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MATERIAL SAFETY DATA SHEET

ISOCYANATE - MDI

Non Hazardous according to criteria of Worksafe Australia

COMPANY DETAILS

Company: Barnes Products Pty Limited
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IDENTIFICATION

Product Name: ISO - MDI
Other Names: Polymeric MDI, Polyphenylmethane Polyisocyanate, Crude MDI
Manufacturers Product Code: AUS MDI
UN Number: Not applicable
Hazchem Code: Not applicable
Poisons Schedule Number: Not applicable
Packaging Group: Not applicable

Use: Raw material for production of Polyurethane.
Recommended Method of Application: Hand mixing/pouring, machine injection/spraying

PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown Liquid
Boiling Point (°C): 180->200 @ 5 mmHg
Melting Point (°C): Not applicable
Vapour Pressure: <0.00001 mmHg @ 25°C
Specific Gravity: 1.23 g/ml (25°C)
Flashpoint (°C): > 200 (ASTM D-93, PMCC)
Flammability Limits (%): Not applicable
Solubility in Water (g/l): Insoluble, reacts slowly

INGREDIENTS

Chemical Entity	CAS Number	Proportion	
Diphenylmethane-4,4'-diisocyanate	101-68-8	30-60%	w/w
Polymethylene Polyphenyl Isocyanate	9016-87-9	30-60%	w/w

HEALTH HAZARD INFORMATION**Health Effects*****Acute – Ingestion:***

Ingestion of this product causes vomiting, nausea and abdominal pain. Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations. The oral LD50 for rats is >10,000 mg/kg.

Acute – Eye:

May cause slight eye irritation. Corneal injury is unlikely.

Acute – Skin:

Prolonged or repeated exposure may cause skin irritation. May stain the skin. Skin contact may result in allergic skin reactions or respiratory sensitisation but is not expected to result in absorption of amounts sufficient to cause other adverse effects. The LD50 for skin absorption in rabbits is >9400 mg/kg.

Acute – Inhaled:

At room temperature, vapours are minimal due to low vapour pressure. However, certain operations may generate vapour or aerosol concentrations sufficient to cause irritation or other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or pumping. Excessive exposure may cause irritation of the eyes, upper respiratory tract and lungs. May cause respiratory sensitisation in susceptible individuals. MDI concentrations below the exposure standards may cause allergic respiratory reactions in individuals already sensitised. Symptoms may include coughing, difficult breathing and feeling of tightness in chest. Effects may be delayed. Impaired lung function (decreased ventilatory capacity) has been associated with overexposure to isocyanates.

Chronic Effects

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/Polymeric MDI aerosols.

CANCER INFORMATION: Lung tumours have been observed in laboratory animals exposed to aerosol droplets of MDI/Polymeric MDI (6mg/m³) for their lifetime. Tumours occurred concurrently with respiratory irritation and lung injury. Current exposure standards are expected to protect against these effects.

TERATOLOGY (BIRTH DEFECTS): In laboratory animals, Polymeric MDI did not produce birth defects, other foetal effects occurred only at high doses, which were toxic to the mother.

Other Health hazard Information: Industrial experience has shown no evidence of carcinogenicity of MDI in humans. An animal study indicates that MDI may induce hypersensitivity following dermal exposure.

FIRST AID MEASURES***Ingestion:***

Never give fluids or induce vomiting if patient is unconscious or is having convulsions. If poisoning occurs, contact a doctor or Poisons Information Centre. If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Eye:

Flush eyes with running water for 15 minutes with eyelids held open. Materials containing MDI may react with the moisture of the eye forming a thick material, which may be difficult to wash from the eyes.

Skin:

In case of skin contact, immediately flush skin with plenty of water (warm, soapy water, if available) for at least 15 minutes while removing contaminated clothing and shoes.

Inhalation:

Remove to fresh air. If not breathing, apply mouth to mouth resuscitation. If breathing is difficult, qualified personnel should administer oxygen. Call a doctor and/or transport to an emergency hospital.

Other Information:

An eye wash fountain, safety shower and a general washing facility should be available in immediate work area.

GENERAL ADVICE TO DOCTOR

The manifestations of respiratory symptoms, including pulmonary edema, resulting from acute exposure may be delayed. No specific antidote is known. Supportive care. Treatment based on judgement by the doctor in response to reactions of the patient.

PRECAUTIONS FOR USE**Exposure Limits*****Other Exposure info:***

Workplace Exposure Standard (ES) # for:

Isocyanates (as-NCO): 0.02mg/m³, TWA: 0.07mg/m³, STEL:Sen.

#-Exposure Standard for Atmospheric Contaminants in the Occupational Environment, published by Worksafe Australia.

TWA – time weighted average exposure

STEL – short term exposure limit

SEN – Sensitiser

Engineering Controls:

Provide general and/or local exhaust ventilation to control airborne levels below the exposure standards.

PERSONAL PROTECTION

Contact of the reacting materials with the skin or eyes can cause severe burns and may be difficult to remove from the affected areas. Immediately wash affected areas with plenty of water (warm soapy water, if available) and seek medical attention. In addition such contact increases the risk of exposure to isocyanate vapours. Use only approved protective clothing and equipment when handling this material (refer to Australian Standards below).

Respiratory Protection:

Atmospheric levels should be maintained below the Exposure Standard. When respiratory protection is required for certain operations, use an approved positive pressure supplied-air respirator. For emergency and other conditions where the exposure standard may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.

Skin Protection:

Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron or full body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water (warm soapy water if available) and launder clothing before reuse.

Glove Type:

AS2161: Industrial Safety Gloves and Mittens (excluding electrical and medical gloves)

Eye/Face Protection:

Use approved safety glasses. If vapour exposure causes eye discomfort, use a full face respirator. Selection and use of personal protective equipment should be in accordance with the recommendations in one or more of the relevant Australia Standards, including: AS1336: recommended practices for eye protection in the industrial environment. AS/NZS 1337: Eye protectors for industrial application. AS/NZS 1715: Selection, use and maintenance of respiratory protective devices.

Clothing:

AS/NZS 2210: Occupational protective footwear. AS2919: Industrial Clothing.

FLAMMABILITY

Fire Hazards: Will support combustion. Toxic fumes are released in fire situations.

Sources of Ignition: Incompatible with oxidising agents, acids, alkalies, alcohols, water; keep away from all heat and ignition sources.

SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT**Storage Precautions:**

Store indoors at 15-25°C in original, unopened containers. Protect from atmospheric moisture. Replace outage with inert dry gas Nitrogen. Avoid product temperatures above 40°C and below 15°C. At temperatures below 15°C crystallisation may occur. Crystallised product can be melted by heating overnight to 60-70°C.

Store away from oxidising agents, alkalies, acids, amines, direct sunlight or any source of ignition or heat.

SPILLS AND DISPOSAL**Protect People:**

Evacuate and ventilate spill area. Contain spill, eg, by diking, to prevent entry into sewers, drains or water systems. Wear full protective equipment including respiratory equipment during clean up.

Major Spill:

If transportation spill Dial 000 for Police or Fire Brigade. If temporary control of isocyanate vapour is required a blanket of protein foam (available at most Fire Brigades) may be placed over the spill. Large quantities may be pumped into closed but not sealed containers for disposal.

Minor Spill:

Absorb the isocyanate with sawdust or other absorbent and shovel into open top containers do not make pressure tight. Transport to well ventilated area (outside) and treat with neutralising solution consisting of a mixture of water and 3-8% concentrated ammonium hydroxide or 5-10% sodium carbonate. Add about 10 parts of neutraliser per part of isocyanate with mixing. Allow to stand for 48 hours letting evolved carbon dioxide escape.

Clean Up:

Decontaminate floor using decontaminate solution mix of 90% water, 5% ammonia and 5% detergent. Allow to stand over affected area for at least 10 minutes. Cover mops and brooms with plastic and dispose properly (often by incineration). Personnel to wear self contained breathing apparatus and full protective clothing.

Disposal:

Any disposal of product, drain and rinse liquid, or containers, must be in accordance with the State, territory and/or Local Government regulations. Liquids are usually incinerated in an approved facility. Solids are usually also incinerated or landfilled in approved facilities. Empty plastic or steel drums should first be decontaminated by filling with water or decontaminated solution. Let drums stand unsealed for at least 48 hours.

Before disposal drums should be drained, triple rinsed with water, and holed or crushed to prevent reuse. The other option is to offer the undamaged, empty and decontaminated containers to a qualified reconditioner or recycler. A suggested method for disposal for drain and rinse liquids is by treatment in an approved wastewater treatment system. Suggested methods for disposal of plastic containers are either disposal in an approved landfill after shredding or incineration in an approved industrial

incinerator or other appropriate incinerator facility. Steel drums are commonly crushed for disposal and sent to an approved landfill.

Chemical additions, processing, storage, or otherwise altering the material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Waste characterisation and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. None of the waste management options should be considered 'arranging for disposal'.

FIRE/EXPLOSION HAZARD

Hazardous Combustion Products:

Isocyanate vapour and mist, carbon dioxide, carbon monoxide, nitrogen oxides and traces of hydrogen cyanide.

Fire Fighting Equipment:

People who are fighting isocyanate fires must be protected against isocyanate vapours and hazardous combustion products by wearing positive pressure self contained breathing apparatus and full protective clothing.

Extinguishing Media:

Carbon dioxide, dry chemical foam. For large fires, alcohol resistant foams are preferred if available. General purpose synthetic foams or protein foams may function, but much less effectively. Water may be used as a blanket for fire extinguishment. If water is used, it should be used in very large quantities. The reaction between water and isocyanate may be vigorous. If possible, contain fire run off water.

Fire Fighting Instructions:

In case of fire use large quantities of water, foam, carbon dioxide or dry chemical. Down wind personnel must be evacuated. Do not reseal contaminated containers. A chemical reaction generating carbon may occur resulting in rupture of the container. Dense smoke emitted when burned without sufficient oxygen. When using water spray, boil over may occur when the product temperature reaches boiling point of water and the reaction forming carbon dioxide will accelerate (tank type scenarios, not spills). Hot MDI reacts vigorously with small amounts of water.

HAZARDOUS REACTION

Chemical Stability

Conditions to Avoid:

Prolonged heating over 45°C. Stable when stored under normal conditions. Thermal decomposition begins at temperatures above 177°C.

Incompatibility with other Materials:

Water, acid, bases, alcohols, and metal compounds. Avoid water as it reacts to form heat and carbon dioxide. Enough heat and pressure can be produced to rupture a closed container. The reaction with water is slow at temperatures less than 49°C, but accelerated at higher temperature and in the presence of the above mentioned materials. Some reactions are violent.

Hazardous Decomposition Products:

Excessive heating can produce isocyanate vapour, mist and other hazardous compounds.

Hazardous Polymerisation:

May occur with incompatible reactants, especially strong bases, water, or temperatures over 160°C.

OTHER INFORMATION

Toxicology

Swallowed: The oral LD50 for rats is greater than 10,000 mg/kg.

Skin: The LD50 for skin absorption in rabbits is greater than 9,400 mg/kg.

Mutagenicity: Mutagenicity data on the MDI are inconclusive. MDI was weakly positive in some in vitro (test tube) studies; other in vitro studies were negative. A mutagenicity study in animals was negative.

ECOLOGICAL INFORMATION

Avoid contaminating waterways, drains, sewers or ground.

Movement & Partitioning:

Movement in the environment is expected to be limited by the formation of insoluble polymers.

Degradation & Transportation:

Biodegradation is not applicable (for the isocyanate itself). Material is expected to be biodegrade only very slowly. Fails to pass OECD modified MITI test; hydrolysis products degrade slowly. Degradation is expected in the atmospheric environment.

Ecotoxicity:

Material is practically non-toxic to aquatic organisms on an acute basis (LD50 greater than 100 mg/l in most sensitive species).

PACKAGING & LABELLING INFORMATION

Quantities in excess of 25kgs are labelled in accordance with the Code of Practice for Labelling.

Workplace Substances. Repacking of this product into quantities less than 25kgs to be in accordance with the SUSDP requirements for this substance.

HAZARDOUS SUBSTANCES CLASSIFICATION: Harmful. Irritant. Sensitiser.

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

SAFETY PHRASE: S26. In case of contact with the eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre.
S28. After contact with skin, wash immediately with plenty of water warm, soapy if available).
S38. In case of insufficient ventilation, wear suitable respiratory equipment.
S45. In case of accident or if you feel unwell, contact a doctor or Poisons information Centre immediately (show the label where possible).

Manufacturers Advice:

The principal components and additives of this product are included in the Australian Inventory of Chemical Substances (AICS).

References:

Worksafe Australia Guide "ISOCYANATES". Australian Government Publishing Service Canberra July 1990. Code WAP90/017 GS012-1990.

CONTACT POINT

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