

1. IDENTIFICATION OF THE SUBSTRATE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Trade name/designation: Alumasc Fleece Back Spray Adhesive.

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

Main use category: Adhesive.

1.3 Manufacturer/Supplier

Supplier:
Alumasc Building Products Ltd
White House Works, Bold Road, Sutton, St Helens, Merseyside, United Kingdom, WA9 4JG
Tel: +44 (0)1744 648400
e-mail: technical@alumascroofing.com

1.4 Manufacturer/Supplier

Emergency telephone: 01744 648 400 - (Mon-Thurs – 08.30-17.00 Fri – 08.30-16.00)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EU) No. 1272/2008 [CPL] and amendments^[1]:

H334 - Respiratory Sensitizer Category 1, H315 - Skin Corrosion/Irritation Category 2, H319 - Eye Irritation Category 2, H280 - Gas under Pressure (Compressed gas), H317 - Skin Sensitizer Category 1, H351 - Carcinogenicity Category 2.

Legend:

1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI.

2.2 Labelling according to Regulation (EU) 1272/2008

Hazard pictures:



Signal word: Danger.

Hazard statements:
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H280: Contains gas under pressure; may explode if heated.
H317: May cause an allergic skin reaction.
H351: Suspected of causing cancer.

Supplementary statement(s):
EUH044: Risk of explosion if heated under confinement.
EUH204: Contains isocyanates. May produce an allergic reaction.

Precautionary statements prevention:
P201: Obtain special instructions before use.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261: Avoid breathing gas.
P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P284: In case of inadequate ventilation] wear respiratory protection.
P272: Contaminated work clothing should not be allowed out of the workplace.
P251: Do not pierce or burn, even after use.
P271: Use only outdoors or in a well-ventilated area.

Precautionary statements response: P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313: IF exposed or concerned: Get medical advice/ attention.
P342+P311: If experiencing respiratory symptoms: Call a POISON CENTER/doctor/ physician/first aider.
P302+P352: IF ON SKIN: Wash with plenty of water and soap.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P337+P313: If eye irritation persists: Get medical advice/attention.
P362+P364: Take off contaminated clothing and wash it before reuse.

Precautionary statements storage: P405: Store locked up.
P410+P403: Protect from sunlight. Store in a well ventilated place.

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

2.3 Other hazards

4,4'-Diphenylmethane Diisocyanate (MDI):

Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply).

Methyl Ethyl Ketone:

Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (Restrictions may apply).

3. COMPOSITION AND INFORMATION ABOUT THE COMPONENTS

3.1 Substances

Spray applied polyurethane adhesive (requires spray gun & hose).

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	Nanoform Particle Characteristics
1.13674-84-5 2.237-158-7 3.Not available 4.Not available	5-10	Tris(2-Chloroisopropyl) Phosphate	Acute Toxicity (Oral) Category 4, Reproductive Toxicity Category 2, Carcinogenicity Category 2, Acute Toxicity (Inhalation) Category 5; H302, H361, H351, H333 ^[1]	Not available
1.101-68-8 2.202-966-0 3.615-005-00-9 4.Not available	1-5	4,4'-Diphenylmethane Diisocyanate (MDI)	Carcinogenicity Category 2, Acute Toxicity (Inhalation) Category 4, Specific Target Organ Toxicity - Repeated Exposure Category 2, Skin Sensitizer Category 1, Specific Target Organ Toxicity - Single Exposure Category 3 (Respiratory Tract Irritation), Skin Corrosion/Irritation Category 2, Respiratory Sensitizer Category 1, Eye Irritation Category 2; H351, H332, H373**, H317, H335, H315, H334, H319 ^[2]	Not available
1.6425-39-4 2.229-194-7 3.Not available 4.Not available	1-5	2,2'-Dimorpholinodiethyl Ether	Eye Irritation Category 2, Skin Sensitizer Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2; H319, H317, H302, H315 ^[1]	Not available
1.32055-14-4 2.500-079-6 3.Not available 4.Not available	1-5	MDI, Oligomeric	Acute Toxicity (Inhalation) Category 4, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Skin Sensitizer Category 1, Carcinogenicity Category 2, Specific Target Organ Toxicity - Single Exposure Category 3 (Respiratory Tract Irritation), Specific Target Organ Toxicity - Repeated Exposure Category 2, Respiratory Sensitizer Category 1; H332, H315, H319, H317, H351, H335, H373, H334, Euh204 ^[1]	Not available

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1.78-93-3 2.201-159-0 3.606-002-00-3 4.Not available	5-10	Methyl Ethyl Ketone *	Flammable Liquid Category 2, Specific Target Organ Toxicity - Single Exposure Category 3 (Narcotic Effects), Eye Irritation Category 2; H225, H336, H319, EUH066 ^[2]	Not available
1.7727-37-9 2.231-783-9 3.Not available 4.Not available	<1	Nitrogen	Gas under Pressure (Compressed gas); H280, EUH044 ^[1]	Not available
1.29118-24-9 2.Not available 3.Not available 4.Not available	10-30	1,3,3,3-Tetrafluoropropene	Gas under Pressure (Liquefied gas); H280, EUH044 ^[1]	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.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact: If product comes in contact with eyes:
 - Immediately hold eyelids apart and flush the eye continuously with 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.
 - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Transport to hospital or doctor without delay.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin contact: If skin contact occurs:
 - Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available).
 - Seek medical attention in event of irritation.

Inhalation: If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. Keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. Transport to hospital, or doctor, without delay. Following uptake by inhalation, move person to an area free from risk of further exposure. Oxygen or artificial respiration should be administered as needed. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. A physician should be consulted.

Ingestion: If swallowed do NOT induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. Seek medical advice. Avoid giving milk or oils. Avoid giving alcohol.

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 intoxication due to Freons/ Halons:

A: Emergency and Supportive Measures.

- Maintain an open airway and assist ventilation if necessary.
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microg/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- There is no specific antidote.

C: Decontamination

- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. DO NOT induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

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

- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability. No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Treatment based on judgment of the physician in response to reactions of the patient.

For frost-bite caused by liquefied petroleum gas:

- If part has not thawed, place in warm water bath (41-46 C) for 15-20 minutes, until the skin turns pink or red. Analgesia may be necessary while thawing.
- If there has been a massive exposure, the general body temperature must be depressed, and the patient must be immediately rewarmed by whole-body immersion, in a bath at the above temperature.
- Shock may occur during rewarming.
- Administer tetanus toxoid booster after hospitalization.
- Prophylactic antibiotics may be useful.
- The patient may require anticoagulants and oxygen.

[Shell Australia 22/12/87]

For gas exposures:

Basic treatment:

- 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.
- Anticipate seizures.

Advanced treatment:

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred. 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.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For sub-chronic and chronic exposures to Isocyanates:

- This material may be a potent pulmonary sensitiser which causes bronchospasm even in patients without prior airway hyperreactivity.
- Clinical symptoms of exposure involve mucosal irritation of respiratory and gastrointestinal tracts.
- Conjunctival irritation, skin inflammation (erythema, pain vesiculation) and gastrointestinal disturbances occur soon after exposure.
- Pulmonary symptoms include cough, burning, substernal pain and dyspnoea.
- Some cross-sensitivity occurs between different isocyanates.
- Noncardiogenic pulmonary oedema and bronchospasm are the most serious consequences of exposure. Markedly symptomatic patients should receive oxygen, ventilatory support and an intravenous line.
- Treatment for asthma includes inhaled sympathomimetics (epinephrine [adrenalin], terbutaline) and steroids.
- Activated charcoal (1 g/kg) and a cathartic (sorbitol, magnesium citrate) may be useful for ingestion.

- Mydriatics, systemic analgesics and topical antibiotics (Sulamyd) may be used for corneal abrasions.
- There is no effective therapy for sensitised workers.

[Ellenhorn and Barceloux; Medical Toxicology]

NOTE: Isocyanates cause airway restriction in naive individuals with the degree of response dependant on the concentration and duration of exposure. They induce smooth muscle contraction which leads to bronchoconstrictive episodes. Acute changes in lung function, such as decreased FEV1, may not represent sensitivity.

[Karol & Jin, Frontiers in Molecular Toxicology, pp 56-61, 1992].

Personnel who work with isocyanates, isocyanate prepolymers or polyisocyanates should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitisation conditions of the skin should not handle or work with isocyanates. Anyone who develops chronic respiratory distress when working with isocyanates should be removed from exposure and examined by a physician. Further exposure must be avoided if a sensitivity to isocyanates or polyisocyanates has developed.

All persons handling organic phosphorus ester materials regularly should undergo regular medical examination with special stress on the central nervous systems. Whilst atropine or pyridine-2-aldoxime methiodide (PAM) are beneficial antidotes for acute phosphate ester poisonings, they are of little value in reversing acute or chronic neurological damage due to phosphites and some types of aryl phosphate.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Foam.
Dry chemical powder.
BCF (where regulations permit).

5.2 Special hazards arising from the substance or mixture

Fire incompatibility:

Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

5.3 Advice for fire-fighters

General:

Alert Fire Brigade and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves.
Prevent, by any means available, spillage from entering drains or water courses.

Fire/explosion hazard:

WARNING: In use may form flammable/ explosive vapour-air mixtures.
Combustible. Will burn if ignited.

Combustion products include:

Carbon Monoxide (CO).
Carbon Dioxide (CO₂).
Isocyanates.

and minor amounts of:

Hydrogen Cyanide.
Nitrogen Oxides (NOX).
Phosphorus Oxides (POX).
Hydrogen Fluoride.
Other Pyrolysis products typical of burning organic material.

Contains low boiling substance:

Closed containers may rupture due to pressure build up under fire conditions.
May emit poisonous fumes.

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:

Clean up all spills immediately.

Avoid breathing vapours/ aerosols/ or dusts and avoid contact with skin and eyes.

Control personal contact with the substance, by using protective equipment.

Major spills:

For Isocyanate spills of less than 40 litres (2 m²):

- Evacuate area from everybody not dealing with the emergency, keep them upwind and prevent further access, remove ignition sources and, if inside building, ventilate area as well as possible.
- Notify supervision and others as necessary.
- Put on personal protective equipment (suitable respiratory protection, face and eye protection, protective suit, gloves and impermeable boots).
- Avoid contamination with water, alkalies and detergent solutions.
- Material reacts with water and generates gas, pressurises containers with even drum rupture resulting.
- DO NOT reseal container if contamination is suspected.

Clear area of personnel and move upwind.

Alert Fire Brigade and tell them location and nature of hazard.

Wear breathing apparatus plus protective gloves.

6.4 Reference to other sections

Personal protective equipment advice is contained in Section 8.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Safe handling:

Contains low boiling substance:

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

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

Fire and explosion protection:

See Section 5.

Other information:

Store in original containers.

Keep containers securely sealed.

Store in a cool, dry, well-ventilated area.

7.2 Conditions for safe storage, including any incompatibilities

Suitable container:

For low viscosity materials:

- Drums and jerricans must be of the non-removable head type.
- 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.

Storage incompatibility:

Methyl Ethyl Ketone:

- reacts violently with strong oxidisers, aldehydes, nitric acid, perchloric acid, potassium tert-butoxide, oleum.
- is incompatible with inorganic acids, aliphatic amines, ammonia, caustics, isocyanates, pyridines, chlorosulfonic acid.
- forms unstable peroxides in storage, or on contact with propanol or hydrogen peroxide.
- attacks some plastics.
- may generate electrostatic charges, due to low conductivity, on flow or agitation.

As a general rule, hydrofluorocarbons tend to be flammable unless they contain more fluorine atoms than hydrogen atoms.

- Haloalkenes are highly reactive.
- Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidisable and polymerisable.
- Avoid reaction or contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact.

Contains a six-membered heterocyclic ring.

Six-membered heterocycles can be described as pi-deficient. Substitution by electronegative groups or additional nitrogen atoms in the ring significantly increase the pi-deficiency.

For Morpholines:

Morpholine undergoes most chemical reactions typical for other secondary amines, though the presence of the ether oxygen withdraws electron density from the nitrogen, rendering it less nucleophilic (and less basic) than structurally similar secondary amines such as piperidine.

Avoid reaction with water, alcohols and detergent solutions. Isocyanates are electrophiles, and as such they are reactive toward a variety of nucleophiles including alcohols, amines, and even water. Upon treatment with an alcohol, an isocyanate forms a urethane linkage.

- A range of exothermic decomposition energies for isocyanates is given as 20-30 kJ/mol.
- The relationship between energy of decomposition and processing hazards has been the subject of discussion; it is suggested that values of energy released per unit of mass, rather than on a molar basis (J/g) be used in the assessment.
- For example, in "open vessel processes" (with man-hole size openings, in an industrial setting), substances with exothermic decomposition energies below 500 J/g are unlikely to present a danger, whilst those in "closed vessel processes" (opening is a safety valve or bursting disk) present some danger where the decomposition energy exceeds 150 J/g.



- X: Must not be stored together.
- O: May be stored together with specific preventions.
- +: May be stored together.

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

7.3 Specific end uses(s)

See Section 1.2.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
Tris(2-Chloroisopropyl) Phosphate	Dermal 2.08 mg/kg bw/day (Systemic, Chronic) Inhalation 5.82 mg/m ³ (Systemic, Chronic) Dermal 2.08 mg/kg bw/day (Systemic, Acute) Inhalation 5.82 mg/m ³ (Systemic, Acute) Dermal 1.04 mg/kg bw/day (Systemic, Chronic) * Inhalation 1.45 mg/m ³ (Systemic, Chronic) * Oral 0.52 mg/kg bw/day (Systemic, Chronic) * Dermal 1.04 mg/kg bw/day (Systemic, Acute) * Inhalation 1.46 mg/m ³ (Systemic, Acute) * Oral 0.52 mg/kg bw/day (Systemic, Acute) *	0.32 mg/L (Water (Fresh)) 0.032 mg/L (Water - Intermittent release) 0.51 mg/L (Water (Marine)) 2.92 mg/kg sediment dw (Sediment (Fresh Water)) 0.29 mg/kg sediment dw (Sediment (Marine)) 0.34 mg/kg soil dw (Soil) 7.84 mg/L (STP) 11.6 mg/kg food (Oral)
4,4'-Diphenylmethane Diisocyanate (MDI)	Inhalation 0.05 mg/m ³ (Local, Chronic) Inhalation 0.1 mg/m ³ (Local, Acute) Inhalation 0.025 mg/m ³ (Local, Chronic) * Inhalation 0.05 mg/m ³ (Local, Acute) *	1 mg/L (Water (Fresh)) 0.1 mg/L (Water - Intermittent release) 10 mg/L (Water (Marine)) 1 mg/kg soil dw (Soil) 1 mg/L (STP)
2,2'-Dimorpholinodiethyl Ether	Dermal 1 mg/kg bw/day (Systemic, Chronic) Inhalation 7.28 mg/m ³ (Systemic, Chronic) Dermal 0.5 mg/kg bw/day (Systemic, Chronic) * Inhalation 1.8 mg/m ³ (Systemic, Chronic) * Oral 0.5 mg/kg bw/day (Systemic, Chronic) *	0.1 mg/L (Water (Fresh)) 0.01 mg/L (Water - Intermittent release) 1 mg/L (Water (Marine)) 8.2 mg/kg sediment dw (Sediment (Fresh Water)) 0.82 mg/kg sediment dw (Sediment (Marine)) 1.58 mg/kg soil dw (Soil) 100 mg/L (STP) 10 mg/kg food (Oral)

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MDI, Oligomeric	Inhalation 0.05 mg/m ³ (Local, Chronic) Inhalation 0.1 mg/m ³ (Local, Acute) Inhalation 0.025 mg/m ³ (Local, Chronic) * Inhalation 0.05 mg/m ³ (Local, Acute) *	1 mg/L (Water (Fresh)) 0.1 mg/L (Water - Intermittent release) 10 mg/L (Water (Marine)) 1 mg/kg soil dw (Soil) 1 mg/L (STP)
Methyl Ethyl Ketone	Dermal 1 161 mg/kg bw/day (Systemic, Chronic) Inhalation 600 mg/m ³ (Systemic, Chronic) Dermal 412 mg/kg bw/day (Systemic, Chronic) * Inhalation 106 mg/m ³ (Systemic, Chronic) * Oral 31 mg/kg bw/day (Systemic, Chronic) *	55.8 mg/L (Water (Fresh)) 55.8 mg/L (Water - Intermittent release) 55.8 mg/L (Water (Marine)) 284.74 mg/kg sediment dw (Sediment (Fresh Water)) 284.7 mg/kg sediment dw (Sediment (Marine)) 22.5 mg/kg soil dw (Soil) 709 mg/L (STP) 1000 mg/kg food (Oral)
1,3,3,3-Tetrafluoropropene	Inhalation 3 902 mg/m ³ (Systemic, Chronic) Inhalation 830 mg/m ³ (Systemic, Chronic) *	0.1 mg/L (Water (Fresh)) 1 mg/L (Water (Marine))

* Values for general population.

Occupational exposure limits (OEL):

Ingredient data:

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs)	4,4'-Diphenylmethane Diisocyanate (MDI)	Isocyanates, all (as - NCO) except Methyl Isocyanate	0.02 mg/m ³	0.07 mg/m ³	Not available	Sen
Europe ECHA Occupational exposure limits - Activity list	4,4'-Diphenylmethane Diisocyanate (MDI)	Not available	Not available	Not available	Not available	Not available
UK Workplace Exposure Limits (WELs)	Methyl Ethyl Ketone	Butan-2-One (Methyl Ethyl Ketone)	200 ppm / 600 mg/m ³	899 mg/m ³ / 300 ppm	Not available	Sk, BMGV
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	Methyl Ethyl Ketone	Butanone	200 ppm / 600 mg/m ³	900 mg/m ³ / 300 ppm	Not available	Not available

Emergency limits:

Ingredient	TEEL-1	TEEL-2	TEEL-3
4,4'-Diphenylmethane Diisocyanate (MDI)	0.45 mg/m ³	Not available	Not available
4,4'-Diphenylmethane Diisocyanate (MDI)	29 mg/m ³	40 mg/m ³	240 mg/m ³
Methyl Ethyl Ketone	Not available	Not available	Not available
Nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
1,3,3,3-Tetrafluoropropene	1,400 ppm	Not available	Not available

Ingredient	Original IDLH	Revised IDLH
Tris(2-Chloroisopropyl)Phosphate	Not available	Not available
4,4'-Diphenylmethane Diisocyanate (MDI)	75 mg/m ³	Not available
2,2'-Dimorpholinodiethyl Ether	Not available	Not available
MDI, Oligomeric	Not available	Not available
Methyl Ethyl Ketone	3,000 ppm	Not available
Nitrogen	Not available	Not available
1,3,3,3-Tetrafluoropropene	Not available	Not available

Occupational exposure banding:

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
Tris(2-Chloroisopropyl)Phosphate	E	≤ 0.1 ppm
2,2'-Dimorpholinodiethyl Ether	E	≤ 0.1 ppm
MDI, Oligomeric	E	≤ 0.1 ppm

Our company policy is one of continuous research and development; we therefore reserve the right to amend content herein without prior notice.

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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

Appropriate engineering controls: Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.



Personal protective:

Eye and face protection:

Safety glasses with side shields.
Chemical goggles.

Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.

Skin protection:

See hand protection below.

Hands/feet protection:

The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

Isocyanate resistant materials include Teflon, Viton, nitrile rubber and some PVA gloves. Protective gloves and overalls should be worn as specified in the appropriate national standard.

Contaminated garments should be removed promptly and should not be re-used until they have been decontaminated.

Body protection:

See other protection below.

Other protection:

Overalls.
Eyewash unit.
Barrier cream.

Environmental exposure controls:

See Section 12.

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:

Alumasc Fleece Back Adhesive

Material	CPI
PE/EVAL/PE	A
BUTYL	C
BUTYL/NEOPRENE	C
HYPALON	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C

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NITRILE+PVC	C
PVA	C
PVC	C
SARANEX-23	C
TEFLON	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:

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Blue		
Physical state	Aerosol	Relative density (Water= 1)	Liquid base:1.02-1.07
Odour	Not available	Partition coefficient n-octanol / water	Not available
Odour threshold	Not available	Auto-ignition temperature (°C)	Not available
pH (as supplied)	Not available	Decomposition temperature	Not available
Melting point / freezing point (°C)	Not available	Viscosity (cSt)	Liquid base: 700.935-934.579
Initial boiling point and boiling range (°C)	Not available	Molecular weight (g/mol)	Not available
Flash point (°C)	Technically impossible to obtain the data. Liquid base: -9°C	Taste	Not available
Evaporation rate	Not available	Explosive properties	Explosive under the influence of a flame
Flammability	Not applicable	Oxidising properties	Not available
Upper Explosive Limit (%)	R152a: 17.35	Surface Tension (dyn/cm or mN/m)	Not available
Lower Explosive Limit (%)	R152a: 4.32	Volatile Component (%vol)	Not available
Vapour pressure (kPa)	Not available	Gas group	Not available
Solubility in water	Immiscible	pH as a solution (1%)	Not available
Vapour density (Air = 1)	Not available	VOC g/L	Not available
Nanoform Solubility	Not available	Nanoform Particle Characteristics	Not available
Particle Size	Not available		

9.2 Other information

Not available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

See Section 7.2.

10.2 Chemical stability

Unstable in the presence of incompatible materials.
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.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Inhaled:

Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

Exposure to fluorocarbons can produce non-specific flu-like symptoms such as chills, fever, weakness, muscle pain, headache, chest discomfort, sore throat and dry cough with rapid recovery. High concentrations can cause irregular heartbeats and a stepwise reduction in lung capacity.

The vapour/mist may be highly irritating to the upper respiratory tract and lungs; the response may be severe enough to produce bronchitis and pulmonary oedema. Possible neurological symptoms arising from isocyanate exposure include headache, insomnia, euphoria, ataxia, anxiety neurosis, depression and paranoia. Gastrointestinal disturbances are characterised by nausea and vomiting.

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.

Acute exposure of humans to high concentrations of methyl ethyl ketone produces irritation to the eyes, nose and throat. Acute exposure by inhalation also causes nervous system depression, headache, and nausea. High vapour levels are easily detected due to odour, however odour fatigue may occur, with loss of warning of exposure.

Inhalation of non-toxic gases may cause:

- CNS effects: headache, confusion, dizziness, stupor, seizures and coma.
- respiratory: shortness of breath and rapid breathing.
- cardiovascular: collapse and irregular heart beats.
- gastrointestinal: mucous membrane irritation, nausea and vomiting.

Ingestion:

The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum.

Not normally a hazard due to physical form of product.

Considered an unlikely route of entry in commercial/industrial environments.

Skin contact: This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition. In humans exposed to Methyl Ethyl Ketone, skin inflammation has been reported. Animal testing has shown methyl ethyl ketone to have high acute toxicity from skin exposure. Fluorocarbons remove natural oils from the skin, causing irritation, dryness and sensitivity. Open cuts, abraded or irritated skin should not be exposed to this material. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

Eye: This material can cause eye irritation and damage in some persons.

Chronic: There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. 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. Long term exposure to morpholine and some related compounds may produce liver and kidney changes. Animal testing has shown evidence of chronic nose irritation and inflammation, and damage to the eye. The reactivity of an epoxide intermediate may be the reason for the cancer-causing properties of halogenated oxiranes. It is reported that 1,1-dichloroethyne, vinyl chloride, trichloroethylene, tetrachloroethylene and chloroprene all cause cancer. Generally speaking, substances with one halogen substitution show higher potential to cause cancer compared to substances with two. Animal testing shows that methyl ethyl ketone may have slight effects on the nervous system, liver, kidney and respiratory system; there may also be developmental effects and an increase in birth defects. However, there is limited information available on the long-term effects of methyl Ethyl Ketone in humans, and no information is available on whether it causes developmental or reproductive toxicity or cancer. It is generally considered to have low toxicity, but it is often used in combination with other solvents, and the toxic effects of the mixture may be greater than with either solvent alone. Persons with a history of asthma or other respiratory problems or are known to be sensitised, should not be engaged in any work involving the handling of Isocyanates. The chemistry of reaction of isocyanates, as evidenced by MDI, in biological milieu is such that in the event of a true exposure of small MDI doses to the mouth, reactions will commence at once with biological macromolecules in the buccal region and will continue along the digestive tract prior to reaching the stomach. Reaction products will be a variety of polyureas and macromolecular conjugates with for example mucus, proteins and cell components.

Alumasc Fleece Back Spray Bond:

Toxicity	Irritation
Not available	Not available

Tris(2-Chloroisopropyl)Phosphate:

Toxicity	Irritation
Dermal (Rabbit) LD50: >2000 mg/kg ^[1]	Eye (Rabbit): non-irritating*
Inhalation (Rat) LC50: >4.6 mg/l4h ^[2]	Skin (Rabbit): mild (24 h):
Oral (Rat) LD50: >500 mg/kg ^[1]	

4,4'-Diphenylmethane Diisocyanate (MDI):

Toxicity	Irritation
Dermal (Rabbit) LD50: >6200 mg/kg ^[2]	Dermal Sensitiser *
Inhalation (Rat) LC50: 0.368 mg/L4h ^[1]	Eye: no adverse effect observed (not irritating) ^[1]
Oral (Rat) LD50: >2000 mg/kg ^[1]	Skin (Rabbit): 500 mg /24 hours
	Skin: adverse effect observed (irritating) ^[1]

2,2'-Dimorpholinodiethyl Ether:

Toxicity	Irritation
Dermal (Rabbit) LD50: 746.24 mg/kg ^[1]	Eye (Rabbit): irritant OECD 405
Oral (Rat) LD50; >2000 mg/kg ^[1]	Eye: adverse effect observed (irritating) ^[1]
	Skin (Rabbit): irritant OECD 404
	Skin: no adverse effect observed (not irritating) ^[1]

MDI, Oligomeric:

Toxicity	Irritation
Dermal (Rabbit) LD50: >9400 mg/kg ^[1]	Not available
Inhalation (Rat) LC50; 0.368 mg/L4h ^[1]	
Oral (Rat) LD50; >2000 mg/kg ^[1]	

Methyl Ethyl Ketone:

Toxicity	Irritation
Dermal (Rabbit) LD50: ~6400-8000 mg/kg ^[2]	Eye (Human): 350 ppm - irritant
Inhalation (Mouse) LC50; 32 mg/L4h ^[2]	Eye (Rabbit): 80 mg - irritant
Oral (Rat) LD50; 2054 mg/kg ^[1]	Skin (Rabbit): 402 mg/24 hr - mild
	Skin (Rabbit): 13.78mg/24 hr open

Nitrogen:

Toxicity	Irritation
Not available	Not available

1,3,3,3-Tetrafluoropropene:

Toxicity	Irritation
Inhalation (Rat) LC50; >1157.752 ppm4h ^[2]	Not available

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.

Tris(2-Chloroisopropyl)Phosphate:

Non-chlorinated triphosphates have varying chemical, physical, toxicological and environmental properties. Blooming has been identified as a source of potential exposure (human and environmental) to triphosphate plasticisers / flame retardants. Blooming is the movement of an ingredient in rubber or plastic to the outer surface after curing.

For tris(2-chloro-1-methylethyl)phosphate (TCPP):

The flame retardant product supplied in the EU, marketed as TCPP, is actually a reaction mixture containing four isomers. The individual isomers in this reaction mixture are not separated or marketed. The individual components are never produced as such.

Alkyl esters of phosphoric acid exhibit a low to moderate acute toxicity and metabolised. From studies done on mice, they are not likely to cause gene damage or affect reproduction. However, 2-ethylhexanoic acid produced an effect on newborn rats at high doses to the pregnant female.

4,4'-Diphenylmethane Diisocyanate (MDI):

Inhalation (human) TClO: 0.13 ppm/30 mins Eye (rabbit): 0.10 mg moderate.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

2,2'-Dimorpholinodiethyl Ether:

Overexposure to most of these materials may cause adverse health effects.

Many amine-based compounds can cause release of histamines, which, in turn, can trigger allergic and other physiological effects, including constriction of the bronchi or asthma and inflammation of the cavity of the nose. Whole-body symptoms include headache, nausea, faintness, anxiety, a decrease in blood pressure, rapid heartbeat, itching, reddening of the skin, urticaria (hives) and swelling of the face, which are usually transient.

There are generally four routes of possible or potential exposure: inhalation, skin contact, eye contact, and swallowing.

Inhalation: Inhaling vapours may result in moderate to severe irritation of the tissues of the nose and throat and can irritate the lungs. Higher concentrations of certain amines can produce severe respiratory irritation, characterized by discharge from the nose, coughing, difficulty in breathing and chest pain. No experimental evidence available for genotoxicity in vitro (Ames test negative). *BASF

MDI, Oligomeric:

* Dow SDS.

Methyl Ethyl Ketone:

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.

Methyl ethyl ketone is considered to have a low order of toxicity; however, methyl ethyl ketone is often used in combination with other solvents and the mixture may have greater toxicity than either solvent alone. Combinations of n-hexane with methyl ethyl ketone, and also methyl n-butyl ketone with methyl ethyl ketone may result in an increased in peripheral neuropathy, a progressive disorder of the nerves of the extremities. Combinations with chloroform also show an increase in toxicity.

Nitrogen:

No significant acute toxicological data identified in literature search.

1,3,3,3-Tetrafluoropropene:

Inhalation (rat) NOEL (28 days): >1.5 mg/l ** Vendor HFO-1234ze is not likely to accumulate in the bodies of humans or animals HFO-1234ze is practically non-toxic. Short-term exposures at levels higher than 10% have not induced cardiac sensitization to adrenalin nor induced serious toxic effects. Rats and rabbits did not exhibit any serious toxic, developmental or reproductive effects even with exposures to high levels of HFO-1234ze. Based on a series of mutagenicity and genomics studies, the cancer risk for HFO-1234ze is low, no cardiac sensitisation was observed in dogs with exposures up to 120,000 ppm; repeated dose toxicity in rats (13-wk) found mild effects on the heart (NOEL 5,000ppm); in vitro genotoxicity findings include negative Ames Test and negative human lymphocyte chromosome aberration test; in vivo genotoxicity findings in the mouse micronucleus test were negative (inhalation, mammalian bone-marrow cytogenetic test with chromosomal analysis).

Alumasc Fleece Back Spray Bond & 4,4'-Diphenylmethane Diisocyanate (MDI) & MDI, Oligomeric:

Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms.

Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T-lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.

Alumasc Fleece Back Spray Bond & 4,4'-Diphenylmethane Diisocyanate (Mdi) & 2,2'-Dimorpholinodiethyl Ether & MDI, Oligomeric:

The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions.

Alumasc Fleece Back Spray Bond & 1,3,3,3- Tetrafluoropropene:

Inhalation of perfluoroalkenes can cause lung injury, kidney damage, brain changes and death. Repeated exposures may alter blood pressure and the production of blood cells. The potential for causing cancer is the subject of speculation. Fluoroalkanes, in contrast, are less toxic.

Disinfection byproducts (DBPs) are formed when disinfectants such as chlorine, chloramines and ozone react with organic and inorganic matter in water. Animal studies have shown that some DBPs cause cancer. To date, several hundred DBPs have been identified.

Numerous haloalkanes and haloalkenes have been tested for cancer-causing and mutation-causing activities.

4,4'-Diphenylmethane Diisocyanate (MDI) & MDI, Oligomeric & Methyl Ethyl Ketone:

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.

4,4'-Diphenylmethane Diisocyanate (MDI) & MDI, Oligomeric:

Isocyanate vapours are irritating to the airways and can cause their inflammation, with wheezing, gasping, severe distress, even loss of consciousness and fluid in the lungs. Nervous system symptoms that may occur include headache, sleep disturbance, euphoria, incoordination, anxiety, depression and paranoia.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Aromatic and aliphatic diisocyanates may cause airway toxicity and skin sensitization. Monomers and prepolymers exhibit similar respiratory effect. Of the several members of diisocyanates tested on experimental animals by inhalation and oral exposure, some caused cancer while others produced a harmless outcome.

Reference No: SDS-SP001
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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.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Alumasc Fleece Back Spray Bond:

End point	Test Duration (hr)	Species	Value	Source
Not available	Not available	Not available	Not available	Not available

Tris(2-Chloroisopropyl)Phosphate:

End point	Test Duration (hr)	Species	Value	Source
ErC50	72h	Algae or other aquatic plants	4mg/l	1
BCF	1008h	Fish	0.8-2.8	7
EC50(ECx)	96h	Algae or other aquatic plants	4mg/l	1
EC50	72h	Algae or other aquatic plants	33mg/l	2
EC50	48h	Crustacea	65335mg/l	1
LC50	96h	Fish	11mg/l	2
EC50	96h	Algae or other aquatic plants	4mg/l	1

4,4'-Diphenylmethane Diisocyanate (MDI):

End point	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	504h	Crustacea	>=10mg/l	2
BCF	672h	Fish	61-150	7
EC50	72h	Algae or other aquatic plants	>1640mg/l	2
LC50	96h	Fish	>1000mg/l	2

2,2'-Dimorpholinodiethyl Ether:

End point	Test Duration (hr)	Species	Value	Source
EC50(ECx)	24h	Crustacea	>100mg/l	2
EC50	72h	Algae or other aquatic plants	>100mg/l	2
EC50	48h	Crustacea	>100mg/l	2
LC50	96h	Fish	>2150mg/l	2

MDI, Oligomeric:

End point	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>1640mg/l	2
LC50	96h	Fish	>1000mg/l	2
NOEC(ECx)	504h	Crustacea	>10mg/l	2

Methyl Ethyl Ketone:

End point	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	96h	Fish	1.18mg/L	4
EC50	96h	Algae or other aquatic plants	>500mg/l	4
EC50	72h	Algae or other aquatic plants	1972mg/l	2
EC50	48h	Crustacea	308mg/l	2
LC50	96h	Fish	>1.18mg/L	4

Nitrogen:

End point	Test Duration (hr)	Species	Value	Source
Not available	Not available	Not available	Not available	Not available

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1.3.3.3-Tetrafluoropropene

End point	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>170mg/l	2
EC50	48h	Crustacea	>160mg/l	2
EC50(ECx)	48h	Crustacea	>160mg/l	2

Legend:

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

Harmful to aquatic organisms.

For Methyl Ethyl Ketone:

log Kow: 0.26-0.69;

log Koc: 0.69;

Koc: 34;

Half-life (hr) air: 2.3;

Half-life (hr) H₂O surface water: 72-288; Henry's atm m³/mol: 1.05E-05;

BOD 5: 1.5-2.24, 46%;

COD: 2.2-2.31, 100%;

ThOD: 2.44;

BCF: 1.

Environmental Fate: Terrestrial Fate - Measured Koc values of 29 and 34 were obtained for methyl ethyl ketone in silt loams. Methyl ethyl ketone is expected to have very high mobility in soil.

Substances containing unsaturated carbons are ubiquitous in indoor environments. They result from many sources (see below). Most are reactive with environmental ozone and many produce stable products which are thought to adversely affect human health. The potential for surfaces in an enclosed space to facilitate reactions should be considered.

In addition to carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), the greenhouse gases mentioned in the Kyoto Protocol include synthetic substances that share the common feature of being highly persistent in the atmosphere and inhibit radiation from escaping out of the atmosphere. These synthetic substances include hydrocarbons that are partially fluorinated (HCFs) or totally fluorinated (PFCs) as well as sulfur hexafluoride (SF₆). The greenhouse potential of these substances, expressed as multiples of that of CO₂, are within the range of 140 to 11,700 for HFCs, from 6500 to 9,200 for PFCs and 23,900 for SF₆.

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.

DO NOT discharge into sewer or waterways.

12.2 Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
Tris(2-Chloroisopropyl)Phosphate	HIGH	HIGH
4,4'-Diphenylmethane Diisocyanate (MDI)	LOW (Half-life = 1 days)	LOW (Half-life = 0.24 days)
2,2'-Dimorpholinodiethyl Ether	HIGH	HIGH
Methyl Ethyl Ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)

12.3 Bio accumulative potential

Ingredient	Bioaccumulation
Tris(2-Chloroisopropyl)Phosphate	LOW (BCF = 4.6)
4,4'-Diphenylmethane Diisocyanate (MDI)	LOW (BCF = 15)
2,2'-Dimorpholinodiethyl Ether	LOW (LogKOW = -1.3122)
Methyl Ethyl Ketone	LOW (LogKOW = 0.29)

12.4 Mobility in soil

Ingredient	Mobility
Tris(2-Chloroisopropyl)Phosphate	LOW (KOC = 1278)
4,4'-Diphenylmethane Diisocyanate (MDI)	LOW (KOC = 376200)
2,2'-Dimorpholinodiethyl Ether	LOW (KOC = 10)
Methyl Ethyl Ketone	MEDIUM (KOC = 3.827)

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

No data available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product / packaging disposal: 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. DO NOT recycle spilled material. Consult State Land Waste Management Authority for disposal. Neutralise spill material carefully and decontaminate empty containers and spill residues with 10% ammonia solution plus detergent or a proprietary decontaminant prior to disposal.

Waste treatment options: Not available.

Sewage disposal options: Not available.

14. TRANSPORT INFORMATION

Labels required:



Marine pollutant:
Hazchem:

No.
2ZE.

Land transport (ADR-RID):

14.1 UN number 3500
14.2 UN proper shipping name Chemical under pressure, N.O.S. (contains Nitrogen and 4,4'-Diphenylmethane Diisocyanate (MDI))
14.3 Transport hazard class(es) Class: 2.2.
Subrisk: Not applicable.
14.4 Packing group Not applicable.
14.5 Environmental hazard Not applicable.

14.6 Special precautions for user

Special provisions	274; 362
Limited quantity	0

Air transport (ICAO-IATA / DGR):

14.1 UN number 3500.
14.2 UN proper shipping name Chemical under pressure, N.O.S. (contains Nitrogen and 4,4'-Diphenylmethane Diisocyanate (MDI))
14.3 Transport hazard class(es) Class: 2.2.
Subrisk: Not applicable.
ERG code: 2L.
14.4 Packing group Not applicable.
14.5 Environmental hazard Not applicable.

14.6 Special precautions for user

Special provisions	A187
Cargo only packing instructions	218

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Cargo only maximum qty / pack	150 kg
Passenger and cargo packing instructions	218
Passenger and cargo maximum qty / pack	75 kg
Passenger and cargo limited quantity packing instructions	Forbidden
Passenger and cargo limited maximum qty / pack	Forbidden

Sea transport (IMDG-Code / GGVSee):

- 14.1 UN number** 3500.
14.2 UN proper shipping name Chemical under pressure, N.O.S. (contains Nitrogen and 4,4'-Diphenylmethane Diisocyanate (MDI))
14.3 Transport hazard class(es) Class: 2.2.
Subrisk: Not applicable.
14.4 Packing group Not applicable.
14.5 Environmental hazard Not applicable.

14.6 Special precautions for user

EMS No.	F-C, S-V
Special provisions	274 362
Limited quantities	0

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

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

Not available.

14.9 Transport in bulk in accordance with the ICG Code

Not available.

15. REGULATORY INFORMATION

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

Tris(2-Chloroisopropyl)Phosphate is found on the following regulatory list:

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances
Europe EC Inventory.
European Union - European Inventory of Existing Commercial Chemical Substances (EINECS).

4,4'-Diphenylmethane Diisocyanate (MDI) is found on the following regulatory list:

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances
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.
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
UK Workplace Exposure Limits (WELs).

2,2'-Dimorpholinodiethyl Ether is found on the following regulatory list:

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

MDI, Oligomeric is found on the following regulatory list:

Europe EC Inventory.

Methyl Ethyl Ketone is found on the following regulatory list:

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs).
EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

Our company policy is one of continuous research and development; we therefore reserve the right to amend content herein without prior notice.

Reference No: SDS-SP001
Date of issue: 01/07/2021

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.

UK Workplace Exposure Limits (WELs).

Nitrogen is found on the following regulatory list:

Europe EC Inventory.

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

1,3,3,3-Tetrafluoropropene is found on the following regulatory list:

Not applicable.

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.

ECHA Summary:

Ingredient	CAS number	Index No	ECHA Dossier
Tris(2-Chloroisopropyl) Phosphate	13674-84-5	Not available	Not available

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Picture Signal Word Code(s)	Hazard Statement Code(s)
1	Acute Tox. 4	GHS07; Wng	H302
2	Acute Tox. 4	GHS07; Wng	H302
1	Acute Tox. 4	GHS07; Wng	H302
2	Acute Tox. 4; Aquatic Chronic 3; Eye Irrit. 2; Skin Irrit. 2	GHS07; Wng	H302; H412; H319; H315

Ingredient	CAS number	Index No	ECHA Dossier
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	615-005-00-9	01-2119457014-47-XXXX 01-2120766410-60-XXXX 01-2120770510-62-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Picture Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Skin Sens. 1; Eye Irrit. 2; Acute Tox. 4; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; STOT RE 2	GHS08; GHS07; Dgr	H315; H317; H319; H332; H334; H335; H351; H373
2	Eye Irrit. 2; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; Skin Sens. 1; STOT SE 3; Skin Irrit. 2; Muta. 2; Acute Tox. 2; STOT RE 1	GHS08; GHS07; Dgr; GHS06	H315; H319; H334; H335; H351; H317; H370; H341; H330; H372
1	Skin Irrit. 2; Skin Sens. 1; Eye Irrit. 2; Acute Tox. 2; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; STOT RE 2	GHS08; GHS07; GHS06; Dgr	H315; H317; H319; H330; H334; H335; H351; H373
2	Skin Irrit. 2; Skin Sens. 1; Eye Irrit. 2; Acute Tox. 2; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; STOT RE 2; STOT SE 3; Acute Tox. 4; Resp. STOT SE 2	GHS08; GHS07; GHS06; Dgr; Wng	H315; H317; H319; H330; H334; H335; H351; H373; H370

Ingredient	CAS number	Index No	ECHA Dossier
2,2'-Dimorpholinodiethyl Ether	6425-39-4	Not available	01-2119969278-20-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Picture Signal Word Code(s)	Hazard Statement Code(s)
1	Eye Irrit. 2	GHS07; Wng	H319
2	Eye Irrit. 2; Skin Irrit. 2; Acute Tox. 4	GHS07; Wng; GHS09	H319; H315; H302; H413; H317

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Ingredient	CAS number	Index No	ECHA Dossier
MDI, Oligomeric	32055-14-4	Not available	01-2119457024-46-XXXX
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Picture Signal Word Code(s)
1	Skin Irrit. 2; Skin Sens. 1; Eye Irrit. 2; Acute Tox. 4; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; STOT RE 2		GHS08; GHS07; Dgr
2	Skin Irrit. 2; Skin Sens. 1; Eye Irrit. 2; Acute Tox. 4; Resp. Sens. 1; Resp. STOT SE 3; Carc. 2; STOT RE 2		GHS08; GHS07; Dgr
Hazard Statement Code(s)			
H315; H317; H319; H332; H334; H335; H351; H373			

Ingredient	CAS number	Index No	ECHA Dossier
Methyl Ethyl Ketone	78-93-3	606-002-00-3	01-2119457290-43-XXXX 01-2119943742-35-XXXX
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Picture Signal Word Code(s)
1	Flam. Liq. 2; Eye Irrit. 2; Narc. STOT SE 3		GHS02; GHS07; Dgr
2	Flam. Liq. 2; Eye Irrit. 2; Narc. STOT SE 3; Resp. STOT SE 3; STOT SE 3; Skin Irrit. 2; Eye Irrit. 2A		GHS02; GHS07; Dgr; Wng; GHS08; GHS01; None Specified
Hazard Statement Code(s)			
H225; H319; H336; H225; H319; H336; H371; H335; H302; H312; H341; H361; H314			

Ingredient	CAS number	Index No	ECHA Dossier
Nitrogen	7727-37-9	Not available	Not available
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Picture Signal Word Code(s)
1	Comp.; Skin Sens. 1; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1		GHS04; Wng; GHS09; GHS07
2	Comp.; Ref. Liq.; Liq.; Diss.; Skin Irrit. 2; Eye Irrit. 2; Acute Tox. 4; Resp. STOT SE 3; Muta. 1B; Carc. 1A; Comp.; Skin Sens. 1; Aquatic Acute 1; Aquatic Chronic 1		GHS04; Wng; GHS08; GHS07; Dgr; GHS09
Hazard Statement Code(s)			
H280; H317; H319; H410; H280; H281; H315; H319; H332; H335; H340; H350; H317; H410			

Ingredient	CAS number	Index No	ECHA Dossier
1,3,3,3-Tetrafluoropropene	29118-24-9	Not available	01-0000019758-54-XXXX
Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)		Picture Signal Word Code(s)
1	Flam. Gas 1; Liq.; Skin Irrit. 2; Eye Irrit. 2; Resp. STOT SE 3		GHS02; GHS07; GHS04; Dgr
2	Flam. Gas 1; Liq.; Skin Irrit. 2; Eye Irrit. 2; Resp. STOT SE 3		GHS02; GHS07; GHS04; Dgr
1	Liq.		GHS04; Wng
2	Liq.		GHS04; Wng
1	Liq.; Flam. Gas 1; Acute Tox. 4; Aquatic Chronic 3		GHS04; Wng; GHS02; Dgr
2	Liq.; Flam. Gas 1; Acute Tox. 4; Aquatic Chronic 3		GHS04; Wng; GHS02; Dgr
Hazard Statement Code(s)			
H220; H280; H315; H319; H335; H220; H280; H315; H319; H335; H280; H280; H315; H319; H335; H280; H220; H412; H280; H220; H412			

Harmonisation Code:

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

16. OTHER INFORMATION

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	No (MDI, Oligomeric)
Canada - DSL	No (MDI, Oligomeric)
Canada - NDSL	No (Tris(2-Chloroisopropyl)Phosphate; 4,4'-Diphenylmethane Diisocyanate (MDI); 2,2'-Dimorpholinodiethyl Ether; MDI, Oligomeric; Methyl Ethyl Ketone; Nitrogen)
China - IECSC	No (MDI, Oligomeric; 1,3,3,3-Tetrafluoropropene)
Europe - EINEC / ELINCS / NLP	No (1,3,3,3-Tetrafluoropropene)
Japan - ENCS	No (MDI, Oligomeric; Nitrogen)
Korea - KECI	No (MDI, Oligomeric)

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New Zealand - NZIoC	No (1,3,3,3-Tetrafluoropropene)
Philippines - PICCS	No (1,3,3,3-Tetrafluoropropene)
USA - TSCA	No (MDI, Oligomeric)
Taiwan - TCSI	Yes
Mexico - INSQ	No (2,2'-Dimorpholinodiethyl Ether; MDI, Oligomeric; 1,3,3,3-Tetrafluoropropene)
Vietnam - NCI	Yes
Russia - FBEPH	No (1,3,3,3-Tetrafluoropropene)

Legend:

Yes = All CAS declared ingredients are on the inventory.

No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets).

Full text Risk and Hazard codes

H220:	Extremely flammable gas.
H225:	Highly flammable liquid and vapour.
H281:	Contains refrigerated gas; may cause cryogenic burns or injury.
H302:	Harmful if swallowed.
H312:	Harmful in contact with skin.
H314:	Causes severe skin burns and eye damage.
H330:	Fatal if inhaled.
H332:	Harmful if inhaled.
H333:	May be harmful if inhaled.
H335:	May cause respiratory irritation.
H336:	May cause drowsiness or dizziness.
H340:	May cause genetic defects.
H341:	Suspected of causing 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.
H410:	Very toxic to aquatic life with long lasting effects.
H412:	Harmful to aquatic life with long lasting effects.
H413:	May cause long lasting harmful effects to aquatic life.

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.

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.

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.

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LOD:	Limit Of Detection.
OTV:	Odour Threshold Value.
BCF:	BioConcentration Factors.
BEI:	Biological Exposure Index.
AIIC:	Australian Inventory of Industrial Chemicals.
DSL:	Domestic Substances List.
NDSL:	Non-Domestic Substances List.
IECSC:	Inventory of Existing Chemical Substance in China.
EINECS:	European INventory of Existing Commercial chemical Substances.
ELINCS:	European List of Notified Chemical Substances.
NLP:	No-Longer Polymers
ENCS:	Existing and New Chemical Substances Inventory.
KECI:	Korea Existing Chemicals Inventory.
NZIoC:	New Zealand Inventory of Chemicals.
PICCS:	Philippine Inventory of Chemicals and Chemical Substances.
TSCA:	Toxic Substances Control Act.
TCSI:	Taiwan Chemical Substance Inventory.
INSQ:	Inventario Nacional de Sustancias Químicas.
NCI:	National Chemical Inventory.
FBEPH:	Russian Register of Potentially Hazardous Chemical and Biological Substances.

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

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