Terra-Lock Adhesive Part A

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Terra-Lock Adhesive Part A

Product Code: 7365-10-A

Intended Use of the Product

Low pressure Polyurethane Foam Roof Tile Adhesive, Side-A Component, for PROFESSIONAL USE ONLY

Name, Address, and Telephone of the Responsible Party

Manufacturer	Supplier	
The Garland Company, Inc.	The Garland Company, Inc.	The Garland Company, Inc.
3800 East 91st Street	3800 East 91st Street	209 Carrier Drive
Cleveland, Ohio 44105-2197	Cleveland, Ohio 44105-2197	Toronto, Ontario M9W 5Y8
T-800-762-8225	T-800-762-8225	T-416-747-7995 800-387-5991
F-216-641-0633	F-216-641-0633	F-416-747-1980
www.garlandco.com		

Emergency Telephone Number

Emergency number : 1-800-262-8200 (CHEMTREC)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Press Gas	H280
Resp Sens 1	H334
Skin irrit. 2	H315
STOT RE 2	H373
Acute Tox 4	H332
Eye Irrit. 2A	H319
Skin Sens. 1	H317
STOTE SE 3	H335

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) :
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H373 May cause damage to organs through prolonged or repeated exposure.
H332 Harmful if inhaled.
H335 May cause respiratory irritation
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H280 Contains gas under pressure; may explode if heated.
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Precautionary Statements (GHS-US) : **P260** Do not breathe gas.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P261 Avoid breathing gas.
P280 Wear protective gloves, protective clothing, eye protection and face protection.

P264 Wash all exposed external body areas thoroughly after handling.
P272 Contaminated work clothing must not be allowed out of the workplace.
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
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.
P302+P352 IF ON SKIN: Wash with plenty of water and soap.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.
P405 Store locked up.
P410+P403 Protect from sunlight. Store in a well-ventilated place.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Mixture

Name	Product identifier	% (w/w)
polymeric diphenylmethane diisocyanate	101-68-8	30-60
4,4'-diphenylmethane diisocyanate (MDI)	9016-87-9	30-60
1,3,3,3-tetrafluoropropene	29118-24-9	5-10
nitrogen	7727-37-9	<5

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).
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.

Skin Contact:

- 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.

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.
- 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.

Ingestion: Seek medical attention.

Indication of any immediate medical attention and special treatment needed

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.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable 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. This presents additional hazard when fire fighting in a confined space.

- Cooling with flooding quantities of water reduces this risk.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.CO2, foam or dry chemicals.

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

Special Hazards Arising From the Substance or Mixture

Fire Fighting	--- GENERAL --- Alert Fire Brigade and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	- Combustible. - Moderate fire hazard when exposed to heat or flame. - When heated to high temperatures decomposes rapidly generating vapour which pressures and may then rupture containers with release of flammable and highly toxic isocyanate vapour. ➢ Containers may explode when heated - Ruptured cylinders may rocket ➢ May burn but does not ignite easily. ➢ Fire exposed cylinders may vent contents through pressure relief devices thereby increasing vapour concentration.. ➢ Fire may produce irritating, poisonous or corrosive gases. **Decomposition may produce toxic fumes of:** carbon monoxide (CO) carbon dioxide (CO2) isocyanates hydrogen cyanide and minor amounts of nitrogen oxides (NOx) other pyrolysis products typical of burning organic material.

Advice for Firefighters

Protective equipment: Protective clothing and respiratory protective device.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

See section 8

Environmental precautions

See section 12

Methods and Material for Containment and Cleaning Up

Minor Spills	• 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. • **DO NOT** touch the spill material • Clear area of all unprotected personnel and move upwind. • Alert Emergency Authority and advise them of the location and nature of hazard. • Wear full body clothing with breathing apparatus. • 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.

SECTION 7: HANDLING AND STORAGE

Precautions for 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.

Other information

Consider storage under inert gas.

- 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 authorized personnel only.

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

·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.
- 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.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Source	Ingredient	Material Name	TWA	STEL	Peak
US OSHA PEL Z-1	4,4'-diphenylmethane diisocyanate (MDI)	Methylene bisphenyl isocyanate (MDI)	Not Available	Not Available	0.02 ppm
US OSHA PEL Z-1	4,4'-diphenylmethane diisocyanate (MDI)	Methylene bisphenyl isocyanate	.005 ppm	Not Available	0.02 (10 minute) ppm

Ingredient	TEEL-1	TEEL-2	TEEL-3
4,4’-diphenylmethane diisocyanate (MDI)	.045 mg/m3	Not Available	Not Available
4,4’-diphenylmethane diisocyanate (MDI)	29 mg/m3	40 mg/m3	240 mg/m3
1,3,3,3-tetrafluoropropene	1,400 ppm	Not available	Not available
nitrogen	7.96E05 ppm	8.32E05 ppm	8.60E05 PPM
Polymeric diphenylmethane diisocyanate	.15 mg/m3	3.6 mg/m3	22 mg/m3

Ingredient	Original IDLH	Revised IDLH
polymeric diphenylmethane diisocyanate	Not available	Not available
4,4’-diphenylmethane diisocyanate (MDI)	75 mg/m3	Not available
1,3,3,3-tetrafluoropropene	Not available	Not available
Nitrogen	Not available	Not available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
polymeric diphenylmethane diisocyanate	E	≤0.1 ppm
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to arange of exposure concentrations that are expected to protect worker health.*	

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 Equipment: Protective goggles. Gloves. Protective clothing.

Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: NOTE:

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.

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

- 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.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Compressed gas
Appearance	:	Moisture sensitive
Odor	:	Not Available
pH	:	Not Available
Boiling Point	:	Not Available
Flash Point	:	Not Available
Vapor Pressure	:	Not determined

Ignition Temperature	:	Not Available
Relative Vapor Density at 20 °C	:	Not Available
Relative Density	:	Not available
Solubility in Water	:	Immiscible
Specific Gravity	:	1.23
VOC	:	Not Available

SECTION 10: STABILITY AND REACTIVITY

Reactivity Stable under recommended storage conditions. See section 7

Thermal decomposition / conditions to be avoided: See section 7.

Possibility of hazardous reactions: See section 7

Conditions to avoid: See section 7

Incompatible materials: See section 7

Hazardous decomposition products: See section 5.

Chemical stability:

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.
- Presence of elevated temperatures.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects – Product

Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of the vapour is hazardous and may even be fatal The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. Inhalation of toxic gases may cause: • Central Nervous System effects including depression, headache, confusion, dizziness, stupor, coma and seizures; • respiratory: acute lung swellings, shortness of breath, wheezing, rapid breathing, other symptoms and respiratory arrest; • heart: collapse, irregular heartbeats and cardiac arrest; • gastrointestinal: irritation, ulcers, nausea and vomiting (may be bloody), and abdominal pain. 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. 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. There is strong evidence to suggest that this material can cause, if inhaled once, very serious, irreversible damage of organs.
Ingestion	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. The material may accentuate any pre-existing dermatitis condition Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. 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	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	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. 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. This product contains a polymer with a functional group considered to be of high concern. Isothiocyanates may cause hypersensitivity of the skin and airways. 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. Animal testing shows that polymeric MDI can damage the nasal cavities and lungs, causing inflammation.and increased cell growth. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.

Component	**Toxicity**	**Irritation**
Terra Lock Adhesive Part A	Not Available	Not Available
1,3,3,3-tetrafluoropropene	Inhalation(Rat) LC50: >1157.752 ppm4h[2]	Not Available
nitrogen	Not Available	Not Available
4,4'-diphenylmethane diisocyanate (MDI)	Dermal (rabbit) LD50: >6200 mg/kg[2] Inhalation(Rat) LC50: 0.368 mg/L4h[1] Oral (Rat) LD50; >2000 mg/kg[1]	Dermal Sensitizer Eye: no adverse effect observed (not irritating)[1] Skin (rabbit): 500 mg /24 hours Skin: adverse effect observed (irritating)[1]
polymeric diphenylmethane diisocyanate	Dermal (rabbit) LD50: >9400 mg/kg[2] Inhalation(Rat) LC50: 0.49 mg/L4h[2] Oral (Rat) LD50; 43000 mg/kg[2]	Eye (rabbit): 100 mg - mild

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*

Component	Toxicity
Terra Lock Adhesive Part A	Not Available
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). 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.
nitrogen	No significant acute toxicological data identified in literature search.
4,4'-diphenylmethane diisocyanate (MDI)	Inhalation (human) TCLo: 0.13 ppm/30 mins Eye (rabbit): 0.10 mg moderate
polymeric diphenylmethane diisocyanate	Dermal (rabbit) LD50: >9400 mg/kg[2] Inhalation(Rat) LC50: 0.49 mg/L4h[2] Oral (Rat) LD50; 43000 mg/kg[2]
Terra-Lock & 4,4'-DIPHENYLMETHANE DIISOCYANATE (MDI) & 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. 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.
Terra-Lock & 1,3,3,3-TETRAFLUOROPROPENE	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) & POLYMERIC DIPHENYLMETHANE DIISOCYANATE	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. 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.

Criteria	Classified?	Criteria	Classified?
Acute toxicity	Yes	Acute toxicity	No
Skin Irritation / Corrosion	Yes	Reproductivity	No
Serious Eye Damage/ Irritation	Yes	STOT – Single Exposure	Yes
Respiratory or skin sensitization	Yes	STOT – Repeated Exposure	Yes
Mutagenicity	No	Aspiration Hazard	No

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Component	Endpoint	Test Duration(hr)	Species	Value	Source
Terra Lock Adhesive Part A	Not Available	Not Available	Not Available	Not Available	Not Available
1,3,3,3-tetrafluoropropene	EC50 EC50 WX50(ECx)	72h 48h 48h	Algae or other aquatic plants Crustacea Crustacea	>170 mg/l >160 mg/l >160 mg/l	2 2 2
nitrogen	Not Available	Not Available	Not Available	Not Available	Not Available
4,4'-diphenylmethane diisocyanate (MDI)	EC50 BCF NOEC(ECx) LC50	72h 672h 504h 96h	Algae or other aquatic plants Fish Crustacea Fish	>1640 mg/l 61-150 >=10 mg/l 95.24-134.37 mg/l	2 7 2 Not available
polymeric diphenylmethane diisocyanate	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 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*				

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
4,4'-diphenylmethane diisocyanate (MDI)	LOW (Half-life = 1 days)	LOW (Half-life = 0.24 days)

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.

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.

Behavior in environmental systems:

Bioaccumulative potential:

Ingredient	Bioaccumulation
4,4'-diphenylmethane diisocyanate (MDI)	LOW (BCF = 15)

Mobility in soil:

Ingredient	Mobility
4,4'-diphenylmethane diisocyanate (MDI)	LOW (KOC = 376200)

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information:

- **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.
- Evaporate residue at an approved site.

Ecology – Waste Materials: Avoid release to the environment. Hazardous waste due to toxicity.

SECTION 14: TRANSPORT INFORMATION

DOT Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Marine Pollutant: No

Special precautions for user

Hazard Label 2.2

Special provisions 362, T50, TP40

IATA Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Transport hazard class(es)

ICAO/IATA Class 2.2

ICAO / IATA Subrisk Not Applicable

ERG Code 2L

Packing group Not Applicable

Environmental hazard Not Applicable

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

IMO Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

IMDG Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Transport hazard class(es)

IMDG Class 2.2

IMDG Subrisk Not Applicable

Packing group Not Applicable

Environmental hazard Not Applicable

Special precautions for user

EMS Number F-C, S-V

Special provisions 274 362

Limited Quantities 0

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Section 355 (extremely hazardous substances):

None of the ingredients are listed.

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

1,3,3,3-tetrafluoropropene is found on the following regulatory lists

US AIHA Workplace Environmental Exposure Levels (WEELs)
US DOE Temporary Emergency Exposure Limits (TEELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US Toxicology Excellence for Risk Assessment (TERA) Workplace EnvironmentalExposure Levels (WEEL)
US TSCA Chemical Substance Inventory - Interim List of Active Substances

nitrogen is found on the following regulatory lists

US - Massachusetts - Right To Know Listed Chemicals
US DOE Temporary Emergency Exposure Limits (TEELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

4,4'-diphenylmethane diisocyanate (MDI) is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
US - California Hazardous Air Pollutants Identified as Toxic Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US Clean Air Act - Hazardous Air Pollutants
US DOE Temporary Emergency Exposure Limits (TEELs)
US EPA Integrated Risk Information System (IRIS)
US EPCRA Section 313 Chemical List
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Limits (PELs) Table Z-1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances
US TSCA New Chemical Exposure Limits (NCEL)

polymeric diphenylmethane diisocyanate is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US DOE Temporary Emergency Exposure Limits (TEELs)
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Flammable (Gases, Aerosols, Liquids, or Solids) No
Gas under pressure Yes
Explosive No
Self-heating No
Pyrophoric (Liquid or Solid) No
Pyrophoric Gas No
Corrosive to metal No
Oxidizer (Liquid, Solid or Gas) No
Organic Peroxide No
Self-reactive No
In contact with water emits flammable gas No
Combustible Dust No
Carcinogenicity No
Acute toxicity (any route of exposure) Yes
Reproductive toxicity No
Skin Corrosion or Irritation Yes
Respiratory or Skin Sensitization Yes
Serious eye damage or eye irritation Yes
Specific target organ toxicity (single or repeated exposure) Yes

Aspiration Hazard No
Germ cell mutagenicity No
Simple Asphyxiant No
Hazards Not Otherwise Classified No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

4,4'-diphenylmethane diisocyanate (MDI)
Reportable Quantity (lbs): 5000

State Regulations

US. California Proposition 65

None Reported

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
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	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

Legend:

Yes = All CAS declared ingredients are on the inventory

No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 6/20/2024

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

Party Responsible for the Preparation of This Document

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This information is based on our knowledge as of the Revision Date and is intended to describe the product only for the purposes of health, safety, and environmental requirements as of the Revision Date. It should not therefore be construed as guaranteeing any specific property of the product nor as providing any warranty, expressed or implied. The user assumes all responsibility, liability, risk of loss, damage, or expense arising out of, or in any way connected with, the handling, storage, use, or disposal of the product.

North America GHS US 2019 & WHMIS

Terra-Lock Adhesive Part B

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: N/A Date of issue: 08/28/2023

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Terra-Lock Adhesive Part B

Product Code: -7365-10-B

Intended Use of the Product

Low pressure Polyurethane Foam Roof Tile Adhesive, Side-B Component, for PROFESSIONAL USE ONLY

Name, Address, and Telephone of the Responsible Party

Manufacturer

The Garland Company, Inc.
3800 East 91st Street
Cleveland, Ohio 44105-2197
T-800-762-8225
F-216-641-0633
www.garlandco.com

Supplier

The Garland Company, Inc.
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Cleveland, Ohio 44105-2197
T-800-762-8225
F-216-641-0633

The Garland Company, Inc.
209 Carrier Drive
Toronto, Ontario M9W 5Y8
T-416-747-7995 800-387-5991
F-416-747-1980

Emergency Telephone Number

Emergency number : 1-800-262-8200 (CHEMTREC)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Press Gas	H280
Repr. 2	H360
Eye damage/irritation 2A	H317

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

Signal Word (GHS-US) : Warning

Hazard Statements (GHS-US) : H280 Contains gas under pressure; may explode if heated.
H361 Suspected of damaging fertility or the unborn child.
H319 Causes serious eye irritation

Precautionary Statements (GHS-US) : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash all exposed external body areas thoroughly after handling.
IF exposed or concerned: Get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
Store locked up.
Protect from sunlight. Store in a well-ventilated place.
Dispose of contents/container in accordance with local/regional/national/international regulations.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Mixture

Name	Product identifier	% (w/w)
tris(2-chloroisopropyl)phosphate	13674-84-5*	10-30
4-nonylphenol, branched, ethoxylated	127087-87-0	0.1-1
N-methyldicyclohexylamine	7560-83-0	0.1-1
glycerol	56-81-5	1-5
1,3,3,3-tetrafluoropropene	29118-24-9	10-30
nitrogen	7727-37-9.	<5
sodium hydroxy-nonylphenyl-N-methylglycinate	56968-08-2	0.1-1

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).
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.

Skin Contact:

- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water (and soap if available)
- Seek medical attention in event of irritation.

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.

- 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.

Ingestion: Not considered a normal route of entry. Avoid giving milk or oils. Avoid giving alcohol.

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, 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 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

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media:

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.

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

Special Hazards Arising From the Substance or Mixture

Fire Fighting	---------- GENERAL ---------- Alert Fire Brigade and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	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) hydrogen fluoride other pyrolysis products typical of burning organic material.

Advice for Firefighters

Protective equipment: Protective clothing and respiratory protective device.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

See section 8

Environmental precautions

See section 12

Methods and Material for Containment and Cleaning Up

Minor Spills	• 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	• Clear area of all unprotected personnel and move upwind. • Alert Emergency Authority and advise them of the location and nature of hazard. • Wear full body clothing with breathing apparatus. • 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.

SECTION 7: HANDLING AND STORAGE

Precautions for 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.

Other information

Consider storage under inert gas.

- 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 authorized personnel only.

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.

- Avoid magnesium, aluminium and their alloys, brass and steel.
- Avoid reaction with oxidising agents
- 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

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Source	Ingredient	Material Name	TWA	STEL	Peak	Notes
US OSHA PEL Z-1	Glycerol	Glycerin (mist) – total dust	15 mg/m3	Not available	Not available	Not available
US OSHA PEL Z-1	Glycerol	Glycerin (mist) – Respirable fraction	5 mg/m3	Not available	Not available	Not available
US OSHA PEL Z-1	Glycerol	Glycerin (mist)	Not available	Not available	Not available	See Appendix D

Ingredient	TEEL-1	TEEL-2	TEEL-3
4-nonylphenol, branched, ethoxylated	30 mg/3	330 mg/m3	2,000 mg/m3
Glycerol	45 mg/m3	180 mg/m3	1,100 mg/m3
1,3,3,3-tetrafluoropropene	1,00 ppm	Not available	Not available
nitrogen	7.96E05 ppm	8.32E05 ppm	8.60E05 PPM

Ingredient	Original IDLH	Revised IDLH
tris(2-chloroisopropyl)phosphate	Not available	Not available
4-nonylphenol, branched, ethoxylated	Not available	Not available
N-methyldicyclohexylamine	Not available	Not available
glycerol	Not available	Not available
1,3,3,3-tetrafluoropropene	Not available	Not available
Nitrogen	Not available	Not available
sodium hydroxy-nonylphenyl-n-methylglycinate	Not available	Not available

Occupational Exposure Banding

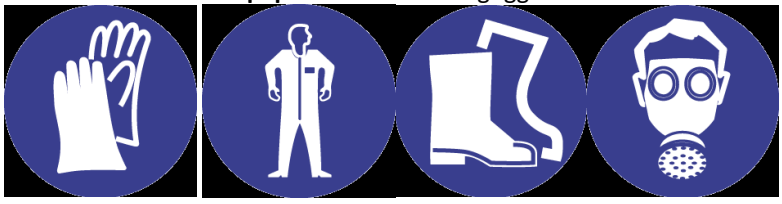
Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
tris(2-chloroisopropyl)phosphate	E	≤0.1 ppm
4-nonylphenol, branched,ethoxylated	E	≤0.1 ppm
sodium hydroxy-nonylphenyl-n-methylglycinate	E	≤0.01 mg/m3
Notes:	*Occupational exposure banding is a process of assigning chemicals 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 arange of exposure concentrations that are expected to protect worker health.*	

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 Equipment: Protective goggles. Gloves. Protective clothing.



Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: When handling sealed and suitably insulated cylinders wear cloth or leather gloves.

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

- 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.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Compressed gas
Appearance	:	Not available
Odor	:	Not available
pH	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available
Solubility in Water	:	immiscible
Specific Gravity	:	Not available
VOC	:	Not available

SECTION 10: STABILITY AND REACTIVITY

Reactivity Stable under recommended storage conditions. See section 7

Possibility of hazardous reactions: See section 7

Conditions to avoid: See section 7

Incompatible materials: See section 7

Hazardous decomposition products: See section 5.

Chemical stability:

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects – Product

Information on toxicological effects

Inhaled	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.
Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	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. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. 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. Not considered to be a risk because of the extreme volatility of the gas.
Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. 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. There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment. Fluorocarbons can cause an increased risk of cancer, spontaneous abortion and birth defects.

Component	**Toxicity**	**Irritation**
Terra Lock Adhesive Part B	Not Available	Not Available
1,3,3,3-tetrafluoropropene	Inhalation(Rat) LC50: >1157.752 ppm4h[2]	Not Available
nitrogen	Not Available	Not Available
Tris(2-chloroisopropyl)phosphate	Dermal (rabbit) LD50: >5000 mg/kg*[2] Inhalation(Rat) LC50: >4.6 mg/kl/4H*[2] Intravenous (Mouse) LD50: 56 mg/kg[2] Oral (Rat) LD50; 1500 mg/kg[2]	Eye (rabbit): non-irritating* Skin (rabbit): mild (24 h)
4-nonylphenol, branched ethoxylated	Oral (Rat) LD50; 1310 mg/kg[2]	Eye (rabbit) SEVERE Eye: adverse effect observed (irritating)[1] Eye: no adverse effect observed (not irritating)[1] Skin (rabbit): Mild Skin: no adverse effect observed (not irritating)[1]
N-methyldicyclohexylamine	Dermal (rabbit) LD50: 323 mg/kg[2] Inhalation(Rat) LC50: >0.54 mg/L4h[2] Oral (Rat) LD50; >=267 mg/kg[1]	Not Available
Glycerol	dermal (guinea pig) LD50: 58500 mg/kg[1] Oral (Mouse) LD50; 4090 mg/kg[2]	Not Available
Sodium hydroxy-	Not Available	Not Available

nonylphenyl-N-methylglycinate		

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*

Component	Toxicity
Terra Lock Adhesive Part B & 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. 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.
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). 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.
Nitrogen & sodium hydroxy-nonylphenyl-N-methylglycinate	No significant acute toxicological data identified in literature search.
N-METHYLDICYCLOHEXYLAMINE & GLYCEROL	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-NONYLPHENOL, BRANCHED, ETHOXYLATED & N-METHYLDICYCLOHEXYLAMINE	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.
4-NONYLPHENOL, BRANCHED, ETHOXYLATED & SODIUM HYDROXY-NONYLPHENYL-N-METHYLGLYCINATE	For nonylphenol and its compounds: Alkylphenols like nonylphenol and bisphenol A have estrogenic effects in the body. They are known as xenoestrogens. Estrogenic substances and other endocrine disruptors are compounds that have hormone-like effects in both wildlife and humans. For nonylphenol: Animal testing suggests that repeated exposure to nonylphenol may cause liver changes and kidney dysfunction. Nonylphenol was not found to cause mutations or chromosomal aberrations.
SODIUM HYDROXYNONYLPHENYLN-METHYLGLYCINATE	sodium hydroxy-nonylphenyl-N-methylglycinates (EC 947-147-5) The skin sensitisation potential of the substance has been characterised using three in vitro studies that respectively assess the potential induction of three key events in the Adverse Outcomes Pathway (AOP) for skin sensitisation. Based on a weight of evidence analysis of the findings, the substance is not considered to have potential to cause skin sensitisation and classification according to Regulation (EC) 1272/2008 in respect of this

	endpoint is not required. The No Observed Adverse Effect Level (NOAEL) for general systemic toxicity was 110 mg/kg/day due to the adverse changes in the kidneys of females receiving 300 mg/kg/day. The potential for the substance to cause genetic toxicity has been investigated in vitro is studies conducted using bacterial and mammalian cell systems. Negative results were obtained a reverse mutation assay (Ames test) using strains of Salmonella typhimurium and Escherichia coli conducted according to OECD TG 471; in a chromosome aberration test using human lymphocytes conducted according to OECD TG 473 and in a gene mutation using l5178Y TK+/- Mouse lymphoma cells conducted according to OECD TG 490, demonstrating that the substance lacks the potential for mutagenicity or clastogenicity in vitro. No effects on reproductive or developmental parameters were observed in a repeated dose and reproductive/developmental toxicity screening study conducted according to OECD TG 422. The substance does not have the potential to cause reproductive or developmental toxicity and does not require classification in respect of this endpoint according to Regulation (EC) 1272/2008. * REACh Dossier
GLYCEROL	At very high concentrations, evidence predicts that glycerol may cause tremor, irritation of the skin, eyes, digestive tract and airway. Otherwise it is of low toxicity. There is no significant evidence to suggest that it causes cancer, genetic, reproductive or developmental toxicity.
N-METHYLDICYCLOHEXYLAMINE	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. The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function. Somnolence, convulsions recorded. When applied to the skin of male rabbits, most adverse effects were observed within an hour after treatment and lasted several hours. The onset of paralysis occurred between several hours and two days after treatment. Paralysis affected only the hindlimbs in some rabbits and affected both the forelimbs and hindlimbs in others. Sensitisation: After identification of the slightly irritating and the non-irritating test article concentrations in the primary irritation experiments, a main study was performed with the selected test article concentrations. The experimental animals were intradermally injected with a 5 % concentration and epidermally exposed to the undiluted test substance while the control animals were similarly treated, but with the vehicle only. Immediately after the epidermal exposure, the skin irritation was scored. The epidermal exposure the induction phase resulted in severe skin irritation.The epidermal exposure in the challenge phase resulted in one positive sensitisation reaction in response to the 10 % test article concentration. Under the conditions used in this study, the substance produced sensitisation rate of 5 %. Based on these results and according to the EEC criteria for classification and labelling requirements for dangerous substances and preparations (EEC Directive 91/325/EEC, Amendment to Annex VI of the EEC Directive 67/548/EEC), POLYCAT 12 need not be labelled as a skin sensitiser. Repeat dose toxicity: The test substance caused significant changes of clinical status of animals (mainly convulsions accompanied with marked salivation). These clinical findings were detected in both sexes at the highest dose level. At the middle dose level these

	symptoms were recorded only sporadically and at the lowest dose level only salivation in males was observed. Genetic toxicity: in vitro The test compound did not demonstrate genetic activity in any of the assays conducted in this evaluation and was considered not mutagenic under these test conditions. Genetic toxicity: in vivo N-methyldicyclohexylamine did not increase the frequency of aberrant cells in rat bone marrow. Toxicity to reproduction: Based on the Reproduction/Developmental toxicity screening test (OECD Guideline 421), NOAEL (offsprings): 40 mg/kg bw/day (male/female), NOAEL (P): 40 mg/kg bw/day (male/female) Developmental; toxicity/ teratogenicity: *REACh Dossier
4-NONYLPHENOL, BRANCHED, ETHOXYLATED	Polyethers (such as ethoxylated surfactants and polyethylene glycols) are highly susceptible to being oxidized in the air. They then form complex mixtures of oxidation products. Animal testing reveals that whole the pure, non-oxidised surfactant is non-sensitizing, many of the oxidation products are sensitisers. The oxidization products also cause irritation. Humans have regular contact with alcohol ethoxylates through a variety of industrial and consumer products such as soaps, detergents and other cleaning products. Exposure to these chemicals can occur through swallowing, inhalation, or contact with the skin or eyes. Studies of acute toxicity show that relatively high volumes would have to occur to produce any toxic response. Both laboratory and animal testing has shown that there is no evidence for alcohol ethoxylates (AEs) causing genetic damage, mutations or cancer. No adverse reproductive or developmental effects were observed. Tri-ethylene glycol ethers undergo enzymatic oxidation to toxic alkoxy acids. They may irritate the skin and the eyes. At high oral doses, they may cause depressed reflexes, flaccid muscle tone, breathing difficulty and coma. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
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.

Criteria	Classified?	Criteria	Classified?
Acute toxicity	No	Acute toxicity	No
Skin Irritation / Corrosion	No	Reproductivity	Yes
Serious Eye Damage/ Irritation	Yes	STOT – Single Exposure	No
Respiratory or skin sensitization	No	STOT – Repeated Exposure	No
Mutagenicity	No	Aspiration Hazard	No

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Component	Endpoint	Test Duration(hr)	Species	Value	Source
Terra Lock Adhesive Part A	Not Available	Not Available	Not Available	Not Available	Not Available
1,3,3,3-tetrafluoropropene	EC50 EC50 WX50(ECx)	72h 48h 48h	Algae or other aquatic plants Crustacea Crustacea	>170 mg/l >160 mg/l >160 mg/l	2 2 2
nitrogen	Not Available	Not Available	Not Available	Not Available	Not Available
tris(2-chloroisopropyl)phosphate	BCF EC50 ErC50 EC50 EC50(ECx) LC50 EC50	1008h 72h 72h 48h 96h 96h 96h	Fish Algae or other aquatic plants Algae or other aquatic plants Crustacea Algae or other aquatic plants Fish Algae or other aquatic plants	0.8-2.8 82 mg/l 4 mg/l 65335 mg/l 4 mg/l 56.2 mg/l 4 mg/l	7 Not available 1 1 1 Not available 1
4-nonylphenol, branched, ethoxylated	EC50 EC50 NOEC50 (ECx) LC50 EC50	72h 48h 96h 96h 96 h	Algae or other aquatic plants Crustacea Algae or other aquatic plants Fish Algae or other aquatic plants	19.485 mg/l 14 mg/l 8 mg/l >10 mg/l 12 mg/l	2 2 2 2 2
N-methyldicyclohexylamine	EC50(ECx) EC50 EC50 LC50	72h 72h 48h 96h	Algae or other aquatic plants Algae or other aquatic plants Crustacea Fish	0.063 mg/l 0.063 mg/l 8 mg/l 62 mg/l	Not Available Not Available Not Available Not Available
glycerol	EC0(ECx) LC50	24h 96h	Crustacea Fish	>500 mg/l 885 mg/l	1 2
sodium hydroxy-nonylphenyl-N-methylglycinate	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 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*				

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.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
tris(2-chloroisopropyl)phosphate	HIGH	HIGH
N-methyldicyclohexylamine	HIGH	HIGH
glycerol	LOW	LOW

Behavior in environmental systems:

Bioaccumulative potential:

Ingredient	Bioaccumulation
tris(2-chloroisopropyl)phosphate	LOW (BCF =4.6)
N-methyldicyclohexylamine	LOW (LogKOW = 3.71)
glycerol	LOW (LogKOW= -1.76)

Mobility in soil:

Ingredient	Mobility
tris(2-chloroisopropyl)phosphate	LOW (KOC = 1278)
N-methyldicyclohexylamine	LOW (KOC = 325)
glycerol	HIGH (KOC=1)

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information:

- Evaporate residue at an approved site.

Ecology – Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

DOT Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Special precautions for user

Hazard Label 2.2

Special provisions 362, T50, TP40

IATA Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Special precautions:

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

IMO Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

IMDG Proper Shipping Name: UN 3500, Chemical under pressure, n.o.s. (Hydrofluoroolefin, Nitrogen), 2.2

Special precautions for user

EMS Number F-C, S-V

Special provisions 274 362

Limited Quantities 0

SECTION 15: REGULATORY INFORMATION

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

tris(2-chloroisopropyl)phosphate is found on the following regulatory lists

US - California - Biomonitoring - Priority Chemicals

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

4-nonylphenol, branched, ethoxylated is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

US DOE Temporary Emergency Exposure Limits (TEELs)

US EPCRA Section 313 Chemical List

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

N-methyldicyclohexylamine is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

glycerol is found on the following regulatory lists

US - Massachusetts - Right To Know Listed Chemicals

US DOE Temporary Emergency Exposure Limits (TEELs)

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Limits (PELs) Table Z-1

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

1,3,3,3-tetrafluoropropene is found on the following regulatory lists

US AIHA Workplace Environmental Exposure Levels (WEELs)
US DOE Temporary Emergency Exposure Limits (TEELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US Toxicology Excellence for Risk Assessment (TERA) Workplace Environmental Exposure Levels (WEEL)
US TSCA Chemical Substance Inventory - Interim List of Active Substances

nitrogen is found on the following regulatory lists

US - Massachusetts - Right To Know Listed Chemicals
US DOE Temporary Emergency Exposure Limits (TEELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

sodium hydroxy-nonylphenyl-N-methylglycinate is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	Yes
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No
Reproductive toxicity	Yes
Skin Corrosion or Irritation	No
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

National Inventory Status

Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Korea - KECI	No (N-methyldicyclohexylamine)
Japan - ENCS	Yes
Philippines - PICCS	No (1,3,3,3-tetrafluoropropene)

USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (N-methyldicyclohexylamine; 1,3,3,3-tetrafluoropropene; sodium hydroxy-nonylphenyl-N-methylglycinate)
Russia - FBEPH	Yes
Vietnam - NCI	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 06/20/2024

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

Party Responsible for the Preparation of This Document

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This information is based on our knowledge as of the Revision Date and is intended to describe the product only for the purposes of health, safety, and environmental requirements as of the Revision Date. It should not therefore be construed as guaranteeing any specific property of the product nor as providing any warranty, expressed or implied. The user assumes all responsibility, liability, risk of loss, damage, or expense arising out of, or in any way connected with, the handling, storage, use, or disposal of the product.

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