
n-propanol 800 ppm Not Available	propionaldehyde	Not Available		Not Available				
	n-propanol	800 ppm	800 ppm		Not Available			

#### **Exposure controls**

dipropyl ether

tert-amyl methyl ether

2,2,4-trimethylpentane

# Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

Not Available

Not Available

Not Available

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



Not Available

Not Available

Not Available







# 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

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.

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	Personal hygiene is a key element of effective hand care.  ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

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Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

 $\ensuremath{\mathsf{C}}\xspace$  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.

## Ansell Glove Selection

Glove — In order of recommendation
AlphaTec® 38-612
MICROFLEX® MidKnight® XTRA 93-862
AlphaTec® 53-001
AlphaTec® 58-005
MICROFLEX® LifeStar EC™ 93-868
MICROFLEX® SafeGrip™ SG-375
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS
MICROFLEX® 93-732
BioClean™ Emerald BENS

The suggested gloves for use should be confirmed with the glove supplier.

# **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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Appearance	Clear Liquid		
	·		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	Enclosed Space Ignition Deflagration Density (g/m3)	Not Available

## **SECTION 10 Stability and reactivity**

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

# **SECTION 11 Toxicological information**

Information on toxicological effects

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

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.

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.

Inhaled Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

produce serious damage to the health of the individual.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose.

The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may

Continued...

Ingestion

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Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 2 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)[1]

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Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 20mg/24H - Moderate					
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL					
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL					
Skin: no adverse effect observed (not irritating) <sup>[1]</sup> TOXICITY  Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL					
TOXICITY   IRRITATION					
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm					
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm					
Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H					
Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL					
Eye (Rodent - rabbit): 0.1mL					
n-butanol Eye (Rodent - rabbit): 1.62mg - Severe					
Eye (Rodent - rabbit): 2mg/24H - Severe					
Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>					
Skin (Human): 20uL/20M Skin (Rodent - rabbit): 20mg/24H - Moderate					
Skin: adverse effect observed (irritating) <sup>[1]</sup>					
TOXICITY IRRITATION					
Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 100uL/24H - Severe					
Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>					
tertiary butanol  Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup> Skin (Rodent - rabbit): 500uL/24H - Mild					
Skin: adverse effect observed (irritating) <sup>[1]</sup>					
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
TOXICITY IRRITATION					
dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>   Eye (Rodent - rabbit): 0.1mL - Severe					
2-butanol Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>					
Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
TOXICITY IRRITATION					
Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup> Eye (Human): 100ppm					
Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL					
Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.1mL - Severe					
Eye (Rodent - rabbit): 100mg - Moderate					
diethyl ether Eye (Rodent - rabbit): 100mg/24H - Moderate					
Eye: no adverse effect observed (not irritating) <sup>[1]</sup>					
Skin (Rodent - guinea pig): 50mg/24H - Severe					
Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild					
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
Chimino datore energia (net minaling)					
TOXICITY IRRITATION					
dimethyl ether Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
TOXICITY IRRITATION					
Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 100uL/24H - Moderate					
tert-butyl ethyl ether  Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup> Eye: no adverse effect observed (not irritating) <sup>[1]</sup>					
Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup> Skin (Rodent - rabbit): 500uL/4H - Moderate					
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
ethanol					
Emanor					
TOXICITY IRRITATION					
TOXICITY IRRITATION  Dermal (rabbit) LD50: 17100 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL					

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100uL - Moderate	
		Eye	(Rodent - rabbit): 500mg - Severe	
		Eye (Rodent - rabbit): 500mg/24H - Mild		
		Eye: adverse effect observed (irritating) <sup>[1]</sup>		
		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
		Skin (Human): 70%/2D		
		Skin (Rodent - rabbit): 20mg/24H - Moderate		
		Skir	(Rodent - rabbit): 400mg - Mild	
		Skin	n: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY		IRRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>	
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>			
	3 3			
	TOXICITY	IRRI	TATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye:	adverse effect observed (irritating) <sup>[1]</sup>	
iso-butyraldehyde	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>	Skin	(Rodent - rabbit): 397mg - Mild	
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin	no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IRR	ITATION	
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100mg - Severe	
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate	
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>		(Rodent - rabbit): 10mg - Moderate	
ioop.opuiio.	Otal (wouse) LD30, 3000 Hg/kg-		<u> </u>	
			: adverse effect observed (irritating) <sup>[1]</sup>	
			n (Rodent - rabbit): 500mg - Mild	
		SKIF	n: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IR	RITATION	
di-iso-propyl ether	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey	RITATION  ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E <sub>y</sub>	ye: no adverse effect observed (not irritating) <sup>[1]</sup>	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	E <sub>y</sub>	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey SH	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Ey SH SH	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup>	
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY	Ey SH SH IRF Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild  xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Ey SH SH IRR Eye Eye Skir	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Ey SH IRF Eye Skii	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup>	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Eye Skin Skin IRR	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup>	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Ey SH IRF Eye Skii Skii IRR Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Skin Skin IRR Eye Skin Skin IRR Eye Eye Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye SH SH IRR Eye Skii Skii Skii FRE Eye Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Eye Eye Eye Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	Eye Eye Eye Skirr Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye Eye Eye Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye Eye Eye Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION (Human): 350ppm (Rodent - rabbit): 80mg	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm	
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Ey SH SH SH IRR Eye Skin Skin IRR Eye Eye Eye Eye Eye Eye Skir Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  n: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>	

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			Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	тохісіту	IRI	RITATION	
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Ey	e: no adverse effect observed (not irritating) <sup>[1]</sup>	
methyl tert-butyl ether	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>	-	in: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>		in: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY		IRRITATION	
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>		Eye (Rodent - rabbit): 100mg/24H - Severe	
	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>	
valeraldehyde	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>		Skin (Rodent - guinea pig): 100% - Severe	
	3 3	Skin (Rodent - rabbit): 500mg/24H - Moderate		
			Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	TOXICITY		IRRITATION	
	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>		Eye (Rodent - rabbit): 20mg/24H - Moderate	
propionaldehyde	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>		Eye (Rodent - rabbit): 41mg - Severe	
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>		Skin (Rodent - rabbit): 500mg - Mild	
	TOXICITY	IDD	ITATION	
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>		e (Rodent - rabbit): 20mg/24H - Moderate	
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>		:: adverse effect observed (irreversible damage) <sup>[1]</sup>	
	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>		n (Human): 100%/24H - Mild	
n-propanol	Ofai (Rat) LD50. 1670 mg/kg <sup>c</sup> 2		n (Human): 100%/47H - Mild	
		Skin (Human): 60%/24H		
	Skin (Rodent - rabbit): 500mg - Mild			
	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
dinrond other	TOXICITY		IRRITATION	
dipropyl ether	Not Available		Not Available	
	TOXICITY	11	RRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	000 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 100uL/24H - Severe		
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>	(L4h <sup>[1]</sup> Eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>		Skin (Rodent - rabbit): 500uL/4H - Severe	
	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY		IRRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
2,2,4-trimethylpentane	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (not irritating)[1]	
Legend:			Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis	
Legend:	Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of	f Toxic Effect o	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis of chemical Substances	
Legend:	Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of	f Toxic Effect o	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis of chemical Substances	
Legend: ACETALDEHYDE	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance as	osure to the my the IARC as anticipated to	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans.	
_	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance as [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia.	osure to the m  of the IARC as anticipated to a & Human Se  t a skin irritant a. Studies in h	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans. The Carcinogen revices 2002]  or sensitizer, but it removes fat from the skin, and it also irritates the eye. The umans have shown that exposure to acetone at a level of 2375 mg/m3 does	
ACETALDEHYDE	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional reg	osure to the many the IARC as anticipated to a & Human Se ta skin irritant a. Studies in higulation, behaviour in the liver	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans. The Carcinogen revices 2002]  or sensitizer, but it removes fat from the skin, and it also irritates the eye. The umans have shown that exposure to acetone at a level of 2375 mg/m3 does	

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 2 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 2 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.			
ISOPROPANOL & METHYL TERT-BUTYL ETHER	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.			
Acute Toxicity	✓ Carcinogenicity	×		
Skin Irritation/Corrosion	<b>✓</b> Reproductivity	×		
Serious Eye Damage/Irritation	STOT - Single Exposure	<b>~</b>		
Respiratory or Skin sensitisation	X STOT - Repeated Exposure	×		
Mutagenicity	X Aspiration Hazard	✓		

Legend:

X − Data either not available or does not fill the criteria for classification
 ✓ − Data available to make classification

# **SECTION 12 Ecological information**

EC50

48h

ASTM D7423 Calibration	Endpoint	Test Duration (hr)		Species	Species Value		Source	
Standard - Level 2	Not Available	Not Available	Not Available		Not Availa	lable Not Ava		Available
	Endpoint	Test Duration (hr)	Spec	ries sair		Value		Source
acetaldehyde	EC50	72h		e or other aquatic plants		>100m	ng/l	2
	EC50	96h					236.6mg/L	
	EC50(ECx)	48h		1 1			g/l	4
	EC50	48h					9.1mg/L	4
	LC50	96h	Fish			28-34r		4
	Endpoint	Test Duration (hr)	Specie	98	Va	lue		Source
	EC50	96h	Algae	or other aquatic plants	9.8	373-27.68	34mg/l	4
	EC50	72h	Algae	or other aquatic plants	56	00-10000	Omg/L	4
acetone	NOEC(ECx)	12h	Fish		0.0	001mg/L		4
	LC50	96h	Fish		37	44.6-500	0.7mg/L	4
	EC50	48h	Crusta	cea	60	98.4mg/L	98.4mg/L	
	Endpoint	Test Duration (hr)	S	pecies			Value	Source
	EC50	72h	P	lgae or other aquatic pla	ants		2.25mg/l	2
allyl alcohol	EC50(ECx)	96h	C	rustacea			0.25mg/l	1
	EC50	48h	C	crustacea			1.65mg/l	2
	LC50	96h	F	ïsh			0.32mg/l	2
	Endpoint	Test Duration (hr)	Spe	ecies		Value	S	Source
	EC50	72h	Alg	ae or other aquatic plant	S	7.3mg	g/l 2	
butyraldehyde	NOEC(ECx)	72h	Alg	Algae or other aquatic plants			0.89mg/l 2	
	EC50	48h	Cru	Crustacea			20mg/l 2	
	LC50	96h	Fish	1		25.8m	ng/l N	Not Available
	Endpoint	Test Duration (hr)	Sp	ecies		Valu	ie	Source
	EC50	96h	Alç	gae or other aquatic plan	nts	225	mg/l	2
	EC50	72h	Alç	Algae or other aquatic plants		>500mg/l		1
n-butanol	NOEC(ECx)	504h	Crustacea			4.1mg/l		2
	EC50	48h	Cr	Crustacea		>500mg/l		1
	LC50	96h	6h Fish			100-500mg/l		4
tertiary butanol		Test Duration (hr)	Spe	ecies		Va	lue	Source
tertiary butanol	Endpoint	,						
tertiary butanol	BCF BCF	1008h	Fisl	1		<0	.5	7
tertiary butanol	-	, ,		n ae or other aquatic plant	s		.5 000mg/l	7

Crustacea

933mg/l

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2-butanol  2-butanol  2-butanol  EC  NO  EC  LC:  BC  NO  EC  NO  EC  NO  LC:  EC  NO  EC  NO  LC:  EC  NO  EC  LC:  En  EC  NO  EC  LC:  EC  LC:  En  EC  LC:  EC  LC:  EC  LC:  EC  LC:  EC  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50	Test Duration (hr) 72h 96h 24h 48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Crustacea Fish  Crustacea Crustacea Fish  Crustacea Fish  Crustacea Fish Crustacea Crustacea Fish Crustacea	Value   1972mg/l   2029mg/l   5mg/L   308mg/l   2993mg/l   2993mg/l     2993mg/l     100mg/l   2560mg/l   1378.63mg/L     154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     1783.04mg/l   380.68mg/l   3.39mg/l   574mg/l   110mg/l     110mg/l       110mg/l	Source   2   2   1   2   2     5
2-butanol  2-butanol  EC NO EC LC:  BC NO EC NO LC: EC NO LC: EC NO EC LC: EC  LC:  Enter-butyl ethyl ether  Enter-butyl ethyl ether  Ecc LC: Ecc LC: Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ec	C50 OEC(ECx) C50 C50 C50  ndpoint CF C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50	96h 24h 48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h  Test Duration (hr) 96h 48h 48h 96h	Algae or other aquatic plants Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	2029mg/l   5mg/L   308mg/l   2993mg/l   2993mg/l   2993mg/l   100mg/l   100mg/l   2560mg/l   1378.63mg/L   154.917mg/l   >4000mg/L   1783.04mg/l   1783.04mg/l   380.68mg/l   3.39mg/l   574mg/l   574mg/l	2
2-butanol NO EC LC:  diethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol  EC EC LC:  En EC NO EC LC:  En EC EC LC:  LC:  En EC LC:  LC:  En EC LC:  LC:  LC:  LC:  LC:  LC:  LC:  L	OEC(ECx) C50 C50 C50 C60 CF C50 OEC(ECx) C50	24h 48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea  Crustacea  Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	5mg/L 308mg/l 2993mg/l 2993mg/l  Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	1   2   2   2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  ethanol	C50 C50  ndpoint CF C50 OEC(ECx) C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 C50 C50  ndpoint C50 C50 C50 ndpoint C50 OEC(ECx) C50 OEC(ECx)	48h 96h  Test Duration (hr) 1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	308mg/l 2993mg/l  Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2   2   2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  dimethyl ether  End EC  NO  EC  LC:  End EC  NO  LC: EC  LC:  LC:  LC:  LC:  LC:  LC:	C50  ndpoint  CF  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)	96h  Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Fish	Value   0.9-1.4   >100mg/l   100mg/l   2560mg/l   1378.63mg/L     Value   154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     Value   380.68mg/l   3.39mg/l   574mg/l	2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  ethanol  ethanol  dimethyl ether  End EC  NO  EC  LC:  End EC  NO  LC: EC  LC:  LC:  LC:  LC:  LC:  LC:	C50  ndpoint  CF  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)  C50  OEC(ECx)	96h  Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Fish  Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish  Fish	Value   0.9-1.4   >100mg/l   100mg/l   2560mg/l   1378.63mg/L     Value   154.917mg/l   >4000mg/l   >4400mg/L   1783.04mg/l     Value   380.68mg/l   3.39mg/l   574mg/l	2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol	ndpoint  CF  C50  OEC(ECx)  C50  ndpoint  C50  OEC(ECx)  C50  C50  C50  ndpoint  C50  C50  C50  ndpoint  C50  C50  C50  C50	Test Duration (hr)  1008h  72h  504h  96h  48h  Test Duration (hr)  96h  48h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Species Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	Value 0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	Source
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol	CF C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx) C50 OEC(ECx)	1008h 72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Algae or other aquatic plants Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	0.9-1.4 >100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	7 2 2 2 5 5 Source 2 1 2 2 2 2 2 2 2 2 2
diethyl ether  dimethyl ether  dimethyl ether  dimethyl ether  tert-butyl ethyl ether  ethanol  ethanol  EC  NO  EC  LC:  En  EC  NO  LC:  EC  LC:  CC  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 OEC(ECx) C50	72h 504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants  Crustacea  Fish  Crustacea  Species  Algae or other aquatic plants  Crustacea  Crustacea  Fish  Species  Algae or other aquatic plants  Crustacea  Fish	>100mg/l 100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 2 2 5 5 Source 2 2 2 2 2 2 2
diethyl ether  NO LC: EC  dimethyl ether  NO EC LC: Entert-butyl ethyl ether  tert-butyl ethyl ether  ethanol  ethanol  Entert-butyl ethyl ether  EC LC: EC  LC: EC  EC  EC  EC  EC  EC  EC  EC  EC  E	OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 OEC(ECx) C50	504h 96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	100mg/l 2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 2 5 5 Source 2 2 2 2 2 2
dimethyl ether  dimethyl ether  dimethyl ether  Enterdimethyl ether  tert-butyl ethyl ether  tert-butyl ethyl ether  ethanol  ethanol	C50 C50  ndpoint C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 OEC(ECx) C50 C50	96h 48h  Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Fish Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	2560mg/l 1378.63mg/L  Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 5 5 Source 2 2 2 2 2 2 2 2
dimethyl ether  dimethyl ether  Enn EC LC:  tert-butyl ethyl ether  ethanol  ethanol	ndpoint C50 OEC(ECx) C50 C50 C50 OEC(ECx) C50 C50 OEC(ECx) C50 C50 C50	48h  Test Duration (hr)  96h  48h  48h  96h  Test Duration (hr)  72h  672h  96h  48h	Crustacea  Species Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	Value 154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	Source   2   2   2   2   2   2   2
dimethyl ether  End EC  LC:  tert-butyl ethyl ether  ethanol  ethanol  End EC  EC  LC:  End EC	ndpoint C50 OEC(ECx) C50 C50 ndpoint C50 OEC(ECx) C50 OEC(ECx) C50 C50	Test Duration (hr) 96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Species  Algae or other aquatic plants  Crustacea  Crustacea  Fish  Species  Algae or other aquatic plants  Crustacea  Fish	Value  154.917mg/l >4000mg/l >4400mg/L  1783.04mg/l  Value  380.68mg/l 3.39mg/l 574mg/l	Source   2   2   2   2   2   2   2
dimethyl ether  EC LC:  tert-butyl ethyl ether  ethanol  ethanol  EC LC:  En EC EC LC:  EC LC:	C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50 OEC(ECx) C50	96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 1 2 2 Source 2 2 2 2
dimethyl ether  EC LC:  tert-butyl ethyl ether  ethanol  ethanol  EC LC:  En EC EC LC:  EC LC:	C50 OEC(ECx) C50 C50  ndpoint C50 OEC(ECx) C50 C50 OEC(ECx) C50	96h 48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Algae or other aquatic plants Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	154.917mg/l >4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	2 1 2 2 Source 2 2 2 2
dimethyl ether  EC  LC:  tert-butyl ethyl ether  Ether  EC  EC  EC  EC  EC  EC  EC  EC  EC  E	OEC(ECx) C50 C50 ndpoint C50 OEC(ECx) C50 C50 C50	48h 48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	>4000mg/l >4400mg/L 1783.04mg/l  Value 380.68mg/l 3.39mg/l 574mg/l	1 2 2 2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  tert-butyl ethyl ether  EC  EC  EC  Ethanol	C50  ndpoint C50  OEC(ECx) C50  C50  C50	48h 96h  Test Duration (hr) 72h 672h 96h 48h	Crustacea Fish  Species Algae or other aquatic plants Crustacea Fish	>4400mg/L 1783.04mg/l Value 380.68mg/l 3.39mg/l 574mg/l	2 2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  Ecc Ecc Ecc Ecc Ecc Ecc Ecc Ecc	ndpoint C50 OEC(ECx) C50 C50 Characteristics	96h  Test Duration (hr) 72h 672h 96h 48h	Species Algae or other aquatic plants Crustacea Fish	1783.04mg/l  Value  380.68mg/l  3.39mg/l  574mg/l	2 Source 2 2 2 2
tert-butyl ethyl ether  tert-butyl ethyl ether  EC  NO  LC:  EC  EC  EC  EC  EC  EC  EC  EC  EC	ndpoint C50 OEC(ECx) C50 C50	Test Duration (hr) 72h 672h 96h 48h	Species Algae or other aquatic plants Crustacea Fish	Value 380.68mg/l 3.39mg/l 574mg/l	Source 2 2 2
tert-butyl ethyl ether  EC  NO  LC:  EC  En  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50	72h 672h 96h 48h	Algae or other aquatic plants Crustacea Fish	380.68mg/l 3.39mg/l 574mg/l	2 2 2
tert-butyl ethyl ether  EC  NO  LC:  EC  En  EC  EC  EC  EC  EC  EC  EC  EC	C50 OEC(ECx) C50 C50	72h 672h 96h 48h	Algae or other aquatic plants Crustacea Fish	380.68mg/l 3.39mg/l 574mg/l	2 2 2
tert-butyl ethyl ether  LC: EC  ethanol  ethanol	OEC(ECx) C50 C50 ndpoint	672h 96h 48h	Crustacea Fish	3.39mg/l 574mg/l	2
ethanol	C50 C50 ndpoint	96h 48h	Fish	574mg/l	2
ethanol EC  ethanol	C50	48h			
ethanol EC	ndpoint		Crustacea	110mg/l	2
ethanol EC EC EC LC:		Toet Duration /hr\			
ethanol EC EC LC:	C50	Test Duration (hr)	Species	Value	Source
ethanol EC		96h	Algae or other aquatic plants	<0.001mg/L	4
ethanol EC	C50	72h	Algae or other aquatic plants	275mg/l	2
LC	C50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	· ,	96h	Fish	42mg/L	4
LO	C50	48h	Crustacea	2mg/L	4
En	ndpoint	Test Duration (hr)	Species	Value	Source
EC	C50	72h	Algae or other aquatic plants	593mg/l	2
<b>isobutanol</b> NO	OEC(ECx)	504h	Crustacea	4mg/L	5
EC	C50	48h	Crustacea	ca.600mg/l	1
LC	C50	96h	Fish	901-1000mg/L	4
F-	ndnoint	Test Duration (hr)	Species	Value	Source
	ndpoint	. ,	Species		
	C50	48h	Crustacea	50-100mg/l	4
	C50	96h	Fish	23mg/l	2
	OEC(ECx)	72h 48h	Algae or other aquatic plants  Crustacea	83.7mg/l 10mg/l	4
	ndpoint	Test Duration (hr)	Species	Value	Source
EC	C50	96h	Algae or other aquatic plants	>1000mg/l	1
isopropanol	C50	72h	Algae or other aquatic plants	>1000mg/l	1
EC	C50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC	C50	96h	Fish	>1400mg/L	4
EC	C50	48h	Crustacea	7550mg/l	4
	n du alt	Took Describes # \	Currier	V-1.	0-
	ndpoint	Test Duration (hr)	Species	Value	Source
	C50	96h	Algae or other aquatic plants	134.9mg/l	2
	OEC(ECx)	48h	Crustacea	46mg/l	1
EC	C50	48h	Crustacea	190mg/l	1

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	Endpoint	Test D	uration (hr)	Spec	ies			Value	9		Source
	EC50	96h			e or other aquatic p			77.98			2
iso-valeraldehyde	EC50	72h			e or other aquatic p	olants		80mg			1
	EC50	48h		Crust	tacea			177m			1
	EC50(ECx)	96h		Fish			3.25r			2	
	LC50	96h		Fish				2.98-	3.54mg/L		4
	Endpoint	Tost D	uration (hr)	Specie	05		v	alue			Sourc
	EC50	96h	dration (iii)	-	or other aquatic p	lante			0.623mg/	<u> </u>	4
methanol	NOEC(ECx)	720h		Fish	or other aquatic p	lanto		.007m			4
methanor	LC50	96h		Fish				90mg/			2
	EC50	48h		Crusta	acea			10000			2
	Endpoint	Test	Duration (hr)	Sį	pecies				Value		Source
	EC50	72h		Al	lgae or other aqua	tic plants			1220mg/l		2
methyl ethyl ketone	EC50	96h		Al	lgae or other aqua	tic plants			>500mg/	L	4
methyr ethyr ketone	NOEC(ECx)	48h		Cı	rustacea				68mg/l		2
	EC50	48h		Cı	rustacea				308mg/l		2
	LC50	96h		Fi	ish				>324mg/	L	4
	Endpoint		Duration (hr)		Species				Value		Source
	EC50	96h			Algae or other aqua	•			184mg/l		1
methyl tert-butyl ether	EC50	72h			Igae or other aqua	itic plants			>800mg	/I	1
	NOEC(ECx)	96h			Crustacea				15mg/l		1
	EC50	48h			Crustacea				>100mg		1
	LC50	96h		F	Fish			187mg/l		1	
	Endpoint	Test [	Ouration (hr)	Spec	cies			Valu	e		Source
	EC50	72h	,		e or other aquatic	plants		>9.3			2
valeraldehyde	NOEC(ECx)	504h			Crustacea			2.5m			2
Í	EC50	48h			stacea			31.5			2
	LC50	96h		Fish					-13.6mg/L	-	4
	Endpoint	Test I	Duration (hr)	SI	pecies				Value		Source
	EC50	96h		Al	lgae or other aqua	tic plants			40mg/l		1
	FOFO	72h		Al	lgae or other aqua	tic plants			58mg/l		1
propionaldehyde	EC50				lane or other eque	tic plants			4mg/l		1
propionaldehyde	EC50 EC10(ECx)	96h		Al	lgae or other aqua						
propionaldehyde					rustacea				88.7mg	/I	1
propionaldehyde	EC10(ECx)	96h		Cı					88.7mg/ 14mg/l	/I	2
propionaldehyde	EC10(ECx) EC50 LC50	96h 48h 96h	huration (hr)	Fi	rustacea			Value	14mg/l	/1	2
propionaldehyde	EC10(ECx) EC50 LC50 Endpoint	96h 48h 96h	Duration (hr)	Fi Spec	rustacea ish	plants		Value 4480n	14mg/l	/1	2 Source
propionaldehyde	EC10(ECx) EC50 LC50  Endpoint EC50	96h 48h 96h  Test D 96h	Duration (hr)	Spec Algae	rustacea ish <b>cies</b> e or other aquatic p			4480n	14mg/l		Source 4
propionaldehyde n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p			4480n 3200-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx)	96h 48h 96h <b>Test D</b> 96h 72h 504h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m	14mg/l ng/L 5600mg/L		Source 4 4 2
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test D 96h 72h 504h 48h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L ng/l 3977mg/l		Source 4 4 2 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea	blants		4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h		Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea tacea	olants		4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available	96h 48h 96h  Test E 96h 72h 504h 48h 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species  Not Available	olants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L	Source	Source 4 4 2 4 4 4 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint	96h 48h 96h  Test E 96h 72h 504h 48h 96h  Table N  Test E	est Duration (hr)	Spec Algae Algae Crust Fish	rustacea iish  cies e or other aquatic pe or other aquatic patacea tacea  Species Not Available	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 5600mg/L ig/l 3977mg/l 4000mg/L	Source	2 Source 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E N  Test E	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Sp	rustacea iish  cies e or other aquatic per or other aquatic per or other aquatic per tacea tacea  Species Not Available  species gae or other aquatic	plants	Value	4480n 3200-: 68.3m 3339-: 3000	14mg/l ng/L 56600mg/L g/l 33977mg/l 4000mg/L Value >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Fish Spec Spec Algae Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatic per tacea tacea  Species Not Available  Decies gae or other aquatic	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50 EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available  Duration (hr)	Spec Algae Algae Crust Crust Fish Sp Alg Crust Crust Fish Crust	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	olants	Value Not Availat	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source Not Avail	2 Source 4 4 2 2 4 1
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Sp Alg Crust Crust Fish Crust	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	c plants	Value Not Availat	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/l >100mg/l 1.4mg/l	Source Not Avail	2   Source   4   4   4   4   4   4   4   4   4

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#### **ASTM D7423 Calibration Standard - Level 2**

NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

#### Mobility in soil

mobility in son	
Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

# **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.

DO NOT allow wash water from cleaning or process equipment to enter drains.

- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers.

# **SECTION 14 Transport information**

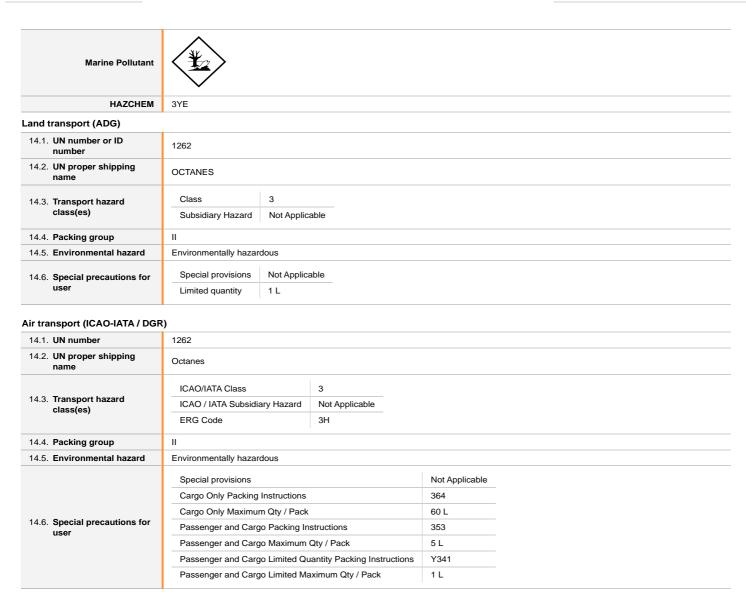
#### **Labels Required**



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# Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262					
14.2. UN proper shipping name	OCTANES					
14.3. Transport hazard class(es)	IMDG Class IMDG Subsidiary Ha	zard Not Applicable				
14.4. Packing group	II					
14.5 Environmental hazard	Marine Pollutant					
14.6. Special precautions for user	EMS Number Special provisions Limited Quantities	F-E , S-E  Not Applicable  1 L				

# 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name Group diethyl ether Not Available dimethyl ether Not Available tert-butyl ethyl ether Not Available ethanol Not Available isobutanol Not Available iso-butyraldehyde Not Available isopropanol Not Available di-iso-propyl ether Not Available iso-valeraldehyde Not Available methanol Not Available methyl ethyl ketone Not Available methyl tert-butyl ether Not Available valeraldehyde

## 14.7.3. Transport in bulk in accordance with the IGC Code

Not Available

Not Available

Not Available

Not Available

Not Available

propionaldehyde

n-propanol

dipropyl ether

tert-amyl methyl ether

2,2,4-trimethylpentane

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### **SECTION 15 Regulatory information**

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

# acetaldehyde 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 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

## acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol 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 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

# isopropanol is found on the following regulatory lists

 $\label{eq:Australia} \mbox{ Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:continuous} \textbf{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

## methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5  $\,$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

## valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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  ${\bf 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ethyl ether)
Canada - DSL	No (tert-butyl ether; dipropyl ether)
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)
China - IECSC	No (tert-butyl ether; tert-amyl methyl ether)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (tert-amyl methyl ether)
Korea - KECI	Yes
New Zealand - NZIoC	No (tert-amyl methyl ether)
Philippines - PICCS	No (tert-butyl ethyl ether)
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	No (tert-butyl ethyl ether)
Vietnam - NCI	Yes
Russia - FBEPH	Yes
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**

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Initial Date	06/03/2025

#### Other information

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
- 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 IndexDNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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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# ASTM D7423 Calibration Standard - Level 3 Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code:

Issue Date: **06/03/2025** Print Date: **06/03/2025** S.GHS.AUS.EN

## SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifie
-------------------

Trouble fubilities	
Product name	ASTM D7423 Calibration Standard - Level 3
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-03

## 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

## **SECTION 2 Hazards identification**

# Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s) Pre	evention
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.
Precautionary statement(s) Res	sponse
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.	
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).	
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.	
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	

# Precautionary statement(s) Storage

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

# Precautionary statement(s) Disposal

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
75-07-0	0.005	acetaldehyde
67-64-1	0.005	acetone
107-18-6	0.005	allyl alcohol
123-72-8	0.005	<u>butyraldehyde</u>
71-36-3	0.005	<u>n-butanol</u>
75-65-0	0.005	tertiary butanol
78-92-2	0.005	2-butanol
60-29-7	0.005	diethyl ether
115-10-6	0.005	dimethyl ether
637-92-3	0.005	tert-butyl ethyl ether
64-17-5	0.005	ethanol
78-83-1	0.005	isobutanol
78-84-2	0.005	<u>iso-butyraldehyde</u>
67-63-0	0.005	isopropanol
108-20-3	0.005	di-iso-propyl ether
590-86-3	0.005	<u>iso-valeraldehyde</u>
67-56-1	0.005	<u>methanol</u>
78-93-3	0.005	methyl ethyl ketone
1634-04-4	0.005	methyl tert-butyl ether
110-62-3	0.005	<u>valeraldehyde</u>
123-38-6	0.005	propionaldehyde
71-23-8	0.005	n-propanol
111-43-3	0.005	dipropyl ether
994-05-8	0.005	tert-amyl methyl ether
540-84-1	99.88	2.2.4-trimethylpentane
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	

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>		
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>		

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

# **SECTION 7 Handling and storage**

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#### Precautions for 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.

# Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Suitable container

Safe handling

- \_\_\_\_\_
- 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

#### Glass container is suitable for laboratory quantities

- .
- 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.

Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

- Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.
- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge.

# Acetic acid:

- vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide
- reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2-aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide, ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene
- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- ► Avoid reaction with oxidising agents

#### n-Octane/ iso-octane:

- reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- ▶ may generate electrostatic charges on agitation or flow, due to low conductivity.

## SECTION 8 Exposure controls / personal protection

#### Control parameters

# Occupational Exposure Limits (OEL)

Storage incompatibility

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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Source	Ingredient	Material name	TWA		STEL	Peak	Notes
Australia Exposure Standards	ethanol	Ethyl alcohol	1000 ppm / 1880 mg/m3	)	Not Available	Not Available	Not Available
Australia Exposure Standards	isobutanol	Isobutyl alcohol	50 ppm / 152 mg	g/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	isopropanol	Isopropyl alcohol	400 ppm / 983 mg/m3		1230 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether	250 ppm / 1040 mg/m3		1300 mg/m3 / 310 ppm	Not Available	Not Available
Australia Exposure Standards	methanol	Methyl alcohol	200 ppm / 262 mg/m3		328 mg/m3 / 250 ppm	Not Available	Not Available
Australia Exposure Standards	methyl ethyl ketone	Methyl ethyl ketone (MEK)	150 ppm / 445 mg/m3		890 mg/m3 / 300 ppm	Not Available	Not Available
Australia Exposure Standards	methyl tert-butyl ether	Methyl-tert butyl ether	25 ppm / 92 mg/	/m3	275 mg/m3 / 75 ppm	Not Available	Not Available
Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	g/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	n-propanol	Propyl alcohol	200 ppm / 492 mg/m3		614 mg/m3 / 250 ppm	Not Available	Not Available
Ingredient	Original IDLH	Original IDLH			ised IDLH		
acetaldehyde	2,000 ppm			Not	Available		
acetone	2,500 ppm			Not Available			
allyl alcohol	20 ppm			Not	Available		
butyraldehyde	Not Available			Not	Available		
n-butanol	1,400 ppm			Not Available			
tertiary butanol	1,600 ppm			Not	Available		
2-butanol	2,000 ppm			Not	Available		
diethyl ether	Not Available			Not	Available		
dimethyl ether	Not Available			Not	Available		
tert-butyl ethyl ether	Not Available			Not	Available		
ethanol	Not Available			Not	Available		

#### **Exposure controls**

isobutanol

isopropano

methanol

iso-butyraldehyde

di-iso-propyl ether iso-valeraldehyde

methyl ethyl ketone

valeraldehyde

n-propanol

dipropyl ether

propionaldehyde

methyl tert-butyl ether

tert-amyl methyl ether

2,2,4-trimethylpentane

# Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

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:

Not Available

Not Available

Not Available

Not Available

Not Available

Not Available Not Available

Not Available

Not Available

Not Available

Not Available

Not Available
Not Available

Not Available

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



1,600 ppm

Not Available

Not Available

Not Available

Not Available

6,000 ppm

3,000 ppm

Not Available

Not Available

Not Available

Not Available

Not Available

Not Available

800 ppm







# 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

#### tion See Hand protection below

## Hands/feet protection

- ▶ Wear chemical protective gloves, e.g. PVC.
- ▶ Wear safety footwear or safety gumboots, e.g. Rubber

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.

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	Personal hygiene is a key element of effective hand care. ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

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Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> 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.

## Ansell Glove Selection

Glove — In order of recommendation
AlphaTec® 38-612
BioClean™ Ultimate BUPS
AlphaTec® 53-001
AlphaTec® 58-005
MICROFLEX® LifeStar EC™ 93-868
MICROFLEX® MidKnight® XTRA 93-862
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS
MICROFLEX® 93-732
MICROFLEX® SafeGrip™ SG-375

The suggested gloves for use should be confirmed with the glove supplier.

# **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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Appearance	Clear		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	Enclosed Space Ignition Deflagration Density (g/m3)	Not Available

## **SECTION 10 Stability and reactivity**

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
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**

nformation on toxicological ef	ifects
a) Acute Toxicity	There is sufficient evidence to classify this material as acutely toxic.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	Based on available data, the classification criteria are not met.
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	Based on available data, the classification criteria are not met.
h) STOT - Single Exposure	There is sufficient evidence to classify this material as toxic to specific organs through single exposure
i) STOT - Repeated Exposure	Based on available data, the classification criteria are not met.
j) Aspiration Hazard	There is sufficient evidence to classify this material as an aspiration hazard
	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
	Inhalation of vangure may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes

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.

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.

**Inhaled** Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

produce serious damage to the health of the individual.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose.

The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere

developing. Before starting consider control of exposure by mechanical ventilation.

| Accidental ingestion of the material may be harmful: animal experiments indicate that ingestion of less than 150 gram may be fatal or may

Continued...

## Ingestion

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#### **ASTM D7423 Calibration Standard - Level 3**

Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 3 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)[1]

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Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 20mg/24H - Moderate	
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL	
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup> TOXICITY  Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL	
TOXICITY   IRRITATION	
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm	
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm	
Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H	
Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL	
Eye (Rodent - rabbit): 0.1mL	
n-butanol Eye (Rodent - rabbit): 1.62mg - Severe	
Eye (Rodent - rabbit): 2mg/24H - Severe	
Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>	
Skin (Human): 20uL/20M Skin (Rodent - rabbit): 20mg/24H - Moderate	
Skin: adverse effect observed (irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 100uL/24H - Severe	
Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>	
tertiary butanol  Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup> Skin (Rodent - rabbit): 500uL/24H - Mild	
Skin: adverse effect observed (irritating) <sup>[1]</sup>	
Skin: no adverse effect observed (initiating) <sup>[1]</sup>	
Skill. Ho adverse effect observed (not illitating).	
TOXICITY IRRITATION	
dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>   Eye (Rodent - rabbit): 0.1mL - Severe	
2-butanol Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>	
Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup> Eye (Human): 100ppm	
Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL	
Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.1mL - Severe	
Eye (Rodent - rabbit): 100mg - Moderate	
diethyl ether Eye (Rodent - rabbit): 100mg/24H - Moderate	
Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
Skin (Rodent - guinea pig): 50mg/24H - Severe	
Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
Chimino datore energia (net minaling)	
TOXICITY IRRITATION	
dimethyl ether Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 100uL/24H - Moderate	
tert-butyl ethyl ether  Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup> Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup> Skin (Rodent - rabbit): 500uL/4H - Moderate	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
ethanol	
Emanor	
TOXICITY IRRITATION	
TOXICITY IRRITATION  Dermal (rabbit) LD50: 17100 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL	

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100uL - Moderate
		Eye	(Rodent - rabbit): 500mg - Severe
		Eye	(Rodent - rabbit): 500mg/24H - Mild
		Eye	: adverse effect observed (irritating) <sup>[1]</sup>
		Eye	: no adverse effect observed (not irritating) <sup>[1]</sup>
		Skir	(Human): 70%/2D
			(Rodent - rabbit): 20mg/24H - Moderate
			n (Rodent - rabbit): 400mg - Mild
		Skir	n: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY		IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>		
	TOXICITY		TATION
iso-butyraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye:	adverse effect observed (irritating) <sup>[1]</sup>
, ,	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>	Skin	(Rodent - rabbit): 397mg - Mild
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin	no adverse effect observed (not irritating) <sup>[1]</sup>
	TOWNER	l IDD	
	TOXICITY		ITATION (P. L. I.
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>	-	(Rodent - rabbit): 100mg - Severe
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 10mg - Moderate
		Eye	: adverse effect observed (irritating) <sup>[1]</sup>
			n (Rodent - rabbit): 500mg - Mild
		Skir	n: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	ID	RITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		/e: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>		kin (Rodent - rabbit): 363mg - Mild
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	SI	
	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	SI	\\\g\
	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY		RITATION
		IRF	
iso-valeraldehyde	TOXICITY	IRF Eye	RITATION
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	IRF Eye Eye	RITATION e (Rodent - rabbit): 100mg/24H - Moderate
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	IRF Eye Eye Ski	e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup>
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	IRF Eye Eye Ski	e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Eye Eye Ski Ski	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup>
iso-valeraldehyde	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY	IRF Eye Ski Ski	RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  b: adverse effect observed (irritating) <sup>[1]</sup> In (Rodent - rabbit): 500mg/24H - Mild  In: adverse effect observed (irritating) <sup>[1]</sup>
·	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	IRF Eye Eye Ski Ski IRR Eye	RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  b: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL
iso-valeraldehyde methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Eye Eye Eye	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe
·	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	IRF Eye Ski Ski IRR Eye Eye Eye	RITATION e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> in (Rodent - rabbit): 500mg/24H - Mild in: adverse effect observed (irritating) <sup>[1]</sup> ITATION (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate
·	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	IRF Eye Ski Ski IRR Eye Eye Eye Eye Eye	RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  b: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate
·	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	IRF Eye Ski Ski Ski Ski Ski Ski Ski	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>
·	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	IRF Eye Ski Ski IRR Eye Eye Eye Eye Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup>
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	IRF Eye Ski Ski IRR Eye Eye Eye Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> in (Rodent - rabbit): 500mg/24H - Mild  in: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> in (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup> in (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup>
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup>	IRF Eye Ski Ski IRR Eye Eye Eye Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> in (Rodent - rabbit): 500mg/24H - Mild  in: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> in (Rodent - rabbit): 20mg/24H - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> in (Rodent - rabbit): 20mg/24H - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup> Inhalation (Mouse) LC50: 32 mg/L4h <sup>[2]</sup>	IRF Eye Skir Skir  IRR Eye Eye Eye Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  n: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup>	IRF Eye Skir Skir  IRR Eye Eye Eye Skir Skir	RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  b: adverse effect observed (irritating) <sup>[1]</sup> In (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> In (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup> Inhalation (Mouse) LC50: 32 mg/L4h <sup>[2]</sup>	IRF Eye Skir Skir IRR Eye Eye Eye Eye Eye Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>
methanol	TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup> Inhalation (Mouse) LC50: 32 mg/L4h <sup>[2]</sup>	IRF Eye Skir Skir Skir Skir Skir Skir Skir Skir	RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  :: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>

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		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IRRITATION	
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
methyl tert-butyl ether	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>	Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	тохісіту	IRRITATION	
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100mg/24H - Severe	
valeraldehyde	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>	Skin (Rodent - guinea pig): 100% - Severe	
		Skin (Rodent - rabbit): 500mg/24H - Moderate	
		Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	TOXICITY	IRRITATION	
	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 20mg/24H - Moderate	
propionaldehyde	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>	Eye (Rodent - rabbit): 41mg - Severe	
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 500mg - Mild	
	TOXICITY	IRRITATION	
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 20mg/24H - Moderate	
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>	Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>	
	ren	Skin (Human): 100%/24H - Mild	
n-propanol	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>		
	Skin (Human): 100%/47H - Mild Skin (Human): 60%/24H		
	Skin (Rodent - rabbit): 500mg - Mild		
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
		Skill. The adverse effect observed (not illitating).	
dipropyl ether	TOXICITY	IRRITATION	
	Not Available	Not Available	
	TOXICITY	IRRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 100uL/24H - Severe	
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Severe	
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
	TOXICITY	IRRITATION	
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
2,2,4-trimethylpentane		Skin: adverse effect observed (irritating) <sup>[1]</sup>	
	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>	Skin: adverse effect observed (irritating) <sup>[1]</sup>	
Legend:		Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis	
	specified data extracted from RTECS - Register of	osure to the material may result in a possible risk of irreversible effects, with the possibility	
	of producing mutation.		
ACETALDEHYDE	of producing mutation.  WARNING: This substance has been classified by	v the IARC as Group 2B: Possibly Carcinogenic to Humans.	
ACETALDEHYDE	of producing mutation.	anticipated to be Carcinogen	
ACETALDEHYDE	of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia	anticipated to be Carcinogen  a. Human Services 2002]  t a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye.  a. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does	
	of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional reg Animal studies show that allyl alcohol is broken do	anticipated to be Carcinogen  a. Human Services 2002]  t a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye.  a. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does	

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 3 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 3 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.				
ISOPROPANOL & METHYL TERT-BUTYL ETHER	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.				
Acute Toxicity	✓ Carcinogenicity	×			
Skin Irritation/Corrosion	✓ Reproductivity	×			
Serious Eye Damage/Irritation	STOT - Single Exposure	<b>~</b>			
Respiratory or Skin sensitisation	X STOT - Repeated Exposure	×			
Mutagenicity	X Aspiration Hazard	✓			

Legend:

Z - Data either not available or does not fill the criteria for classification
 Z - Data available to make classification

# **SECTION 12 Ecological information**

ASTM D7423 Calibration	Endpoint	Test Duration (hr)		Species	Value		S	Source	
Standard - Level 3	Not Available	Not Available		Not Available	Not Avail	able	N	lot Avail	lable
	Endpoint	Test Duration (hr)	Sp	ecies		Value	,		Source
	EC50	72h	-	gae or other aquatic plants		>100	mg/l		2
	EC50	96h	Alg	gae or other aquatic plants		236.6	img/L		4
acetaldehyde	EC50(ECx)	48h		gae or other aquatic plants		0.02n			4
	EC50	48h	Cr	ustacea		39.4-	59.1mg/L		4
	LC50	96h	Fis	sh		28-34	lmg/L		4
	Endpoint	Test Duration (hr)	Spe	cies	Va	ilue			Source
	EC50	96h	Alga	e or other aquatic plants	9.	873-27.6	684mg/l		4
	EC50	72h		e or other aquatic plants		00-1000			4
acetone	NOEC(ECx)	12h	Fish			001mg/L			4
	LC50	96h	Fish		37	44.6-50	00.7mg/L		4
	EC50	48h	Crus	stacea	60	98.4mg	/L		5
	Endpoint	Test Duration (hr)		Species			Value		Source
	EC50	72h		Algae or other aquatic plants			2.25mg/l		2
allyl alcohol	EC50(ECx)	96h		Crustacea			0.25mg/l		1
	EC50	48h		Crustacea			1.65mg/l		2
	LC50	96h		Fish			0.32mg/l		2
	Endpoint	Test Duration (hr)	s	pecies		Valu	e	Source	e
	EC50	72h	А	lgae or other aquatic plant	S	7.3m	ng/l	2	
butyraldehyde	NOEC(ECx)	72h	А	lgae or other aquatic plant	S	0.89	mg/l	2	
	EC50	48h	С	rustacea		20m	g/l	2	
	LC50	96h	F	ish		25.8	mg/l	Not A	vailable
	Endpoint	Test Duration (hr)	1	Species		Va	lue		Source
	EC50	96h		Algae or other aquatic plan	ıts		5mg/l		2
	EC50	72h		Algae or other aquatic plan			00mg/l		1
n-butanol	NOEC(ECx)	504h	Crustacea				mg/l		2
	EC50	48h	Crustacea				00mg/l		1
	LC50	96h		Fish			0-500mg/l		4
tertiary butanol									
	Endpoint	Test Duration (hr)		pecies			alue		Source
	BCF	1008h		ish			0.5		7
	EC50	72h		lgae or other aquatic plant			1000mg/l		1
	EC50	96h		lgae or other aquatic plant	s		976mg/l		2
	EC0(ECx)	48h		rustacea		1.1	80mg/l		1

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	LC50	96h	Fish	>180mg/l	1
	Endi/	Took Describes # >	Cussian	W-1	0
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	1972mg/l	2
2-butanol	EC50	96h	Algae or other aquatic plants	2029mg/l	2
	NOEC(ECx)	24h	Fish	5mg/L	2
	EC50	48h	Crustacea	308mg/l	
	LC50	96h	Fish	2993mg/l	2
	Endpoint	Test Duration (hr)	Species	Value	Source
	BCF	1008h	Fish	0.9-1.4	7
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
diethyl ether	NOEC(ECx)	504h	Crustacea	100mg/l	2
	LC50	96h	Fish	2560mg/l	2
	EC50	48h	Crustacea	1378.63mg/L	5
	2000	4011	Ordioladoa	1070.00119/2	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	154.917mg/l	2
dimethyl ether	NOEC(ECx)	48h	Crustacea	>4000mg/l	1
,	EC50	48h	Crustacea	>4400mg/L	2
	LC50	96h	Fish	1783.04mg/l	2
		1 22		eereg	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	380.68mg/l	2
tert-butyl ethyl ether	NOEC(ECx)	672h	Crustacea	3.39mg/l	2
	LC50	96h	Fish	574mg/l	2
	EC50	48h	Crustacea	110mg/l	2
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	72h	Algae or other aquatic plants	275mg/l	2
ethanol	EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	LC50	96h	Fish	42mg/L	4
	EC50	48h	Crustacea	2mg/L	4
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	593mg/l	2
isobutanol	NOEC(ECx)	504h	Crustacea	4mg/L	5
	EC50				
		48h	Crustacea	ca.600mg/l	1
	LC50	48h 96h	Crustacea Fish	ca.600mg/l 901-1000mg/L	1 4
		96h	Fish	901-1000mg/L	4
	Endpoint	96h  Test Duration (hr)	Fish	901-1000mg/L  Value	4 Source
	Endpoint EC50	96h  Test Duration (hr) 48h	Species Crustacea	901-1000mg/L  Value  50-100mg/l	Source 4
iso-butyraldehyde	Endpoint EC50 LC50	96h  Test Duration (hr) 48h 96h	Species Crustacea Fish	901-1000mg/L  Value  50-100mg/l  23mg/l	3 Source 4 2
iso-butyraldehyde	Endpoint EC50	96h  Test Duration (hr) 48h	Species Crustacea	901-1000mg/L  Value  50-100mg/l	Source 4
iso-butyraldehyde	Endpoint EC50 LC50	96h  Test Duration (hr) 48h 96h	Species Crustacea Fish	901-1000mg/L  Value  50-100mg/l  23mg/l	3 Source 4 2
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l	Source 4 2 2 4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value	4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l	4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea  Species  Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  0.011mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  >1000mg/L  >1400mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea  Species  Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  0.011mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea	901-1000mg/L     Value     50-100mg/l   23mg/l   83.7mg/l   10mg/l     Value   >1000mg/l   >1000mg/l   0.011mg/L   >1400mg/L   7550mg/l	Source 4 2 2 4  Source 1 1 4 4 4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Species	901-1000mg/L     Value	4
isopropanol	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50 EC50 EC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)  96h	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Algae or other aquatic plants Fish Crustacea	901-1000mg/L     Value     50-100mg/l   23mg/l   83.7mg/l   10mg/l     Value   >1000mg/l   >1000mg/l   >1000mg/l   >1400mg/L   7550mg/l     Value   134.9mg/l	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Species	901-1000mg/L     Value	4

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	Endpoint	Test D	uration (hr)	Spec	ies			Value	9		Source
	EC50	96h			e or other aquatic p			77.98			2
iso-valeraldehyde	EC50	72h			e or other aquatic p	olants		80mg			1
	EC50	48h		Crust	tacea			177m			1
	EC50(ECx)	96h		Fish				3.25r			2
	LC50	96h		Fish				2.98-	3.54mg/L		4
	Endpoint	Tost D	uration (hr)	Specie	05		v	alue			Sourc
	EC50	96h	dration (iii)	-	or other aquatic p	lante			0.623mg/	<u> </u>	4
methanol	NOEC(ECx)	720h		Fish	or other aquatic p	lanto		.007m			4
methanor	LC50	96h		Fish				90mg/			2
	EC50	48h		Crusta	acea			10000			2
	Endpoint	Test	Duration (hr)	Sį	pecies				Value		Source
	EC50	72h		Al	lgae or other aqua	tic plants			1220mg/l		2
methyl ethyl ketone	EC50	96h		Al	lgae or other aqua	tic plants			>500mg/	L	4
methyr ethyr ketone	NOEC(ECx)	48h		Cı	rustacea				68mg/l		2
	EC50	48h		Cı	rustacea				308mg/l		2
	LC50	96h		Fi	ish				>324mg/	L	4
	Endpoint		Duration (hr)		Species				Value		Source
	EC50	96h			Algae or other aqua	•			184mg/l		1
methyl tert-butyl ether	EC50	72h			Igae or other aqua	itic plants			>800mg	/I	1
	NOEC(ECx)	96h			Crustacea				15mg/l		1
	EC50	48h			Crustacea				>100mg		1
	LC50	96h		F	ish				187mg/l		1
	Endpoint	Test [	Ouration (hr)	Spec	cies			Valu	e		Source
	EC50	72h	,		e or other aquatic	plants		>9.3			2
valeraldehyde	NOEC(ECx)	504h			stacea			2.5m			2
Í	EC50	48h			stacea			31.5			2
	LC50	96h		Fish					-13.6mg/L	-	4
	Endpoint	Test I	Duration (hr)	SI	pecies				Value		Source
	EC50	96h		Al	lgae or other aqua	tic plants			40mg/l		1
	FOFO	72h		Al	lgae or other aqua	tic plants			58mg/l		1
propionaldehyde	EC50				lane or other eque	tic plants			4mg/l		1
propionaldehyde	EC50 EC10(ECx)	96h		Al	lgae or other aqua						
propionaldehyde					rustacea				88.7mg	/I	1
propionaldehyde	EC10(ECx)	96h		Cı					88.7mg/ 14mg/l	/I	2
propionaldehyde	EC10(ECx) EC50 LC50	96h 48h 96h	huration (hr)	Fi	rustacea			Value	14mg/l	/1	2
propionaldehyde	EC10(ECx) EC50 LC50 Endpoint	96h 48h 96h	Duration (hr)	Fi Spec	rustacea ish	plants		Value 4480n	14mg/l	/1	2 Source
propionaldehyde	EC10(ECx) EC50 LC50  Endpoint EC50	96h 48h 96h  Test D 96h	Duration (hr)	Spec Algae	rustacea ish <b>cies</b> e or other aquatic p			4480n	14mg/l		Source 4
propionaldehyde n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p			4480n 3200-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx)	96h 48h 96h <b>Test D</b> 96h 72h 504h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m	14mg/l ng/L 5600mg/L		Source 4 4 2
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test D 96h 72h 504h 48h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L ng/l 3977mg/l		Source 4 4 2 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea	blants		4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h		Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea tacea	olants		4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available	96h 48h 96h  Test E 96h 72h 504h 48h 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species  Not Available	olants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L	Source	Source 4 4 2 4 4 4 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint	96h 48h 96h  Test E 96h 72h 504h 48h 96h  Table N  Test E	est Duration (hr)	Spec Algae Algae Crust Fish	rustacea iish  cies e or other aquatic pe or other aquatic patacea tacea  Species Not Available	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 5600mg/L ig/l 3977mg/l 4000mg/L	Source	2 Source 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E N  Test E	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Sp	rustacea iish  cies e or other aquatic per or other aquatic per or other aquatic per tacea tacea  Species Not Available  species gae or other aquatic	plants	Value	4480n 3200-: 68.3m 3339-: 3000	14mg/l ng/L 56600mg/L g/l 33977mg/l 4000mg/L Value >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Fish Spec Spec Algae Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatic per tacea tacea  Species Not Available  Decies gae or other aquatic	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50 EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available  Duration (hr)	Spec Algae Algae Crust Crust Fish Sp Alg Crust Crust Fish Crust	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	olants	Value Not Availat	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source Not Avail	2 Source 4 4 2 2 4 1
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E 72h 96h 48h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Sp Alg Crust Crust Fish Crust	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	c plants	Value Not Availat	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/l >100mg/l 1.4mg/l	Source Not Avail	2   Source   4   4   4   4   4   4   4   4   4

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NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

## Mobility in soil

mobility in son	
Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

# **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.

DO NOT allow wash water from cleaning or process equipment to enter drains.

- It may be necessary to collect all wash water for treatment before disposal.
- ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers.

# **SECTION 14 Transport information**

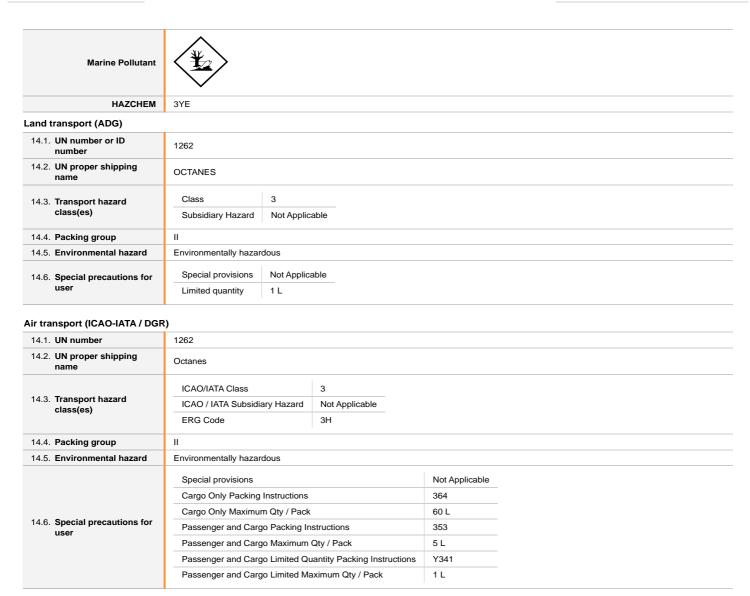
#### **Labels Required**



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# Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262	1262				
14.2. UN proper shipping name	OCTANES	OCTANES				
14.3. Transport hazard class(es)	IMDG Class     3       IMDG Subsidiary Hazard     Not Applicable					
14.4. Packing group	П					
14.5 Environmental hazard	Marine Pollutant					
14.6. Special precautions for user	EMS Number Special provisions Limited Quantities	F-E , S-E  Not Applicable  1 L				

# 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name	Group
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### 14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

# **SECTION 15 Regulatory information**

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

#### acetaldehyde 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 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

#### acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

 $\label{thm:constraints} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule \ 2}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol 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 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

# isopropanol is found on the following regulatory lists

 $\label{eq:Australia} \mbox{ Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

#### methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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  ${\bf 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### Additional Regulatory Information

Not Applicable

#### **National Inventory Status**

National Inventory	Status	
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ether)	
Canada - DSL	No (tert-butyl ether; dipropyl ether)	
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)	
China - IECSC	No (tert-butyl ether; tert-amyl methyl ether)	
Europe - EINEC / ELINCS / NLP	Yes	
Japan - ENCS	No (tert-amyl methyl ether)	
Korea - KECI	Yes	
New Zealand - NZIoC	No (tert-amyl methyl ether)	
Philippines - PICCS	No (tert-butyl ethyl ether)	
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'	
Taiwan - TCSI	Yes	
Mexico - INSQ	No (tert-butyl ethyl ether)	
Vietnam - NCI	Yes	
Russia - FBEPH	Yes	
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	06/03/2025
Initial Date	06/03/2025

#### Other information

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
- 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
- ▶ DNEL: Derived No-Effect Level
- ► PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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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# **ASTM D7423 Calibration Standard - Level 4 Novachem Pty Ltd**

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Issue Date: 06/03/2025 Print Date: 06/03/2025 S.GHS.AUS.EN

#### SECTION 1 Identification of the substance / mixture and of the company / undertaking

#### **Product Identifier** Product name ASTM D7423 Calibration Standard - Level 4 Synonyms Not Available

OCTANES Proper shipping name D-7423-TP-CAL-04

Relevant identified uses of the substance or mixture and uses advised against Laboratory Chemical Reference Material Relevant identified uses

#### 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Other means of identification

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

#### **SECTION 2 Hazards identification**

# Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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H225	Highly flammable liquid and vapour.	
H302	Harmful if swallowed.	
H304	May be fatal if swallowed and enters airways.	
H315	Causes skin irritation.	
H319	Causes serious eye irritation.	
H335	May cause respiratory irritation.	
H336	May cause drowsiness or dizziness.	
H410	Very toxic to aquatic life with long lasting effects.	
Precautionary statement(s) Prevention		
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.	
P271	Use only outdoors or in a well-ventilated area.	
P240	Ground and bond container and receiving equipment.	
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.	

# Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.	
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).	
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.	
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	

# Precautionary statement(s) Storage

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

# Precautionary statement(s) Disposal

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
75-07-0	0.008	acetaldehyde
67-64-1	0.008	acetone
107-18-6	0.008	allyl alcohol
123-72-8	0.008	<u>butyraldehyde</u>
71-36-3	0.008	<u>n-butanol</u>
75-65-0	0.008	tertiary butanol
78-92-2	0.008	2-butanol
60-29-7	0.008	diethyl ether
115-10-6	0.008	dimethyl ether
637-92-3	0.008	tert-butyl ethyl ether
64-17-5	0.008	ethanol
78-83-1	0.008	isobutanol
78-84-2	0.008	<u>iso-butyraldehyde</u>
67-63-0	0.008	isopropanol
108-20-3	0.008	di-iso-propyl ether
590-86-3	0.008	<u>iso-valeraldehyde</u>
67-56-1	0.008	methanol
78-93-3	0.008	methyl ethyl ketone
1634-04-4	0.008	methyl tert-butyl ether
110-62-3	0.008	<u>valeraldehyde</u>
123-38-6	0.008	propionaldehyde
71-23-8	0.008	<u>n-propanol</u>
111-43-3	0.008	dipropyl ether
994-05-8	0.008	tert-amyl methyl ether
540-84-1	99.808	2.2.4-trimethylpentane
Legend:	Classified by Chemwatch; 2. Classification drawn from C&L * EU IOELVs avai	wn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. lable

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>	
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>	

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

# **SECTION 7 Handling and storage**

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#### Precautions for 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.

#### Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Suitable container

Safe handling

- 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

- Glass container is suitable for laboratory quantities
- 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.

#### Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

- ▶ Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.
- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge.

#### Acetic acid:

- ▶ vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide

# Storage incompatibility

- reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene
- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- Avoid reaction with oxidising agents

#### n-Octane/ iso-octane:

- ▶ reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- may generate electrostatic charges on agitation or flow, due to low conductivity.

#### SECTION 8 Exposure controls / personal protection

#### Control parameters

# Occupational Exposure Limits (OEL)

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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Australia Exposure Standards isobutanol Isobutyl alcohol 50 ppm / 152 mg/m3 Not Available Not Available Available  Australia Exposure Standards isopropanol Isopropyl alcohol 400 ppm / 983 mg/m3 1230 mg/m3 / 500 ppm Not Available Not Available Not Available  Australia Exposure Standards di-iso-propyl ether Isopropyl ether 250 ppm / 1040 ppm Not Available Not Available Not Available  Australia Exposure Standards methanol Methyl alcohol 200 ppm / 262 mg/m3 28 mg/m3 / 250 ppm / Not Available Not Available  Australia Exposure Standards methyl ethyl ketone (MEK) Methyl ethyl ketone (MEK) 150 ppm / 445 mg/m3 275 mg/m3 / 300 ppm Not Available Not Available  Australia Exposure Standards valeraldehyde n-Valeraldehyde 50 ppm / 176 mg/m3 Not Available Not Avai	Source	Ingredient	Material name	TWA		STEL	Peak	Notes
Australia Exposure Standards   sobutant   s	Australia Exposure Standards	ethanol	Ethyl alcohol		)	Not Available	Not Available	Not Available
Available Exposure Standards   4-liso-propyl ether   1-sopropyl ether	Australia Exposure Standards	isobutanol	Isobutyl alcohol	50 ppm / 152 mg	<sub>J</sub> /m3	Not Available	Not Available	Not Available
Australia Exposure Standards	Australia Exposure Standards	isopropanol	Isopropyl alcohol			_	Not Available	Not Available
Available Apustrus Standards   methyl ethyl ketone   Methyl ethyl ketone   mg/m3   pm   Not Available   Available   Available   Available   Methyl ethyl ketone   Methyl ethyl ketone   mg/m3   pm   Not Available   Not Available   Available   Available   Available   Methyl ethyl eth	Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether				Not Available	Not Available
Available xposure Standards   methyl tert-butyl   methyl tert-butyl tert-butyl tert-butyl tert-butyl   methyl tert-butyl   methyl tert-butyl tert-butyl   methyl tert-butyl   methyl tert-butyl   methyl tert-butyl te	Australia Exposure Standards	methanol	Methyl alcohol			_	Not Available	Not Available
Available	Australia Exposure Standards	methyl ethyl ketone				_	Not Available	Not Available
Australia Exposure Standards         valeraldenyde         6-0 ppm / 148 mg/m3         Not Available         Available         Available           Australia Exposure Standards         n-propanol         Propyl alcohol         200 ppm / 492 mg/m3         614 mg/m3 / 250 ppm         Not Available         Not Available           acetaldehyde         2,000 ppm         1,600 ppm         Not Available         1,600 ppm         Not Available           butyraldehyde         1,400 ppm         1,400 ppm         Not Available         Not Available           2-butanol         2,000 ppm         Not Available         Not Available           2-butanol         1,600 ppm         Not Available         Not Available           2-butanol         2,000 ppm         Not Available         Not Available           4 tert-butyl ether         Not Available         Not Available         Not Available           4 tert-butyl ethyl ether         Not Available         Not Available         Not Available           4 ethanol         1,600 ppm         Not Available         Not Available           4 ethanol         Not Available         Not Available         Not Available           4 ethanol         Not Available         Not Available         Not Available           4 ethanol         Not Available         Not Ava	Australia Exposure Standards		Methyl-tert butyl ether	25 ppm / 92 mg/s	m3	275 mg/m3 / 75 ppm	Not Available	Not Available
Available Exposure Standards         Pyropy alone         mg/m3         ppm of Not Available         Available           Ingredient         Original IDLH         Revised IDLH           acetaldehyde         2,000 ppm         Not Available         Not Available           acetone         2,500 ppm         Not Available         Not Available           butyraldehyde         Not Available         Not Available         Not Available           tertiary butanol         1,600 ppm         Not Available         Not Available           diethyl ether         Not Available         Not Available         Not Available           dimethyl ether         Not Available         Not Available         Not Available           ethanol         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available         Not Available           iso-propyl ether         Not Available         Not Available         Not Available           iso-propyl ether         Not Available         Not Available         Not Available           iso-propyl ether </td <td>Australia Exposure Standards</td> <td>valeraldehyde</td> <td>n-Valeraldehyde</td> <td>50 ppm / 176 mg</td> <td>g/m3</td> <td>Not Available</td> <td>Not Available</td> <td>Not Available</td>	Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	g/m3	Not Available	Not Available	Not Available
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valeraldehyde     Not Available     Not Available       propionaldehyde     Not Available     Not Available	methyl ethyl ketone	3,000 ppm	3,000 ppm		Not Available			
propionaldehyde Not Available Not Available	methyl tert-butyl ether	Not Available			Not Available			
	valeraldehyde	Not Available	Not Available		Not Available			
n-propanol 800 ppm Not Available	propionaldehyde	Not Available	Not Available		Not Available			
	n-propanol	800 ppm	800 ppm			Available		

#### **Exposure controls**

tert-amyl methyl ether

2,2,4-trimethylpentane

dipropyl ether

#### Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

Not Available

Not Available

Not Available

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



Not Available

Not Available

Not Available







# 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

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.

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	Personal hygiene is a key element of effective hand care.  ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

ASTM D7423 Calibration Standard - Level 4

Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> 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.

# Ansell Glove Selection

Glove — In order of recommendation
AlphaTec® 38-612
BioClean™ Ultimate BUPS
AlphaTec® 53-001
AlphaTec® 58-005
MICROFLEX® LifeStar EC™ 93-868
MICROFLEX® MidKnight® XTRA 93-862
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS
MICROFLEX® 93-732
MICROFLEX® SafeGrip™ SG-375

The suggested gloves for use should be confirmed with the glove supplier.

# **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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#### **ASTM D7423 Calibration Standard - Level 4**

Appearance	Clear		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available

#### **SECTION 10 Stability and reactivity**

**Enclosed Space Ignition** 

Time Equivalent (s/m3)

Not Available

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

**Enclosed Space Ignition** 

Deflagration Density (g/m3)

Not Available

# **SECTION 11 Toxicological information**

information on toxicological effects			
	a) Acute Toxicity	There is sufficient ev	

Ingestion

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

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.

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.

Inhaled Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

produce serious damage to the health of the individual.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere

developing. Before starting consider control of exposure by mechanical ventilation. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may Version No: **1.1** Page **8** of **22** Issue Date: **06/03/2025** 

#### ASTM D7423 Calibration Standard - Level 4

Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 4 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)[1]

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	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 20mg/24H - Moderate
butyraldehyde	Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
butyruidenyde	Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 410mg - Mild
	Crar (rat) 2500: 0000 mg/kg	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
		Chin. To datable check described (flot initiality)
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>	Eye (Human): 50ppm
	Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>	Eye (Human): 990ppm/1H
	Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.005mL - Severe
	(,	Eye (Rodent - rabbit): 0.1mL
n-butanol		Eye (Rodent - rabbit): 1.62mg - Severe
		Eye (Rodent - rabbit): 2mg/24H - Severe
		Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>
		Skin (Human): 20uL/20M
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin: adverse effect observed (irritating)[1]
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100uL/24H - Severe
tertiary butanol	Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 500uL/24H - Mild
		Skin: adverse effect observed (irritating) <sup>[1]</sup>
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe
2-butanol	Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	oral (nat) 22001 2001 mg/ng	Ciam to de coso sheet oscol to (tiot amaing)
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup>	Eye (Human): 100ppm
	Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL
	Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe
		Eye (Rodent - rabbit): 100mg - Moderate
diethyl ether		Eye (Rodent - rabbit): 100mg/24H - Moderate
		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
		Skin (Rodent - guinea pig): 50mg/24H - Severe
		Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
		Chin. To devote direct observed (Not initialing)
	TOXICITY	IRRITATION
dimethyl ether	Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 100uL/24H - Moderate
	Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
tert-butyl ethyl ether	milatation (rtat) 2000: Folloo mg/rm	
tert-butyl ethyl ether	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Moderate
tert-butyl ethyl ether	<u> </u>	Skin (Rodent - rabbit): 500uL/4H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
tert-butyl ethyl ether	<u> </u>	, , ,
	<u> </u>	, , ,
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100uL - Moderate
		Eye (Rodent - rabbit): 500mg - Severe
		Eye (Rodent - rabbit): 500mg/24H - Mild
		Eye: adverse effect observed (irritating) <sup>[1]</sup>
		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
		Skin (Human): 70%/2D
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin (Rodent - rabbit): 400mg - Mild
		Skin: no adverse effect observed (not irritating)[1]
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>	Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>	3,
	3 3	
	тохісіту	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
iso-butyraldehyde	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>	Skin (Rodent - rabbit): 397mg - Mild
	<u> </u>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating).
	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100mg - Severe
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>	Eye (Rodent - rabbit): 100mg/24H - Moderate
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 10mg - Moderate
		Eye: adverse effect observed (irritating) <sup>[1]</sup>
		Skin (Rodent - rabbit): 500mg - Mild
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRRITATION
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>     Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>     Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>     TOXICITY     Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>     Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>     TOXICITY	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>     Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>     Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>     TOXICITY     Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>     Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>     TOXICITY	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 pm4h <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 pm4h <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 pm4h <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 pm4h <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>     Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>     Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>     TOXICITY     Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>     Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 15800 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>     Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>     TOXICITY	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  IRRITATION
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>     Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>     Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>     TOXICITY     Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>     Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 15800 mg/kg <sup>[2]</sup>     Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>     Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>     TOXICITY	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  IRRITATION
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 40mg - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Human): 350ppm
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 0.1mL - Severe  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 40mg - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Human): 350ppm  Eye (Rodent - rabbit): 80mg  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 80mg  Eye: adverse effect observed (irritating) <sup>[1]</sup>
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 363mg - Mild  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye: adverse effect observed (irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500mg/24H - Mild  Skin: adverse effect observed (irritating) <sup>[1]</sup> IRRITATION  Eye (Rodent - rabbit): 0.1mL  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 100mg/24H - Moderate  Eye (Rodent - rabbit): 20mg/24H - Moderate  Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 20mg/24H - Moderate  Skin: no adverse effect observed (not irritating) <sup>[1]</sup> IRRITATION  Eye (Human): 350ppm  Eye (Rodent - rabbit): 80mg  Eye: adverse effect observed (irritating) <sup>[1]</sup>

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			Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
	TOXICITY		RITATION					
methyl tert-butyl ether	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>						
	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>	Skin: adverse effect observed (irritating)[1]						
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>	Sk	in: no adverse effect observed (not irritating) <sup>[1]</sup>					
	тохісіту		IRRITATION					
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>		Eye (Rodent - rabbit): 100mg/24H - Severe					
	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>					
valeraldehyde	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>		Skin (Rodent - guinea pig): 100% - Severe					
			Skin (Rodent - rabbit): 500mg/24H - Moderate					
			Skin: adverse effect observed (irritating) <sup>[1]</sup>					
	TOXICITY		IRRITATION					
propionaldehyde	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>		Eye (Rodent - rabbit): 20mg/24H - Moderate					
	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>		Eye (Rodent - rabbit): 41mg - Severe					
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>		Skin (Rodent - rabbit): 500mg - Mild					
	TOXICITY	IRF	RITATION					
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>	Eye	e (Rodent - rabbit): 20mg/24H - Moderate					
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>	Eye	e: adverse effect observed (irreversible damage) <sup>[1]</sup>					
n-propanol	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>	Ski	n (Human): 100%/24H - Mild					
n-propanoi		Ski	n (Human): 100%/47H - Mild					
		Ski	n (Human): 60%/24H					
	Skin (Rodent - rabbit): 500mg - Mild							
		Ski	n: no adverse effect observed (not irritating) <sup>[1]</sup>					
	TOXICITY		IRRITATION					
dipropyl ether	Not Available		Not Available					
	TOXICITY		DDITATION .					
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		RRITATION  Eye (Rodent - rabbit): 100uL/24H - Severe					
And the Lord Lord of			, , , , , , , , , , , , , , , , , , ,					
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin (Rodent - rabbit): 500uL/4H - Severe					
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
	TOXICITY		IRRITATION					
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>					
2,2,4-trimethylpentane	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>					
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>					
Legend:	Value obtained from Europe ECHA Registered S     specified data extracted from RTECS - Register of		Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances					
	appearance data extraoring from TVT 200 Tragistion of	TOXIO ENOCE	or oriented substances					
	Laboratory (in vitro) and animal studies show, expo	sure to the n	naterial may result in a possible risk of irreversible effects, with the possibilit					
	of producing mutation.		WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.					
ACETALDEHYDE	of producing mutation.	the IAPC as	Group 2B: Possibly Carringgonic to Humans					
ACETALDEHYDE	WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a	inticipated to	be Carcinogen					
ACETALDEHYDE	WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health	inticipated to	be Carcinogen					
ACETALDEHYDE	WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not	anticipated to & Human Se a skin irritan a Studies in h	be Carcinogen ervices 2002]  t or sensitizer, but it removes fat from the skin, and it also irritates the eye. Humans have shown that exposure to acetone at a level of 2375 mg/m3 doe					
	WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional reg Animal studies show that allyl alcohol is broken do	a skin irritan a Studies in hulation, behawn in the live	be Carcinogen  bervices 2002]  t or sensitizer, but it removes fat from the skin, and it also irritates the eye.  because the sensitizer of the sensitizer o					

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 4 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 4 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.			
ISOPROPANOL & METHYL TERT-BUTYL ETHER	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.			
Acute Toxicity	✓ Carcinogenicity	×		
Skin Irritation/Corrosion	✓ Reproductivity	×		
Serious Eye Damage/Irritation	STOT - Single Exposure	<b>~</b>		
Respiratory or Skin sensitisation	X STOT - Repeated Exposure	×		
Mutagenicity	X Aspiration Hazard	✓		

Legend:

Z - Data either not available or does not fill the criteria for classification
 Z - Data available to make classification

# **SECTION 12 Ecological information**

ASTM D7423 Calibration	Endpoint	Test Duration (hr)		Species	Value		Sc	ource	
Standard - Level 4	Not Available	Not Available		Not Available	Not Ava	ilable	No	ot Availa	ble
	Endpoint	Test Duration (hr)	Spe	ecies		Value	•		Source
	EC50	72h	Alg	ae or other aquatic plants		>100	mg/l		2
a a a tal da bu da	EC50	96h	Alg	ae or other aquatic plants		236.6	Smg/L		4
acetaldehyde	EC50(ECx)	48h	Alg	ae or other aquatic plants		0.02r	ng/l		4
	EC50	48h	Cru	stacea		39.4-	59.1mg/L		4
	LC50	96h	Fisl	1		28-34	lmg/L		4
	Endpoint	Test Duration (hr)	Spec			/alue	"		Sourc
	EC50	96h		or other aquatic plants		9.873-27.6			4
acetone	EC50	72h		or other aquatic plants		600-100			4
	NOEC(ECx)	12h	Fish			0.001mg/l			4
	LC50	96h	Fish				00.7mg/L		4
	EC50	48h	Crust	acea	6	6098.4mg	/L		5
	Endpoint	Test Duration (hr)		Species			Value		Source
	EC50	72h		Algae or other aquatic plants			2.25mg/l		2
allyl alcohol	EC50(ECx)	96h		Crustacea			0.25mg/l		1
·	EC50	48h		Crustacea			1.65mg/l		2
	LC50	96h		Fish			0.32mg/l		2
	Endpoint	Test Duration (hr)	Sp	ecies		Valu	e	Source	,
	EC50	72h	Ale	gae or other aquatic plants	8	7.3m	ng/l	2	
butyraldehyde	NOEC(ECx)	72h	Ale	gae or other aquatic plants	8	0.89	mg/l	2	
	EC50	48h		ustacea		20m	20mg/l 2		
	LC50	96h	Fis	sh		25.8	mg/l	Not Ava	ailable
	Endpoint	Test Duration (hr)	s	pecies		Va	lue		Source
	EC50	96h		gae or other aquatic plant	:S		5mg/l		2
	EC50	72h		gae or other aquatic plant			00mg/l		1
n-butanol	NOEC(ECx)	504h		Crustacea			4.1mg/l		2
	EC50	48h	С	Crustacea			00mg/l		1
	LC50	96h		Fish			0-500mg/l		4
tertiary butanol									
.,	Endpoint	Test Duration (hr)	Sp	ecies		V	alue alue		Source
	BCF	1008h	Fis	sh		<	0.5		7
	EC50	72h	Al	gae or other aquatic plants	3	>	1000mg/l		1
	EC50	96h	Al	gae or other aquatic plants	3	>	976mg/l		2
	EC0(ECx)	48h	Cr	ustacea		1	80mg/l		1
	EC50	48h	Cr	ustacea		9	33mg/l		1
	EC30	7011	Ι Ο.	aotaooa		1 -	3		

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	LC50	96h	Fish	>	180mg/l	1
	Endpoint	Test Duration (hr)	Species		Value	Source
	EC50	72h	Algae or other aquatic plants		1972mg/l	2
	EC50	96h	Algae or other aquatic plants		2029mg/l	2
2-butanol	NOEC(ECx)	24h	Fish		5mg/L	1
	EC50	48h	Crustacea		308mg/l	2
	LC50					2
	LC50	96h	Fish		2993mg/l	2
	Endpoint	Test Duration (hr)	Species	Valu	ıe	Source
	BCF	1008h	Fish	0.9-	1.4	7
	EC50	72h	Algae or other aquatic plants	>10	0mg/l	2
diethyl ether	NOEC(ECx)	504h	Crustacea	100	mg/l	2
	LC50	96h	Fish	256	0mg/l	2
	EC50	48h	Crustacea	137	8.63mg/L	5
	Endpoint	Test Duration (hr)	Species	Val		Source
	EC50	96h	Algae or other aquatic plants	154	4.917mg/l	2
dimethyl ether	NOEC(ECx)	48h	Crustacea	>40	000mg/l	1
	EC50	48h	Crustacea	>44	400mg/L	2
	LC50	96h	Fish	178	33.04mg/l	2
	Endnoint	Toet Duration (ha)	Species	T.	alue	Source
	Endpoint	Test Duration (hr)	Species			
	EC50	72h	Algae or other aquatic plants		80.68mg/l	2
tert-butyl ethyl ether	NOEC(ECx)	672h	Crustacea			2
	LC50	96h	Fish		74mg/l	2
	EC50	48h	Crustacea	11	10mg/l	2
	Endpoint	Test Duration (hr)	Species	Val	lue	Source
	EC50	96h	Algae or other aquatic plants			4
	EC50	72h	Algae or other aquatic plants			2
ethanol	EC50(ECx)	96h	Algae or other aquatic plants	<0.	.001mg/L	4
	LC50	96h	Fish			4
	EC50	48h	Crustacea		ıg/L	4
	Endpoint	Test Duration (hr)	Species	Value	,	Source
	EC50	72h	Algae or other aquatic plants	593m	ıg/l	2
isobutanol	NOEC(ECx)	504h	Crustacea	4mg/l	L	5
	EC50	48h	Crustacea	ca.60	0mg/l	1
	LC50	96h	Fish	901-1	000mg/L	4
	Endpoint	Test Duration (hr)	Species	W.	alue	Source
	EC50	48h	Crustacea		0-100mg/l	4
iso-butyraldehyde	LC50	96h	Fish		3mg/l	2
150-butyraldenyde	EC50	72h	Algae or other aquatic plants		3.7mg/l	2
	NOEC(ECx)	48h	Crustacea		Omg/l	4
		1	·			
	Endpoint	Test Duration (hr)	Species	Va	alue	Source
	EC50	96h	Algae or other aquatic plants	>1	000mg/l	1
iconronanal	EC50	72h	Algae or other aquatic plants	>1	000mg/l	1
isopropanol	EC50(ECx)	24h	Algae or other aquatic plants	0.0	011mg/L	4
	LC50	96h	Fish	>1	400mg/L	4
	EC50	48h	Crustacea	75	550mg/l	4
		T-48 0 0 0 1	0		Value	
		Loct Duration (hr)	Species		Valliev	Source
	Endpoint	Test Duration (hr)				
	EC50	96h	Algae or other aquatic plants		134.9mg/l	2
di-iso-propyl ether	EC50 NOEC(ECx)	96h 48h	Algae or other aquatic plants Crustacea		134.9mg/l 46mg/l	2
di-iso-propyl ether	EC50	96h	Algae or other aquatic plants		134.9mg/l	2

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	Endpoint		uration (hr)	Spec				Value			Source
	EC50	96h		Algae	or other aqu	atic plants		77.98	Bmg/l		2
iso-valeraldehyde	EC50	72h		Algae	or other aqu	atic plants		80mg	g/l		1
•	EC50	48h		Crust	acea			177m			1
	EC50(ECx)	96h		Fish				3.25r			2
	LC50	96h		Fish				2.98-	3.54mg/L		4
	Endnaint	Tool C	trunction (bu)	Cuasi			· ·	/alue			Source
	Endpoint EC50	96h	uration (hr)	Specie	or other aqua	atia planta			0.623mg/		4
methanol	NOEC(ECx)	720h		Fish	or other aqua	alic plants		0.007m			4
methanoi	LC50	96h		Fish							2
	EC50	48h		Crusta	202			90mg/l			2
	2030	7011		Ordsta	loca			10000	1119/1		
	Endpoint	Test	Duration (hr)	Sp	pecies				Value		Source
	EC50	72h		Al	gae or other	aquatic plants			1220mg/l		2
	EC50	96h			-	aquatic plants			>500mg/l		4
methyl ethyl ketone	NOEC(ECx)	48h			rustacea			_	68mg/l		2
	EC50	48h		Cı	rustacea				308mg/l		2
	LC50	96h		Fis	sh				>324mg/l	 L	4
	Endpoint	Test	Duration (hr)	S	pecies				Value		Source
	EC50	96h		А	lgae or other	aquatic plants			184mg/l		1
	EC50	72h		А	lgae or other	aquatic plants			>800mg	/I	1
methyl tert-butyl ether	NOEC(ECx)	96h		С	rustacea				15mg/l		1
	EC50	48h		С	rustacea				>100mg	/I	1
	LC50	96h		Fi	ish				187mg/l		1
	Endpoint EC50	72h	Ouration (hr)	Spec		uotio planta		Valu			Source 2
valeraldehyde	NOEC(ECx)	504h						>9.3 2.5m			2
valeralueriyue								_			
	EC50 LC50	96h	48h					31.5	mg/i -13.6mg/L		4
				1.1011				1110			
	Endpoint	Test	Duration (hr)	Sį	pecies				Value		Source
	EC50	96h		Al	lgae or other	aquatic plants			40mg/l		1
nuanian aldahuda	EC50	72h		Al	lgae or other	aquatic plants			58mg/l		1
propionaldehyde	EC10(ECx)	96h		Al	lgae or other	aquatic plants			4mg/l		1
	EC50	48h	48h		rustacea				88.7mg	/1	1
	LC50	96h		Fi	sh				14mg/l		2
	Endpoint		Ouration (hr)	Spec				Value			Source
	EC50	96h			or other aqu			4480n			4
n-propanol	EC50	72h			e or other aqu	latic plants			5600mg/L		4
	NOEC(ECx)	504h		Crust					88.3mg/l		2
	EC50	48h		Crust	acea				3977mg/l		4
	LC50	96h		Fish				3000-4	4000mg/L		4
	Endpoint	Т	est Duration (hr)		Species		Value			Source	
dipropyl ether	Not Available		ot Available		Not Avail	able	Not Availa	ble		Not Avail	lable
	Endpoint		Ouration (hr)		ecies				Value		Source
	EC50	72h				equatic plants			>100mg/l		4
	LC50	96h		Fis	sh				>100mg/l		2
tert-amyl methyl ether	EC50	48h		Cru	ustacea				100mg/l		2
tert-amyl methyl ether	EC30			Crustacea				1.4mg/l		1	
tert-amyl methyl ether	EC50(ECx)	24h									
tert-amyl methyl ether 2,2,4-trimethylpentane	EC50(ECx)	24h	1								
	EC50(ECx)	24h	Test Duration (hr)			Species		Value			ource
	EC50(ECx)	24h	Test Duration (hr)			Species Fish		<b>Value</b> 440-58	0	<b>So</b> 7	urce

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NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

# Mobility in soil

Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

# **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
- 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.
- 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**



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#### **Marine Pollutant HAZCHEM** 3YE Land transport (ADG) 14.1. UN number or ID 1262 number 14.2. UN proper shipping **OCTANES** name 3 Class 14.3. Transport hazard class(es) Subsidiary Hazard Not Applicable П 14.4. Packing group 14.5. Environmental hazard Environmentally hazardous Not Applicable 14.6. Special precautions for Special provisions Limited quantity 1 L Air transport (ICAO-IATA / DGR) 14.1. UN number 1262 14.2. UN proper shipping Octanes name ICAO/IATA Class 3 14.3. Transport hazard ICAO / IATA Subsidiary Hazard Not Applicable class(es) **ERG Code** ЗН 14.4. Packing group 14.5. Environmental hazard Environmentally hazardous Special provisions Not Applicable Cargo Only Packing Instructions 364 Cargo Only Maximum Qty / Pack 60 L 14.6. Special precautions for Passenger and Cargo Packing Instructions 353 user Passenger and Cargo Maximum Qty / Pack 5 L Passenger and Cargo Limited Quantity Packing Instructions Y341 Passenger and Cargo Limited Maximum Qty / Pack 1 L

# Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262	
14.2. UN proper shipping name	OCTANES	
14.3. Transport hazard class(es)	IMDG Class IMDG Subsidiary Ha	zard Not Applicable
14.4. Packing group	II	
14.5 Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number Special provisions Limited Quantities	F-E , S-E  Not Applicable  1 L

# 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name	Group
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### 14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### **SECTION 15 Regulatory information**

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

#### acetaldehyde 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 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

#### acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol is found on the following regulatory lists

 $\label{eq:Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals} Australia \ Hazardous \ Chemical Information System (HCIS) - Hazardous Chemicals$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

# isopropanol is found on the following regulatory lists

 $\label{eq:Australia} \mbox{ Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

#### methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5  $\,$ 

 $\label{thm:constraints} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule \ 6}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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  ${\bf 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ethyl ether)
Canada - DSL	No (tert-butyl ether; dipropyl ether)
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)
China - IECSC	No (tert-butyl ether; tert-amyl methyl ether)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (tert-amyl methyl ether)
Korea - KECI	Yes
New Zealand - NZIoC	No (tert-amyl methyl ether)
Philippines - PICCS	No (tert-butyl ethyl ether)
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	No (tert-butyl ethyl ether)
Vietnam - NCI	Yes
Russia - FBEPH	Yes
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**

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#### Other information

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
- 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
- ▶ DNEL: Derived No-Effect Level
- ► PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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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# ASTM D7423 Calibration Standard - Level 5 Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code:

Issue Date: **06/03/2025** Print Date: **06/03/2025** S.GHS.AUS.EN

#### SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier		
Product name	ASTM D7423 Calibration Standard - Level 5	
Synonyms	Not Available	
Proper shipping name	OCTANES	
Other means of identification	D-7423-TP-CAI -05	

# 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

#### **SECTION 2 Hazards identification**

# Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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11005		
H225	Highly flammable liquid and vapour.	
H302	Harmful if swallowed.	
H304	May be fatal if swallowed and enters airways.	
H315	Causes skin irritation.	
H319	Causes serious eye irritation.	
H335	May cause respiratory irritation.	
Н336	May cause drowsiness or dizziness.	
H410	Very toxic to aquatic life with long lasting effects.	
Precautionary statement(s) Prevention		
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.	
P271	Use only outdoors or in a well-ventilated area.	
P240	Ground and bond container and receiving equipment.	
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.	

# Precautionary statement(s) Response

P301+P310	310 IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.	
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).	
P370+P378 In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.		
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.		

# 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
75-07-0	0.01	acetaldehyde
67-64-1	0.01	acetone
107-18-6	0.01	allyl alcohol
123-72-8	0.01	<u>butyraldehyde</u>
71-36-3	0.01	<u>n-butanol</u>
75-65-0	0.01	tertiary butanol
78-92-2	0.01	2-butanol
60-29-7	0.01	<u>diethyl ether</u>
115-10-6	0.01	dimethyl ether
637-92-3	0.01	tert-butyl ethyl ether
64-17-5	0.01	ethanol
78-83-1	0.01	isobutanol
78-84-2	0.01	<u>iso-butyraldehyde</u>
67-63-0	0.01	isopropanol
108-20-3	0.01	di-iso-propyl ether
590-86-3	0.01	<u>iso-valeraldehyde</u>
67-56-1	0.01	methanol
78-93-3	0.01	methyl ethyl ketone
1634-04-4	0.01	methyl tert-butyl ether
110-62-3	0.01	<u>valeraldehyde</u>
123-38-6	0.01	propionaldehyde
71-23-8	0.01	n-propanol
111-43-3	0.01	dipropyl ether
994-05-8	0.01	tert-amyl methyl ether
540-84-1	99.76	2.2.4-trimethylpentane
Legend:	Classified by Chemwatch; 2. Classification drawn Classification drawn from C&L * EU IOELVs avai	wn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. lable

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

# **SECTION 7 Handling and storage**

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#### Precautions for 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.

# Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
  - Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Safe handling

- ▶ 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

#### **•**

- Glass container is suitable for laboratory quantities
- Packing as supplied by manufacturer

#### Suitable container

- 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.

# Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

- Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.
- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge.

#### Acetic acid:

- vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide

# Storage incompatibility

- reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2-aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide, ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene
- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- ► Avoid reaction with oxidising agents

#### n-Octane/ iso-octane:

- reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- ▶ may generate electrostatic charges on agitation or flow, due to low conductivity.

#### SECTION 8 Exposure controls / personal protection

#### Control parameters

# Occupational Exposure Limits (OEL)

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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Australia Exposure Standards         ethanol         Entyl alcohol         0.000 ppm / 182 mg/m3         Not Available         Not Available         Not Available         Not Available         Not Available         Available         Available         Not Available         Not Available         Not Available         Available <th>Source</th> <th>Ingredient</th> <th>Material name</th> <th>TWA</th> <th></th> <th>STEL</th> <th>Peak</th> <th>Notes</th>	Source	Ingredient	Material name	TWA		STEL	Peak	Notes	
Australia Exposure Standards   sobulanol   sobuly alcohol   400 pm / 98c mg/m3   1230 mg/m3 / 500   Not Available   Available	Australia Exposure Standards	ethanol	Ethyl alcohol		)	Not Available	Not Available		
Available Exposure Standards   690/090/nd   1900/nd   1	Australia Exposure Standards	isobutanol	Isobutyl alcohol	50 ppm / 152 mg	ı/m3	Not Available	Not Available		
Available Available Standards   methanol	Australia Exposure Standards	isopropanol	Isopropyl alcohol			_	Not Available		
Available Exposure Standards   methyl ethyl ketone   Methyl ethyl ketone   fiso ppm/ 3   890 mg/m3 / 900   Not Available   Available   Available   Methyl ethyl ketone   Methyl ethyl ketone   fiso ppm/ 3   890 mg/m3 / 900   Not Available   Available   Available   Methyl ethyl	Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether			_	Not Available		
Available Exposure Standards         Methyl tert-butyl either other either Eurly lettin betroit either Eurly lettin betroit either either Eurly lettin either Eurly	Australia Exposure Standards	methanol	Methyl alcohol			_	Not Available		
Available Exposure Standards valeraldehyde	Australia Exposure Standards	methyl ethyl ketone				_	Not Available		
Australia Exposure Standards         Valeralderlyde         60 pm/r4s mg/m3         Not Available	Australia Exposure Standards		Methyl-tert butyl ether	25 ppm / 92 mg/ı	m3	275 mg/m3 / 75 ppm	Not Available		
Available Exposure Standards         Propyria acond         mg/m3         ppm         Not Available         Available           Ingredient         Original IDLH         Revised IDLH           acetaldehyde         2,000 ppm         Not Available         Not Available         Secondary	Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	ı/m3	Not Available	Not Available		
acetaldehyde         2,000 ppm         Not Available           acetone         2,500 ppm         Not Available           allyl alcohol         20 ppm         Not Available           butyraldehyde         Not Available         Not Available           n-butanol         1,400 ppm         Not Available           tertiary butanol         1,600 ppm         Not Available           diethyl ether         Not Available         Not Available           dimethyl ether         Not Available         Not Available           tert-butyl ethyl ether         Not Available         Not Available           ethanol         Not Available         Not Available           isobutanol         1,600 ppm         Not Available           isobutyraldehyde         Not Available         Not Available           isopropanol         Not Available         Not Available           di-iso-propyl ether         Not Available         Not Available           methanol         6,000 ppm         Not Available           methanol         6,000 ppm         Not Available           methyl ethyl ether         Not Available         Not Available           methyl ethyl ether         Not Available         Not Available           methyl ethyl ether         Not Av	Australia Exposure Standards	n-propanol	Propyl alcohol			_	Not Available		
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dimethyl ether Not Available	2-butanol	2,000 ppm			Not a	Available			
tert-butyl ethyl ether Not Available Not Available Not Available ethanol Not Available Not Available Not Available isobutanol 1,600 ppm Not Available Not Available Not Available isopropanol Not Available Not Available Not Available isopropanol Not Available Not Available Not Available Not Available Not Available Not Available iso-valeraldehyde Not Available Not Available Not Available Not Available Not Available nethanol 6,000 ppm Not Available Not Available Not Available nethyl ethyl ketone 3,000 ppm Not Available	diethyl ether	Not Available			Not a	Available			
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iso-butyraldehyde Not Available Not Available Not Available Not Available Sepropanol Not Available	ethanol	Not Available			Not Available				
isopropanol Not Available	isobutanol	1,600 ppm			Not Available				
di-iso-propyl ether Not Available	iso-butyraldehyde	Not Available			Not Available				
iso-valeraldehyde Not Available Not Available methanol 6,000 ppm Not Available methyl tetne 3,000 ppm Not Available methyl tetr-butyl ether Not Available Not Available valeraldehyde Not Available Not Available propionaldehyde Not Available Not Available Not Available Not Available	isopropanol	Not Available			Not Available				
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methyl tert-butyl ether Not Available Not Available valeraldehyde Not Available Not Available propionaldehyde Not Available Not Available	methanol	6,000 ppm			Not Available				
valeraldehyde     Not Available       propionaldehyde     Not Available       Not Available     Not Available	methyl ethyl ketone	3,000 ppm			Not Available				
propionaldehyde Not Available Not Available	methyl tert-butyl ether	Not Available		Not Available					
	valeraldehyde	Not Available	Not Available			Not Available			
n-propanol 800 ppm Not Available	propionaldehyde	Not Available	Not Available			Not Available			
	n-propanol	800 ppm	800 ppm			Not Available			

#### **Exposure controls**

tert-amyl methyl ether

2,2,4-trimethylpentane

dipropyl ether

# Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

Not Available

Not Available

Not Available

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



Not Available

Not Available

Not Available







# 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

#### n See Hand protection below

#### Hands/feet protection

- ▶ Wear chemical protective gloves, e.g. PVC.
- ▶ Wear safety footwear or safety gumboots, e.g. Rubber

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.

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	Personal hygiene is a key element of effective hand care.  ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

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Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> 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

 $\mbox{\bf NOTE}:$  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.

# Ansell Glove Selection

Glove — In order of recommendation
AlphaTec® 38-612
BioClean™ Ultimate BUPS
AlphaTec® 53-001
AlphaTec® 58-005
MICROFLEX® LifeStar EC™ 93-868
MICROFLEX® MidKnight® XTRA 93-862
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS
MICROFLEX® 93-732
MICROFLEX® SafeGrip™ SG-375

The suggested gloves for use should be confirmed with the glove supplier.

# **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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Appearance	Clear liquid		
Physical state	Liquid	Relative density (Water = 1)	0.691
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	396
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	Enclosed Space Ignition Deflagration Density (g/m3)	Not Available

#### **SECTION 10 Stability and reactivity**

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
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**

Ingestion

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

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.

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.

Inhaled Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

produce serious damage to the health of the individual.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere

developing. Before starting consider control of exposure by mechanical ventilation. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may Version No: **1.1** Page **8** of **22** Issue Date: **06/03/2025** 

#### ASTM D7423 Calibration Standard - Level 5

Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 5 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)[1]

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	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 20mg/24H - Moderate			
butyraldehyde	Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>			
	Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 410mg - Mild			
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
		·			
	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>	Eye (Human): 50ppm			
	Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>	Eye (Human): 990ppm/1H			
	Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.005mL - Severe			
		Eye (Rodent - rabbit): 0.1mL			
n-butanol		Eye (Rodent - rabbit): 1.62mg - Severe			
		Eye (Rodent - rabbit): 2mg/24H - Severe			
		Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>			
		Skin (Human): 20uL/20M  Skin (Rodent - rabbit): 20mg/24H - Moderate			
	Skin: adverse effect observed (irritating) <sup>[1]</sup>				
	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100uL/24H - Severe			
	Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>			
tertiary butanol	Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup>	Skin (Rodent - rabbit): 500uL/24H - Mild			
	Cram (cram) and crame maying	Skin: adverse effect observed (irritating) <sup>[1]</sup>			
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
		Chin. To davoice check observed (not initiality)			
	TOXICITY	IRRITATION			
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe			
2-butanol	Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>			
	Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup>	Eye (Human): 100ppm			
	Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL			
	Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 0.1mL - Severe			
		Eye (Rodent - rabbit): 100mg - Moderate			
diethyl ether		Eye (Rodent - rabbit): 100mg/24H - Moderate			
		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>			
		Skin (Rodent - guinea pig): 50mg/24H - Severe			
		Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild			
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
		Skin. Ho adverse effect observed (not initiating).			
	TOXICITY	IRRITATION			
dimethyl ether	Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
	madalor (ray 2000 r 2000 pp	China his current stock stock floor inhaming)			
	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 100uL/24H - Moderate			
tert-butyl ethyl ether	Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>			
, , , , , , , , , , , , , , , , , , , ,	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Moderate			
	, ( · · ,  · · · · · · · · · · · · · · ·	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>			
	L				
ethanol	TOXICITY	IRRITATION			
	Dermal (rabbit) LD50: 17100 mg/kg <sup>[1]</sup>	Eye (Rodent - rabbit): 0.1mL			
	Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye (Rodent - rabbit): 100mg/4S - Moderate			
	. ,				

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100uL - Moderate		
		Eye	(Rodent - rabbit): 500mg - Severe		
		Eye	Eye (Rodent - rabbit): 500mg/24H - Mild		
		Eye	Eye: adverse effect observed (irritating) <sup>[1]</sup>		
		Eye	: no adverse effect observed (not irritating) <sup>[1]</sup>		
			n (Human): 70%/2D		
			n (Rodent - rabbit): 20mg/24H - Moderate		
			n (Rodent - rabbit): 400mg - Mild		
		Skir	n: no adverse effect observed (not irritating)[1]		
	TOXICITY		IRRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>		
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>		3)		
	TOXICITY	IRRI	TATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye:	adverse effect observed (irritating) <sup>[1]</sup>		
iso-butyraldehyde	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>		(Rodent - rabbit): 397mg - Mild		
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin	: no adverse effect observed (not irritating) <sup>[1]</sup>		
	3 3		3)		
	TOXICITY	IRR	ITATION		
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>		e (Rodent - rabbit): 100mg - Severe		
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate		
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	-	(Rodent - rabbit): 10mg - Moderate		
ізоргориної	Ofal (Wouse) LD50, 3600 mg/kg <sup>c</sup> <sup>2</sup>		<u> </u>		
			:: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg - Mild		
			n: no adverse effect observed (not irritating) <sup>[1]</sup>		
		SKII	n: no adverse effect observed (not irritating).		
	TOXICITY	IR	RRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
di-iso-propyl ether	Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>		kin (Rodent - rabbit): 363mg - Mild		
	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>		kin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	Oral (Mouse) ED30, 3000 Hig/kg-	- J	KIII. HO adverse enect observed (not imaling): -		
	TOXICITY	IRE	RITATION		
	Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>		e (Rodent - rabbit): 100mg/24H - Moderate		
iso-valeraldehyde	Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>		e: adverse effect observed (irritating) <sup>[1]</sup>		
150-Valeraluerryue	Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	-	n (Rodent - rabbit): 500mg/24H - Mild		
	Oral (Guillea) ED30, 2930 Hig/kg-		n: adverse effect observed (irritating) <sup>[1]</sup>		
		- OKI	n. auverse enect observed (initiating).		
	TOVICITY	IDD	ITATION		
	Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>		ITATION  (Rodent - rabbit): 0.1mL		
			<u> </u>		
	Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>		(Rodent - rabbit): 0.1mL - Severe		
methanol	Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate		
		-	(Rodent - rabbit): 40mg - Moderate		
			: no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate		
		Skir	n: no adverse effect observed (not irritating) <sup>[1]</sup>		
methyl ethyl ketone	TOVICITY	in-	UTATION		
	TOXICITY		ITATION		
	Dermal (rabbit) LD50: 6480 mg/kg <sup>[2]</sup>	-	(Human): 350ppm		
	Inhalation (Mouse) LC50: 32 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 80mg		
	Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>		
			n (Rodent - rabbit): 14mg/24H - Mild		
		SKIR	n (Rodent - rabbit): 402mg/24H - Mild		
		Skir	n (Rodent - rabbit): 500mg/24H - Moderate		

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			Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	тохісіту	IRF	RITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eve	e: no adverse effect observed (not irritating) <sup>[1]</sup>
methyl tert-butyl ether	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>		n: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>		n: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY		RRITATION
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>		Eye (Rodent - rabbit): 100mg/24H - Severe
	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>
valeraldehyde	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>		Skin (Rodent - guinea pig): 100% - Severe
	Olai (Kat) LD50. 4561 Hig/kg <sup>c 2</sup>		Skin (Rodent - rabbit): 500mg/24H - Moderate
			Skin: adverse effect observed (irritating) <sup>[1]</sup>
	TOWNTY		
	TOXICITY		IRRITATION
propionaldehyde	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>		Eye (Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>		Eye (Rodent - rabbit): 41mg - Severe
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>		Skin (Rodent - rabbit): 500mg - Mild
	TOXICITY	IRR	ITATION
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>	Eye	: adverse effect observed (irreversible damage) <sup>[1]</sup>
	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>	Skir	n (Human): 100%/24H - Mild
n-propanol		Skin (Human): 100%/47H - Mild	
		Skir	n (Human): 60%/24H
		Skir	n (Rodent - rabbit): 500mg - Mild
		Skir	n: no adverse effect observed (not irritating) <sup>[1]</sup>
dipropyl ether	TOXICITY		IRRITATION
dipropyi etner	Not Available		Not Available
	TOXICITY	II	RRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E	ye (Rodent - rabbit): 100uL/24H - Severe
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>	E	ye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>	Skin (Rodent - rabbit): 500uL/4H - Severe	
		S	kin: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY		IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
2,2,4-trimethylpentane	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (intating) <sup>[1]</sup>
Legend:	Value obtained from Europe ECHA Registered S     specified data extracted from RTECS - Register of		
Legend:	specified data extracted from RTECS - Register of	Toxic Effect of	f chemical Substances
Legend:	specified data extracted from RTECS - Register of	Toxic Effect of	f chemical Substances
Legend:	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, export producing mutation.  WARNING: This substance has been classified by	osure to the m	aterial may result in a possible risk of irreversible effects, with the possibilit
•	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, export of producing mutation.	osure to the m	of chemical Substances  aterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans.
•	specified data extracted from RTECS - Register of  Laboratory (in vitro) and animal studies show, experience of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia	osure to the most the IARC as anticipated to law a kin irritant as Studies in h	of chemical Substances  Interial may result in a possible risk of irreversible effects, with the possibility of the possibility
ACETALDEHYDE	specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, expension of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional regulational studies show that allyl alcohol is broken down.	osure to the man the IARC as anticipated to law a kin irritant at Studies in hulation, behavior in the liver	of chemical Substances  Interial may result in a possible risk of irreversible effects, with the possibility of the possibility

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 5 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 5 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.				
ISOPROPANOL & METHYL TERT-BUTYL ETHER	The substance is classified by IARC as Group 3: <b>NOT</b> classifiable as to its carcinogenicity to humans Evidence of carcinogenicity may be inadequate or li	· ·			
Acute Toxicity	✓	Carcinogenicity	×		
Skin Irritation/Corrosion	✓	Reproductivity	×		
Serious Eye Damage/Irritation	<b>~</b>	STOT - Single Exposure	~		
Respiratory or Skin sensitisation	×	STOT - Repeated Exposure	×		
Mutagenicity	×	Aspiration Hazard	~		

Legend:

X − Data either not available or does not fill the criteria for classification
 ✓ − Data available to make classification

## **SECTION 12 Ecological information**

EC50

48h

ASTM D7423 Calibration	Endpoint	Test Duration (hr)		Species Value		lue So		Source		
Standard - Level 5 Not Available		Not Available		Not Available	Not Avai	ilable	N	Not Avail	able	
	Endpoint	Test Duration (hr)	Spec	cies		Value	•		Source	
	EC50	72h		e or other aquatic plants		>100			2	
	EC50	96h		e or other aquatic plants		236.6	mg/L		4	
acetaldehyde	EC50(ECx)	48h		e or other aquatic plants		0.02n			4	
	EC50	48h	Crus	tacea		39.4-	59.1mg/L		4	
	LC50	96h	Fish			28-34	mg/L		4	
	Endpoint	Test Duration (hr)	Specie	9S	V	/alue			Source	
	EC50	96h		or other aquatic plants	9	.873-27.6	884mg/l		4	
	EC50	72h		or other aquatic plants		600-1000			4	
acetone	NOEC(ECx)	12h	Fish		0	.001mg/L			4	
	LC50	96h	Fish		3	744.6-50	00.7mg/L		4	
	EC50	48h	Crusta	cea	6	098.4mg	/L		5	
									'	
	Endpoint	Test Duration (hr)	S	pecies			Value		Source	
	EC50	72h	A	Algae or other aquatic plants			2.25mg/l		2	
allyl alcohol	EC50(ECx)	96h	C	Crustacea			0.25mg/l		1	
	EC50	48h	C	Crustacea			1.65mg/l		2	
	LC50	96h	F	Fish			0.32mg/l		2	
	Endpoint	Test Duration (hr)	Spe	ecies		Valu	е	Source	e	
	EC50	72h	Alg	ae or other aquatic plant	s	7.3m	ıg/l	2		
butyraldehyde	NOEC(ECx)	72h	Alg	Algae or other aquatic plants			0.89mg/l 2			
	EC50	48h	Cru	Crustacea		20m	20mg/l 2			
	LC50	96h	Fish	1		25.8	mg/l	Not A	vailable	
	Endpoint	Test Duration (hr)	Sp	ecies		Va	lue		Source	
	EC50	96h	Alç	gae or other aquatic plan	ts	22	5mg/l		2	
n-butanol	EC50	72h	Alç	gae or other aquatic plan	ts	>50	00mg/l		1	
n-butanoi	NOEC(ECx)	504h	Cr	Crustacea			mg/l		2	
	EC50	48h	Cr	Crustacea			00mg/l		1	
	LC50	96h	Fis	h		100	0-500mg/l		4	
tertiary butanol	Endpoint	Test Duration (hr)	Spe	ecies		V	alue		Source	
		1008h	Fisl				0.5		7	
	BCF	100011	1 101							
	BCF EC50	72h		ae or other aquatic plant	S		1000mg/l		1	

Crustacea

933mg/l

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	LC50	96h	Fish	>180mg/l	1
	Enducint	Toot Duration (hr)	Chasias	Value	Cauras
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	1972mg/l	2
2-butanol	EC50	96h	Algae or other aquatic plants	2029mg/l	2
	NOEC(ECx)	24h	Fish	5mg/L	1
	EC50	48h	Crustacea	308mg/l	2
	LC50	96h	Fish	2993mg/l	2
	Enducint	Took Direction (hr)	Charies	Value	Source
	Endpoint	Test Duration (hr)	Species		
	BCF	1008h	Fish	0.9-1.4	7
diethyl ether	EC50	72h	Algae or other aquatic plants	>100mg/l	2
	NOEC(ECx)	504h	Crustacea	100mg/l	2
	LC50	96h	Fish	2560mg/l	2
	EC50	48h	Crustacea	1378.63mg/L	5
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	154.917mg/l	2
dimethyl ether		48h	Crustacea		1
aimethyl etner	NOEC(ECx)			>4000mg/l	
	EC50	48h	Crustacea	>4400mg/L	2
	LC50	96h	Fish	1783.04mg/l	2
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	380.68mg/l	2
tert-butyl ethyl ether	NOEC(ECx)	672h	Crustacea	3.39mg/l	2
tore water carry carro.	LC50	96h	Fish	574mg/l	2
	EC50	48h	Crustacea	110mg/l	2
	2030	4011	Ciustacea	110mg/i	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	72h	Algae or other aquatic plants	275mg/l	2
ethanol	EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	LC50	96h	Fish	42mg/L	4
	EC50	48h	Crustacea	2mg/L	4
				-	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	593mg/l	2
isobutanol	NOEC(ECx)	504h	Crustacea	4mg/L	5
	EC50	48h	Crustacea	ca.600mg/l	1
	LC50	96h	Fish	901-1000mg/L	4
	Fuducius	Total Dougations (bas)	Oi.	V-I	0
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	48h	Crustacea	50-100mg/l	4
iso-butyraldehyde	LC50	96h	Fish	23mg/l	2
	EC50	72h	Algae or other aquatic plants	83.7mg/l	2
	NOEC(ECx)	48h	Crustacea	10mg/l	4
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	>1000mg/l	1
	EC50	72h	Algae or other aquatic plants	>1000mg/l	1
isopropanol	EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
	LC50	96h	Fish	>1400mg/L	4
	EC50	48h	Crustacea	7550mg/l	4
	Endpoint	Test Duration (hr)	Species	Value	Source
		1			
	EC50	96h	Algae or other aquatic plants	134.9mg/l	2
di-iso-propyl ether	EC50 NOEC(ECx)	48h	Crustacea	46mg/l	1
di-iso-propyl ether	EC50				
di-iso-propyl ether	EC50 NOEC(ECx)	48h	Crustacea	46mg/l	1

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	Endpoint	Test D	uration (hr)	Spec	ies			Value	9		Source
	EC50	96h			e or other aquatic p			77.98			2
iso-valeraldehyde	EC50	72h			e or other aquatic p	olants		80mg			1
	EC50	48h		Crust	tacea			177m			1
	EC50(ECx)	96h		Fish				3.25r			2
	LC50	96h		Fish				2.98-	3.54mg/L		4
	Endpoint	Tost D	uration (hr)	Specie	05		v	alue			Sourc
	EC50	96h	dration (iii)	-	or other aquatic p	lante			0.623mg/	<u> </u>	4
methanol	NOEC(ECx)	720h		Fish	or other aquatic p	lanto		.007m			4
methanor	LC50	96h		Fish				90mg/			2
	EC50	48h		Crusta	acea			10000			2
	Endpoint	Test	Duration (hr)	Sį	pecies				Value		Source
	EC50	72h		Al	lgae or other aqua	tic plants			1220mg/l		2
methyl ethyl ketone	EC50	96h		Al	lgae or other aqua	tic plants			>500mg/	L	4
methyr ethyr ketone	NOEC(ECx)	48h		Cı	rustacea				68mg/l		2
	EC50	48h		Cı	rustacea				308mg/l		2
	LC50	96h		Fi	ish				>324mg/	L	4
	Endpoint		Duration (hr)		Species				Value		Source
	EC50	96h			Algae or other aqua	•			184mg/l		1
methyl tert-butyl ether	EC50	72h			Igae or other aqua	itic plants			>800mg	/I	1
	NOEC(ECx)	96h			Crustacea				15mg/l		1
	EC50	48h			Crustacea				>100mg		1
	LC50	96h		F	ish				187mg/l		1
	Endpoint	Test [	Ouration (hr)	Spec	cies			Valu	e		Source
	EC50	72h	,		e or other aquatic	plants		>9.3			2
valeraldehyde	NOEC(ECx)	504h			Crustacea			2.5m			2
Í	EC50	48h						31.5			2
	LC50	96h		Fish					-13.6mg/L	-	4
	Endpoint	Test I	Duration (hr)	SI	pecies				Value		Source
	EC50	96h		Al	lgae or other aqua	tic plants			40mg/l		1
	FOFO	72h		Al	lgae or other aqua	tic plants			58mg/l		1
propionaldehyde	EC50				lane or other eque	tic plants			4mg/l		1
propionaldehyde	EC50 EC10(ECx)	96h		Al	lgae or other aqua						
propionaldehyde					rustacea				88.7mg	/I	1
propionaldehyde	EC10(ECx)	96h		Cı					88.7mg/ 14mg/l	/I	2
propionaldehyde	EC10(ECx) EC50 LC50	96h 48h 96h	huration (hr)	Fi	rustacea			Value	14mg/l	/1	2
propionaldehyde	EC10(ECx) EC50 LC50 Endpoint	96h 48h 96h	Duration (hr)	Fi Spec	rustacea ish	plants		Value 4480n	14mg/l	/1	2 Source
propionaldehyde	EC10(ECx) EC50 LC50  Endpoint EC50	96h 48h 96h  Test D	Duration (hr)	Spec Algae	rustacea ish <b>cies</b> e or other aquatic p			4480n	14mg/l		Source 4
propionaldehyde n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p			4480n 3200-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx)	96h 48h 96h <b>Test D</b> 96h 72h 504h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m	14mg/l ng/L 5600mg/L		Source 4 4 2
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50	96h 48h 96h  Test D 96h 72h	Duration (hr)	Spec Algae	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l		Source 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test D 96h 72h 504h 48h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea			4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L ng/l 3977mg/l		Source 4 4 2 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h	Duration (hr)	Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea	blants		4480n 3200- 68.3m 3339-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4
	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	96h 48h 96h  Test E 96h 72h 504h 48h 96h		Spec Algae Algae Crust	rustacea iish cies e or other aquatic p e or other aquatic p tacea tacea	olants		4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L		Source 4 4 2 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available	96h 48h 96h  Test E 96h 72h 504h 48h 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species  Not Available	olants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 5600mg/L g/l 3977mg/l 4000mg/L	Source	Source 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint	96h 48h 96h  Test E 96h 72h 504h 48h 96h  Table N  Test E	est Duration (hr)	Spec Algae Algae Crust Fish	rustacea iish  cies e or other aquatic pe or other aquatic patacea tacea  Species Not Available	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 5600mg/L ig/l 3977mg/l 4000mg/L	Source	2 Source 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h  Test E N  Test E	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Sp	rustacea iish  cies e or other aquatic per or other aquatic per or other aquatic per tacea tacea  Species Not Available  species gae or other aquatic	plants	Value	4480n 3200-: 68.3m 3339-: 3000	14mg/l ng/L 56600mg/L g/l 33977mg/l 4000mg/L Value >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Fish Spec Spec Algae Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est D 96h 72h 504h 48h 96h  Test D 72h 504h 48h 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatic per tacea tacea  Species Not Available  Decies gae or other aquatic	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	96h 48h 96h 7est E 96h 72h 504h 48h 96h Test E N Test E 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Crust Fish Spec Crust Fish	rustacea iish  cies e or other aquatic per or other aquatics per or other	plants	Value	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/L >100mg/L	Source	2   Source   4   4   4   4   4   4   4   4   4
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50 EC50 LC50	96h 48h 96h 7est D 96h 72h 504h 48h 96h  Test D 72h 504h 48h 96h	est Duration (hr) ot Available  Duration (hr)	Spec Algae Algae Crust Fish Sp Alg Fish Cru	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	olants	Value Not Availat	4480n 3200 68.3m 3339 3000	14mg/l ng/L 56600mg/L 3977mg/l 4000mg/L Value >100mg/l >100mg/l	Source Not Avail	2 Source 4 4 2 2 4 1
n-propanol dipropyl ether	EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50  EC50 LC50	96h 48h 96h 7est D 96h 72h 504h 48h 96h  Test D 72h 504h 48h 96h	est Duration (hr) ot Available	Spec Algae Algae Crust Fish Sp Alg Fish Cru	rustacea iish  cies e or other aquatic p e or other aquatic p tacea tacea  Species Not Available  pecies gae or other aquati	c plants	Value Not Availat	4480n 3200- 68.3m 3339- 3000-	14mg/l ng/L 56600mg/L 13977mg/l 4000mg/L Value >100mg/l >100mg/l 1.4mg/l	Source Not Avail	2   Source   4   4   4   4   4   4   4   4   4

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#### **ASTM D7423 Calibration Standard - Level 5**

NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

#### Mobility in soil

Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

## **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)

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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.
- 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**

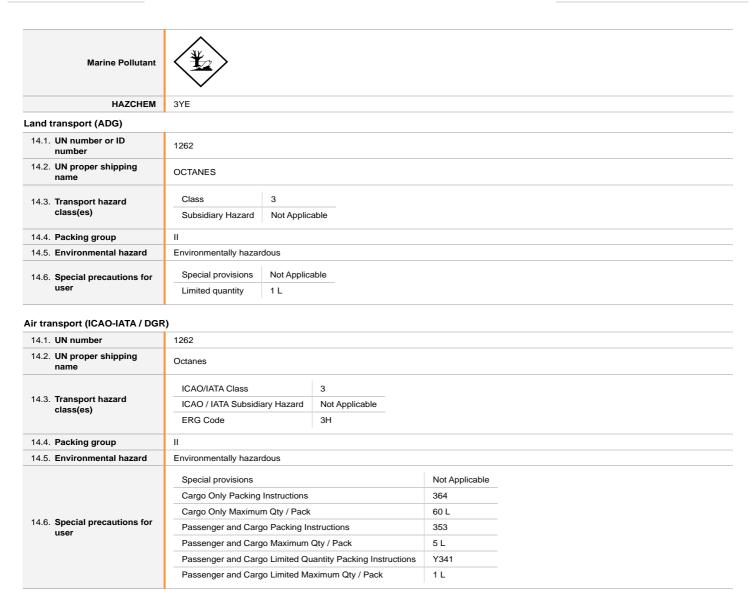
#### **Labels Required**



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## Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262	1262		
14.2. UN proper shipping name	OCTANES	OCTANES		
14.3. Transport hazard class(es)	IMDG Class	3		
Ciass(es)	IMDG Subsidiary Ha	zard Not Applicable		
14.4. Packing group	II	II .		
14.5 Environmental hazard	Marine Pollutant	Marine Pollutant		
	EMS Number	F-E, S-E		
14.6. Special precautions for user	Special provisions	Not Applicable		
	Limited Quantities	1L		

## 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name Group diethyl ether Not Available dimethyl ether Not Available tert-butyl ethyl ether Not Available ethanol Not Available isobutanol Not Available iso-butyraldehyde Not Available isopropanol Not Available di-iso-propyl ether Not Available iso-valeraldehyde Not Available methanol Not Available methyl ethyl ketone Not Available methyl tert-butyl ether Not Available valeraldehyde propionaldehyde Not Available

## 14.7.3. Transport in bulk in accordance with the IGC Code

Not Available

Not Available

Not Available

Not Available

n-propanol

dipropyl ether

tert-amyl methyl ether

2,2,4-trimethylpentane

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### **SECTION 15 Regulatory information**

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

## acetaldehyde 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 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

## acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol is found on the following regulatory lists

 $\label{eq:Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals} Australia \ Hazardous \ Chemical Information System (HCIS) - Hazardous Chemicals$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

## isopropanol is found on the following regulatory lists

 $\label{prop:eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:continuous} \textbf{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

## methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5  $\,$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

## valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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  ${\bf 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status	
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ether)	
Canada - DSL	No (tert-butyl ether; dipropyl ether)	
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)	
China - IECSC	No (tert-butyl ethyl ether; tert-amyl methyl ether)	
Europe - EINEC / ELINCS / NLP	Yes	
Japan - ENCS	No (tert-amyl methyl ether)	
Korea - KECI	Yes	
New Zealand - NZIoC	No (tert-amyl methyl ether)	
Philippines - PICCS	No (tert-butyl ethyl ether)	
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'	
Taiwan - TCSI	Yes	
Mexico - INSQ	No (tert-butyl ethyl ether)	
Vietnam - NCI	Yes	
Russia - FBEPH	Yes	
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**

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Initial Date	06/03/2025

#### Other information

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
- 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 IndexDNEL: Derived No-Effect Level
- DNEL: Derived No-Effect Level
   PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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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# ASTM D7423 Calibration Standard - Level 6 Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Chemwatch Hazard Alert Code:

Issue Date: **06/03/2025** Print Date: **06/03/2025** S.GHS.AUS.EN

## SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier	
Product name	ASTM D7423 Calibration Standard - Level 6
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-06

## 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
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

#### **Emergency telephone number**

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone number(s)	13 11 26	13 11 26
Other emergency telephone number(s)	Not Available	Not Available

## **SECTION 2 Hazards identification**

## Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	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, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
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)

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H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s) Prevention	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P240	Ground and bond container and receiving equipment.

#### Precautionary statement(s) Response

P241

· · · · · · · · · · · · · · · · · · ·		
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.	
P331	Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).	
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.	
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	

Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.

## Precautionary statement(s) Storage

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

## Precautionary statement(s) Disposal

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
75-07-0	0.02	<u>acetaldehyde</u>
67-64-1	0.02	acetone
107-18-6	0.02	allyl alcohol
123-72-8	0.02	<u>butyraldehyde</u>
71-36-3	0.02	<u>n-butanol</u>
75-65-0	0.02	tertiary butanol
78-92-2	0.02	2-butanol
60-29-7	0.02	diethyl ether
115-10-6	0.02	dimethyl ether
637-92-3	0.02	tert-butyl ethyl ether
64-17-5	0.02	ethanol
78-83-1	0.02	isobutanol
78-84-2	0.02	<u>iso-butyraldehyde</u>
67-63-0	0.02	isopropanol
108-20-3	0.02	di-iso-propyl ether
590-86-3	0.02	<u>iso-valeraldehyde</u>
67-56-1	0.02	<u>methanol</u>
78-93-3	0.02	methyl ethyl ketone
1634-04-4	0.02	methyl tert-butyl ether
110-62-3	0.02	<u>valeraldehyde</u>
123-38-6	0.02	propionaldehyde
71-23-8	0.02	n-propanol
111-43-3	0.02	<u>dipropyl ether</u>
994-05-8	0.02	tert-amyl methyl ether
540-84-1	99.52	2.2.4-trimethylpentane
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	

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#### 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	<ul> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>	
Ingestion	<ul> <li>If swallowed do NOT induce vomiting.</li> <li>If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>Observe the patient carefully.</li> <li>Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>Seek medical advice.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>	

#### 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]

#### **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	<ul> <li>Liquid and vapour are highly flammable.</li> <li>Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>Vapour may travel a considerable distance to source of ignition.</li> <li>Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>Combustion products include:         <ul> <li>carbon dioxide (CO2)</li> <li>other pyrolysis products typical of burning organic material.</li> </ul> </li> <li>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</li> </ul>
HAZCHEM	ЗҮЕ

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

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

## **SECTION 7 Handling and storage**

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#### **ASTM D7423 Calibration Standard - Level 6**

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#### Precautions for 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.

## Contains low boiling substance:

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapours
- · 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.

- 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

Safe handling

- 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

- Glass container is suitable for laboratory quantities
- Packing as supplied by manufacturer

## Suitable container

- 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.

#### Low molecular weight alkanes are a type of chemical compounds that can be found in gases or liquids. These alkanes:

- ▶ Can cause a dangerous reaction with strong oxidizers, chlorine, chlorine dioxide, and dioxygenyl tetrafluoroborate when there is oxygen and heat present.
- Are incompatible with halogens.
- Can create static charges due to their low conductivity, leading to an accumulation of static charge.

#### Acetic acid:

- ▶ vapours forms explosive mixtures with air (above 39 C.)
- reacts violently with bases such as carbonates and hydroxides (giving off large quantities of heat), oxidisers, organic amines, acetaldehyde, potassium tert-butoxide

## Storage incompatibility

- reacts (sometimes violently), with strong acids, aliphatic amines, alkanolamines, alkylene oxides, epichlorohydrin, acetic anhydride, 2aminoethanol, ammonia, ammonium nitrate, bromine pentafluoride, chlorosulfonic acid, chromic acid, chromium trioxide ethylenediamine, ethyleneimine, hydrogen peroxide, isocyanates, oleum, perchloric acid, permanganates, phosphorus isocyanate, phosphorus trichloride, sodium peroxide, xylene
- attacks cast iron, stainless steel and other metals, forming flammable hydrogen gas
- attacks many forms of rubber, plastics and coatings
- Avoid reaction with oxidising agents

## n-Octane/ iso-octane:

- ▶ reacts violently with strong oxidisers, dinitrogen tetraoxide
- is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates
- attacks some plastics, rubber and coatings
- may generate electrostatic charges on agitation or flow, due to low conductivity.

## SECTION 8 Exposure controls / personal protection

#### Control parameters

## Occupational Exposure Limits (OEL)

#### INGREDIENT DATA

INGREDIENT DATA						
Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	acetaldehyde	Acetaldehyde	20 ppm / 36 mg/m3	91 mg/m3 / 50 ppm	Not Available	Not Available
Australia Exposure Standards	acetone	Acetone	500 ppm / 1185 mg/m3	2375 mg/m3 / 1000 ppm	Not Available	Not Available
Australia Exposure Standards	allyl alcohol	Allyl alcohol	2 ppm / 4.8 mg/m3	9.5 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	n-butanol	n-Butyl alcohol	Not Available	Not Available	50 ppm / 152 mg/m3	Not Available
Australia Exposure Standards	tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m3	455 mg/m3 / 150 ppm	Not Available	Not Available
Australia Exposure Standards	2-butanol	sec-Butyl alcohol	100 ppm / 303 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diethyl ether	Ethyl ether	400 ppm / 1210 mg/m3	1520 mg/m3 / 500 ppm	Not Available	Not Available
Australia Exposure Standards	dimethyl ether	Dimethyl ether	400 ppm / 760 mg/m3	950 mg/m3 / 500 ppm	Not Available	Not Available

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Australia Exposure Standards   emanor   Etnyl alcohol   1000 ppm / 1820 m/m   Not Available   Not Available   Ava	Source	Ingredient	Material name	TWA		STEL	Peak	Notes	
Asiatalia Exposure Standards   sobuland   s	Australia Exposure Standards	ethanol	Ethyl alcohol		)	Not Available	Not Available		
Available Exposure Standards   di-liso-propyl ethor   dispropyl e	Australia Exposure Standards	isobutanol	Isobutyl alcohol	50 ppm / 152 mg	<sub>J</sub> /m3	Not Available	Not Available		
Available Exposure Standards	Australia Exposure Standards	isopropanol	Isopropyl alcohol				Not Available		
Available Exposure Standards methyl ethyl ketone (MEK) mg/m3   890 mg/m3 / 300 mg/m3 / 30	Australia Exposure Standards	di-iso-propyl ether	Isopropyl ether				Not Available		
Mathylater Exposure Standards   methyl tert-butyl either   methyl either   mot Available   methyl either   methyl either   mot Available   methyl eithyl ketone   mot Available   mot Available   methyl eithyl ketone   mot Available   mot	Australia Exposure Standards	methanol	Methyl alcohol			_	Not Available		
Available xposure standards	Australia Exposure Standards	methyl ethyl ketone				_	Not Available		
Available Exposure Standards	Australia Exposure Standards		Methyl-tert butyl ether	25 ppm / 92 mg/ı	m3	275 mg/m3 / 75 ppm	Not Available		
Available Exposure Standards         Pripopal of Ingredient         Propy alono of Ingrigination of	Australia Exposure Standards	valeraldehyde	n-Valeraldehyde	50 ppm / 176 mg	<sub>J</sub> /m3	Not Available	Not Available		
acetaldehyde         2,000 ppm         Not Available           acetone         2,500 ppm         Not Available           allyl alcohol         20 ppm         Not Available           butyraidehyde         Not Available         Not Available           n-butanol         1,400 ppm         Not Available           certainy butanol         1,600 ppm         Not Available           2-butanol         2,000 ppm         Not Available           diethyl ether         Not Available         Not Available           tert-bulyl ethyl ether         Not Available         Not Available           tert-bulyl ethyl ether         Not Available         Not Available           ethanol         Not Available         Not Available           iso-butyraidehyde         Not Available         Not Available           iso-butyraidehyde         Not Available         Not Available           di-iso-propyl ether         Not Available         Not Available           iso-valeraldehyde         Not Available         Not Available           methyl ethyl ketone         9,000 ppm         Not Available           methyl terl-butyl ether         Not Available         Not Available           valeraldehyde         Not Available         Not Available           prop	Australia Exposure Standards	n-propanol	Propyl alcohol			_	Not Available		
acetone         2,500 ppm         Not Available           allyl alcohol         20 ppm         Not Available           butyraldehyde         Not Available         Not Available           n-butanol         1,400 ppm         Not Available           tertiary butanol         1,600 ppm         Not Available           2-butanol         2,000 ppm         Not Available           diethyl ether         Not Available         Not Available           dimethyl ether         Not Available         Not Available           ethanol         Not Available         Not Available           ethanol         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available           iso-butyraldehyde         Not Available         Not Available           di-iso-propyl ether         Not Available         Not Available           di-iso-propyl ether         Not Available         Not Available           iso-valeraldehyde         Not Available         Not Available           methanol         6,000 ppm         Not Available           methyl ethro-         3,000 ppm         Not Available           methyl tetr-butyl ether         Not Available         Not Available           valeraldehyde	Ingredient	Original IDLH			Rev	Revised IDLH			
allyl alcohol         20 ppm         Not Available           butyraldehyde         Not Available         Not Available           n-butanol         1,400 ppm         Not Available           tertiary butanol         1,600 ppm         Not Available           2-butanol         2,000 ppm         Not Available           diethyl ether         Not Available         Not Available           diethyl ether         Not Available         Not Available           tert-butyl ethyl ether         Not Available         Not Available           ethanol         Not Available         Not Available           isobutanol         1,600 ppm         Not Available           iso-butyraldehyde         Not Available         Not Available           iso-proppanol         Not Available         Not Available           di-iso-propyl ether         Not Available         Not Available           iso-valeraldehyde         Not Available         Not Available           methanol         6,000 ppm         Not Available           methyl tertyl ketone         3,000 ppm         Not Available           methyl tertyl ketone         Not Available         Not Available           valeraldehyde         Not Available         Not Available           valeraldehyde	acetaldehyde	2,000 ppm			Not a	Not Available			
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n-propanol 800 ppm Not Available	propionaldehyde	Not Available	Not Available						
	· · · · · · · · · · · · · · · · · · ·	800 ppm	800 ppm		Not Available				
					Not	Available			

#### **Exposure controls**

tert-amyl methyl ether

2,2,4-trimethylpentane

## Appropriate engineering controls

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear

Not Available

Not Available

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



Not Available

Not Available







## Eye and face protection

- ► Safety glasses with side shields
- ► Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]

advance and has therefore to be checked prior to the application.

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

#### ction See Hand protection below

## Hands/feet protection

▶ Wear chemical protective gloves, e.g. PVC.

• Wear safety footwear or safety gumboots, e.g. Rubber
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

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.

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	Personal hygiene is a key element of effective hand care. ▶ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	<ul> <li>Overalls.</li> <li>PVC Apron.</li> <li>PVC protective suit may be required if exposure severe.</li> <li>Eyewash unit.</li> <li>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</li> <li>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</li> <li>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.</li> </ul>

#### 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:

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Material	СРІ
BUTYL	С
BUTYL/NEOPRENE	С
CPE	С
HYPALON	С
NAT+NEOPR+NITRILE	С
NATURAL RUBBER	С
NATURAL+NEOPRENE	С
NEOPRENE	С
NEOPRENE/NATURAL	С
NITRILE	С
NITRILE+PVC	С
PE	С
PE/EVAL/PE	С
PVA	С
PVC	С
PVDC/PE/PVDC	С
SARANEX-23	С
SARANEX-23 2-PLY	С
TEFLON	С
VITON	С
VITON/NEOPRENE	С

<sup>\*</sup> 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.

## Ansell Glove Selection

Glove — In order of recommendation	
AlphaTec® 38-612	
BioClean™ Ultimate BUPS	
AlphaTec® 53-001	
AlphaTec® 58-005	
MICROFLEX® LifeStar EC™ 93-868	
MICROFLEX® MidKnight® XTRA 93-862	
BioClean™ Fusion (Sterile) S-BFAP	
BioClean™ N-Plus BNPS	
MICROFLEX® 93-732	
MICROFLEX® SafeGrip™ SG-375	

The suggested gloves for use should be confirmed with the glove supplier.

## **SECTION 9 Physical and chemical properties**

#### 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

 $A(All \ classes) = Organic \ vapours, \ B \ AUS \ or \ B1 = Acid \ gasses, \ B2 = Acid \ gas \ or \ hydrogen \ cyanide(HCN), \ E = Sulfur \ dioxide(SO2), \ G = Agricultural \ chemicals, \ K = Ammonia(NH3), \ Hg = Mercury, \ NO = Oxides \ of \ nitrogen, \ MB = Methyl \ bromide, \ AX = Low \ boiling \ point \ organic \ compounds(below \ 65 \ degC)$ 

- 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

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Appearance	Clear		
Physical state	Liquid	Relative density (Water = 1)	0.691
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 (°C)	Not Available
Melting point / freezing point (°C)	-107.3	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	99.2	Molecular weight (g/mol)	Not Available
Flash point (°C)	-12	Taste	Not Available
Evaporation rate	>1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	6	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1	Volatile Component (%vol)	>99
Vapour pressure (kPa)	5.47	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	3.93	VOC g/L	Not Available
Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available

# Time Equivalent (s/m3) **SECTION 10 Stability and reactivity**

**Enclosed Space Ignition** 

Flame Height (cm)

Not Available

Not Available

Reactivity	See section 7
Chemical stability	<ul> <li>Unstable in the presence of incompatible materials.</li> <li>Product is considered stable.</li> <li>Hazardous polymerisation will not occur.</li> </ul>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

Flame Duration (s)

**Enclosed Space Ignition** 

Deflagration Density (g/m3)

Not Available

Not Available

## **SECTION 11 Toxicological information**

Ingestion

Information or	n toxicological	effects
----------------	-----------------	---------

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

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.

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.

#### Inhaled Isobutanol appears to be more toxic than n-butyl alcohol. It may result in narcosis and death.

produce serious damage to the health of the individual.

Nerve damage can be caused by some non-ring hydrocarbons. Symptoms are temporary, and include weakness, tremors, increased saliva, some convulsions, excessive tears with discolouration and inco-ordination lasting up to 24 hours.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere

developing. Before starting consider control of exposure by mechanical ventilation. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may Version No: **1.1** Page **8** of **22** Issue Date: **06/03/2025** 

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Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Following a single dose of isobutanol in rats, deaths were delayed for several days and hepatic degeneration was evident. Swallowing 10 millilitres of isopropanol may cause serious injury; 100 millilitres may be fatal if not properly treated. The adult single lethal dose is approximately 250 millilitres. Isopropanol is twice as poisonous as ethanol, and the effects caused are similar, except that isopropanol does not cause an initial feeling of well-being. Swallowing may cause nausea, vomiting and diarrhea; vomiting and stomach inflammation is more prominent with isopropanol than with ethanol. Not a likely route of entry into the body in commercial or industrial environments. The liquid may produce considerable gastrointestinal discomfort and be harmful or toxic if swallowed. 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. This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Application of isobutanol to human skin produced slight redness and blood congestion. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred Open cuts, abraded or irritated skin should not be exposed to this material Skin Contact 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. 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. Isopropanol, also known as IPA, is a chemical that has low toxicity when it comes to immediate exposure. It can irritate the eyes and cause discomfort in high concentrations of its vapors. Prolonged exposure to these vapors can lead to depression of the central nervous system. Some people may experience irritation or sensitivity on their skin when using isopropanol. This material can cause eye irritation and damage in some persons. Instillation of isobutanol into the eye may cause moderate to severe irritation but no permanent injury to the cornea. Eve Instillation of isoparaffins into rabbit eyes produces only slight irritation. Isopropanol vapour may cause mild eye irritation at 400 parts per million. Splashes may cause severe eye irritation, possible burns to the cornea and eye damage. Eye contact may cause tearing and blurring of vision Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational Oral exposure of rats to isobutanol caused cancers of the gullet and stomach, liver or blood (myelogenous leukaemia). Abnormal non-cancer growths were also more common in those animals exposed to isobutanol. Chronic Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents. Long term, or repeated exposure of isopropanol may cause inco-ordination and tiredness Repeated inhalation exposure to isopropanol may produce sleepiness, inco-ordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in adult animals. Isopropanol does not cause genetic damage. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS] TOXICITY IRRITATION **ASTM D7423 Calibration** Standard - Level 6 Not Available Not Available TOXICITY IRRITATION Dermal (rabbit) LD50: 3540 mg/kg<sup>[2]</sup> Eye (Human): 50ppm/15M Inhalation (Mouse) LC50: 23 mg/L4h<sup>[2]</sup> Eye (Rodent - rabbit): 40mg - Severe Eye: adverse effect observed (irritating)<sup>[1]</sup> Oral (Rat) LD50: 661 mg/kg<sup>[2]</sup> acetaldehyde Skin (Rodent - rabbit): 500mg - Mild Skin (Rodent - rabbit): 500mg - Mild Skin: adverse effect observed (irritating)<sup>[1]</sup> Skin: no adverse effect observed (not irritating)<sup>[1]</sup> TOXICITY IRRITATION Eye (Human): 186300ppm - Mild Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup> Inhalation (Mouse) LC50: 44 mg/L4h<sup>[2]</sup> Eye (Human): 500ppm Eye (Rodent - rabbit): 10uL - Mild Oral (Rat) LD50: 5800 mg/kg<sup>[2]</sup> Eve (Rodent - rabbit): 20mg - Severe acetone Eye (Rodent - rabbit): 20mg/24H - Moderate Eye: adverse effect observed (irritating)<sup>[1]</sup> Skin (Rodent - rabbit): 395mg - Mild Skin (Rodent - rabbit): 500mg/24H - Mild Skin: no adverse effect observed (not irritating)<sup>[1]</sup> allyl alcohol TOXICITY IRRITATION Dermal (rabbit) LD50: 45 mg/kg<sup>[2]</sup> Eye (Human): 25ppm - Severe Inhalation (Rat) LC50: >100 ppm4h<sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL Oral (Rat) LD50: 64 mg/kg<sup>[2]</sup> Eye (Rodent - rabbit): 20mg - Severe Eye: adverse effect observed (irritating)[1] Skin (Rodent - rabbit): 0.5mL - Mild

Skin (Rodent - rabbit): 10mg/24H

Skin: adverse effect observed (irritating)<sup>[1]</sup>

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Dermal (rabbit) LD50: 3560 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 20mg/24H - Moderate	
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL	
Inhalation (Rat) LC50: >5.46 mg/l4h <sup>[1]</sup>   Eye: adverse effect observed (irritating) <sup>[1]</sup>     Oral (Rat) LD50: 5900 mg/kg <sup>[2]</sup>   Skin (Rodent - rabbit): 410mg - Mild     Skin: no adverse effect observed (not irritating) <sup>[1]</sup>     TOXICITY   IRRITATION     Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm     Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup>   Eye (Human): 990ppm/1H     Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup>   Eye (Rodent - rabbit): 0.005mL - Severe     Eye (Rodent - rabbit): 0.1mL	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup> TOXICITY  Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL	
TOXICITY   IRRITATION	
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm	
Dermal (rabbit) LD50: 3400 mg/kg <sup>[2]</sup>   Eye (Human): 50ppm	
Inhalation (Rat) LC50: 8000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Human): 990ppm/1H  Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL	
Oral (Rat) LD50: 790 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.005mL - Severe  Eye (Rodent - rabbit): 0.1mL	
Eye (Rodent - rabbit): 0.1mL	
n-butanol Eye (Rodent - rabbit): 1.62mg - Severe	
Eye (Rodent - rabbit): 2mg/24H - Severe	
Eye: adverse effect observed (irreversible damage) <sup>[1]</sup>	
Skin (Human): 20uL/20M Skin (Rodent - rabbit): 20mg/24H - Moderate	
Skin: adverse effect observed (irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 100uL/24H - Severe	
Inhalation (Rat) LC50: >9700 ppm4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>	
tertiary butanol  Oral (Rat) LD50: 1500 mg/kg <sup>[2]</sup> Skin (Rodent - rabbit): 500uL/24H - Mild	
Skin: adverse effect observed (irritating) <sup>[1]</sup>	
Skin: no adverse effect observed (initiating) <sup>[1]</sup>	
Skill. Ho adverse effect observed (not finitating).	
TOXICITY IRRITATION	
dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>   Eye (Rodent - rabbit): 0.1mL - Severe	
2-butanol Inhalation (Rat) LC50: 48.5 mg/L4h <sup>[2]</sup> Eye: adverse effect observed (irritating) <sup>[1]</sup>	
Oral (Rat) LD50: 2054 mg/kg <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >14280 mg/kg <sup>[2]</sup> Eye (Human): 100ppm	
Inhalation (Rat) LC50: 32000 ppm4h <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL	
Oral (Rat) LD50: 1215 mg/kg <sup>[2]</sup> Eye (Rodent - rabbit): 0.1mL - Severe	
Eye (Rodent - rabbit): 100mg - Moderate	
diethyl ether Eye (Rodent - rabbit): 100mg/24H - Moderate	
Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
Skin (Rodent - guinea pig): 50mg/24H - Severe	
Skin (Rodent - rabbit): 360mg - Mild Skin (Rodent - rabbit): 360mg - Mild	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
Cimino datore energia (net imaling)	
TOXICITY IRRITATION	
dimethyl ether Inhalation (Rat) LC50: >20000 ppm4h <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
TOXICITY IRRITATION	
Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 100uL/24H - Moderate	
tert-butyl ethyl ether  Inhalation (Rat) LC50: >5.88 mg/l4h <sup>[1]</sup> Eye: no adverse effect observed (not irritating) <sup>[1]</sup>	
Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup> Skin (Rodent - rabbit): 500uL/4H - Moderate	
Skin: no adverse effect observed (not irritating) <sup>[1]</sup>	
ethanol	
Emanor	
TOXICITY IRRITATION	
TOXICITY IRRITATION  Dermal (rabbit) LD50: 17100 mg/kg <sup>[1]</sup> Eye (Rodent - rabbit): 0.1mL	

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	Oral (Rat) LD50: 7060 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100uL - Moderate
		Eye	(Rodent - rabbit): 500mg - Severe
		Eye	(Rodent - rabbit): 500mg/24H - Mild
		Eye	: adverse effect observed (irritating) <sup>[1]</sup>
		Eye	: no adverse effect observed (not irritating) <sup>[1]</sup>
		Skin	(Human): 70%/2D
		Skin	n (Rodent - rabbit): 20mg/24H - Moderate
		Skir	(Rodent - rabbit): 400mg - Mild
		Skin	n: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY		IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>
isobutanol	Inhalation(Rabbit) LC50; 2.63 mg/L4h <sup>[2]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>
	Oral (Rat) LD50: 2460 mg/kg <sup>[2]</sup>		
	3 3		
	TOXICITY	IRRI	TATION
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye:	adverse effect observed (irritating) <sup>[1]</sup>
iso-butyraldehyde	Inhalation (Rat) LC50: >23.6 mg/l4h <sup>[1]</sup>	Skin	(Rodent - rabbit): 397mg - Mild
	Oral (Rat) LD50: >2830 mg/kg <sup>[1]</sup>	Skin	no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IRR	ITATION
	Dermal (rabbit) LD50: 12800 mg/kg <sup>[2]</sup>	Eye	(Rodent - rabbit): 100mg - Severe
	Inhalation (Mouse) LC50: 53 mg/L4h <sup>[2]</sup>		(Rodent - rabbit): 100mg/24H - Moderate
isopropanol	Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>		(Rodent - rabbit): 10mg - Moderate
ioop.opuiio.	Otal (wouse) LD30, 3000 Hg/kg-		<u> </u>
			: adverse effect observed (irritating) <sup>[1]</sup>
			n (Rodent - rabbit): 500mg - Mild
		SKIF	n: no adverse effect observed (not irritating) <sup>[1]</sup>
	TOXICITY	IR	RITATION
di-iso-propyl ether	TOXICITY  Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey	RITATION  ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E <sub>y</sub>	ye: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	E <sub>y</sub>	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup>	Ey SH	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup>	Ey SH SH	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup>
di-iso-propyl ether	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY	Ey SH SH IRF Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup>	Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild  xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Eye Eye Ski	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup>	Ey SH SH IRR Eye Eye Skir	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Ey SH SH IRF Eye Skii Skii	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup>
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup>	Eye Skin Skin IRR	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup>
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup>	Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Ey SH IRF Eye Skii Skii IRR Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Skin Skin IRR Eye Skin Skin IRR Eye Eye Eye Eye	ve: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> en (Rodent - rabbit): 500mg/24H - Mild en: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye SH SH IRR Eye Skii Skii Skii FRE Eye Eye Eye Eye Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate
iso-valeraldehyde	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup>	Eye Eye Eye Eye Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rabbit) LC50; 120.6 mg/L4h <sup>[2]</sup> Oral (Mouse) LD50; 3600 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 3180 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 42.7 mg/l4h <sup>[1]</sup> Oral (Guinea) LD50; 2950 mg/kg <sup>[2]</sup> TOXICITY  Dermal (rabbit) LD50: 15800 mg/kg <sup>[2]</sup> Inhalation (Rat) LC50: 64000 ppm4h <sup>[2]</sup> Oral (Rat) LD50: 5628 mg/kg <sup>[2]</sup>	Eye Eye Eye Skirr Skirr Skirr	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate  a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup>
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye Eye Eye Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 0.1mL - Severe (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye Skin Skin  IRR Eye Skin Skin  IRR Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> xin (Rodent - rabbit): 363mg - Mild xin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  a (Rodent - rabbit): 100mg/24H - Moderate a: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 100mg/24H - Moderate (Rodent - rabbit): 40mg - Moderate (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate i: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION (Human): 350ppm (Rodent - rabbit): 80mg
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Eye	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 0.1mL - Severe  (Rodent - rabbit): 40mg - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate : no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm
iso-valeraldehyde methanol	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	Ey SH SH SH IRR Eye Skin Skin IRR Eye Eye Eye Eye Eye Eye Skir Skir Skir	ye: no adverse effect observed (not irritating) <sup>[1]</sup> kin (Rodent - rabbit): 363mg - Mild  kin: no adverse effect observed (not irritating) <sup>[1]</sup> RITATION  e (Rodent - rabbit): 100mg/24H - Moderate  e: adverse effect observed (irritating) <sup>[1]</sup> n (Rodent - rabbit): 500mg/24H - Mild  n: adverse effect observed (irritating) <sup>[1]</sup> ITATION  (Rodent - rabbit): 0.1mL  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 100mg/24H - Moderate  (Rodent - rabbit): 40mg - Moderate  : no adverse effect observed (not irritating) <sup>[1]</sup> n (Rodent - rabbit): 20mg/24H - Moderate  n: no adverse effect observed (not irritating) <sup>[1]</sup> ITATION  (Human): 350ppm  (Rodent - rabbit): 80mg  : adverse effect observed (irritating) <sup>[1]</sup>

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			Skin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	тохісіту	IRI	RITATION		
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Ey	e: no adverse effect observed (not irritating) <sup>[1]</sup>		
methyl tert-butyl ether	Inhalation (Rat) LC50: 41 mg/L4h <sup>[2]</sup>		in: adverse effect observed (irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: >2000 mg/kg <sup>[2]</sup>		in: no adverse effect observed (not irritating) <sup>[1]</sup>		
	TOXICITY		IRRITATION		
	Dermal (rabbit) LD50: 4857 mg/kg <sup>[2]</sup>		Eye (Rodent - rabbit): 100mg/24H - Severe		
	Inhalation (Rat) LC50: 14 mg/L4h <sup>[2]</sup>		Eye: adverse effect observed (irritating) <sup>[1]</sup>		
valeraldehyde	Oral (Rat) LD50: 4581 mg/kg <sup>[2]</sup>		Skin (Rodent - guinea pig): 100% - Severe		
	3 3		Skin (Rodent - rabbit): 500mg/24H - Moderate		
			Skin: adverse effect observed (irritating) <sup>[1]</sup>		
	TOXICITY		IRRITATION		
	Dermal (rabbit) LD50: 2460 mg/kg <sup>[1]</sup>		Eye (Rodent - rabbit): 20mg/24H - Moderate		
propionaldehyde	Inhalation (Rat) LC50: >4.6 mg/l4h <sup>[1]</sup>		Eye (Rodent - rabbit): 41mg - Severe		
	Oral (Rat) LD50: 1410 mg/kg <sup>[2]</sup>		Skin (Rodent - rabbit): 500mg - Mild		
	TOXICITY	IDD	ITATION		
	Dermal (rabbit) LD50: 5040 mg/kg <sup>[2]</sup>		e (Rodent - rabbit): 20mg/24H - Moderate		
	Inhalation (Rat) LC50: >33.8 mg/l4h <sup>[1]</sup>		:: adverse effect observed (irreversible damage) <sup>[1]</sup>		
	Oral (Rat) LD50: 1870 mg/kg <sup>[2]</sup>		n (Human): 100%/24H - Mild		
n-propanol	Ofai (Rat) LD50. 1670 mg/kg <sup>c</sup> 2		n (Human): 100%/47H - Mild		
			n (Human): 60%/24H		
	Skin (Rodent - rabbit): 500mg - Mild				
		Ski	n: no adverse effect observed (not irritating) <sup>[1]</sup>		
dinrond other	TOXICITY		IRRITATION		
dipropyl ether	Not Available		Not Available		
	TOXICITY	11	RRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>	E	ye (Rodent - rabbit): 100uL/24H - Severe		
tert-amyl methyl ether	Inhalation (Rat) LC50: >5.4 mg/L4h <sup>[1]</sup>	E	eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: 1602 mg/kg <sup>[1]</sup>	5	Skin (Rodent - rabbit): 500uL/4H - Severe		
		5	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	TOXICITY		IRRITATION		
	Dermal (rabbit) LD50: >2000 mg/kg <sup>[1]</sup>		Eye: no adverse effect observed (not irritating) <sup>[1]</sup>		
2,2,4-trimethylpentane	Inhalation (Rat) LC50: >33.52 mg/l4h <sup>[1]</sup>		Skin: adverse effect observed (irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>		
	Oral (Rat) LD50: >5000 mg/kg <sup>[1]</sup>		Skin: no adverse effect observed (not irritating)[1]		
Legend:			Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis		
Legend:	Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of	f Toxic Effect o	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis of chemical Substances		
Legend:	Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of	f Toxic Effect o	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwis of chemical Substances		
Legend: ACETALDEHYDE	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance as	osure to the my the IARC as anticipated to	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans.		
_	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance as [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia.	osure to the m  of the IARC as anticipated to a & Human Se  t a skin irritant a. Studies in h	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans. The Carcinogen revices 2002]  or sensitizer, but it removes fat from the skin, and it also irritates the eye. The umans have shown that exposure to acetone at a level of 2375 mg/m3 does		
ACETALDEHYDE	1. Value obtained from Europe ECHA Registered Specified data extracted from RTECS - Register of Laboratory (in vitro) and animal studies show, export of producing mutation.  WARNING: This substance has been classified by Tenth Annual Report on Carcinogens: Substance a [National Toxicology Program: U.S. Dep. of Health For acetone: The acute toxicity of acetone is low. Acetone is not Animal testing shows acetone may cause anaemia not negatively impact an individual's emotional reg	osure to the many the IARC as anticipated to a & Human Se ta skin irritant a. Studies in higulation, behaviour in the liver	Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise of chemical Substances  naterial may result in a possible risk of irreversible effects, with the possibility Group 2B: Possibly Carcinogenic to Humans. The Carcinogen revices 2002]  or sensitizer, but it removes fat from the skin, and it also irritates the eye. The umans have shown that exposure to acetone at a level of 2375 mg/m3 does		

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show that BA is not likely to cause skin sensitization. Warning of exposure occurs before irritation of the nose, because n-butanol has an odour which can be detected below concentration levels cause irritation. Repeat dose toxicity: Animal testing showed temporarily reduction in activity and food intake following repeated exposure to BA, but otherwise there was no evidence of chronic toxicity. Reproductive toxicity: Several animal studies indicate BA does not possess reproductive toxicity, and does not affect fertility. Developmental toxicity: BA only caused developmental changes and toxic effects on the foetus near or at levels that were toxic to the mother. Genetic toxicity: Testing shows that BA does not possess genetic toxicity. Cancer-causing potential: Based on negative results from testing for potential of n-butanol to cause mutations and chromosomal aberrations, BA has a very small potential for causing cancer. Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce ISOPROPANOL depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is DI-ISO-PROPYL ETHER stopped. DIPE does not irritate the skin but prolonged contact can leach fat away from the skin, potentially leading to inflammation. It is not expected to sensitise skin. At a sufficiently high concentration, it can irritate the eyes. For isovaleraldehyde: Isovaleraldehyde is an irritating fluid with an unpleasant odour; at high doses it can be absorbed into the body through all routes of exposure, including by swallowing, skin contact and inhalation. Acute toxicity is low after swallowing, skin contact or inhalation; it ISO-VALERALDEHYDE is clearly irritating to the eyes and strongly irritating to skin. The substance is not a strong sensitiser. Isovaleraldehyde, at present, is not thought to cause genetic toxicity or cancer. Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also METHYL ETHYL KETONE methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity. For methyl tert-butyl ether (MTBE): In particular climates (such as subarctic), susceptible people may be adversely affected by volatile emissions from MTBE-blended gasoline. Animal testing shows that MTBE has low acute toxicity, and the main affected system is the METHYL TERT-BUTYL nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-**ETHER** blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness. **PROPIONAL DEHYDE** General anaesthesia, convulsions recorded. TERT-AMYL METHYL ETHER Oral (rat) LD50: 1602-2100 mg/kg\* \*[NICNAS] **ASTM D7423 Calibration** Standard - Level 6 & **ACETALDEHYDE & ALLYL** ALCOHOL & N-BUTANOL & **TERTIARY BUTANOL & 2-**Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-alleroic **BUTANOL & TERT-BUTYL** condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating **ETHYL ETHER &** compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset **ISOBUTANOL & ISO**of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS **BUTYRALDEHYDE &** include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, ISOPROPANOL & ISOand the lack of minimal lymphocytic inflammation, without eosinophilia. **VALERALDEHYDE & METHYL ETHYL KETONE &** PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE The safety of isoparaffins as used in cosmetic products was reviewed by the Cosmetic Ingredient Review (CIR) Expert Panel. These ingredients function mostly as solvents and also function as emollients in the 0001% to 90% concentration range. The CIR Expert Panel has reviewed relevant animal and clinical data and concluded that these ingredients are safe in the present practices of use and concentration The CIR Expert Panel noted that most of the available data related to oral or inhalation exposure to isoparaffins, but the dermal and ocular exposure data that were available, suggested mild ocular irritation, mild-to-severe irritation, no sensitization or photosensitization, and no phototoxicity. No significant toxicity was identified in oral or inhalation exposure studies of the following end points: genotoxicity, reproductive **ASTM D7423 Calibration** and developmental toxicity, or carcinogenicity. Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-Standard - Level 6 & 2,2,4globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and TRIMETHYLPENTANE inhalation exposure studies Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of nparaffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. ACETALDEHYDE & **ACETONE & N-BUTANOL &** 2-BUTANOL & ETHANOL & **ISOBUTANOL &** ISOPROPANOL & DI-ISO-The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the PROPYL ETHER & ISOproduction of vesicles, scaling and thickening of the skin. VALERAL DEHYDE & METHANOL & METHYL **ETHYL KETONE &** PROPIONALDEHYDE & N-**PROPANOL ALLYL ALCOHOL & BUTYRALDEHYDE & N-**The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may **BUTANOL & ISOBUTANOL &** produce conjunctivitis. VALERALDEHYDE & N-PROPANOL **BUTYRAL DEHYDE &** DIETHYL ETHER & ISO-The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the **BUTYRALDEHYDE &** production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. VALERALDEHYDE **BUTYRALDEHYDE &** For n-alkyl aldehydes VALERALDEHYDE & Acute toxicity hazard of the n-alkyl aldehyde cluster members is moderate via inhalation and low via oral and dermal routes of exposure. Cluster members have been shown to be eye and skin irritants, but not skin sensitisers. PROPIONALDEHYDE Positive results for genotoxicity were reported for cluster members with lower molecular weights (<100), while members with molecular weights > 100 were negative, with the exception of nonanal (124-19-6). Although cancer bioassay data are not available for this cluster,

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	several members of this cluster are considered potential carcinogens due to structural analogy to their carcinogenic lower homologs, acetaldehyde and formaldehyde.  The primary metabolism of linear saturated aliphatic aldehydes and acids is a fundamental part of cell biochemistry. Aldehydes are successively oxidized to their corresponding carboxylic acids.				
ISOPROPANOL & METHYL TERT-BUTYL ETHER	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.				
Acute Toxicity	✓ Carcinogenicity	×			
Skin Irritation/Corrosion	✓ Reproductivity	×			
Serious Eye Damage/Irritation	STOT - Single Exposure	<b>~</b>			
Respiratory or Skin sensitisation	X STOT - Repeated Exposure	×			
Mutagenicity	X Aspiration Hazard	✓			

Legend:

X − Data either not available or does not fill the criteria for classification
 ✓ − Data available to make classification

## **SECTION 12 Ecological information**

ASTM D7423 Calibration	Endpoint	Te	Test Duration (hr)  Not Available		Species	Value			Source	
Standard - Level 6	Not Available	N			Not Available	Not Available Not Availal				
	Enduciat	Took D	unation (br)	C.			V	alue		Source
	Endpoint EC50		Test Duration (hr) Species  72h Algae or other aquatic plants				>100mg/l			2
	EC50	96h			gae or other aquatic plants			36.6mg/L		4
acetaldehyde	EC50(ECx)	48h			gae or other aquatic plants			.02mg/l		4
	EC50	48h			ustacea			9.4-59.1mg/l		4
	LC50	96h		Fis				9.4-39. mg/t 8-34mg/L	-	4
	2030	3011		1 16	911		20	5-54111g/L		14
	Endpoint	Tost D	uration (hr)	Sne	cies		Value			Source
	EC50	96h	uration (iii)		e or other aquatic plants			27.684mg/l		4
	EC50	72h			e or other aquatic plants			10000mg/L		4
acetone	NOEC(ECx)	12h		Fish			0.001n			4
	LC50	96h		Fish				iig/L 6-5000.7mg/l		4
	EC50	48h			stacea		6098.4		-	5
	L030	4011		Cius	nacea		0030.4	HIIIg/L		
	Endpoint	Test	Duration (hr)		Species			Value		Source
	EC50	72h	. ,		Algae or other aquatic plants			2.25mg/l		2
allyl alcohol	EC50(ECx)	96h			Crustacea			0.25mg/l		1
uy. u	EC50		48h		Crustacea			1.65mg		2
	LC50	96h			Fish			0.32mg		2
	Endpoint	Test I	Duration (hr)	S	pecies		١	/alue	Sour	ce
	EC50	72h		А	lgae or other aquatic plant	s	7	7.3mg/l	2	
butyraldehyde	NOEC(ECx)	72h		А	lgae or other aquatic plant	S	C	).89mg/l	2	
	EC50	48h		C	Crustacea			20mg/l 2		
	LC50	96h		F	ish		2	25.8mg/l	Not A	vailable
	Endpoint	Test	Duration (hr)	;	Species			Value		Source
	EC50	96h			Algae or other aquatic plar	its		225mg/l		2
n hutanal	EC50	72h			Algae or other aquatic plar	its		>500mg/l		1
n-butanol	NOEC(ECx)	504h			Crustacea			4.1mg/l		2
	EC50	48h			Crustacea			>500mg/l		1
	LC50	96h			Fish			100-500mg	/I	4
441										
tertiary butanol	Endpoint	Test Du	ıration (hr)	S	pecies			Value		Source
	BCF	1008h		F	ish			<0.5		7
	EC50	72h		А	lgae or other aquatic plant	s		>1000mg/	1	1
	EC50	96h		Д	lgae or other aquatic plant	S		>976mg/l		2
	EC0(ECx)	48h		C	rustacea			180mg/l		1

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	LC50	96h	Fish	>180mg/l	1
	Endi/	Took Describes # >	Cussian	W-1	0
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	1972mg/l	2
2-butanol	EC50	96h	Algae or other aquatic plants	2029mg/l	2
	NOEC(ECx)	24h	Fish	5mg/L	2
	EC50	48h	Crustacea	308mg/l	
	LC50	96h	Fish	2993mg/l	2
	Endpoint	Test Duration (hr)	Species	Value	Source
	BCF	1008h	Fish	0.9-1.4	7
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
diethyl ether	NOEC(ECx)	504h	Crustacea	100mg/l	2
	LC50	96h	Fish	2560mg/l	2
	EC50	48h	Crustacea	1378.63mg/L	5
	2000	4011	Ordioladoa	1070.00119/2	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	154.917mg/l	2
dimethyl ether	NOEC(ECx)	48h	Crustacea	>4000mg/l	1
,	EC50	48h	Crustacea	>4400mg/L	2
	LC50	96h	Fish	1783.04mg/l	2
		1 22		sereg	
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	380.68mg/l	2
tert-butyl ethyl ether	NOEC(ECx)	672h	Crustacea	3.39mg/l	2
	LC50	96h	Fish	574mg/l	2
	EC50	48h	Crustacea	110mg/l	2
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	96h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	72h	Algae or other aquatic plants	275mg/l	2
ethanol	EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	LC50	96h	Fish	42mg/L	4
	EC50	48h	Crustacea	2mg/L	4
	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	593mg/l	2
isobutanol	NOEC(ECx)	504h	Crustacea	4mg/L	5
	EC50				
		48h	Crustacea	ca.600mg/l	1
	LC50	48h 96h	Crustacea Fish	ca.600mg/l 901-1000mg/L	1 4
		96h	Fish	901-1000mg/L	4
	Endpoint	96h  Test Duration (hr)	Fish	901-1000mg/L  Value	4 Source
	Endpoint EC50	96h  Test Duration (hr) 48h	Species Crustacea	901-1000mg/L  Value  50-100mg/l	Source 4
iso-butyraldehyde	Endpoint EC50 LC50	96h  Test Duration (hr) 48h 96h	Species Crustacea Fish	901-1000mg/L  Value  50-100mg/l  23mg/l	3 Source 4 2
iso-butyraldehyde	Endpoint EC50	96h  Test Duration (hr) 48h	Species Crustacea	901-1000mg/L  Value  50-100mg/l	Source 4
iso-butyraldehyde	Endpoint EC50 LC50	96h  Test Duration (hr) 48h 96h	Species Crustacea Fish	901-1000mg/L  Value  50-100mg/l  23mg/l	3 Source 4 2
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l	Source 4 2 2 4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value	4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l	4
iso-butyraldehyde	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea  Species  Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  0.011mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h	Fish  Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  >1000mg/L  >1400mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50(ECx)	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h	Fish  Species  Crustacea  Fish  Algae or other aquatic plants  Crustacea  Species  Algae or other aquatic plants	901-1000mg/L  Value  50-100mg/l  23mg/l  83.7mg/l  10mg/l  Value  >1000mg/l  >1000mg/l  0.011mg/L	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea	901-1000mg/L     Value     50-100mg/l   23mg/l   83.7mg/l   10mg/l     Value   >1000mg/l   >1000mg/l   0.011mg/L   >1400mg/L   7550mg/l     7550mg/l	Source 4 2 2 4  Source 1 1 4 4 4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Species	901-1000mg/L     Value	4
isopropanol	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50 EC50 EC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)  96h	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Algae or other aquatic plants Fish Crustacea	901-1000mg/L     Value     50-100mg/l   23mg/l   83.7mg/l   10mg/l     Value   >1000mg/l   >1000mg/l   >1000mg/l   >1400mg/L   7550mg/l     Value   134.9mg/l	4
	Endpoint EC50 LC50 EC50 NOEC(ECx)  Endpoint EC50 EC50 EC50 EC50(ECx) LC50 EC50	96h  Test Duration (hr)  48h  96h  72h  48h  Test Duration (hr)  96h  72h  24h  96h  48h  Test Duration (hr)	Species Crustacea Fish Algae or other aquatic plants Crustacea  Species Algae or other aquatic plants Algae or other aquatic plants Algae or other aquatic plants Fish Crustacea  Species Species	901-1000mg/L     Value	4

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_	Endpoint	Test D	uration (hr)	Sne	ecies			Valu	е		Source
	EC50	96h	,		gae or other aqu	uatic plants			Bmg/l		2
	EC50	72h			gae or other aqu	· ·		80mg			1
iso-valeraldehyde	EC50	48h			ustacea			177n			1
	EC50(ECx)	96h		Fis	sh			3.25	mg/l		2
	LC50	96h		Fis	sh			2.98-	-3.54mg/l	L	4
	Endpoint	Tost C	Ouration (hr)	Sno	ecies		l v	/alue			Source
	EC50	96h	diadon (m)		ae or other aqu	atic plants			0.623mg	ı/I	4
methanol	NOEC(ECx)	720h		Fish		atic plants		.007m		/·	4
	LC50	96h		Fish				90mg/			2
	EC50	48h		_	stacea			10000			2
			5 ( 4)								
	Endpoint EC50		Duration (hr)		Species	aguatia planta			Value	/1	Source 2
	EC50	72h 96h				aquatic plants			1220mg		4
methyl ethyl ketone	NOEC(ECx)	48h			Crustacea	aquatic plants			>500mg/l	/L	2
	EC50	48h			Crustacea				308mg/l		2
	LC50	96h			Fish				>324mg		4
	LC30	9011			FISH				>324111g		4
	Endpoint	Test	Duration (hr)		Species				Value		Source
	EC50	96h			Algae or other	r aquatic plants			184mg/	1	1
methyl tert-butyl ether	EC50	72h			Algae or other	r aquatic plants			>800m(	g/l	1
, ,	NOEC(ECx)	96h			Crustacea				15mg/l		1
	EC50	48h		Crustacea				>100m(	g/l	1	
	LC50	96h			Fish				187mg/	1	1
	Endpoint	Test I	Duration (hr)	Sp	pecies			Valu	ie		Source
	EC50	72h			Algae or other aquatic plants			>9.3mg/l			2
valeraldehyde	NOEC(ECx)	504h	504h		Crustacea			2.5mg/l			2
	EC50	48h		Cr	Crustacea			31.5	img/l		2
	LC50	96h		Fis	sh			11.3	-13.6mg/	L	4
	Endpoint	Toet	Duration (hr)		Species				Value		Source
		1631	Duration (iii)			aquatic plants			40mg/l		1
	-	96h				aquatic plants			Tomg/i		
	EC50	96h				aduatic plants			58mg/l		1
propionaldehyde	EC50 EC50	72h			Algae or other	aquatic plants			58mg/l		1
propionaldehyde	EC50 EC50 EC10(ECx)	72h 96h			Algae or other	aquatic plants			4mg/l		1
propionaldehyde	EC50 EC50	72h			Algae or other					g/l	
propionaldehyde	EC50 EC50 EC10(ECx) EC50 LC50	72h 96h 48h 96h			Algae or other Algae or other Crustacea Fish				4mg/l 88.7mg 14mg/l	g/l	1 1 2
propionaldehyde	EC50 EC50 EC10(ECx) EC50 LC50 Endpoint	72h 96h 48h 96h	Ouration (hr)	Spe	Algae or other Algae or other Crustacea Fish	aquatic plants		Value	4mg/l 88.7mg 14mg/l	g/l	1 1 2 Source
propionaldehyde	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50	72h 96h 48h 96h <b>Test I</b> 96h	Ouration (hr)	Spr Alg	Algae or other Algae or other Crustacea Fish eccies gae or other aqu	aquatic plants		4480r	4mg/l 88.7mg 14mg/l	g/l	1 1 2 Source 4
propionaldehyde n-propanol	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50	72h 96h 48h 96h  Test [ 96h 72h	Duration (hr)	Spo Alg	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu	aquatic plants		4480r 3200-	4mg/l 88.7mg 14mg/l mg/L 5600mg/	g/l	1 1 2 Source 4 4
	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx)	72h 96h 48h 96h <b>Test I</b> 96h 72h 504h	Duration (hr)	Spi Alg Alg Cru	Algae or other Algae or other Crustacea Fish  eccies gae or other aquestacea	aquatic plants		4480r 3200- 68.3m	4mg/l 88.7mg 14mg/l mg/L 5600mg/	g/l	1 1 2 Source 4 4 2
	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50	72h 96h 48h 96h  Test [ 96h 72h	Duration (hr)	Spi Alg Alg Cru	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea	aquatic plants		4480r 3200- 68.3m 3339-	4mg/l 88.7mg 14mg/l mg/L 5600mg/	g/I /L	1 1 2 Source 4 4
	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	72h 96h 48h 96h 7est I 96h 72h 504h 48h 96h		Spe Alg Alg Cru	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339-	4mg/l 88.7mg 14mg/l 14mg/l 5600mg/ ng/l 3977mg/	g/l 'L 'I	Source 4 4 2 4 4
	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	72h 96h 48h 96h  Test [ 96h 72h 504h 48h 96h	est Duration (hr)	Spe Alg Alg Cru	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea sh  Species	uatic plants uatic plants uatic plants	Value	4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg 14mg/l 14mg/l 5600mg/ ng/l 3977mg/	g/l /L /L Source	Source 4 4 2 2 4 4 4
n-propanol	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	72h 96h 48h 96h  Test [ 96h 72h 504h 48h 96h		Spe Alg Alg Cru	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea	uatic plants uatic plants uatic plants	Value Not Availa	4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg 14mg/l 14mg/l 5600mg/ ng/l 3977mg/	g/l 'L 'I	Source 4 4 2 2 4 4 4
n-propanol	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50	72h 96h 48h 96h 7est I 96h 72h 504h 48h 96h	est Duration (hr)	Spr Alg Alg Cru Cru Fis	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea sh  Species	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg 14mg/l 14mg/l 5600mg/ ng/l 3977mg/	g/l /L /L Source	1
n-propanol	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available	72h 96h 48h 96h 7est I 96h 72h 504h 48h 96h	est Duration (hr) lot Available	Spe Alg Alg Cru Cru Fis	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea sh  Species Not Avail	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg 14mg/l 14mg/L 5600mg/ 13977mg/ 4000mg/	g/l /L /L Source Not Avai	1
n-propanol	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available	72h 96h 48h 96h 72h 504h 48h 96h  Trest I	est Duration (hr) lot Available	Spe Alg Alg Cru Cru Fis	Algae or other Algae or other Crustacea Fish  eccies gae or other aqu gae or other aqu ustacea ustacea ustacea Not Avail	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg/l 14mg/l 5600mg/l 3977mg/ 4000mg/	g/l /L Source Not Avai	1
n-propanol dipropyl ether	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50	72h 96h 48h 96h 72h 504h 48h 96h  Test I 72h 72h	est Duration (hr) lot Available	Spp Alg Alg Cru Cru Fis	Algae or other Algae or other Crustacea Fish  Pecies gae or other aqu gae or other aqu ustacea ustacea sh  Species Not Avail	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg/l 14mg/l 14mg/l 5600mg/l 3977mg/ 4000mg/	g/l //L Source Not Avai	1
n-propanol dipropyl ether	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50	72h 96h 48h 96h 7est I 96h 72h 504h 48h 96h Test I 72h 96h	est Duration (hr) lot Available	Spr Alg Alg Cru Cru Fis	Algae or other Algae or other Algae or other Crustacea Fish  Pecies gae or other aquistacea ustacea sh  Species Not Avail	uatic plants uatic plants uatic plants		4480r 3200- 68.3m 3339- 3000- ble	4mg/l 88.7mg/l 14mg/l 14mg/l 5600mg/l 3977mg/ 4000mg/ Value >100mg/	g/l //L Source Not Avai	1
n-propanol dipropyl ether	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 LC50 EC50 EC50 LC50 EC50 EC50 EC50 EC50	72h 96h 48h 96h 72h 504h 48h 96h 72h 504h 48h 96h 72h 48h 48h 48h 48h 48h	est Duration (hr) lot Available  Duration (hr)	Spot Alg Alg Cru Cru Fis	Algae or other Algae or other Algae or other Crustacea Fish  Pecies gae or other aquistacea ustacea Sh  Species Not Avail  Species Algae or other a	uatic plants uatic plants uatic plants lable	Not Availa	4480r 3200- 68.3m 3339- 3000-	4mg/l 88.7mg/l 14mg/l 14mg/l 5600mg/l 3977mg/ 4000mg/ Value >100mg/l	g/l /L Source Not Avai	1
n-propanol dipropyl ether	EC50 EC50 EC10(ECx) EC50 LC50  Endpoint EC50 EC50 NOEC(ECx) EC50 LC50  Endpoint Not Available  Endpoint EC50 EC50 LC50	72h 96h 48h 96h 72h 504h 48h 96h 72h 504h 48h 96h 72h 48h 48h 48h 48h 48h	est Duration (hr) lot Available	Spot Alg Alg Cru Cru Fis	Algae or other Algae or other Algae or other Crustacea Fish  Pecies gae or other aquistacea ustacea Sh  Species Not Avail  Species Algae or other a	uatic plants uatic plants uatic plants	Not Availa	4480r 3200- 68.3m 3339- 3000- ble	4mg/l 88.7mg/l 14mg/l 14mg/l 5600mg/l 3977mg/ 4000mg/l 100mg/l 1.4mg/l	g/l /L Source Not Avai	1

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NOEC(ECx)	504h	Crustacea	0.17mg/l	2
LC50	96h	Fish	0.11mg/l	2

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

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

When released in the environment, alkanes don't undergo rapid biodegradation, because they have no functional groups (like hydroxyl or carbonyl) that are needed by most organisms in order to metabolize the compound.

However, some bacteria can metabolise some alkanes (especially those linear and short), by oxidizing the terminal carbon atom. The product is an alcohol, that could be next oxidised to an aldehyde, and finally to a carboxylic acid. The resulting fatty acid could be metabolised through the fatty acid degradation pathway.

Environmental Fate: n-Octane may be released into the environment through various waste streams as a result of its production and use in petroleum and gasoline products. Terrestrial Fate: If released to soil, n-octane will have no mobility and will volatilize from moist and dry soil based upon its physico-chemical properties. However, volatilization may be attenuated due to its adsorption potential onto soil. Study shows that n-octane is capable of undergoing biodegradation under aerobic conditions.

DO NOT discharge into sewer or waterways.

#### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetaldehyde	LOW	LOW
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
allyl alcohol	LOW (Half-life = 14 days)	LOW (Half-life = 0.92 days)
butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.17 days)
n-butanol	LOW (Half-life = 54 days)	LOW (Half-life = 3.65 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
2-butanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
diethyl ether	LOW	LOW
dimethyl ether	LOW	LOW
tert-butyl ethyl ether	LOW	LOW
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
isobutanol	LOW (Half-life = 14.42 days)	LOW (Half-life = 4.15 days)
iso-butyraldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
di-iso-propyl ether	HIGH	HIGH
iso-valeraldehyde	LOW	LOW
methanol	LOW	LOW
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
methyl tert-butyl ether	HIGH (Half-life = 360 days)	LOW (Half-life = 11.04 days)
valeraldehyde	LOW	LOW
propionaldehyde	LOW (Half-life = 14 days)	LOW (Half-life = 1.38 days)
n-propanol	LOW	LOW
dipropyl ether	LOW	LOW
tert-amyl methyl ether	LOW	LOW
2,2,4-trimethylpentane	HIGH	HIGH

#### Bioaccumulative potential

Bioaccumulative potential	
Ingredient	Bioaccumulation
acetaldehyde	LOW (BCF = 1.2)
acetone	LOW (BCF = 0.69)
allyl alcohol	LOW (LogKOW = 0.17)
butyraldehyde	LOW (LogKOW = 0.88)
n-butanol	LOW (BCF = 0.64)
tertiary butanol	LOW (BCF = 1.09)
2-butanol	LOW (BCF = 1.71)
diethyl ether	LOW (BCF = 9.1)
dimethyl ether	LOW (LogKOW = 0.1)
tert-butyl ethyl ether	LOW (LogKOW = 1.9203)
ethanol	LOW (LogKOW = -0.31)
isobutanol	LOW (LogKOW = 0.76)
iso-butyraldehyde	LOW (LogKOW = 0.74)
isopropanol	LOW (LogKOW = 0.05)
di-iso-propyl ether	LOW (LogKOW = 1.52)
iso-valeraldehyde	LOW (LogKOW = 1.2339)
methanol	LOW (BCF = 10)
methyl ethyl ketone	LOW (LogKOW = 0.29)
methyl tert-butyl ether	LOW (BCF = 1.5)

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Ingredient	Bioaccumulation
valeraldehyde	LOW (LogKOW = 1.31)
propionaldehyde	LOW (LogKOW = 0.59)
n-propanol	LOW (LogKOW = 0.25)
dipropyl ether	LOW (LogKOW = 2.03)
tert-amyl methyl ether	LOW (LogKOW = 1.9203)
2,2,4-trimethylpentane	MEDIUM (BCF = 650)

#### Mobility in soil

WODING IN SOII	
Ingredient	Mobility
acetaldehyde	HIGH (Log KOC = 1.498)
acetone	HIGH (Log KOC = 1.981)
allyl alcohol	HIGH (Log KOC = 1.325)
butyraldehyde	LOW (Log KOC = 5.096)
n-butanol	MEDIUM (Log KOC = 2.443)
tertiary butanol	HIGH (Log KOC = 1.471)
2-butanol	MEDIUM (Log KOC = 2.048)
diethyl ether	LOW (Log KOC = 4.395)
dimethyl ether	HIGH (Log KOC = 1.292)
tert-butyl ethyl ether	LOW (Log KOC = 9.697)
ethanol	HIGH (Log KOC = 1)
isobutanol	MEDIUM (Log KOC = 2.048)
iso-butyraldehyde	LOW (Log KOC = 4.272)
isopropanol	HIGH (Log KOC = 1.06)
di-iso-propyl ether	LOW (Log KOC = 10.5)
iso-valeraldehyde	LOW (Log KOC = 7.878)
methanol	HIGH (Log KOC = 1)
methyl ethyl ketone	MEDIUM (Log KOC = 3.827)
methyl tert-butyl ether	LOW (Log KOC = 5.258)
valeraldehyde	LOW (Log KOC = 9.399)
propionaldehyde	MEDIUM (Log KOC = 2.763)
n-propanol	HIGH (Log KOC = 1.325)
dipropyl ether	LOW (Log KOC = 14.95)
tert-amyl methyl ether	LOW (Log KOC = 10.44)
2,2,4-trimethylpentane	LOW (Log KOC = 275.5)

## **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.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
   It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers.

## **SECTION 14 Transport information**

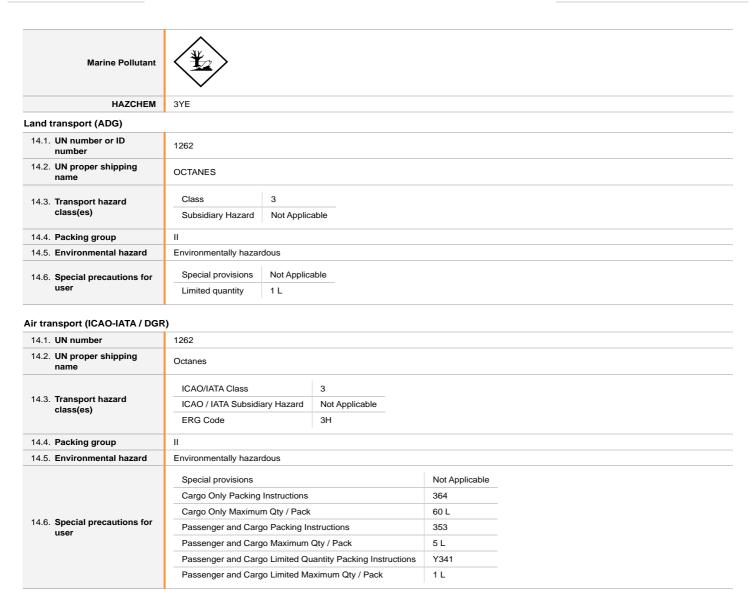
#### **Labels Required**



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## Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1262	
14.2. UN proper shipping name	OCTANES	
14.3. Transport hazard class(es)	IMDG Class IMDG Subsidiary Ha	3 szard Not Applicable
14.4. Packing group	П	
14.5 Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number Special provisions Limited Quantities	F-E , S-E  Not Applicable  1 L

## 14.7. Maritime transport in bulk according to IMO instruments

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

Not Applicable

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

Product name	Group
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available

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Product name	Group
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

#### 14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
acetaldehyde	Not Available
acetone	Not Available
allyl alcohol	Not Available
butyraldehyde	Not Available
n-butanol	Not Available
tertiary butanol	Not Available
2-butanol	Not Available
diethyl ether	Not Available
dimethyl ether	Not Available
tert-butyl ethyl ether	Not Available
ethanol	Not Available
isobutanol	Not Available
iso-butyraldehyde	Not Available
isopropanol	Not Available
di-iso-propyl ether	Not Available
iso-valeraldehyde	Not Available
methanol	Not Available
methyl ethyl ketone	Not Available
methyl tert-butyl ether	Not Available
valeraldehyde	Not Available
propionaldehyde	Not Available
n-propanol	Not Available
dipropyl ether	Not Available
tert-amyl methyl ether	Not Available
2,2,4-trimethylpentane	Not Available

## **SECTION 15 Regulatory information**

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

## acetaldehyde 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

 $\label{thm:conditional} \mbox{ International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs}$ 

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

#### acetone 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)

#### allyl alcohol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

Australian Inventory of Industrial Chemicals (AIIC)

#### butyraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-butanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### tertiary butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### 2-butanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### diethyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dimethyl ether 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)

#### tert-butyl ethyl ether is found on the following regulatory lists

Not Applicable

#### ethanol is found on the following regulatory lists

 $\label{eq:Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals} Australia \ Hazardous \ Chemical Information System (HCIS) - Hazardous Chemicals$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australian Inventory of Industrial Chemicals (AIIC)

#### isobutanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-butyraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

## isopropanol is found on the following regulatory lists

 $\label{prop:eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

#### di-iso-propyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## iso-valeraldehyde is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

#### methanol is found on the following regulatory lists

 $\label{eq:australia} \mbox{Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals}$ 

 $\label{eq:australia} \textbf{Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5}$ 

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List

## methyl ethyl ketone 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)

#### methyl tert-butyl ether 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 2

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

## valeraldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

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Australian Inventory of Industrial Chemicals (AIIC)

#### propionaldehyde is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### n-propanol 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

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

#### dipropyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## tert-amyl methyl ether is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

## 2,2,4-trimethylpentane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

#### **Additional Regulatory Information**

Not Applicable

#### **National Inventory Status**

National Inventory	Status	
Australia - AIIC / Australia Non- Industrial Use	No (tert-butyl ethyl ether)	
Canada - DSL	No (tert-butyl ether; dipropyl ether)	
Canada - NDSL	No (acetaldehyde; acetone; allyl alcohol; butyraldehyde; n-butanol; tertiary butanol; 2-butanol; diethyl ether; dimethyl ether; ethanol; isobutanol; iso-butyraldehyde; isopropanol; di-iso-propyl ether; iso-valeraldehyde; methanol; methyl ethyl ketone; methyl tert-butyl ether; valeraldehyde; propionaldehyde; n-propanol; tert-amyl methyl ether; 2,2,4-trimethylpentane)	
China - IECSC	No (tert-butyl ether; tert-amyl methyl ether)	
Europe - EINEC / ELINCS / NLP	Yes	
Japan - ENCS	No (tert-amyl methyl ether)	
Korea - KECI	Yes	
New Zealand - NZIoC	No (tert-amyl methyl ether)	
Philippines - PICCS	No (tert-butyl ethyl ether)	
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'	
Taiwan - TCSI	Yes	
Mexico - INSQ	No (tert-butyl ethyl ether)	
Vietnam - NCI	Yes	
Russia - FBEPH	Yes	
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**

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#### Other information

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
- 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
- ▶ DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

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- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
- ▶ AllC: 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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