Isooctane Blank

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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	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 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)

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

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
540-84-1	100	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***	

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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

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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	
Fire/Explosion Hazard	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	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	▸ 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.
Storage incompatibility	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. ▸ Avoid reaction with oxidising agents

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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
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. Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

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

Material	CPI
NITRILE	A
NEOPRENE	B
PVA	B
NATURAL RUBBER	C

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

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)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	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
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	- Unstable in the presence of incompatible materials. - Product is considered stable. - Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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.

Continued...

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
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 contact in some persons. The material may accentuate any pre-existing dermatitis condition 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 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.
Eye	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 produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

Isooctane Blank

TOXICITY	IRRITATION
Not Available	Not Available

2,2,4-trimethylpentane

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend: ***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
Isooctane Blank & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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.

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

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sensitisation	
Mutagenicity	✗

Aspiration Hazard ✓

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

SECTION 12 Ecological information

Toxicity

Isooctane Blank

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

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	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
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

Labels Required

Continued...

	
Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	IMDG Class: 3 IMDG Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5 **Environmental hazard**	Marine Pollutant
14.6. **Special precautions for user**	EMS Number: F-E , S-E Special provisions: Not Applicable Limited Quantities: 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
2,2,4-trimethylpentane	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Continued...

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

Continued...

- PICCS: Philippine Inventory of Chemicals and Chemical Substances
- TSCA: Toxic Substances Control Act
- TCSI: Taiwan Chemical Substance Inventory
- INSQ: Inventario Nacional de Sustancias Químicas
- NCI: National Chemical Inventory
- FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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end of SDS

ASTM D7423 Calibration Standard - Level 1

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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 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 [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 (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)

Page 1 continued...

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

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	acetaldehyde
67-64-1	0.001	acetone
107-18-6	0.001	allyl alcohol
123-72-8	0.001	butyraldehyde
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	ethanol
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	valeraldehyde
123-38-6	0.001	propionaldehyde
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. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ASTM D7423 Calibration Standard - Level 1

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

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

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TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

Continued...

Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
	Eye (Rodent - rabbit): 500mg - Severe
	Eye (Rodent - rabbit): 500mg/24H - Mild
	Eye: adverse effect observed (irritating)[1]
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Human): 70%/2D
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin (Rodent - rabbit): 400mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

isobutanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: adverse effect observed (irritating)[1]

methanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 40mg - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 14mg/24H - Mild
	Skin (Rodent - rabbit): 402mg/24H - Mild
	Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

		Skin: no adverse effect observed (not irritating)[1]

methyl tert-butyl ether	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

valeraldehyde	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
	Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
		Skin (Rodent - rabbit): 500mg/24H - Moderate
		Skin: adverse effect observed (irritating)[1]

propionaldehyde	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
	Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

n-propanol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
	Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
		Skin (Human): 100%/47H - Mild
		Skin (Human): 60%/24H
		Skin (Rodent - rabbit): 500mg - Mild
		Skin: no adverse effect observed (not irritating)[1]

dipropyl ether	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

tert-amyl methyl ether	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
	Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
		Skin: no adverse effect observed (not irritating)[1]

2,2,4-trimethylpentane	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 1 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 1

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

Continued...

	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

Continued...

iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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 2

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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: **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 [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 (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)

Page 1 continued...

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

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	butyraldehyde
71-36-3	0.002	n-butanol
75-65-0	0.002	tertiary butanol
78-92-2	0.002	2-butanol
60-29-7	0.002	diethyl ether
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	iso-butyraldehyde
67-63-0	0.002	isopropanol
108-20-3	0.002	di-iso-propyl ether
590-86-3	0.002	iso-valeraldehyde
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	valeraldehyde
123-38-6	0.002	propionaldehyde
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:	***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ASTM D7423 Calibration Standard - Level 2

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

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

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TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

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Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
	Eye (Rodent - rabbit): 500mg - Severe
	Eye (Rodent - rabbit): 500mg/24H - Mild
	Eye: adverse effect observed (irritating)[1]
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Human): 70%/2D
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin (Rodent - rabbit): 400mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

isobutanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: adverse effect observed (irritating)[1]

methanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 40mg - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 14mg/24H - Mild
	Skin (Rodent - rabbit): 402mg/24H - Mild
	Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

		Skin: no adverse effect observed (not irritating)[1]

	TOXICITY	IRRITATION
methyl tert-butyl ether	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

	TOXICITY	IRRITATION
valeraldehyde	Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
	Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
		Skin (Rodent - rabbit): 500mg/24H - Moderate
		Skin: adverse effect observed (irritating)[1]

	TOXICITY	IRRITATION
propionaldehyde	Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
	Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

	TOXICITY	IRRITATION
n-propanol	Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
	Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
		Skin (Human): 100%/47H - Mild
		Skin (Human): 60%/24H
		Skin (Rodent - rabbit): 500mg - Mild
		Skin: no adverse effect observed (not irritating)[1]

	TOXICITY	IRRITATION
dipropyl ether	Not Available	Not Available

	TOXICITY	IRRITATION
tert-amyl methyl ether	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
	Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
		Skin: no adverse effect observed (not irritating)[1]

	TOXICITY	IRRITATION
2,2,4-trimethylpentane	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 2 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 2

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

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	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

Continued...

iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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 3

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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 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 [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 (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)

Page 1 continued...

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

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	0.005	acetaldehyde
67-64-1	0.005	acetone
107-18-6	0.005	allyl alcohol
123-72-8	0.005	butyraldehyde
71-36-3	0.005	n-butanol
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	iso-butyraldehyde
67-63-0	0.005	isopropanol
108-20-3	0.005	di-iso-propyl ether
590-86-3	0.005	iso-valeraldehyde
67-56-1	0.005	methanol
78-93-3	0.005	methyl ethyl ketone
1634-04-4	0.005	methyl tert-butyl ether
110-62-3	0.005	valeraldehyde
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***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ASTM D7423 Calibration Standard - Level 3

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

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

ASTM D7423 Calibration Standard - Level 3

TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

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Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
	Eye (Rodent - rabbit): 500mg - Severe
	Eye (Rodent - rabbit): 500mg/24H - Mild
	Eye: adverse effect observed (irritating)[1]
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Human): 70%/2D
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin (Rodent - rabbit): 400mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

isobutanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: adverse effect observed (irritating)[1]

methanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 40mg - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 14mg/24H - Mild
	Skin (Rodent - rabbit): 402mg/24H - Mild
	Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

	Skin: no adverse effect observed (not irritating)[1]

methyl tert-butyl ether

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
	Skin (Rodent - rabbit): 500mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

propionaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

n-propanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
	Skin (Human): 100%/47H - Mild
	Skin (Human): 60%/24H
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dipropyl ether

TOXICITY	IRRITATION
Not Available	Not Available

tert-amyl methyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
	Skin: no adverse effect observed (not irritating)[1]

2,2,4-trimethylpentane

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 3 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 3

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

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	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

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iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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 4

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-04

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 (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)

Page 1 continued...

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

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	0.008	acetaldehyde
67-64-1	0.008	acetone
107-18-6	0.008	allyl alcohol
123-72-8	0.008	butyraldehyde
71-36-3	0.008	n-butanol
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	iso-butyraldehyde
67-63-0	0.008	isopropanol
108-20-3	0.008	di-iso-propyl ether
590-86-3	0.008	iso-valeraldehyde
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	valeraldehyde
123-38-6	0.008	propionaldehyde
71-23-8	0.008	n-propanol
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:	***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
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Material	CPI
BUTYL	C
BUTYL/NEOPRENE	C
CPE	C
HYPALON	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/NEOPRENE	C

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

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TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

Continued...

Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
	Eye (Rodent - rabbit): 500mg - Severe
	Eye (Rodent - rabbit): 500mg/24H - Mild
	Eye: adverse effect observed (irritating)[1]
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Human): 70%/2D
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin (Rodent - rabbit): 400mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

isobutanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: adverse effect observed (irritating)[1]

methanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 40mg - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 14mg/24H - Mild
	Skin (Rodent - rabbit): 402mg/24H - Mild
	Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

	Skin: no adverse effect observed (not irritating)[1]

methyl tert-butyl ether

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
	Skin (Rodent - rabbit): 500mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

propionaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

n-propanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
	Skin (Human): 100%/47H - Mild
	Skin (Human): 60%/24H
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dipropyl ether

TOXICITY	IRRITATION
Not Available	Not Available

tert-amyl methyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
	Skin: no adverse effect observed (not irritating)[1]

2,2,4-trimethylpentane

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 4 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 4

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

Continued...

	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

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iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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 5

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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 5
Synonyms	Not Available
Proper shipping name	OCTANES
Other means of identification	D-7423-TP-CAL-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 [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 (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)

Page 1 continued...

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

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	butyraldehyde
71-36-3	0.01	n-butanol
75-65-0	0.01	tertiary butanol
78-92-2	0.01	2-butanol
60-29-7	0.01	diethyl ether
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	iso-butyraldehyde
67-63-0	0.01	isopropanol
108-20-3	0.01	di-iso-propyl ether
590-86-3	0.01	iso-valeraldehyde
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	valeraldehyde
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:	***1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
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Material	CPI
BUTYL	C
BUTYL/NEOPRENE	C
CPE	C
HYPALON	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/NEOPRENE	C

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

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TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

Continued...

Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
	Eye (Rodent - rabbit): 500mg - Severe
	Eye (Rodent - rabbit): 500mg/24H - Mild
	Eye: adverse effect observed (irritating)[1]
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Human): 70%/2D
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin (Rodent - rabbit): 400mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

isobutanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: adverse effect observed (irritating)[1]

methanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 40mg - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 14mg/24H - Mild
	Skin (Rodent - rabbit): 402mg/24H - Mild
	Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

	Skin: no adverse effect observed (not irritating)[1]

methyl tert-butyl ether

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
	Skin (Rodent - rabbit): 500mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

propionaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

n-propanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
	Skin (Human): 100%/47H - Mild
	Skin (Human): 60%/24H
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dipropyl ether

TOXICITY	IRRITATION
Not Available	Not Available

tert-amyl methyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
	Skin: no adverse effect observed (not irritating)[1]

2,2,4-trimethylpentane

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 5 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 5

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

Continued...

	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

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iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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 6

Novachem Pty Ltd

Chemwatch Hazard Alert Code: **3**

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 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 [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 (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)

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

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	0.02	acetaldehyde
67-64-1	0.02	acetone
107-18-6	0.02	allyl alcohol
123-72-8	0.02	butyraldehyde
71-36-3	0.02	n-butanol
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	iso-butyraldehyde
67-63-0	0.02	isopropanol
108-20-3	0.02	di-iso-propyl ether
590-86-3	0.02	iso-valeraldehyde
67-56-1	0.02	methanol
78-93-3	0.02	methyl ethyl ketone
1634-04-4	0.02	methyl tert-butyl ether
110-62-3	0.02	valeraldehyde
123-38-6	0.02	propionaldehyde
71-23-8	0.02	n-propanol
111-43-3	0.02	dipropyl ether
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***	

SECTION 4 First aid measures

Continued...

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. **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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 Handling and storage

Continued...

Precautions for safe handling

Safe handling	The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. ▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. **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	▸ 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.
Storage incompatibility	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)

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

Continued...

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/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/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	Revised 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
isobutanol	1,600 ppm	Not Available
iso-butyraldehyde	Not Available	Not Available
isopropanol	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 ethyl ketone	3,000 ppm	Not Available
methyl tert-butyl ether	Not Available	Not Available
valeraldehyde	Not Available	Not Available
propionaldehyde	Not Available	Not Available
n-propanol	800 ppm	Not Available
dipropyl ether	Not Available	Not Available
tert-amyl methyl ether	Not Available	Not Available
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
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.

Continued...

	Personal hygiene is a key element of effective hand care. ▸ Neoprene rubber gloves
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
'Forsberg Clothing Performance Index'.
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
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Material	CPI
BUTYL	C
BUTYL/NEOPRENE	C
CPE	C
HYPALON	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/NEOPRENE	C

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

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.

Respiratory protection

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

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

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

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

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
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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. 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. 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.

Continued...

	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.
Skin Contact	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 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.
Eye	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. 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.
Chronic	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 exposure. 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. 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]

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TOXICITY	IRRITATION
Not Available	Not Available

acetaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3540 mg/kg[2]	Eye (Human): 50ppm/15M
Inhalation (Mouse) LC50: 23 mg/L4h[2]	Eye (Rodent - rabbit): 40mg - Severe
Oral (Rat) LD50: 661 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 500mg - Mild
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

acetone

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (Human): 186300ppm - Mild
Inhalation (Mouse) LC50: 44 mg/L4h[2]	Eye (Human): 500ppm
Oral (Rat) LD50: 5800 mg/kg[2]	Eye (Rodent - rabbit): 10uL - Mild
	Eye (Rodent - rabbit): 20mg - Severe
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye: adverse effect observed (irritating)[1]
	Skin (Rodent - rabbit): 395mg - Mild
	Skin (Rodent - rabbit): 500mg/24H - Mild
	Skin: no adverse effect observed (not irritating)[1]

allyl alcohol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 45 mg/kg[2]	Eye (Human): 25ppm - Severe
Inhalation (Rat) LC50: >100 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 64 mg/kg[2]	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]

Continued...

butyraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3560 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >5.46 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 5900 mg/kg[2]	Skin (Rodent - rabbit): 410mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

n-butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3400 mg/kg[2]	Eye (Human): 50ppm
Inhalation (Rat) LC50: 8000 ppm4h[2]	Eye (Human): 990ppm/1H
Oral (Rat) LD50: 790 mg/kg[2]	Eye (Rodent - rabbit): 0.005mL - Severe
	Eye (Rodent - rabbit): 0.1mL
	Eye (Rodent - rabbit): 1.62mg - Severe
	Eye (Rodent - rabbit): 2mg/24H - Severe
	Eye: adverse effect observed (irreversible damage)[1]
	Skin (Human): 20uL/20M
	Skin (Rodent - rabbit): 20mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

tertiary butanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >9700 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 1500 mg/kg[2]	Skin (Rodent - rabbit): 500uL/24H - Mild
	Skin: adverse effect observed (irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

2-butanol

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL - Severe
Inhalation (Rat) LC50: 48.5 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 2054 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

diethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >14280 mg/kg[2]	Eye (Human): 100ppm
Inhalation (Rat) LC50: 32000 ppm4h[1]	Eye (Rodent - rabbit): 0.1mL
Oral (Rat) LD50: 1215 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Eye (Rodent - rabbit): 100mg - Moderate
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye: no adverse effect observed (not irritating)[1]
	Skin (Rodent - guinea pig): 50mg/24H - Severe
	Skin (Rodent - rabbit): 360mg - Mild
	Skin (Rodent - rabbit): 360mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dimethyl ether

TOXICITY	IRRITATION
Inhalation (Rat) LC50: >20000 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

tert-butyl ethyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Moderate
Inhalation (Rat) LC50: >5.88 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Moderate
	Skin: no adverse effect observed (not irritating)[1]

ethanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (Rodent - rabbit): 0.1mL
Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 100mg/4S - Moderate

Continued...

	Oral (Rat) LD50: 7060 mg/kg[2]	Eye (Rodent - rabbit): 100uL - Moderate
		Eye (Rodent - rabbit): 500mg - Severe
		Eye (Rodent - rabbit): 500mg/24H - Mild
		Eye: adverse effect observed (irritating)[1]
		Eye: no adverse effect observed (not irritating)[1]
		Skin (Human): 70%/2D
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin (Rodent - rabbit): 400mg - Mild
		Skin: no adverse effect observed (not irritating)[1]

isobutanol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Inhalation(Rabbit) LC50; 2.63 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
	Oral (Rat) LD50: 2460 mg/kg[2]	

iso-butyraldehyde	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Inhalation (Rat) LC50: >23.6 mg/l4h[1]	Skin (Rodent - rabbit): 397mg - Mild
	Oral (Rat) LD50: >2830 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

isopropanol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 12800 mg/kg[2]	Eye (Rodent - rabbit): 100mg - Severe
	Inhalation (Mouse) LC50: 53 mg/L4h[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Oral (Mouse) LD50; 3600 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Moderate
		Eye: adverse effect observed (irritating)[1]
		Skin (Rodent - rabbit): 500mg - Mild
		Skin: no adverse effect observed (not irritating)[1]

di-iso-propyl ether	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation(Rabbit) LC50; 120.6 mg/L4h[2]	Skin (Rodent - rabbit): 363mg - Mild
	Oral (Mouse) LD50; 3600 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

iso-valeraldehyde	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 3180 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Inhalation (Rat) LC50: 42.7 mg/l4h[1]	Eye: adverse effect observed (irritating)[1]
	Oral (Guinea) LD50; 2950 mg/kg[2]	Skin (Rodent - rabbit): 500mg/24H - Mild
		Skin: adverse effect observed (irritating)[1]

methanol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 15800 mg/kg[2]	Eye (Rodent - rabbit): 0.1mL
	Inhalation (Rat) LC50: 64000 ppm4h[2]	Eye (Rodent - rabbit): 0.1mL - Severe
	Oral (Rat) LD50: 5628 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Moderate
		Eye (Rodent - rabbit): 40mg - Moderate
		Eye: no adverse effect observed (not irritating)[1]
		Skin (Rodent - rabbit): 20mg/24H - Moderate
		Skin: no adverse effect observed (not irritating)[1]

methyl ethyl ketone	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 6480 mg/kg[2]	Eye (Human): 350ppm
	Inhalation (Mouse) LC50: 32 mg/L4h[2]	Eye (Rodent - rabbit): 80mg
	Oral (Rat) LD50: 2054 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
		Skin (Rodent - rabbit): 14mg/24H - Mild
		Skin (Rodent - rabbit): 402mg/24H - Mild
		Skin (Rodent - rabbit): 500mg/24H - Moderate

Continued...

	Skin: no adverse effect observed (not irritating)[1]

methyl tert-butyl ether

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: 41 mg/L4h[2]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >2000 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]

valeraldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 4857 mg/kg[2]	Eye (Rodent - rabbit): 100mg/24H - Severe
Inhalation (Rat) LC50: 14 mg/L4h[2]	Eye: adverse effect observed (irritating)[1]
Oral (Rat) LD50: 4581 mg/kg[2]	Skin (Rodent - guinea pig): 100% - Severe
	Skin (Rodent - rabbit): 500mg/24H - Moderate
	Skin: adverse effect observed (irritating)[1]

propionaldehyde

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 2460 mg/kg[1]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >4.6 mg/l4h[1]	Eye (Rodent - rabbit): 41mg - Severe
Oral (Rat) LD50: 1410 mg/kg[2]	Skin (Rodent - rabbit): 500mg - Mild

n-propanol

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 5040 mg/kg[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
Inhalation (Rat) LC50: >33.8 mg/l4h[1]	Eye: adverse effect observed (irreversible damage)[1]
Oral (Rat) LD50: 1870 mg/kg[2]	Skin (Human): 100%/24H - Mild
	Skin (Human): 100%/47H - Mild
	Skin (Human): 60%/24H
	Skin (Rodent - rabbit): 500mg - Mild
	Skin: no adverse effect observed (not irritating)[1]

dipropyl ether

TOXICITY	IRRITATION
Not Available	Not Available

tert-amyl methyl ether

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 100uL/24H - Severe
Inhalation (Rat) LC50: >5.4 mg/L4h[1]	Eye: no adverse effect observed (not irritating)[1]
Oral (Rat) LD50: 1602 mg/kg[1]	Skin (Rodent - rabbit): 500uL/4H - Severe
	Skin: no adverse effect observed (not irritating)[1]

2,2,4-trimethylpentane

TOXICITY	IRRITATION
Dermal (rabbit) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
Inhalation (Rat) LC50: >33.52 mg/l4h[1]	Skin: adverse effect observed (irritating)[1]
Oral (Rat) LD50: >5000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ACETALDEHYDE	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [***National Toxicology Program: U.S. Dep. of Health & Human Services 2002***]
ACETONE	For acetone: The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitizer, but it removes fat from the skin, and it also irritates the eye. Animal testing shows acetone may cause anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/m3 does not negatively impact an individual's emotional regulation, behaviour, or learning ability.
ALLYL ALCOHOL	Animal studies show that allyl alcohol is broken down in the liver to many products, including acrolein, which is toxic to the liver. Acrolein is also potentially toxic to the heart. Allyl alcohol is slightly irritating to the skin, eyes and lining of the nose. The substance has been harmful to the kidney in rats.
N-BUTANOL	For n-butanol: Acute toxicity: In animal testing, n-butanol (BA) was only slightly toxic, following exposure by swallowing, skin contact or irritation. Animal testing and human experience suggest that n-butanol is moderately irritating to the skin but severely irritating to the eye. Human studies

Continued...

	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	Isopropanol is irritating to the eyes, nose and throat but generally not to the skin. Prolonged high dose exposure may also produce depression of the central nervous system and drowsiness. Few have reported skin irritation. It can be absorbed from the skin or when inhaled.
DI-ISO-PROPYL ETHER	For diisopropyl ether (DIPE): DIPE has low toxicity; high concentrations depress the nervous system, but this is reversible when exposure is 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.
ISO-VALERALDEHYDE	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 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	Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.
METHYL TERT-BUTYL ETHER	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 nervous system. In humans, no symptoms were observed in testing at concentrations of 5mg/m3 for 1 hour. After the introduction of MTBE-blended gasoline in Alaska, there were complaints of headaches, irritation of the eye, nose and throat, cough, nausea, dizziness and spaciness.
PROPIONALDEHYDE	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-BUTANOL & TERT-BUTYL ETHYL ETHER & ISOBUTANOL & ISO-BUTYRALDEHYDE & ISOPROPANOL & ISO-VALERALDEHYDE & METHYL ETHYL KETONE & PROPIONALDEHYDE & 2,2,4-TRIMETHYLPENTANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
ASTM D7423 Calibration Standard - Level 6 & 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 and developmental toxicity, or carcinogenicity.Nephrotoxicity, however, was a concern. The Expert Panel noted the involvement of a2u-globulin in the mechanism for isoparaffin-induced nephrotoxicity/renal tubule cell proliferation in male rats of various strains in oral and inhalation exposure studies. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins 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-PROPYL ETHER & ISO-VALERALDEHYDE & METHANOL & METHYL ETHYL KETONE & PROPIONALDEHYDE & N-PROPANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ALLYL ALCOHOL & BUTYRALDEHYDE & N-BUTANOL & ISOBUTANOL & VALERALDEHYDE & N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
BUTYRALDEHYDE & DIETHYL ETHER & ISO-BUTYRALDEHYDE & VALERALDEHYDE	The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.
BUTYRALDEHYDE & VALERALDEHYDE & PROPIONALDEHYDE	For n-alkyl aldehydes: 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. 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,

Continued...

	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**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Mutagenicity	✘	**Aspiration Hazard**	✔

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

SECTION 12 Ecological information

Toxicity

ASTM D7423 Calibration Standard - Level 6

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

acetaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	96h	Algae or other aquatic plants	236.6mg/L	4
EC50(ECx)	48h	Algae or other aquatic plants	0.02mg/l	4
EC50	48h	Crustacea	39.4-59.1mg/L	4
LC50	96h	Fish	28-34mg/L	4

acetone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
EC50	72h	Algae or other aquatic plants	5600-10000mg/L	4
NOEC(ECx)	12h	Fish	0.001mg/L	4
LC50	96h	Fish	3744.6-5000.7mg/L	4
EC50	48h	Crustacea	6098.4mg/L	5

allyl alcohol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	2.25mg/l	2
EC50(ECx)	96h	Crustacea	0.25mg/l	1
EC50	48h	Crustacea	1.65mg/l	2
LC50	96h	Fish	0.32mg/l	2

butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	7.3mg/l	2
NOEC(ECx)	72h	Algae or other aquatic plants	0.89mg/l	2
EC50	48h	Crustacea	20mg/l	2
LC50	96h	Fish	25.8mg/l	Not Available

n-butanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	225mg/l	2
EC50	72h	Algae or other aquatic plants	>500mg/l	1
NOEC(ECx)	504h	Crustacea	4.1mg/l	2
EC50	48h	Crustacea	>500mg/l	1
LC50	96h	Fish	100-500mg/l	4

tertiary butanol

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.5	7
EC50	72h	Algae or other aquatic plants	>1000mg/l	1
EC50	96h	Algae or other aquatic plants	>976mg/l	2
EC0(ECx)	48h	Crustacea	180mg/l	1
EC50	48h	Crustacea	933mg/l	1

Continued...

	LC50	96h	Fish	>180mg/l	1

2-butanol

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
NOEC(ECx)	24h	Fish	5mg/L	1
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	2993mg/l	2

diethyl ether

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
NOEC(ECx)	504h	Crustacea	100mg/l	2
LC50	96h	Fish	2560mg/l	2
EC50	48h	Crustacea	1378.63mg/L	5

dimethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	154.917mg/l	2
NOEC(ECx)	48h	Crustacea	>4000mg/l	1
EC50	48h	Crustacea	>4400mg/L	2
LC50	96h	Fish	1783.04mg/l	2

tert-butyl ethyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	380.68mg/l	2
NOEC(ECx)	672h	Crustacea	3.39mg/l	2
LC50	96h	Fish	574mg/l	2
EC50	48h	Crustacea	110mg/l	2

ethanol

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
EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
LC50	96h	Fish	42mg/L	4
EC50	48h	Crustacea	2mg/L	4

isobutanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	593mg/l	2
NOEC(ECx)	504h	Crustacea	4mg/L	5
EC50	48h	Crustacea	ca.600mg/l	1
LC50	96h	Fish	901-1000mg/L	4

iso-butyraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48h	Crustacea	50-100mg/l	4
LC50	96h	Fish	23mg/l	2
EC50	72h	Algae or other aquatic plants	83.7mg/l	2
NOEC(ECx)	48h	Crustacea	10mg/l	4

isopropanol

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
EC50(ECx)	24h	Algae or other aquatic plants	0.011mg/L	4
LC50	96h	Fish	>1400mg/L	4
EC50	48h	Crustacea	7550mg/l	4

di-iso-propyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	134.9mg/l	2
NOEC(ECx)	48h	Crustacea	46mg/l	1
EC50	48h	Crustacea	190mg/l	1
LC50	96h	Fish	91.7mg/l	2

Continued...

iso-valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	77.98mg/l	2
EC50	72h	Algae or other aquatic plants	80mg/l	1
EC50	48h	Crustacea	177mg/l	1
EC50(ECx)	96h	Fish	3.25mg/l	2
LC50	96h	Fish	2.98-3.54mg/L	4

methanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
NOEC(ECx)	720h	Fish	0.007mg/L	4
LC50	96h	Fish	290mg/l	2
EC50	48h	Crustacea	>10000mg/l	2

methyl ethyl ketone

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	1220mg/l	2
EC50	96h	Algae or other aquatic plants	>500mg/L	4
NOEC(ECx)	48h	Crustacea	68mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>324mg/L	4

methyl tert-butyl ether

Endpoint	Test 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
NOEC(ECx)	96h	Crustacea	15mg/l	1
EC50	48h	Crustacea	>100mg/l	1
LC50	96h	Fish	187mg/l	1

valeraldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>9.3mg/l	2
NOEC(ECx)	504h	Crustacea	2.5mg/l	2
EC50	48h	Crustacea	31.5mg/l	2
LC50	96h	Fish	11.3-13.6mg/L	4

propionaldehyde

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	40mg/l	1
EC50	72h	Algae or other aquatic plants	58mg/l	1
EC10(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	48h	Crustacea	88.7mg/l	1
LC50	96h	Fish	14mg/l	2

n-propanol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4480mg/L	4
EC50	72h	Algae or other aquatic plants	3200-5600mg/L	4
NOEC(ECx)	504h	Crustacea	68.3mg/l	2
EC50	48h	Crustacea	3339-3977mg/l	4
LC50	96h	Fish	3000-4000mg/L	4

dipropyl ether

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

tert-amyl methyl ether

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>100mg/L	4
LC50	96h	Fish	>100mg/l	2
EC50	48h	Crustacea	100mg/l	2
EC50(ECx)	24h	Crustacea	1.4mg/l	1

2,2,4-trimethylpentane

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	672h	Fish	440-580	7
EC50	48h	Crustacea	0.4mg/l	2

Continued...

	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)

Continued...

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) 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

	

Continued...

Marine Pollutant	
HAZCHEM	3YE

Land transport (ADG)

14.1. **UN number or ID number**	1262
14.2. **UN proper shipping name**	OCTANES
14.3. **Transport hazard class(es)**	Class: 3 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1262
14.2. **UN proper shipping name**	Octanes
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 3 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 3H
14.4. **Packing group**	II
14.5. **Environmental hazard**	Environmentally hazardous
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

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

Continued...

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

Continued...

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
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
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)
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

Continued...

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 ethyl 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

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

Continued...

- 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
- 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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