Material Safety Data Sheet

 Issue date: September 2006

Greenlink Erapak Isocyanate

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: Greenlink Erapak Isocyanate
Synonym: Polymeric MDI

Use: Polyurethane Isocyanate

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2. HAZARDS IDENTIFICATION

HAZARDOUS ACCORDING TO NOHSC CRITERIA

Hazard Category: Harmful (Xn), Irritant (Xi)

Hazard Classification: HAZARDOUS SUBSTANCE, NON-DANGEROUS GOOD

RISK PHRASES
R20 Harmful by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R42/43 May cause sensitisation by inhalation and skin contact.

SAFETY PHRASES
S23 Do not breathe vapour/spray.
S36/37 Wear suitable protective clothing and gloves.
S45 In case of accident or if you feel unwell, contact a doctor immediately and show this container or label.

Poison Schedule: S6 [Aust]
This material is a Scheduled **S6** Poison and must be stored, handled and used according to the appropriate regulations.

Warning Statement:
Avoid breathing vapours. Avoid skin and eye contact. Breathing of vapours may produce asthma-like symptoms. Skin contact may cause allergic reaction.

3. COMPOSITION / INFORMATION ON INGREDIENTS

SUBSTANCE NAME	Proportion	CAS Number
DIPHENYLMETHANE DIISOCYANATE (Isomers and Homologues) [MDI]	Greater than 60%	9016-87-9

All other ingredients not hazardous according to NOHSC Criteria.

4. FIRST AID MEASURES

Swallowed:
If swallowed, DO NOT induce vomiting. Seek medical attention immediately. Give nothing by mouth. Wash out the mouth with water (do not swallow). Never give fluids or induce vomiting if person is unconscious or is having convulsions.

Eye:
If material is splashed into eyes, immediately, flush with plenty of water for 15 minutes, ensuring eyelids are held open. Seek medical attention without delay, preferably from an ophthalmologist.

Skin:
If material is splashed onto the skin, remove any contaminated clothing and wash skin thoroughly with plenty of water and soap (warm water is preferable if available). Flush skin with water. Seek medical attention if irritation persists after washing. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

Inhaled:
Remove victim to fresh air. Apply resuscitation if victim is not breathing. If breathing is difficult, oxygen should be administered by a qualified person. Seek medical attention.

First Aid Facilities:
Eye wash fountain, safety shower and normal washroom facilities.

Advice to Doctor:
Treat symptomatically. May cause respiratory sensitisation or asthma-like symptoms. Bronchodilators, expectorants, and anti-tussives may be of help. Excessive exposure may aggravate pre-existing asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airway dysfunction syndrome). Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary oedema, may be delayed. Persons receiving significant exposure should be observed for 24-48 hours for signs of respiratory distress. Maintain adequate ventilation and oxygenation of the patient. If you are sensitised to diisocyanates, consult your doctor regarding working with other respiratory irritants or sensitisers. Although cholinesterase depression has been reported with this material, it is not of benefit in determining exposure and need not be considered in the treatment of persons exposed to the material. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

In case of poisoning, contact Poisons Information Centre
In Australia call Tel: 131126
In New Zealand Tel: 034747000

5. FIRE-FIGHTING MEASURES

Fire/Explosion Hazard
If safe to do so, move undamaged containers from fire area.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposes on heating emitting toxic fumes including oxides of carbon and nitrogen, and hydrogen cyanide.

OTHER FIRE/EXPLOSION HAZARDS: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Contamination of isocyanates with water could lead to dangerous pressure inside closed containers by generation of carbon dioxide. Containers may burst if overheated. Do not discharge extinguishing waters into streams, rivers and lakes.

FIRE FIGHTING PROCEDURES: Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Fight fire from protected location or safe distance. Fire fighters to wear positive pressure Self-Contained Breathing Apparatus (SCBA) and full protective clothing (including helmet, coat trousers, boots and gloves).

EXTINGUISHING MEDIA: Use carbon dioxide; dry chemical; protein-based foam; or alcohol-resistant foam. If water is to be used, it must be sprayed only in large quantities (see Section 10 - Stability and Reactivity).

HAZCHEM CODE: None allocated [Aust]

FLAMMABILITY

This material is not flammable. This material is a C2 Combustible according to *AS1940 - Storage and Handling of Flammable and Combustible Liquids*.

6. ACCIDENTAL RELEASE MEASURES

PROTECT PEOPLE:

Avoid any contact. Barricade area. Evacuate non-emergency personnel from area. Only trained and properly protected personnel should be involved in clean-up operations. Keep upwind of spill. Ventilate area. Use appropriate personal protective equipment (refer to Section 8 - Exposure Controls / Personal Protection). Respiratory protection should be worn, including positive pressure self-contained breathing apparatus.

PROTECT THE ENVIRONMENT:

Contain liquid to prevent contamination of soil, surface water or ground water. Prevent from entering, sewers or drains. Should the product enter sewer or drains, it should be pumped into a covered vented container, the cover should be placed loosely on the container, but not made pressure tight. Move container to a well-ventilated area. Emergency services may need to be called to assist in the clean-up operation.

CLEAN-UP:

Supplies of suitable decontaminant should always be kept available. Contain and cover the spillage with decontaminant, wet earth or wet sand and leave to react for at least 30 minutes. Collect material in suitable and properly labelled open-top containers and remove for further decontamination if necessary. DO NOT place in sealed container. Prolonged contact with water results in a chemical reaction, which may result in rupture of the container due to generation of carbon dioxide gas. Remove to a well ventilated area. Clean up floor areas. Wash area well with water. Test atmosphere for vapours to ensure safe working conditions before other personnel are allowed in the area.

Suitable decontaminant solutions:

Formulation 1 - sodium carbonate 5-10%; liquid detergent 0.2-2%; water to make up to 100%.

Formulation 2 - concentrated ammonia solution 3-8%; liquid detergent 0.2-2%; water to make up to 100%.

Note: If ammonia is used, use good ventilation to prevent vapour exposure.

7. HANDLING AND STORAGE

Avoid contact of this product with water at all times during handling and storage.

HANDLING:

Products based on diisocyanates should always be used in a well-ventilated area with appropriate local extraction in such a way that the exposure standards for these materials are not exceeded. It is recommended that the diisocyanate concentration in air be checked at regular intervals. Keep equipment clean. Use disposable containers and tools where possible. Do no eat, drink or smoke in the workplace.

STORAGE:

Store in a cool, dry place. Keep containers tightly closed when not in use. Protect from atmospheric moisture. Products based on diisocyanates react with water liberating carbon dioxide, which can lead to excessive pressure in closed containers, and form solid insoluble polymers, which can block pipes, valves, etc. Contact with copper or copper alloys and galvanised surfaces must be avoided, so valves etc made from these materials must not be used in equipment for storing and handling diisocyanates. It is recommended that stainless steel with an appropriate lining be used, to a minimum standard of Packing Group III. Do not store in open containers. Damaged or punctured drums should be emptied and disposed of properly.

STORAGE REGULATIONS:

C2 Combustible Liquid according to *AS1940 - Storage and Handling of Flammable and Combustible Liquids*. Store in accordance with regulations for storage of combustible liquids.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards
No exposure standards are available for this product, however, the following exposure standards have been assigned by [NOHSC] to the following components of the product:

DIPHENYLMETHANE DIISOCYANATE (Isomers and Homologues) [MDI]
(NOHSC Australia)
Isocyanates, all (as -NCO)
[TWA] 0.02 mg/m³
[STEL] 0.07 mg/m³
Notices: Sen

Engineering Controls
Engineering controls should be installed and regularly monitored to ensure exposure to vapour/aerosol is minimised. Exhaust systems should be designed in accordance with workplace conditions. The air should always be moved away from the source of vapour generation and the person working at this point. The odour and irritancy of this material are inadequate to warn of excessive exposure.

Personal Protection Equipment
CLOTHING: Wear suitable protective clothing to prevent skin contact - overalls, boots, and apron. Suitable materials include butyl rubber, neoprene, nitrile/butadiene rubber, laminated polyethylene.
GLOVES: Wear chemical-resistant gloves to prevent skin contact. Examples of preferred glove barrier materials include: butyl rubber, chlorinated polyethylene, polyethylene, or ethyl vinyl alcohol laminate (EVAL). Examples of acceptable glove barrier materials include: natural rubber (latex), neoprene, nitrile/butadiene rubber (nitrile or NBR), polyvinyl chloride (PVC or vinyl), or viton.
EYES: Wear safety glasses with side shields, chemical goggles or face shield to protect eyes.
RESPIRATORY PROTECTION: Avoid breathing of vapours/gases. Atmospheric levels should be maintained below the exposure standard. When atmospheric levels may exceed the exposure standard, use an approved air-purifying respirator equipped with an organic vapour sorbent and a particulate filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive pressure air-supplying respirator (airline or SCBA). For emergency response, or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Select and use respirators in accordance with *AS/NZS 1715/1716*.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Dark amber viscous liquid
Boiling Point Melting Point:	BP > 200°C (decomposes), MP = forms crystals below 10°C
Vapour Pressure:	<0.00001mmHg @ 20°C
Specific Gravity:	Density = 1.2 @ 25°C
Flash Point:	>200°C (DIN 51758)
Flammability Limits:	Not applicable
Solubility in Water:	Insoluble in water, reacts with water liberating carbon dioxide

Other Properties
Vapour density = 8.5 (air = 1)

10. STABILITY AND REACTIVITY

STABILITY:
Stable under normal conditions of use.

HAZARDOUS DECOMPOSITION PRODUCTS:
Emits toxic fumes including oxides of carbon and nitrogen, isocyanate vapours and hydrogen cyanide when heated to decomposition.

HAZARDOUS POLYMERIZATION:
Can occur. Polymerisation can be catalysed by strong bases and water. Can react with itself at temperatures above 160°C. Products based on diisocyanates react with many materials such as bases, ammonia, 1° and 2° amines, alcohols, water and acids generating heat. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of reaction partners is good, or is supported by stirring or the presence of solvents. Products based on diisocyanates are insoluble in, and denser than, water and sink to the bottom, but react slowly at the interface. A solid water-insoluble layer of polyurea is formed and carbon dioxide gas is liberated.

INCOMPATIBILITIES:
Acids, alcohols, amines, bases, strong oxidising agents, water, galvanised metals, and copper and its alloys.

CONDITIONS TO AVOID:
Excessive heat, ignition sources and incompatible materials.

11. TOXICOLOGICAL INFORMATION

No adverse health effects are expected, if the product is handled in accordance with this Material Safety Data Sheet and the product label. Symptoms and effects that may arise if the product is mishandled and overexposure occurs are:

ACUTE HEALTH EFFECTS:
Swallowed:
Low toxicity if swallowed. Ingestion may cause gastrointestinal irritation.

Eye:
May cause moderate eye irritation. May cause very slight transient (temporary) corneal injury.

Skin:
According to human experience, the material may cause slight to moderate irritation. May stain skin. May cause sensitisation by skin contact. Animal studies have shown that skin contact with diisocyanates may play a role in respiratory sensitisation.

Inhaled:
Harmful if inhaled.
Vapour and aerosol can cause severe irritation of the respiratory tract with burning sensation of the nose and throat. High exposure can result in inflammation of lung tissue and fluid in the lungs. In hypersensitive people, very low concentrations may lead to bronchoconstriction (asthmatic signs and symptoms). Effects may be delayed. May cause sensitisation by inhalation.

Chronic:
Prolonged or repeated skin contact may lead to dermatitis.
Prolonged contact may cause severe eye irritation and some form of permanent eye damage may occur.
Prolonged or repeated exposure may lead to irreversible damage to health.
Chronic exposure by inhalation may result in a permanent decrease in lung function.
Prolonged or repeated contact with this substance will cause sensitisation by inhalation.
Prolonged or repeated contact with this substance will cause sensitisation by skin contact.

Toxicological Data:
Acute Toxicity Data:
LD50 (oral, rat) > 2000 mg/kg
LD50 (dermal, rabbit) > 2000 mg/kg
LC50 (inhalation, rat, 4hr) = 490 mg/m³ (aerosol). The experimentally produced aerosol has an aerodynamic diameter of <5µm.

Teratogenicity:
Did not cause birth defects in laboratory animals; other foetal effects occurred only at doses toxic to the mother.

Reproductive Toxicity:
No relevant information found.

Carcinogenicity:
Rats have been exposed for two years to an experimentally produced respirable aerosol of polymeric MDI, which resulted in chronic pulmonary irritation at high concentrations. The prolonged irritation led to the formation of tumours in the lungs of a small proportion of the rats exposed to 6 mg/m³. There were no tumours at 1 mg/m³ and no effects at 0.2 mg/m³. In the absence of prolonged high exposure leading to chronic irritation and lung damage, it is highly unlikely that tumours could occur, although these results reinforce the need to observe the recommended safety precautions and occupational exposure limit when working with MDI-based products. Industrial experience in humans has not shown any links between MDI-based products exposure and cancer development.

12. ECOLOGICAL INFORMATION

Ecotoxity:
The measured ecotoxicity is that of the hydrolysed product, generally under conditions maximising production of soluble species. Material is not expected to be toxic to aquatic organisms on an acute basis (LC50/EC50 greater than 100mg/L in most sensitive species). The LC50 in earthworm Eisenia foetida is greater than 1000mg/kg.

Mobility:
In the aquatic or terrestrial environment, movement is expected to be limited by its reactivity with water forming predominantly insoluble polyureas. No appreciable volatilisation from water to air is expected.

Persistence / Degradability:
In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

Chemical Fate Information:
Avoid contaminating waterways, drains, sewers or ground.

13. DISPOSAL CONSIDERATIONS

Do not allow into any sewers, drains, on the ground or into any body of water. Any disposal must be accordance with applicable State, Territory and/or Local government regulations. The preferred waste management option for unused, uncontaminated, unformulated, or not otherwise altered material is to send to an approved recycler, reclaimer, or incinerator. The same waste management options are recommended for used or contaminated material, although additional evaluation is required. Waste characterisation and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. Chemical additions, processing, storage, or otherwise altering this material may make the waste management information presented here incomplete, inaccurate or otherwise inappropriate.

Any disposal of contaminated packaging and washings must be in accordance with State, Territory and/or Local government regulations. After container has been cleaned and labelling has been removed, empty containers can be sent for recycling or disposal. If the container is to be reconditioned, the reconditioning company should be made aware of the nature of the original contents.

14. TRANSPORT INFORMATION

Road Transport
UN Number: None allocated
Proper Shipping Name: NONE ALLOCATED
Dangerous Goods Class: None allocated
Packing Group: None allocated
Label: Harmful (**Xn**), Irritant (**Xi**)

Air Transport
UN Number: None allocated
Proper Shipping Name: NONE ALLOCATED
Dangerous Goods Class: None allocated
Packing Group: None allocated
Label: Harmful (**Xn**), Irritant (**Xi**)

Sea Transport
UN Number: None allocated
Proper Shipping Name: NONE ALLOCATED
Dangerous Goods Class: None allocated
Packing Group: None allocated
Label: Harmful (**Xn**), Irritant (**Xi**)

15. REGULATORY INFORMATION

Poison Schedule: S6 [Aust]

Inventory Status:

Inventory	*Status*
Australia (AICS)	Y

Y = all ingredients are on the inventory.

16. OTHER INFORMATION

Date of Preparation:
Issue date: 4/09/06
Supersedes: August 2005

Reasons for Update:
Review of all sections.

Key Legend Information:
NOHSC - National Occupational Health & Safety Commission {Formerly Worksafe}[Aust]
SUSDP - Standard for the Uniform Scheduling of Drugs and Poisons [Aust]
TWA - Time Weighted Average [Int]
STEL - Short Term Exposure Limit [Int]
AICS - Australian Inventory of Chemical Substances
EPA - Environmental Protection Agency [Int]
NIOSH - National Institute for Occupational Safety and Health [US]
AS/NZS 1715 - Selection, use and maintenance of respiratory protective devices. [Aust/NZ]
AS/NZS 1716 - Respiratory protective devices. [Aust/NZ]
IATA - International Aviation Transport Authority [Int]
ICAO - International Civil Aviation Organization [Int]
IMO - International Maritime Organisation. [Int]
IMDG - International Maritime Dangerous Goods [Int]
United Nations Recommendations for the Transport of Dangerous Goods and Globally Harmonized System for the classification and labelling of Chemicals. [Int]
EU - European Union
[Aust/NZ] = Australian New Zealand
[Int] = International
[US] = United States of America

Removal of the heading of *Poison Schedule [Aust]*, in section 3 and 15 of this Material Safety Data Sheet (MSDS) makes this a valid health and safety document in other international jurisdictions/countries. For full compliance please contact your Federal, State or Local regulators for further information.

Disclaimer
This MSDS summarises our best knowledge of the health and safety hazard information available on the product and the measures to be used to handle and use the product safely. Each user should read this MSDS and consider the information in connection with the way the product is intended to be handled or used.

Principal References:
Information supplied by manufacturer, reference sources including the public domain.

END OF MSDS