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

### 1.1 Product identifier

Trade name/designation: Euroroof PU Insulation Spray Adhesive.

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

Identified uses: 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 (EC) No 1272/2008 [CLP]:**
H334 - Respiratory Sensitizer Category 1, H373 - Specific target organ toxicity - repeated exposure Category 2, 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.

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:

Hazard statements:
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H373: May cause damage to organs through prolonged or repeated exposure.
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 statements:
EUH044: Risk of explosion if heated under confinement.
EUH204: Contains isocyanates. May produce an allergic reaction.

Precautionary statements:
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 doctor.
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.
P314: Get medical advice/attention if you feel unwell.
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

**Polymeric Diphenylmethane Diisocyanate:**
Listed in the Europe Regulation (EC) No 1907/2006 - Annex XVII (restrictions may apply).

## 3. COMPOSITION AND INFORMATION ABOUT THE COMPONENTS

### 3.1 Substance

Spray applied polyurethane adhesive.

### 3.2 Mixture

| **1.CAS No.<br>2.EC No.<br>3. Index No 4.<br>4.REACH No.** | **%[weight]** | **Name** | **Classification according to regulation (EC) No 1272/2008 [CLP] and amendments** |
|---|---|---|---|
| 1.29118-24-9<br>2.Not available<br>3.Not available<br>4.01-0000019758-54-XXXX | 10-30 | 1,3,3,3-Tetrafluoropropene | Gas under Pressure (Liquefied gas); H280 [1] |
| 1.9016-87-9<br>2.Not available<br>3.Not available<br>4.01-2119457024-46-XXXX | 10-30 | Polymeric Diphenylmethane Diisocyanate | 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] |
| 1.7727-37-9<br>2.231-783-9<br>3.Not available<br>4.Not available | <1 | Nitrogen | Gas under Pressure (Compressed gas); H280, EUH044 [1] |
| 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 | | |

## 4. FIRST-AID MEASURES

### 4.1 Description of first aid measures

Eye contact: If product comes in contact with eyes remove the patient from gas source or contaminated area.
Take the patient to the nearest eye wash, shower or other source of clean water.
Open the eyelid(s) wide to allow the material to evaporate.
Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.
The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage.
Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s).
Transport to hospital or doctor.
Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur.

If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage.
Ensure verbal communication and physical contact with the patient.
DO NOT allow the patient to rub the eyes.
DO NOT allow the patient to tightly shut the eyes.
DO NOT introduce oil or ointment into the eye(s) without medical advice.
DO NOT use hot or tepid water.

Skin contact: If skin or hair contact occurs:
Immediately flush body and clothes with large amounts of water, using safety shower if available.
Quickly remove all contaminated clothing, including footwear.
Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
Transport to hospital, or doctor.

Inhalation: 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.
Following exposure to gas, remove the patient from the gas source or contaminated area.
NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer.
Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures.
If the patient is not breathing spontaneously, administer rescue breathing.
If the patient does not have a pulse, administer CPR.
If medical oxygen and appropriately trained personnel are available, administer 100% oxygen.
Summon an emergency ambulance. If an ambulance is Not available, contact a physician, hospital, or Poison Control Centre for further instruction.
Keep the patient warm, comfortable and at rest while awaiting medical care.
MONITOR THE BREATHING AND PULSE, CONTINUOUSLY.
Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.

Ingestion: Not considered a normal route of entry.
- 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 microgm/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:**

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.

**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.

## 5. FIRE-FIGHTING MEASURES

### 5.1 Extinguishing media

Small quantities of water in contact with hot liquid may react violently with generation of a large volume of rapidly expanding hot sticky semi-solid foam
Presents additional hazard when fire fighting in a confined space.
Cooling with flooding quantities of water reduces this risk.
SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.
LARGE FIRE: Cool cylinder.
**DO NOT direct water at source of leak or venting safety devices as icing may occur.**

### 5.2 Special hazards arising from the substance or mixture

Avoid contamination with oxidising agent,s 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 and protective gloves.
Fight fire from a safe distance, with adequate cover.
Containers may explode when heated - ruptured cylinders may rocket.
Fire exposed containers may vent contents through pressure relief devices.
High concentrations of gas may cause asphyxiation without warning.
May decompose explosively when heated or involved in fire.

**Decomposition may produce toxic fumes of:**
- carbon monoxide (CO).

**Combustion products include:**
- carbon dioxide (CO2).
- isocyanates.
- hydrogen cyanide.

**and minor amounts of:**
- nitrogen oxides (NOx).
- 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.

## 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 materials for containment and cleaning up

**Minor spills:**
Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used.
DO NOT enter confined spaces where gas may have accumulated.

**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 all unprotected personnel and move upwind.
Alert emergency authority and advise them of the location and nature of hazard.
Wear breathing apparatus and protective gloves.
Remove leaking cylinders to a safe place.
Fit vent pipes. Release pressure under safe, controlled conditions .
Burn issuing gas at vent pipes.
DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

### 6.4 Reference to other sections

Refer to Section 8.

## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe handling

**Safe handling:**
Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.
The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines.
Fully welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended.
DO NOT transfer gas from one cylinder to another.

**Fire & explosion protection:**
See Section 5.

**Other information:**
Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open.
Such compounds should be sited and built in accordance with statutory requirements.
The storage compound should be kept clear and access restricted to authorised personnel only.

### 7.2 Conditions for safe storage, including any incompatibilities

**Suitable container:**
Cylinder:
Ensure the use of equipment rated for cylinder pressure.
Ensure the use of compatible materials of construction.
Valve protection cap to be in place until cylinder is secured, connected

**Storage incompatibility:**
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.
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 /g.
Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances.

\+ X + O + + +

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

### 7.3 Specific end use(s)

See Section 1.2.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

| Ingredient | DNELs<br>Exposure Pattern Worker | PNECs<br>Compartment |
|---|---|---|
| 1,3,3,3-tetrafluoropropene | Inhalation 3 902 mg/m³ (Systemic, Chronic)<br>Inhalation 830 mg/m³ (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) | polymeric diphenylmethane | Isocyanates, all (as -NCO) Except methyl isocyanate | 0.02 mg/m3 | 0.07 mg/m3 | Not Available | Sen |
| Europe ECHA Occupational exposure limits - Activity list | polymeric diphenylmethane | Not available | Not Available | Not Available | Not Available | Not available |

| Emergency Limits | | | |
|---|---|---|---|
| **Ingredient** | **TEEL-1** | **TEEL-2** | **TEEL-3** |
| 1,3,3,3-tetrafluoropropene | 1,400 ppm | Not available | Not available |
| polymeric diphenylmethane diisocyanate | 0.15 mg/m3 | 3.6 mg/m3 | 22 mg/m3 |
| nitrogen | 7.96E+05 ppm | 8.32E+05 ppm | 8.69E+05 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| 1,3,3,3-tetrafluoropropene | Not available | Not available |
| polymeric diphenylmethane diisocyanate | Not available | Not available |
| nitrogen | Not available | Not available |

### 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.

**Eye and face protection:**

**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.
When handling sealed and suitably insulated cylinders wear cloth or leather gloves.

**Body protection:**
See other protection below.

**Other protection:**
Protective overalls, closely fitted at neck and wrist.
Eye-wash unit.
Ensure availability of lifeline in confined spaces.

**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.
Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change).
Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

**Environmental exposure controls:**
See Section 12.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

| | | | |
|---|---|---|---|
| **Appearance** | Cream | | |
| **Physical state** | Compressed Gas | **Relative density (Water = 1)** | 1.14-1.20 |
| **Odour** | Characteristic | **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)** | 2083.333-2916.667 |
| **Initial boiling point and boiling range (°C)** | Not available | **Molecular weight (g/mol)** | Not available |
| **Flash point (°C)** | Not available | **Taste** | Not available |
| **Evaporation rate** | Not available | **Explosive properties** | Not available |

| | | | |
|---|---|---|---|
| **Flammability** | Not available | **Oxidising properties** | Does not meet criteria for |
| **Upper Explosive Limit (%)** | Not available | **Surface Tension (dyn/cm or mN/m)** | Not available |
| **Lower Explosive Limit (%)** | Not available | **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 |

### 9.2 Other information

No data 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 7.2.

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

**Inhaled:**
There is strong evidence to suggest that this material can cause, if inhaled once, very serious, irreversible damage of organs. The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
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.
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.
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.

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may produce severely toxic effects. Relatively small amounts absorbed from the lungs may prove fatal.

**Ingestion:**
There is strong evidence to suggest that this material can cause, if swallowed once, very serious, irreversible damage of organs. Not normally a hazard due to physical form of product.
Considered an unlikely route of entry in commercial/industrial environments.
Accidental ingestion of the material may be seriously damaging to the health of the individual; animal experiments indicate that ingestion of less than 40 gram may be fatal.

**Skin contact:**
This material can cause inflammation of the skin on contact in some persons.
There is strong evidence to suggest that this material, on a single contact with skin, can cause very serious, irreversible damage of organs. 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.
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.
Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

**Eye:**
Not considered to be a risk because of the extreme volatility of the gas.
This material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.

**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.
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. Main route of exposure to the gas in the workplace is by inhalation.
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.

**Euroroof Insulation Adhesive:**

| **Toxicity** | **Irritation** |
|---|---|
| Not available | Not available |

**1,3,3,3-Tetrafluoropropene:**

| **Toxicity** | **Irritation** |
|---|---|
| Inhalation (rat) LC50; >1157.752 ppm4[2] | Not available |

**Polymeric Diphenylmethane Diisocyanate:**

| **Toxicity** | **Irritation** |
|---|---|
| Dermal (rabbit) LD50: >9400 mg/kg[2] | Eye (rabbit): 100 mg – mild |
| Dermal (rabbit) LD50: >9400 mg/kg[2] | |
| Oral(Rat) LD50; 43000 mg/kg[2] | |

**Nitrogen:**

| **Toxicity** | **Irritation** |
|---|---|
| Not available | 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.

**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 cytogenic test with chromosomal analysis).

**Polymeric Diphenylmethane Diisocyanate:**
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.
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, inco-ordination, 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.
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.

**Nitrogen:**
No significant acute toxicological data identified in literature search.

**Euroroof Insulation Adhesive & Polymeric Diphenylmethane Diisocyanate:**
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.
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

**Euroroof Insulation Adhesive & 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

| | | | |
|---|---|---|---|
| **Acute Toxicity** | ✗ | **Carcinogenicity** | ✓ |
| **Skin Irritation/Corrosion** | ✓ | **Reproductivity** | ✗ |
| **Serious Eye Damage/Irritation** | ✓ | **STOT - Single Exposure** | ✗ |
| **Respiratory or Skin Sensitisation** | ✓ | **STOT – Repeated Exposure** | ✓ |
| **Mutagenicity** | ✗ | **Aspiration Hazard** | ✗ |

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

**Euroroof Insulation Adhesive:**

| End Point | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| Not available | Not available | Not available | Not available | Not available |

**1,3,3,3-Tetrafluoropropene:**

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

**Polymeric Diphenylmethane Diisocyanate:**

| End Point | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| Not available | Not available | Not available | Not available | Not available |

**Nitrogen:**

| End Point | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| Not available | Not available | Not available | Not available | Not available |

**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.

**Polyisocyanates:**
Polyisocyanates are not readily biodegradable. However, due to other elimination mechanisms (hydrolysis, adsorption), long retention times in water are not to be expected. The resulting polyurea is more or less inert and, due to its molecular size, not bioavailable.
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 ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$), 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 ($SF_6$). The greenhouse potential of these substances, expressed as multiples of that of $CO_2$, are within the range of 140 to 11,700 for HFCs, from 6500 to 9,200 for PFCs and 23,900 for $SF_6$.
For Isocyanate Monomers:
Environmental Fate: Isocyanates, (di- and polyfunctional isocyanates), are commonly used to make various polymers, such as polyurethanes. Polyurethanes find significant application in the manufacture of rigid and flexible foams. They are also used in the production of adhesives, elastomers, and coatings.
DO NOT discharge into sewer or waterways.

### 12.2 Persistence and degradability

No data available.

### 12.3 Bioaccumulative potential

No data available.

### 12.4 Mobility in soil

No data available.

### 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:**
Evaporate residue at an approved site.
Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

**Waste treatment options:**
Not available.

**Sewage disposal options:**
Not available.

## 14. TRANSPORT INFORMATION

Label:


| | |
|---|---|
| Marine pollutant: | No. |
| Hazchem: | 2ZE. |

**LAND TRANSPORT (ADR-RID):**

### 14.1 UN Number

3500.

### 14.2 UN property shipping name

CHEMICAL UNDER PRESSURE, N.O.S. (contains polymeric diphenylmethane diisocyanate and nitrogen).

### 14.3 Transport hazard class(es)

| | |
|---|---|
| Class: | 2.2. |
| Sub-risk: | Not applicable. |

### 14.4 Packaging group

Not applicable.

### 14.5 Environmental hazard

Not applicable.

### 14.6 Special precautions for user

| | |
|---|---|
| Hazard identification (Kemler): | 20. |
| Classification code: | 8A. |
| Hazard label: | 2.2. |
| Special provisions: | 274 659. |
| Limited quantity: | 0. |
| Tunnel restriction code: | 3 (C/E). |

**AIR TRANSPORT (ICAO-IATA / DGR)**

**14.1 UN Number**

3500.

**14.2 UN property shipping name**

CHEMICAL UNDER PRESSURE, N.O.S. (contains polymeric diphenylmethane diisocyanate and nitrogen).

**14.3 Transport hazard class(es)**

| | |
|---|---|
| Class: | 2.2. |
| Sub-risk: | Not applicable. |
| ERG code: | 2L. |

**14.4 Packaging group**

Not applicable.

**14.5 Environmental hazard**

Not applicable.

**14.6 Special precautions for user**

| | |
|---|---|
| Special provisions: | A187. |
| Cargo only packing instructions: | 218. |
| 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 property shipping name**

CHEMICAL UNDER PRESSURE, N.O.S. (contains polymeric diphenylmethane diisocyanate and nitrogen).

**14.3 Transport hazard class(es)**

| | |
|---|---|
| Class: | 2.2. |
| Sub-risk: | Not applicable. |

**14.4 Packaging 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. |

**INLAND WATERWAYS TRANSPORT (ADN):**

**14.1 UN Number**

3500.

**14.2 UN property shipping name**

CHEMICAL UNDER PRESSURE, N.O.S. (contains polymeric diphenylmethane diisocyanate and nitrogen).

**14.3 Transport hazard class(es)**

Not applicable.

**14.4 Packaging group**

Not applicable.

**14.5 Environmental hazard**

Not applicable.

**14.6 Special precautions for user**

| | |
|---|---|
| Classification code: | 8A. |
| Special provisions: | 274; 659. |
| Limited quantity: | 0. |
| Equipment required: | PP. |
| Fire cones number: | 0. |

## 15. REGULATORY INFORMATION

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

**1,3,3,3-Tetrafluoropropene is found on the following regulatory lists:**
Not applicable.

**Polymeric Diphenylmethane Diisocyanate 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.
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs.
UK Workplace Exposure Limits (WELs).

**Nitrogen is found on the following regulatory lists:**
Europe EC Inventory.
European Union - European Inventory of Existing Commercial Chemical Substances (EINECS).

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.

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use: | Yes. |
| Canada - DSL: | Yes |
| Canada - NDSL: | No (polymeric diphenylmethane diisocyanate; nitrogen). |
| China – IECSC: | No (1,3,3,3-tetrafluoropropene). |
| Europe - EINEC / ELINCS / NLP: | No (1,3,3,3-tetrafluoropropene; polymeric diphenylmethane diisocyanate). |
| Japan – ENCS: | No (nitrogen). |
| Korea – KECI: | Yes. |

| | |
|---|---|
| New Zealand – NZIoC: | No (1,3,3,3-tetrafluoropropene). |
| Philippines – PICCS: | No (1,3,3,3-tetrafluoropropene). |
| USA – TSCA: | Yes. |
| Taiwan – TCSI: | Yes. |
| Mexico – INSQ: | No (1,3,3,3-tetrafluoropropene). |
| Vietnam – NCI: | Yes. |
| Russia – ARIPS: | No (1,3,3,3-tetrafluoropropene). |
| Legend: | Yes = All CAS declared ingredients are on the inventory<br>No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific |

## 16. 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. |
| 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: | Bio-Concentration Factors. |
| BEI: | Biological Exposure Index. |

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