

SAFETY DATA SHEET

Safety Data Sheet (Conforms to Annex II of REACH (1907/2006) - Regulation 2020/878

Chemwatch Hazard Alert Code: 4

Issue Date: 09.11.2022

Print Date: 09.11.2023

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01360 ADAM HALL SPRAY ADHESIVE

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

1.1. Product Identifier

Product name	ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL
Proper shipping name	AEROSOLS (contains propane)
Other means of identification	UFI:WMJ5-Y2PY-W00U-08MR

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

Chemical Product Category	PC1	Adhesives, sealants
Sectors of Use	SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
	SU3	Industrial uses: Uses of substances as such or in preparations* at industrial sites
Sector of Use - Sub Category	SU19	Building and construction work
Relevant identified uses	Application is by spray atomisation from a hand held aerosol pack	
Uses advised against	Not Applicable	

1.3. Details of the manufacturer or supplier of the safety data sheet

Registered company name	Adam Hall GmbH
Address	Adam-Hall-Str. 1 · 61267 Neu-Anspach · Germany
Telephone	+49 (0) 60 8194 19 - 0
Fax	+49 (0) 60 81 9419 - 1000
Website	adamhall.com

1.4. Emergency telephone number

Association / Organisation	Toxin Information Center, Mainz
Emergency number	+49 (6131) 19240 (24-hour hotline)

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to regulation (EC) No 1272/2008 [CLP] and amendments ^[1]	H336 - Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, H315 - Skin Corrosion/Irritation Category 2, H319 - Serious Eye Damage/Eye Irritation Category 2, H412 - Hazardous to the Aquatic Environment Long-Term Hazard Category 3, H222+H229 - Aerosols Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

2.2. Label elements

Hazard pictogram(s)	 
Signal word	Danger

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2.2. Label elements

H336	May cause drowsiness or dizziness.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H412	Harmful to aquatic life with long lasting effects.
H222+H229	Extremely flammable aerosol. Pressurized container: may burst if heated.

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P271	Use only outdoors or in a well-ventilated area.
P261	Avoid breathing gas
P273	Avoid release to the environment.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

P405	Store locked up.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

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

Inhalation may produce health damage*.

Cumulative effects may result following exposure*.

May produce discomfort of the respiratory system and skin*.

Acetone	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	Listed in the Europe Regulation (EU) 2018/1881 Specific Requirements for Endocrine Disruptors
Butane	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
Propane	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)
Iso-Butane	Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply)

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SECTION 3: Composition / information on ingredients

3.1. Substances

See Composition on ingredients' in Section 3.2

3.2. Mixtures

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classification according to regulation (EC) No 1272/2008 [CLP] and amendments	SCL / M-Factor	Nanoform Particle Characteristics
1.67-64-1 2.200-662-2 3.606-001-00-8 4.01- 2119471330-49-XXXX	20-40	acetone *	Flammable Liquids Category 2, Serious Eye Damage/Eye Irritation Category 2, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3; H225, H319, H336 [2]	N.A.	N.A.
1.64742-49-0.* 2.921-024-6 3.649-328-00-1 4.01- 2119486291-36-XXXX	10-30	Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane [e]	Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Long-Term Hazard Category 2, Flammable Liquids Category 2, Skin Corrosion/Irritation Category 2, Aspiration Hazard Category 1; H336, H411, H225, H315, H304 [1]	0	N.A.
1.106-97-8. 2.203-448-7 3.601-004-00-0601-004-01-8 4.01- 2119474691-32-XXXX	10-30	butane	Flammable Gases Category 1A, Gases Under Pressure (Liquefied Gas); H220, H280, EUH044 [1]	N.A.	N.A.
1.74-98-6 2.200-827-9 3.601-003-00-5 4.01- 2119486944- 21-XXXX	20-40	propane	Flammable Gases Category 1, Gases Under Pressure; H220, H280 [2]	N.A.	N.A.
1.75-28-5. 2.200-857-2 3.601-004-00-0601-004-01-8 4.01- 2119485395- 27-XXXX	5-10	iso-butane	Flammable Gases Category 1A, Gases Under Pressure (Liquefied Gas); H220, H280, EUH044 [1]	N.A.	Not Available

Legend: 1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; * EU IOELVs available; [e] Substance identified as having endocrine disrupting properties.

SECTION 4: First aid measures

4.1. Description of first aid measures

Eye Contact	<ul style="list-style-type: none">Immediately hold the eyelids apart and flush the eye continuously for at least 15 minutes 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.Transport to hospital or doctor without delay.Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<ul style="list-style-type: none">Flush skin and hair with running water (and soap if available).Remove any adhering solids with industrial skin cleansing cream.DO NOT use solvents.Seek medical attention in the event of irritation.
Inhalation	<ul style="list-style-type: none">Remove to fresh air.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.If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.Transport to hospital, or doctor.
Ingestion	<ul style="list-style-type: none">Immediately give a glass of water.First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomit.

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4.2. Most important symptoms and effects, both acute and delayed

See Section 11

4.3. Indication of any immediate medical attention and special treatment needed

For petroleum distillates

- In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption - decontamination (induced emesis or lavage) is controversial and should be considered on the merits of each individual case; of course the usual precautions of an endotracheal tube should be considered prior to lavage, to prevent aspiration.
- Individuals intoxicated by petroleum distillates should be hospitalized immediately, with acute and continuing attention to neurologic and cardiopulmonary function.
- Positive pressure ventilation may be necessary.
- Acute central nervous system signs and symptoms may result from large ingestions of aspiration-induced hypoxia.
- After the initial episode, individuals should be followed for changes in blood variables and the delayed appearance of pulmonary oedema and chemical pneumonitis. Such patients should be followed for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated.
- Gastrointestinal symptoms are usually minor and pathological changes of the liver and kidneys are reported to be uncommon in acute intoxications.
- Chlorinated and non-chlorinated hydrocarbons may sensitize the heart to epinephrine and other circulating catecholamines so that arrhythmias may occur. Careful consideration of this potential adverse effect should precede administration of epinephrine or other cardiac stimulants and the selection of bronchodilators. BP America Product Safety & Toxicology Department.

Treat symptomatically.

For simple ketones:

Basic Treatment	Advanced Treatment	Emergency Department
<ul style="list-style-type: none">Establish a patent airway with suction where necessary.Watch for signs of respiratory insufficiency and assist ventilation as necessary.Administer oxygen by non-rebreather mask at 10 to 15 l/min.Monitor and treat, where necessary, for pulmonary oedema.Monitor and treat, where necessary, for shock.DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5mL/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.Give activated charcoal.	<ul style="list-style-type: none">Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.Consider intubation at first sign of upper airway obstruction resulting from oedema.Positive-pressure ventilation using a bag-valve mask might be of use.Monitor and treat, where necessary, for arrhythmias.Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.Drug therapy should be considered for pulmonary oedema.Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.Treat seizures with diazepam.Proparacaine hydrochloride should be used to assist eye irrigation.	<ul style="list-style-type: none">Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5: Firefighting measures

5.1. Extinguishing media

	SMALL FIRE	LARGE FIRE
Alcohol stable foam		
Dry chemical powder	x	
BCF (where regulations permit)		
Carbon dioxide	x	
Water spray or fog - Large fires only	x	x

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5.2. 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.
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5.3. Advice for firefighters

Fire Fighting	
Fire/Explosion Hazard	Carbon dioxide (CO2), other pyrolysis products typical of burning organic material.Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions. BEWARE: Empty solvent, paint, lacquer and flammable liquid drums present a severe explosion hazard if cut by flame torch or welded. Even when thoroughly cleaned or reconditioned the drum seams may retain sufficient solvent to generate an explosive atmosphere in the drum. WARNING: Aerosol containers may present pressure related hazards.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See Section 8

6.2. Environmental precautions

See Section 12

6.3. Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none">Clean up all spills immediately.Avoid breathing vapours and contact with skin and eyes.Wear protective clothing, impervious gloves and safety glasses.Shut off all possible sources of ignition and increase ventilation.Wipe up.If safe, damaged cans should be placed in a container outdoors, away from all ignition sources, until pressure has dissipated.Undamaged cans should be gathered and stowed safely.
Major Spills	<ul style="list-style-type: none">Clear area of personnel and move upwind.Alert Fire Brigade and tell them location and nature of hazard.May be violently or explosively reactive.Wear breathing apparatus plus protective gloves.Prevent, by any means available, spillage from entering drains or water coursesNo smoking, naked lights or ignition sources.Increase ventilation.Stop leak if safe to do so.Water spray or fog may be used to disperse / absorb vapour.Absorb or cover spill with sand, earth, inert materials or vermiculite.If safe, damaged cans should be placed in a container outdoors, away from ignition sources, until pressure has dissipated.Undamaged cans should be gathered and stowed safely.Collect residues and seal in labelled drums for disposal.

6.4. Reference to other sections

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

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe handling	<p>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. Radon and its radioactive decay products are hazardous if inhaled or ingested.</p> <ul style="list-style-type: none">▪ 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 enter confined spaces until atmosphere has been checked.▪ Avoid smoking, naked lights or ignition sources.▪ Avoid contact with incompatible materials.▪ When handling, DO NOT eat, drink or smoke.▪ DO NOT incinerate or puncture aerosol cans.▪ DO NOT spray directly on humans, exposed food or food utensils.▪ Avoid physical damage to containers.▪ Always wash hands with soap and water after handling.▪ Work clothes should be laundered separately.▪ Use good occupational work practice.▪ Observe manufacturer's storage and handling recommendations contained within this SDS.▪ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Fire and explosion protection	See section 5
Other information	

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none">▪ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.▪ For materials with a viscosity of at least 2680 cSt. (23 deg. C)▪ For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)▪ Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C): (i) Removable head packaging; (ii) Cans with friction closures and (iii) low pressure tubes and cartridges may be used.▪ Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages▪ In addition, where inner packagings are glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.▪ Aerosol dispenser.▪ Check that containers are clearly labelled.
Storage incompatibility	<p>Low molecular weight alkanes:</p> <ul style="list-style-type: none">▪ May react violently with strong oxidisers, chlorine, chlorine dioxide, dioxygenyl tetrafluoroborate.▪ May react with oxidising materials, nickel carbonyl in the presence of oxygen, heat.▪ Are incompatible with nitronium tetrafluoroborate(1-), halogens and interhalogens▪ may generate electrostatic charges, due to low conductivity, on flow or agitation.▪ Avoid flame and ignition sources <p>Redox reactions of alkanes, in particular with oxygen and the halogens, are possible as the carbon atoms are in a strongly reduced condition. Reaction with oxygen (if present in sufficient quantity to satisfy the reaction stoichiometry) leads to combustion without any smoke, producing carbon dioxide and water. Free radical halogenation reactions occur with halogens, leading to the production of haloalkanes. In addition, alkanes have been shown to interact with, and bind to, certain transition metal complexes Interaction between chlorine and ethane over activated carbon at 350 deg C has caused explosions, but added carbon dioxide reduces the risk. The violent interaction of liquid chlorine injected into ethane at 80 deg C/10 bar becomes very violent if ethylene is also present A mixture prepared at -196 deg C with either methane or ethane exploded when the temp was raised to -78 deg C. Addition of nickel carbonyl to an n-butane-oxygen mixture causes an explosion at 20-40 deg C. Alkanes will react with steam in the presence of a nickel catalyst to give hydrogen.</p>

VERSION: 4.5

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Storage incompatibility

Acetone:

- may react violently with chloroform, activated charcoal, aliphatic amines, bromine, bromine trifluoride, chlorotriazine, chromic(IV) acid, chromic(VI) acid, chromium trioxide, chromyl chloride, hexachloromelamine, iodine heptafluoride, iodoform, liquid oxygen, nitrosyl chloride, nitrosyl perchlorate, nitryl perchlorate, perchloromelamine, peroxomonosulfuric acid, platinum, potassium tert-butoxide, strong acids, sulfur dichloride, trichloromelamine, xenon tetrafluoride
- reacts violently with bromoform and chloroform in the presence of alkalis or in contact with alkaline surfaces.
- may form unstable and explosive peroxides in contact with strong oxidisers, fluorine, hydrogen peroxide (90%), sodium perchlorate, 2-methyl-1,3-butadiene
- can increase the explosive sensitivity of nitromethane on contact flow or agitation may generate electrostatic charges due to low conductivity
- dissolves or attacks most rubber, resins, and plastics (polyethylenes, polyester, vinyl ester, PVC, Neoprene, Viton)
- Butane/ isobutane
- reacts violently with strong oxidisers
- reacts with acetylene, halogens and nitrous oxides
- is incompatible with chlorine dioxide, conc. nitric acid and some plastics
- may generate electrostatic charges, due to low conductivity, in flow or when agitated - these may ignite the vapour. Segregate from nickel carbonyl in the presence of oxygen, heat (20-40 C)

Ketones in this group:

- are reactive with many acids and bases liberating heat and flammable gases (e.g., H₂).
- react with reducing agents such as hydrides, alkali metals, and nitrides to produce flammable gas (H₂) and heat.
- are incompatible with isocyanates, aldehydes, cyanides, peroxides, and anhydrides.
- react violently with aldehydes, HNO₃ (nitric acid), HNO₃ + H₂O₂ (mixture of nitric acid and hydrogen peroxide), and HClO₄ (perchloric acid).
- may react with hydrogen peroxide to form unstable peroxides; many are heat- and shock-sensitive explosives. A significant property of most ketones is that the hydrogen atoms on the carbons next to the carbonyl group are relatively acidic when compared to hydrogen atoms in typical hydrocarbons. Under strongly basic conditions these hydrogen atoms may be abstracted to form an enolate anion. This property allows ketones, especially methyl ketones, to participate in condensation reactions with other ketones and aldehydes. This type of condensation reaction is favoured by high substrate concentrations and high pH (greater than 1 wt% NaOH).

Propane:

- reacts violently with strong oxidisers, barium peroxide, chlorine dioxide, dichlorine oxide, fluorine etc.
- liquid attacks some plastics, rubber and coatings
- may accumulate static charges which may ignite its vapours
- Avoid reaction with oxidising agents

7.3. Specific end use(s)

See section 1.2

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
acetone	Dermal 186 mg/kg bw/day (Systemic, Chronic) Inhalation 1 210 mg/m ³ (Systemic, Chronic) Inhalation 2 420 mg/m ³ (Local, Acute) Dermal 62 mg/kg bw/day (Systemic, Chronic) * Inhalation 200 mg/m ³ (Systemic, Chronic) * Oral 62 mg/kg bw/day (Systemic, Chronic) *	10.6 mg/L (Water (Fresh)) 1.06 mg/L (Water - Intermittent release) 21 mg/L (Water (Marine)) 30.4 mg/kg sediment dw (Sediment (Fresh Water)) 3.04 mg/kg sediment dw (Sediment (Marine)) 29.5 mg/kg soil dw (Soil) 100 mg/L (STP)
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	Dermal 13 964 mg/kg bw/day (Systemic, Chronic) Inhalation 2 085 mg/m ³ (Systemic, Chronic) Inhalation 837.5 mg/m ³ (Local, Chronic) Inhalation 1 286.4 mg/m ³ (Systemic, Acute) Inhalation 1 066.67 mg/m ³ (Local, Acute) Dermal 1 377 mg/kg bw/day (Systemic, Chronic) * Inhalation 1 131 mg/m ³ (Systemic, Chronic) * Oral 1 301 mg/kg bw/day (Systemic, Chronic) * Inhalation 178.57 mg/m ³ (Local, Chronic) * Inhalation 1 152 mg/m ³ (Systemic, Acute) * Inhalation 640 mg/m ³ (Local, Acute) *	Not Available

* Values for General Population

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Ingredient Data

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Germany TRGS 900 - Limit Values for the Workplace Atmosphere	acetone	Aceton	500 ppm / 1200 mg/m ³	Not Available	N.A.	N.A.
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	acetone	Aceton	500 ppm / 1210 mg/m ³	Not Available	N.A.	N.A.
Germany Recommended Exposure Limits - MAK Values	acetone	Aceton	500 ppm / 1200 mg/m ³	2400 mg/m ³ / 1000 ppm	N.A.	see section XII; Preg gr: B; prerequisite for Group C see documentation
Germany TRGS 900 - Limit Values for the Workplace Atmosphere	butane	Butan	1000 ppm / 2400 mg/m ³	Not Available	N.A.	N.A.
Germany Recommended Exposure Limits - MAK Values	butane	Butane (both isomers) - n-Butane	1000 ppm / 2400 mg/m ³	9600 mg/m ³ / 4000 ppm	N.A.	Preg gr: D
Germany TRGS 900 - Limit Values for the Workplace Atmosphere	propane	Propan	1000 ppm / 1800 mg/m ³	Not Available	N.A.	N.A.
Germany Recommended Exposure Limits - MAK Values	propane	Propane	1000 ppm / 1800 mg/m ³	7200 mg/m ³ / 4000 ppm	N.A.	Preg gr: D
Germany TRGS 900 - Limit Values for the Workplace Atmosphere	iso-butane	Isobutan	1000 ppm / 2400 mg/m ³	Not Available	N.A.	N.A.
Germany Recommended Exposure Limits - MAK Values	iso-butane	Butane (both isomers) - Isobutane	1000 ppm / 2400 mg/m ³	9600 mg/m ³ / 4000 ppm	N.A.	Preg gr: D

* Occupational Exposure Limits (OEL)

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3	Original IDLH	Revised IDLH
acetone	N.A.	N.A.	N.A.	2,500 ppm	N.A.
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	1,000 mg/m ³	11,000 mg/m ³	66,000 mg/m ³	N.A.	N.A.
butane	N.A.	N.A.	N.A.	N.A.	1,600 ppm
propane	N.A.	N.A.	N.A.	2,100 ppm	N.A.
iso-butane	5500* ppm	17000** ppm	53000*** ppm	N.A.	N.A.

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	E	≤ 0.1 ppm

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

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8.2. Exposure controls

8.2.1. Appropriate engineering controls	<p>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.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard „physically“ away from the worker and ventilation that strategically „adds“ and „removes“ air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. General exhaust is adequate under normal conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying „escape“ velocities which, in turn, determine the „capture velocities“ of fresh circulating air required to effectively remove the contaminant.</p>	
	Type of Contaminant:	Speed:
	aerosols, (released at low velocity into zone of active generation)	0.5-1 m/s
	direct spray, spray painting in shallow booths, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
	Within each range the appropriate value depends on:	
	Lower end of the range	Upper end of the range
	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
	2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
	3: Intermittent, low production.	3: High production, heavy use
	4: Large hood or large air mass in motion	4: Small hood-local control only
8.2.2. Personal protection	<p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	
	    	
Eye and face protection	<ul style="list-style-type: none"> Safety glasses with side shields. Chemical goggles. Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent] 	
Skin protection	See Hand protection below	
Hands/feet protection	<p>No special equipment needed when handling small quantities.</p> <p>OTHERWISE:</p> <ul style="list-style-type: none"> For potentially moderate exposures: Wear general protective gloves, eg. light weight rubber gloves. For potentially heavy exposures: Wear chemical protective gloves, eg. PVC. and safety footwear. 	
Body protection	See Other protection below	
Other protection	<p>No special equipment needed when handling small quantities.</p> <p>OTHERWISE:</p> <ul style="list-style-type: none"> Overalls. Skin cleansing cream. Eyewash unit. Do not spray on hot surfaces. 	

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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: ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL

Material	CPI
BUTYL	A
BUTYL/NEOPRENE	A
PE/EVAL/PE	A
PVDC/PE/PVDC	A
SARANEX-23 2-PLY	B
TEFLON	B
CPE	C
HYPALON	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
SARANEX-23	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.

Respiratory protection

Type AX 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	Air-line*	AX-2	AX-PAPR-2 ^
up to 20 x ES	-	AX-3	-
20+ x ES	-	Air-line**	-

* - Continuous-flow; ** - Continuous-flow or positive pressure demand

^ - 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 C)

- 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
- Generally not applicable.

Aerosols, in common with most vapours/ mists, should never be used in confined spaces without adequate ventilation. Aerosols, containing agents designed to enhance or mask smell, have triggered allergic reactions in predisposed individuals. 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	AX-AUS / Class 1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+		-	Airline**

** - 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 = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 deg C)

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8.2.3. Environmental exposure controls

See section 12

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Coloured	Relative density (Water = 1)	0.8
Physical state	Dissolved Gas	Partition coefficient n-octanol/ water	N.A.
Odour	N.A.	Auto-ignition temperature (°C)	N.A.
Odour threshold	N.A.	Decomposition temperature (°C)	N.A.
pH (as supplied)	N.A.	Viscosity (cSt)	>20.5 @ 40C
Melting point / freezing point (°C)	N.A.	Molecular weight (g/mol)	N.A.
Initial boiling point and boiling range (°C)	55	Taste	N.A.
Flash point (°C)	-17	Explosive properties	N.A.
Evaporation rate	N.A.	Oxidising properties	N.A.
Flammability	Highly Flammable	Surface Tension (dyn/cm or mN/m)	N.A.
Upper Explosive Limit (%)	N.A.	Volatile Component (%vol)	N.A.
Lower Explosive Limit (%)	N.A.	Gas group	N.A.
Vapour pressure (kPa)	N.A.	pH as a solution (1%)	N.A.
Solubility in water	Immiscible	VOC g/L	580.00
Vapour density (Air = 1)	N.A.	Nanoform Particle Characteristics	N.A.
Nanoform Solubility	N.A.		
Particle Size	N.A.		

9.2. Other information

Not Available

SECTION 10: Stability and reactivity

10.1.Reactivity	See section 7.2
10.2. Chemical stability	<ul style="list-style-type: none">Elevated temperatures.Presence of open flame.Product is considered stable.Hazardous polymerisation will not occur.
10.3. Possibility of hazardous reactions	See section 7.2
10.4. Conditions to avoid	See section 7.2
10.5. Incompatible materials	See section 7.2
10.6. Hazardous decomposition products	See section 5.3

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Inhaled	<p>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. Isobutane produces a dose dependent action and at high concentrations may cause numbness, suffocation, exhilaration, dizziness, headache, nausea, confusion, in-coordination and unconsciousness in severe cases. The paraffin gases are practically not harmful at low doses. Higher doses may produce reversible brain and nerve depression and irritation. The vapour is discomforting.</p> <p>WARNING: Intentional misuse by concentrating/inhaling contents may be lethal.</p> <p>Inhaling high concentrations of mixed hydrocarbons can cause narcosis, with nausea, vomiting and lightheadedness. Low molecular weight (C2-C12) hydrocarbons can irritate mucous membranes and cause incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowsiness, tremors and stupor. 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. 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 in-co-ordination. 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 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. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p>
Ingestion	<p>The material has NOT been classified by EC Directives or other classification systems as „harmful by ingestion“. This is because of the lack of corroborating animal or human evidence. Isoparaffinic hydrocarbons cause temporary lethargy, weakness, inco-ordination and diarrhoea. Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) Chronic inhalation or skin exposure to n-hexane may cause damage to nerve ends in extremities, e.g. finger, toes with loss of sensation.</p>
Skin Contact	<p>The material may accentuate any pre-existing dermatitis condition. Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Skin exposure to isoparaffins may produce slight to moderate irritation in animals and humans. Rare sensitisation reactions in humans have occurred. Spray mist may produce discomfort. 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. There is some evidence to suggest that the material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.</p>
Eye	<p>Instillation of isoparaffins into rabbit eyes produces only slight irritation. Direct eye contact with petroleum hydrocarbons can be painful, and the corneal epithelium may be temporarily damaged. Aromatic species can cause irritation and excessive tear secretion. The liquid may produce eye discomfort and is capable of causing temporary impairment of vision and/or transient eye inflammation, ulceration. There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.</p>
Chronic	<p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. Constant or exposure over long periods to mixed hydrocarbons may produce stupor with dizziness, weakness and visual disturbance, weight loss and anaemia, and reduced liver and kidney function. Skin exposure may result in drying and cracking and redness of the skin. Workers exposed to acetone for long periods showed inflammation of the airways, stomach and small bowel, attacks of giddiness and loss of strength. Exposure to acetone may enhance the liver toxicity of chlorinated solvents. Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS]</p>

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ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL	TOXICITY	IRRITATION
	N.A.	N.A.
acetone	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 20000 mg/kg[2]	Eye (human): 500 ppm - irritant
	Inhalation(Mouse) LC50: 44 mg/L4h[2]	Eye (rabbit): 20mg/24hr - moderate
	Oral (Rat) LD50: 5800 mg/kg[2]	Eye (rabbit): 3.95 mg - SEVERE
		Eye: adverse effect observed (irritating)[1]
		Skin (rabbit): 500 mg/24hr - mild
		Skin (rabbit): 395mg (open) - mild
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >1900 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation(Rat) LC50: >4.42 mg/L4h[1]	Skin: adverse effect observed (irritating)[1]
butane	TOXICITY	IRRITATION
	Oral (Rat) LD50: >2000 mg/kg[1]	
propane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50: 658 mg/L4h[2]	N.A.
iso-butane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50: >13023 ppm4h[1]	N.A.
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	

ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
ACETONE	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.
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	<p>For Low Boiling Point Naphthas (LBPNs):</p> <p>Acute toxicity: LBPNs generally have low acute toxicity by the oral (median lethal dose [LD50] in rats > 2000 mg/kg-bw), inhalation (LD50 in rats > 5000 mg/m3) and dermal (LD50 in rabbits > 2000 mg/kg-bw) routes of exposure. Most LBPNs are mild to moderate eye and skin irritants in rabbits, with the exception of heavy catalytic cracked and heavy catalytic reformed naphthas, which have higher primary skin irritation indices.</p> <p>Sensitisation: LBPNs do not appear to be skin sensitizers, but a poor response in the positive control was also noted in these studies</p> <p>Repeat dose toxicity: The lowest-observed-adverse-effect concentration (LOAEC) and lowest-observed-adverse-effect level (LOAEL) values identified following short-term (2-89 days) and subchronic (greater than 90 days) exposure to the LBPN substances. These values were determined for a variety of endpoints after considering the toxicity data for all LBPNs in the group. Most of the studies were carried out by the inhalation route of exposure. Renal effects, including increased kidney weight, renal lesions (renal tubule dilation, necrosis) and hyaline droplet formation, observed in male rats exposed orally or by inhalation to most LBPNs, were considered species- and sex-specific. These effects were determined to be due to a mechanism of action not relevant to humans -specifically, the interaction between hydrocarbon metabolites and alpha-2-microglobulin, an enzyme not produced in substantial amounts in female rats, mice and other species, including humans. The resulting nephrotoxicity and subsequent carcinogenesis in male rats were therefore not considered in deriving LOAEC/LOAEL values. Only a limited number of studies of short-term and subchronic duration were identified for site-restricted LBPNs. The lowest LOAEC identified in these studies, via the inhalation route, is 5475 mg/m3, based on a concentration-related increase in liver weight in both male and female rats following a 13-week exposure to light catalytic cracked naphtha. Shorter exposures of rats to this test substance resulted in nasal irritation at 9041 mg/m3. No systemic toxicity was reported following dermal exposure to light catalytic cracked naphtha, but skin irritation and accompanying histopathological changes were increased, in a dose-dependent manner, at doses as low as 30 mg/kg-bw per day when applied 5 days per week for 90 days in rats. No non-cancer chronic toxicity studies (= 1 year) were identified for site-restricted LBPNs and very few non-cancer chronic toxicity studies were identified for other LBPNs. An LOAEC of 200 mg/m3 was noted in a chronic inhalation study that exposed mice and rats to unleaded gasoline (containing 2% benzene). This inhalation LOAEC was based on ocular discharge and ocular irritation in rats. At the higher concentration of 6170 mg/m3, increased kidney weight was observed in male and female rats (increased kidney weight was also observed in males only at 870 mg/m3). Furthermore, decreased body weight in male and female mice was also observed at 6170 mg/m3. A LOAEL of 714 mg/kg-bw was identified for dermal exposure based on local skin effects (inflammatory and degenerative skin changes) in mice following application of naphtha for 105 weeks. No systemic toxicity was reported.</p>

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Hydrocarbons, C6-C7,
n-alkanes, isoalkanes,
cyclics, <5% n-hexane

Genotoxicity: Although few genotoxicity studies were identified for the site-restricted LBPNS, the genotoxicity of several other LBPNS substances has been evaluated using a variety of in vivo and in vitro assays. While in vivo genotoxicity assays were negative overall, the in vitro tests exhibited mixed results. For in vivo genotoxicity tests, LBPNS exhibited negative results for chromosomal aberrations and micronuclei induction, but exhibited positive results in one sister chromatid exchange assay although this result was not considered definitive for clastogenic activity as no genetic material was unbalanced or lost. Mixtures that were tested, which included a number of light naphthas, displayed mixed results (i.e., both positive and negative for the same assay) for chromosomal aberrations and negative results for the dominant lethal mutation assay. Unleaded gasoline (containing 2% benzene) was tested for its ability to induce unscheduled deoxyribonucleic acid (DNA) synthesis (UDS) and replicative DNA synthesis (RDS) in rodent hepatocytes and kidney cells. UDS and RDS were induced in mouse hepatocytes via oral exposure and RDS was induced in rat kidney cells via oral and inhalation exposure. Unleaded gasoline (benzene content not stated) exhibited negative results for chromosomal aberrations and the dominant lethal mutation assay and mixed results for atypical cell foci in rodent renal and hepatic cells. For in vitro genotoxicity studies, LBPNS were negative for six out of seven Ames tests, and were also negative for UDS and for forward mutations LBPNS exhibited mixed or equivocal results for the mouse lymphoma and sister chromatid exchange assays, as well as for cell transformation and positive results for one bacterial DNA repair assay. Mixtures that were tested, which included a number of light naphthas, displayed negative results for the Ames and mouse lymphoma assays Gasoline exhibited negative results for the Ames test battery, the sister chromatid exchange assay and for one mutagenicity assay. Mixed results were observed for UDS and the mouse lymphoma assay. While the majority of in vivo genotoxicity results for LBPNS substances are negative, the potential for genotoxicity of LBPNS as a group cannot be discounted based on the mixed in vitro genotoxicity results.

Carcinogenicity: Although a number of epidemiological studies have reported increases in the incidence of a variety of cancers, the majority of these studies are considered to contain incomplete or inadequate information. Limited data, however, are available for skin cancer and leukemia incidence, as well as mortality among petroleum refinery workers. It was concluded that there is limited evidence supporting the view that working in petroleum refineries entails a carcinogenic risk (Group 2A carcinogen). IARC (1989a) also classified gasoline as a Group 2B carcinogen; it considered the evidence for carcinogenicity in humans from gasoline to be inadequate and noted that published epidemiological studies had several limitations, including a lack of exposure data and the fact that it was not possible to separate the effects of combustion products from those of gasoline itself. Similar conclusions were drawn from other reviews of epidemiological studies for gasoline (US EPA 1987a, 1987b). Thus, the evidence gathered from these epidemiological studies is considered to be inadequate to conclude on the effects of human exposure to LBPNS substances. No inhalation studies assessing the carcinogenicity of the site-restricted LBPNS were identified. Only unleaded gasoline has been examined for its carcinogenic potential, in several inhalation studies. In one study, rats and mice were exposed to 0, 200, 870 or 6170 mg/m³ of a 2% benzene formulation of the test substance, via inhalation, for approximately 2 years. A statistically significant increase in hepatocellular adenomas and carcinomas, as well as a non-statistical increase in renal tumours, were observed at the highest dose in female mice. A dose-dependent increase in the incidence of primary renal neoplasms was also detected in male rats, but this was not considered to be relevant to humans, as discussed previously. Carcinogenicity was also assessed for unleaded gasoline, via inhalation, as part of initiation/promotion studies. In these studies, unleaded gasoline did not appear to initiate tumour formation, but did show renal cell and hepatic tumour promotion ability, when rats and mice were exposed, via inhalation, for durations ranging from 13 weeks to approximately 1 year using an initiation/promotion protocol. However, further examination of data relevant to the composition of unleaded gasoline demonstrated that this is a highly-regulated substance; it is expected to contain a lower percentage of benzene and has a discrete component profile when compared to other substances in the LBPNS group. Both the European Commission and the International Agency for Research on Cancer (IARC) have classified LBPNS substances as carcinogenic. All of these substances were classified by the European Commission (2008) as Category 2 (R45: may cause cancer) (benzene content = 0.1% by weight). IARC has classified gasoline, an LBPNS, as a Group 2B carcinogen (possibly carcinogenic to humans) and "occupational exposures in petroleum refining" as Group 2A carcinogens (probably carcinogenic to humans). Several studies were conducted on experimental animals to investigate the dermal carcinogenicity of LBPNS. The majority of these studies were conducted through exposure of mice to doses ranging from 694-1351 mg/kg-bw, for durations ranging from 1 year to the animals lifetime or until a tumour persisted for 2 weeks. Given the route of exposure, the studies specifically examined the formation of skin tumours. Results for carcinogenicity via dermal exposure are mixed. Both malignant and benign skin tumours were induced with heavy catalytic cracked naphtha, light catalytic cracked naphtha, light straight-run naphtha and naphtha. Significant increases in squamous cell carcinomas were also observed when mice were dermally treated with Stoddard solvent, but the latter was administered as a mixture (90% test substance), and the details of the study were not available. In contrast, insignificant increases in tumour formation or no tumours were observed when light alkylate naphtha, heavy catalytic reformed naphtha, sweetened naphtha, light catalytically cracked naphtha or unleaded gasoline was dermally applied to mice. Negative results for skin tumours were also observed in male mice dermally exposed to sweetened naphtha using an initiation/promotion protocol. Reproductive/ Developmental toxicity: No reproductive or developmental toxicity was observed for the majority of LBPNS substances evaluated. Most of these studies were carried out by inhalation exposure in rodents. NOAEC values for reproductive toxicity following inhalation exposure ranged from 1701 mg/m³ (CAS RN 8052-41-3) to 27 687 mg/m³ (CAS RN 64741-63-5) for the LBPNS group evaluated, and from 7690 mg/m³ to 27 059 mg/m³ for the site-restricted light catalytic cracked and full-range catalytic reformed naphthas. However, a decreased number of pups per litter and higher frequency of post-implantation loss were observed following inhalation exposure of female rats to hydrotreated heavy naphtha (CAS RN 64742-48-9) at a concentration of 4679 mg/m³, 6 hours per day, from gestational days 7-20. For dermal exposures, NOAEL values of 714 mg/kg-bw (CAS RN 8030-30-6) and 1000 mg/kg-bw per day (CAS RN 68513-02-0) were noted. For oral exposures, no adverse effects on reproductive parameters were reported when rats were given site-restricted light catalytic cracked naphtha at 2000 mg/kg on gestational day 13. For most LBPNS, no treatment-related developmental effects were observed by the different routes of exposure. However, developmental toxicity was observed for a few naphthas. Decreased foetal body weight and an increased incidence of ossification variations were observed when rat dams were exposed to light aromatized solvent naphtha, by gavage, at 1250 mg/kg-bw per day. In addition, pregnant rats exposed by inhalation to hydrotreated heavy naphtha at 4679 mg/m³ delivered pups with higher birth weights. Cognitive and memory impairments were also observed in the offspring. Low Boiling Point Naphthas [Site-Restricted] For petroleum: This product contains benzene, which can cause acute myeloid leukaemia, and n-hexane, which can be metabolized to

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Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	compounds which are toxic to the nervous system. This product contains toluene, and animal studies suggest high concentrations of toluene lead to hearing loss. This product contains ethyl benzene and naphthalene, from which animal testing shows evidence of tumour formation. Cancer-causing potential: Animal testing shows inhaling petroleum causes tumours of the liver and kidney; these are however not considered to be relevant in humans. Mutation-causing potential: Most studies involving gasoline have returned negative results regarding the potential to cause mutations, including all recent studies in living human subjects (such as in petrol service station attendants). Reproductive toxicity: Animal studies show that high concentrations of toluene (>0.1%) can cause developmental effects such as lower birth weight and developmental toxicity to the nervous system of the foetus. Other studies show no adverse effects on the foetus. Human effects: Prolonged or repeated contact may cause defatting of the skin which can lead to skin inflammation and may make the skin more susceptible to irritation and penetration by other materials. Animal testing shows that exposure to gasoline over a lifetime can cause kidney cancer, but the relevance in humans is questionable.
PROPANE	No significant acute toxicological data identified in literature search.
ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL & Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	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. The gut cell may play a major role in determining the proportion of hydrocarbon that becomes available to be deposited unchanged in peripheral tissues such as in the body fat stores or the liver.
ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL & 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 macrocytic anaemia. Studies in humans have shown that exposure to acetone at a level of 2375 mg/cubic metre has not caused neurobehavioural deficits.

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

11.2 Information on other hazards

11.2.1. Endocrine Disruption Properties

Many chemicals may mimic or interfere with the body's hormones, known as the endocrine system. Endocrine disruptors are chemicals that can interfere with endocrine (or hormonal) systems. Endocrine disruptors interfere with the synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body. Any system in the body controlled by hormones can be derailed by hormone disruptors. Specifically, endocrine disruptors may be associated with the development of learning disabilities, deformations of the body various cancers and sexual development problems. Endocrine disrupting chemicals cause adverse effects in animals. But limited scientific information exists on potential health problems in humans. Because people are typically exposed to multiple endocrine disruptors at the same time, assessing public health effects is difficult.

11.2.2. Other Information

See section 11.1

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SECTION 12: Ecological information

12.1. Toxicity

ADAM HALL - SPRAY ADHESIVE ADVANCED TECHNOLOGY AEROSOL	Endpoint	Test Duration (hr)	Species	Value	Source
	N.A.	N.A.	N.A.	N.A.	N.A.
acetone	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	12h	Fish	0.001mg/L	4
	EC50	48h	Crustacea	6098.4mg/L	5
	LC50	96h	Fish	3744.6-5000.7mg/L	4
	EC50	96h	Algae or other aquatic plants	9.873-27.684mg/l	4
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	504h	Crustacea	0.17mg/l	2
	EC50	48h	Crustacea	0.64mg/l	2
	LC50	96h	Fish	4.26mg/l	2
	EC50	96h	Algae or other aquatic plants	64mg/l	2
butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2
propane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
iso-butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
Legend:	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
Legend:	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2

Harmful 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.

For petroleum distillates:

Environmental fate: When petroleum substances are released into the environment, four major fate processes will take place: dissolution in water, volatilization, biodegradation and adsorption. These processes will cause changes in the composition of these UVCB substances. In the case of spills on land or water surfaces, photodegradation-another fate process-can also be significant. As noted previously, the solubility and vapour pressure of components within a mixture will differ from those of the component alone. These interactions are complex for complex UVCBs such as petroleum hydrocarbons. Each of the fate processes affects hydrocarbon families differently. Aromatics tend to be more water-soluble than aliphatics of the same carbon number, whereas aliphatics tend to be more volatile. Thus, when a petroleum mixture is released into the environment, the principal water contaminants are likely to be aromatics, whereas aliphatics will be the principal air contaminants. The trend in volatility by component class is as follows: alkenes = alkanes > aromatics = cycloalkanes. The most soluble and volatile components have the lowest molecular weight; thus there is a general shift to higher molecular weight components in residual materials.

Biodegradation: Biodegradation is almost always operative when petroleum mixtures are released into the environment. It has been widely demonstrated that nearly all soils and sediments have populations of bacteria and other organisms capable of degrading petroleum hydrocarbons. Degradation occurs both in the presence and absence of oxygen. Two key factors that determine degradation rates are oxygen supply and molecular structure. In general, degradation is more rapid under aerobic conditions. Decreasing trends in degradation rates according to structure are as follows:

- (1) n-alkanes, especially in the C10-C25 range, which are degraded readily;
- (2) isoalkanes;
- (3) alkenes;
- (4) benzene, toluene, ethylbenzene, xylenes (BTEX) (when present in concentrations that are not toxic to microorganisms);
- (5) monoaromatics;

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- (6) polynuclear (polycyclic) aromatic hydrocarbons (PAHs); and
(7) higher molecular weight cycloalkanes (which may degrade very slowly).

Three weathering processes-dissolution in water, volatilization and biodegradation-typically result in the depletion of the more readily soluble,volatile and degradable compounds and the accumulation of those most resistant to these processes in residues. When large quantities of a hydrocarbon mixture enter the soil compartment, soil organic matter and other sorption sites in soil are fully saturated and the hydrocarbons will begin to form a separate phase (a non-aqueous phase liquid, or NAPL) in the soil. At concentrations below the retention capacity for the hydrocarbon in the soil, the NAPL will be immobile this is referred to as residual NAPL. Above the retention capacity, the NAPL becomes mobile and will move within the soil

Bioaccumulation: Bioaccumulation potential was characterized based on empirical and/or modelled data for a suite of petroleum hydrocarbons expected to occur in petroleum substances. Bioaccumulation factors (BAFs) are the preferred metric for assessing the bioaccumulation potential of substances, as the bioconcentration factor (BCF) may not adequately account for the bioaccumulation potential of substances via the diet, which predominates for substances with log Kow > ~4.5 In addition to fish BCF and BAF data, bioaccumulation data for aquatic invertebrate species were also considered. Biota-sediment/soil accumulation factors (BSAFs), trophic magnification factors and biomagnification factors were also considered in characterizing bioaccumulation potential. Overall, there is consistent empirical and predicted evidence to suggest that the following components have the potential for high bioaccumulation, with BAF/BCF values greater than 5000: C13-C15 isoalkanes, C12 alkenes, C12-C15 one-ring cycloalkanes, C12 and C15 two-ring cycloalkanes, C14 polycycloalkanes, C15 one-ring aromatics, C15 and C20 cycloalkane monoaromatics, C12-C13 diaromatics, C20 cycloalkane diaromatics, and C14 and C20 three-ring PAHs These components are associated with a slow rate of metabolism and are highly lipophilic. Exposures from water and diet, when combined, suggest that the rate of uptake would exceed that of the total elimination rate. Most of these components are not expected to biomagnify in aquatic or terrestrial foodwebs, largely because a combination of metabolism, low dietary assimilation efficiency and growth dilution allows the elimination rate to exceed the uptake rate from the diet; however, one study suggests that some alkyl-PAHs may biomagnify. While only BSAFs were found for some PAHs, it is possible that BSAFs will be > 1 for invertebrates, given that they do not have the same metabolic competency as fish. In general, fish can efficiently metabolize aromatic compounds. There is some evidence that alkylation increases bioaccumulation of naphthalene but it is not known if this can be generalized to larger PAHs or if any potential increase in bioaccumulation due to alkylation will be sufficient to exceed a BAF/BCF of 5000. Some lower trophic level organisms (i.e., invertebrates) appear to lack the capacity to efficiently metabolize aromatic compounds, resulting in high bioaccumulation potential for some aromatic components as compared to fish. This is the case for the C14 three-ring PAH, which was bioconcentrated to a high level (BCF > 5000) by invertebrates but not by fish. There is potential for such bioaccumulative components to reach toxic levels in organisms if exposure is continuous and of sufficient magnitude, though this is unlikely in the water column following a spill scenario due to relatively rapid dispersal Bioaccumulation of aromatic compounds might be lower in natural environments than what is observed in the laboratory. PAHs may sorb to organic material suspended in the water column (dissolved humic material), which decreases their overall bioavailability primarily due to an increase in size. This has been observed with fish.

Ecotoxicity: Diesel fuel studies in salt water are available. The values varied greatly for aquatic species such as rainbow trout and Daphnia magna, demonstrating the inherent variability of diesel fuel compositions and its effects on toxicity. Most experimental acute toxicity values are above 1 mg/L. The lowest 48-hour LC50 for salmonids was 2.4 mg/L. Daphnia magna had a 24-hour LC50 of 1.8 mg/L. The values varied greatly for aquatic species such as rainbow trout and Daphnia magna, demonstrating the inherent variability of diesel fuel compositions and its effects on toxicity. Most experimental acute toxicity values are above 1 mg/L. The lowest 48-hour LC50 for salmonids was 2.4 mg/L. Daphnia magna had a 24-hour LC50 of 1.8 mg/L. The tropical mysid *Metamysidopsis insularis* was shown to be very sensitive to diesel fuel, with a 96-hour LC50 value of 0.22 mg/L this species has been shown to be as sensitive as temperate mysids to toxicants. However, this study used nominal concentrations, and therefore was not considered acceptable. In another study involving diesel fuel, the effect on brown or common shrimp (*Crangon crangon*) a 96-hour LC50 of 22 mg/L was determined. A "gas oil" was also tested and a 96-hour LC50 of 12 mg/L was determined. The steady state cell density of marine phytoplankton decreased with increasing concentrations of diesel fuel, with different sensitivities between species. The diatom *Phaeodactylum tricornutum* showed a 20% decrease in cell density in 24 hours following a 3 mg/L exposure with a 24-hour no-observed effect concentration (NOEC) of 2.5 mg/L. The microalga *Isochrysis galbana* was more tolerant to diesel fuel, with a 24-hour lowest-observed-effect concentration (LOEC) of 26 mg/L (14% decrease in cell density), and a NOEC of 25 mg/L. Finally, the green algae *Chlorella salina* was relatively insensitive to diesel fuel contamination, with a 24-hour LOEC of 170 mg/L (27% decrease in cell density), and a NOEC of 160 mg/L. All populations of phytoplankton returned to a steady state within 5 days of exposure. In sandy soils, earthworm (*Eisenia fetida*) mortality only occurred at diesel fuel concentrations greater than 10 000 mg/kg, which was also the concentration at which sub-lethal weight loss was recorded. Nephrotoxic effects of diesel fuel have been documented in several animal and human studies. Some species of birds (mallard ducks in particular) are generally resistant to the toxic effects of petrochemical ingestion, and large amounts of petrochemicals are needed in order to cause direct mortality.

For n-Heptane: Log Kow: 4.66; Koc: 2400-8100; Half-life (hr) Air: 52.8; Half-life (hr) Surface Water: 2.9-312; Henry's atm m³/mol: 2.06; BOD 5 (if unstated): 1.92; COD: 0.06; BCF: 340-2000; Log BCF: 2.53-3.31.

Atmospheric Fate: Breakdown of n-heptane by sunlight is not expected to be an important fate process. If released to the atmosphere, n-heptane is expected to exist entirely in the vapor phase, in ambient air. Reactions hydroxyl radicals in the atmosphere have been shown to be important. Night-time reactions with nitrate radicals may contribute to the atmospheric transformation of n-heptane, especially in urban environments. n-Heptane is not expected to be susceptible to direct breakdown by sunlight.

Terrestrial Fate: n-Heptane is expected to be broken down by biological processes in the soil; however, evaporation and adsorption from soil are expected to be a more important fate processes. n-Heptane will be slightly mobile to immobile in soil.

Aquatic Fate: Breakdown of n-heptane by water is not expected to be an important fate process. Biological breakdown may occur in water; however, evaporation is expected to be a more important fate process. The evaporation half-life for the substance from a model river is 2.9 hours and from a model pond is 13 days. In aquatic systems, n-heptane may partition from the water column to organic matter in sediments and suspended solids.

Ecotoxicity: Concentration of the substance in aquatic life may be important in aquatic environments. The substance is moderately toxic to goldfish; however n-heptane has low toxicity to golden orfe, western mosquitofish, Daphnia magna water fleas, and snail. The substance is toxic to opossum shrimp.

For n-Hexane: Log Kow: 3.17-3.94; Henry's Law Constant: 1.69 atm-m³/mol; Vapor Pressure: 150 mm Hg @ 25 C; Log Koc: 2.90 to 3.61. BOD 5, (if unstated): 2.21; COD: 0.04; ThOD: 3.52.

Atmospheric Fate: n-Hexane is not expected to be directly broken down by sunlight. The main atmospheric removal mechanism is through reactions with hydroxyl radicals, with an approximant half-life of 2.9 days. The smog-producing potential of n-hexane is very low, compared to other alkanes, or chlorinated VOCs. Hydroxyl ion reactions in the upper troposphere, therefore, are probably the primary mechanisms for n-hexane degradation in the atmosphere.

Terrestrial Fate: Surface evaporation is expected to be the main fate process of this substance in soil. The substance has a moderate ability to sorb to soil particles but, is expected to have low potential for leaching into the lower soil depths. n-Hexane is expected to generally stay near the soil surface and, if not appreciably sorbed into the soil matrix, will eventually evaporate. Exceptions would involve locations with shallow groundwater tables where large spills occur - in such cases, n-hexane would spread out to contaminate a large volume of soil. Once introduced into groundwater, n-hexane

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may be fairly persistent, since its degradation by water is slow and opportunities for biodegradation may be limited, (due to low oxygen conditions), or, where nutrients, such as nitrogen or phosphorus, are in limited supply. Biological breakdown is probably the most significant degradation mechanism in groundwater. *Pseudomonas mendocina* bacteria have been shown to break the substance down in groundwater and mixed/pure bacterial cultures can utilize the substance, in the presence of oxygen. The most important biological breakdown process involves the conversion of n-hexane to primary alcohols, aldehydes and, ultimately, into fatty acids. In general, unless the n-hexane is buried at some depth within a soil or sediment, evaporation is generally assumed to occur at a much more rapid rate than chemical or biochemical degradation processes.

Aquatic Fate: The dominant transport process from water is evaporation, with an estimated half-life of <3 hours. For standing bodies of water, a half-life no longer than 6.8 days is estimated. The substance has very low water solubility and is resistant to breakdown by water. Few data exist for the biological breakdown of n-hexane in water, however; this process is not considered to be as rapid as evaporation. N-Hexane may be persistent if released to deep sediment.

Ecotoxicity: This substance is not expected to concentrate/accumulate in aquatic organisms or the food chain. These substances are considered to be the most readily biodegradable fractions in petroleum, particularly when oxygen is present in solution. The substance is moderately toxic to rainbow trout, fathead minnow, bluegill, and *Daphnia* water fleas.

For Ketones: Ketones, unless they are alpha, beta--unsaturated ketones, can be considered as narcosis or baseline toxicity compounds.

Aquatic Fate: Hydrolysis of ketones in water is thermodynamically favourable only for low molecular weight ketones. Reactions with water are reversible with no permanent change in the structure of the ketone substrate. Ketones are stable to water under ambient environmental conditions. When pH levels are greater than 10, condensation reactions can occur which produce higher molecular weight products. Under ambient conditions of temperature, pH, and low concentration, these condensation reactions are unfavourable. Based on its reactions in air, it seems likely that ketones undergo photolysis in water.

Terrestrial Fate: It is probable that ketones will be biodegraded by micro-organisms in soil and water.

Ecotoxicity: Ketones are unlikely to bioconcentrate or biomagnify.

For Butane (Synonym: n-Butane): Log Kow: 2.89; Koc: 450-900; Henry's Law Constant: 0.95 atm-cu m/mole, Vapor Pressure: 1820 mm Hg; BCF: 1.9.

Atmospheric Fate: Butane is expected to exist only as a gas in the ambient atmosphere. Gas-phase n-butane is degraded in the atmosphere by reaction with hydroxyl radicals; the half-life for this reaction in air is estimated to be 6.3 days, (@ 25 C). Butane is not expected to absorb UV light and probably will probably not be broken down directly by sunlight in the atmosphere. Nighttime reactions with radical species and nitrogen oxides may contribute to the atmospheric transformation of butane.

Terrestrial Fate: Butane is expected to have low mobility in soil. Evaporation from dry soil surfaces is expected to be the main fate process. This substance is expected to be biologically degraded in soil.

Aquatic Fate: Butane may adsorb to suspended solids and sediment and is expected to occur from water surfaces with an estimated half-life for a model river of 2.2 hours and 3 days, from a model lake. Biological breakdown in water is expected to occur with complete breakdown estimated to be 34 days to 2-butanone and 2-butanol, (observed in studies). Breakdown by water and by sunlight in water are not expected to be important fate processes.

Ecotoxicity: The substance is expected to moderately accumulate in aquatic organisms. Butane is moderately toxic to fish, and *Daphnia* water fleas.

For Isobutene (Refrigerant Gas): Koc: 35, (estimated); Henry's Law Constant: 4.08 atm-cu m/mole; Vapor Pressure: 2611 mm Hg @ 25 deg C; BCF: 74, (estimated).

Atmospheric Fate: Isobutene is a gas at ordinary temperatures. The substance is highly flammable and explosive. It is degraded in the atmosphere by reactions with hydroxyl radicals; the half-life for this reaction in air is 6.9 days. The loss of these substances via wet/dry deposition is thought to be of minor importance. It is thought that the substance will evaporate upon leaving the atmosphere in precipitation then reemitted to the atmosphere after deposition to the land. Isobutene is a contributor to the production of PAN, (peroxyacyl nitrates), under photochemical smog conditions.

Terrestrial Fate: Isobutene will have very high mobility in soil and low adsorption potential. Evaporation from dry/moist soil surfaces is an important fate process for this substance. Isobutene is biodegradable, especially under acclimated conditions, and may biodegrade in soil. The substance is not expected to contaminate the soil.

Aquatic Fate: Isobutene is not expected to not adsorb to sediment/particulate matter in the water column. Isobutene will readily evaporate from water with an estimated half-life of 2.2 hours, for a model river and 3.0 days. If the gas is introduced to water, it will float and boil, producing a flammable, and visible, vapor cloud. Isobutene will not concentrate in aquatic organisms and will be broken down by microorganisms in water, however; the substance will not contaminate the water.

Ecotoxicity: Isobutene has slight acute toxicity to aquatic life. Short-term effects include death of animals, fish, and birds and low growth rate in plants. Long term, (chronic), effects include shortened life-spans, reproductive problems, lowered fertility, and appearance/behavioral changes in animals.

For Propane: Koc 460. log Kow 2.36. Henry's Law constant of 7.07×10^{-1} atm-cu m/mole, derived from its vapour pressure, 7150 mm Hg, and water solubility, 62.4 mg/L. Estimated BCF: 13.1.

Atmospheric Fate: Propane is expected to exist solely as a gas in the ambient atmosphere. Gas-phase propane is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 14 days and is not expected to be susceptible to direct photolysis by sunlight. **DO NOT discharge into sewer or waterways.**

Terrestrial Fate: Propane is expected to have moderate mobility in soil. Volatilization from moist soil surfaces is expected to be an important fate process. Volatilization from dry soil surfaces is based vapor pressure. Biodegradation may be an important fate process in soil and sediment.

Aquatic Fate: Propane is expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected and half-lives for a model river and model lake are estimated to be 41 minutes and 2.6 days, respectively. Biodegradation may not be an important fate process in water.

Ecotoxicity: The potential for bioconcentration in aquatic organisms is low.

For Acetone: log Kow : -0.24; Half-life (hr) air : 312-1896; Half-life (hr) H2O surface water : 20; Henry's atm m³ /mol : 3.67E-05 BOD 5: 0.31-1.76, 46-55% COD: 1.12-2.07 ThOD: 2.2 BCF: 0.69.

Environmental Fate: The relatively long half-life allows acetone to be transported long distances from its emission source.

Atmospheric Fate: Acetone preferentially locates in the air compartment when released to the environment. In air, acetone is lost by photolysis and reaction with photochemically produced hydroxyl radicals; the estimated half-life of these combined processes is about 22 days.

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Air Quality Standards: none available.

Terrestrial Fate: Very little acetone is expected to reside in soil, biota, or suspended solids and has low propensity for soil absorption and a high preference for moving through the soil and into the ground water. Acetone released to soil volatilizes although some may leach into the ground where it rapidly biodegrades. Soil Guidelines: none available.

Aquatic Fate: A substantial amount of acetone can also be found in water. Acetone is highly soluble and slightly persistent in water, with a half-life of about 20 hours Drinking Water

Standard: none available.

Ecotoxicity: Acetone does not concentrate in the food chain, is minimally toxic to aquatic life and is considered to be readily biodegradable. Testing shows that acetone exhibits a low order of toxicity for brook trout, fathead minnow, Japanese quail, ring-neck pheasant and water fleas. Low toxicity for aquatic invertebrates. For aquatic plants, NOEC: 5400-7500 mg/L. Acetone vapours were shown to be relatively toxic to flour beetle and flour moths and their eggs. The direct application of acetone liquid to the body of the insects or surface of the eggs did not, however, cause any mortality. The ability of acetone to inhibit cell multiplication has been examined in a wide variety of microorganisms. Mild to moderate toxicity occurred in bacteria exposed to acetone for 6-4 days however, overall data indicates a low degree of toxicity for acetone. The only exception to these findings was the results obtained with the flagellated protozoa (*Entosiphon sulcatum*).

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
butane	LOW	LOW
propane	LOW	LOW
iso-butane	HIGH	HIGH

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
acetone	LOW (BCF = 0.69)
butane	LOW (LogKOW = 2.89)
propane	LOW (LogKOW = 2.89)
iso-butane	LOW (BCF = 1.97)

12.4. Mobility in soil

Ingredient	Mobility
acetone	HIGH (KOC = 1.981)
butane	LOW (KOC = 43.79)
propane	LOW (KOC = 23.74)
iso-butane	LOW (KOC = 35.04)

12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	N.A.	N.A.	N.A.
PBT	N.A.	N.A.	N.A.
vPvB	N.A.	N.A.	N.A.
PBT Criteria fulfilled?			No
vPvB			No

12.6. Endocrine Disruption Properties

The evidence linking adverse effects to endocrine disruptors is more compelling in the environment than it is in humans. Endocrine disruptors profoundly alter reproductive physiology of ecosystems and ultimately impact entire populations. Some endocrine-disrupting chemicals are slow to break-down in the environment. That characteristic makes them potentially hazardous over long periods of time. Some well established adverse effects of endocrine disruptors in various wildlife species include; eggshell-thinning, displayed of characteristics of the opposite sex and impaired reproductive development. Other adverse changes in wildlife species that have been suggested, but not proven include; reproductive abnormalities, immune dysfunction and skeletal deformities.

12.7. Other adverse effects

Not Available

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none">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.Consult State Land Waste Management Authority for disposal.Discharge contents of damaged aerosol cans at an approved site.Allow small quantities to evaporate.DO NOT incinerate or puncture aerosol cans.Bury residues and emptied aerosol cans at an approved site.
Waste treatment options	N.A.
Sewage disposal options	N.A.

SECTION 14: Transport Information

Labels Required

	
Marine Pollutant	No

Land Transport (ADR-RID)

14.1. UN number	1950
14.2. UN proper shipping name	AEROSOLS (contains propane)
14.3. Transport hazard class(es)	Class 2.1 Subrisk Not Applicable
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Hazard identification (Kemler) Not Applicable Classification code 5F Hazard Label 2.1 Special provisions 190 327 344 625 Limited quantity 1 L Tunnel Restriction Code 2 (D)

Air Transport (ICAO-IATA / DGR)

14.1. UN number	1950
14.2. UN proper shipping name	Aerosols, flammable (contains propane)
14.3. Transport hazard class(es)	ICAO/IATA Class 2.1
14.4. Packing group	ICAO / IATA Subrisk Not Applicable
14.5. Environmental hazard	ERG Code 10L
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Special provisions A145 A167 A802 Cargo Only Packing Instructions 203 Cargo Only Maximum Qty / Pack 150 kg Passenger and Cargo Packing Instructions 203

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14.6. Special precautions for user	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y203
	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G

Sea Transport (IMDG-Code / GGVSee)

14.1. UN number	1950	
14.2. UN proper shipping name	AEROSOLS (contains propane)	
14.3. Transport hazard class(es)	IMDG Class	2.1
	IMDG Subrisk	Not Applicable
14.4. Packing group	Not Applicable	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	EMS Number	F-D, S-U
	Special provisions	63 190 277 327 344 381 959
	Limited Quantities	1000 ml

Inland Waterways transport (ADN)

14.1. UN number	1950	
14.2. UN proper shipping name	AEROSOLS (contains propane)	
14.3. Transport hazard class(es)	2.1	Not Applicable
14.4. Packing group	Not Applicable	
14.5. Environmental hazard	Not Applicable	
14.6. Special precautions for user	Classification code	5F
	Special provisions	190; 327; 344; 625
	Limited quantity	1 L
	Equipment required	PP, EX, A
	Fire cones number	1

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

Not Applicable

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

Product name	Group
acetone	N.A.
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	N.A.
butane	N.A.
propane	N.A.
iso-butane	N.A.

14.9. Transport in bulk in accordance with the ICG Code

Product name	Ship Type
acetone	N.A.
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	N.A.
butane	N.A.
propane	N.A.
iso-butane	N.A.

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SECTION 15: Regulatory information

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

Acetone is found on the following regulatory lists:

EU Consolidated List of Indicative
Occupational Exposure Limit Values (IOELVs)

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions
on the manufacture, placing on the market and use of certain
dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing
Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification,
Labelling and Packaging of Substances and Mixtures - Annex VI

Germany Classification of Substances Hazardous to Waters (WGK)

Germany Recommended Exposure Limits - MAK Values

Germany Recommended Exposure Limits - MAK Values

Germany Recommended Exposure Limits - MAK Values -
Pregnancy Risk Group Classifications & Germ Cell Mutagens

Germany TRGS 900 - Limit Values for the Workplace Atmosphere

Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane is found on the following regulatory lists:

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions
on the manufacture, placing on the market and use of certain
dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 2)
Carcinogens: Category 1 B

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4)
Germ cell mutagens: Category 1 B

Europe EC Inventory

European Union - European Inventory of Existing Commercial
Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification,
Labelling and Packaging of Substances and Mixtures - Annex VI

Germany Classification of Substances Hazardous to Waters (WGK)

Germany Recommended Exposure Limits - MAK Values -
Pregnancy Risk Group Classifications & Germ Cell Mutagens

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

Butane is found on the following regulatory lists:

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions
on the manufacture, placing on the market and use of certain
dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1)
Carcinogens: Category 1 A

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4)
Germ cell mutagens: Category 1 B

Europe EC Inventory

European Union - European Inventory of Existing
Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification,
Labelling and Packaging of Substances and Mixtures - Annex VI

Germany Institute for Occupational Safety Social Accident
Insurance (IFA) List of the carcinogenic, mutagenic and reproduction
(CMR) substances (German)

Germany Recommended Exposure Limits - MAK Values

Germany Recommended Exposure Limits - MAK Values -
Pregnancy Risk Group Classifications & Germ Cell Mutagens

Germany TRGS 900 - Limit Values for the Workplace Atmosphere

Propane is found on the following regulatory lists:

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions
on the manufacture, placing on the market and use of certain
dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial
Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification,
Labelling and Packaging of Substances and Mixtures - Annex VI

Germany Classification of Substances Hazardous to Waters (WGK)

Germany Recommended Exposure Limits - MAK Values

Germany Recommended Exposure Limits - MAK Values -
Pregnancy Risk Group Classifications & Germ Cell Mutagens

Germany TRGS 900 - Limit Values for the Workplace Atmosphere

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Iso-butane is found on the following regulatory lists:

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: Category 1 A

EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Germ cell mutagens: Category 1 B

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

Germany Classification of Substances Hazardous to Waters (WGK)

Germany Institute for Occupational Safety Social Accident Insurance (IFA) List of the carcinogenic, mutagenic and reproduction (CMR) substances (German)

Germany Recommended Exposure Limits - MAK Values

Germany Recommended Exposure Limits - MAK Values - Pregnancy Risk Group Classifications & Germ Cell Mutagens

Germany TRGS 900 - Limit Values for the Workplace Atmosphere

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2020/878; Regulation (EC) No 1272/2008 as updated through ATPs.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier	
acetone	67-64-1	606-001-00-8	01-2119471330-49-XXXX	
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 2; Eye Irrit. 2; STOT SE 3		GHS02; GHS07; Dgr	H225; H319; H336
2	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; STOT SE 3; STOT SE 3; Skin Irrit. 2; Skin Sens. 1; Aquatic Chronic 2		Dgr; GHS08; GHS01; GHS06; GHS09	H225; H319; H336; H371; H228; H315; H312; H335; H302; H332; H340; H317; H411

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier	
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane	64742-49-0.*	649-328-00-1	01-2119486291-36-XXXX	
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Asp. Tox. 1; Muta. 1B; Carc. 1B		GHS08; Dgr	H304; H340; H350
2	Asp. Tox. 1; Muta. 1B; Carc. 1B; Flam. Liq. 1; Skin Irrit. 2; STOT SE 3; Repr. 2; Eye Irrit. 2; STOT RE 1; Acute Tox. 4; STOT SE 3; Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1		GHS08; Dgr; GHS02; GHS09; GHS03; GHS05	H304; H340; H350; H224; H315; H336; H361; H319; H372; H332; H335; H302; H400; H410

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier	
butane	106-97-8.	601-004-00-0 601-004-01-8	01- 2119474691-32-XXXX	
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Gas 1		GHS02; GHS04; Dgr	H220

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

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Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
2	Flam. Gas 1; Liq.; Muta. 1B; Carc. 1A; STOT SE 3	GHS02; GHS04; Dgr; GHS08	H220; H280; H340; H350; H304; H315; H335; H336; H361; H373; H411; H223; H229; H371

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
propane	74-98-6	601-003-00-5	01-2119486944- 21-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Gas 1	GHS02; GHS04; Dgr	H220
2	Flam. Gas 1; Liq.; Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 4; STOT SE 3; Muta. 1B; Carc. 1A; Flam. Liq. 2; Asp. Tox. 1; STOT SE 3; Repr. 2; STOT RE 2; Aquatic Chronic 2	GHS02; GHS04; Dgr; GHS03; GHS08; GHS09	H220; H280; H223; H229; H315; H319; H332; H335; H340; H350; H225; H304; H336; H361; H373; H411

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
iso-butane	75-28-5.	601-004-00-0 601-004-01-8	01- 2119485395- 27-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Gas 1	GHS02; GHS04; Dgr	H220
2	Flam. Gas 1; Liq.; Muta. 1B; Carc. 1A; STOT SE 3; STOT SE 1	GHS04; Dgr; GHS08; GHS01	H220; H280; H340; H350; H336; H223; H229; H370

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

15.3. Classification of Substances and Mixtures into Water Hazard Classes

Preparation is WGK non-hazardous to waters

Name	WGK	Score	Source
ACETONE	non-hazardous to waters		From Regulation
Hydrocarbons, C6-C7,n-alkanes, isoalkanes, cyclics, <5% n-hexane	non-hazardous to waters		From Regulation
BUTANE	non-hazardous to waters		From Regulation
PROPANE	non-hazardous to waters		From Regulation
ISO-BUTANE	non-hazardous to waters		From Regulation

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (acetone; Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane; butane; propane; iso-butane)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes

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Russia - FBEPH	Yes
Legend:	<i>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.</i>

SECTION 16: Other information

Revision Date	09/11/2022
Initial Date	28/03/2022

Full text Risk and Hazard codes

H220	Extremely flammable gas.
H223	Flammable aerosol.
H224	Extremely flammable liquid and vapour.
H225	Highly flammable liquid and vapour.
H228	Flammable solid.
H229	Pressurised container: May burst if heated.
H280	Contains gas under pressure; may explode if heated.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H370	Causes damage to organs.
H371	May cause damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

SDS Version Summary

Version	Date of Update	Sections Updated
3.5	09/11/2022	Fire Fighter (fire/explosion hazard), Physical Properties

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

- EN 166 Personal eye-protection
- EN 340 Protective clothing
- EN 374 Protective gloves against chemicals and micro-organisms
- EN 13832 Footwear protecting against chemicals
- EN 133 Respiratory protective devices

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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
AIIIC: 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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