Material Safety Data Sheet

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I. Identification of the Material and Supplier

Material Identification: Flatproofing Material, A-side
HeviDuty, HeviDuty II, Ecofil HD

Chemical Family: Aromatic Isocyanate Prepolymer

Distributed in Australia by:

Voest Alpine Mining
Old Punt Rd., Tomago, NSW 2322, Australia
Telephone: 61249852660
After Hours: 01161419022500
FAX: 61249852699
International Emergency, Call collect:
0011-1-(703) 527-3887

II. Hazards Identification

Product Classification: "T+" according to the criteria of Nat'l Occupational Health & Safety Commission

Health Hazards: Irritating to eyes, respiratory system and skin. Inhalation at levels above the occupational exposure limit could cause respiratory sensitization. Risk of serious damage to respiratory system. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of TDI may develop in sensitized persons.

Additional Comments: This product contains small amounts of toluene diisocyanate 2, 4 isomer which, based on animal research is a suspected carcinogen. Warnings of the sensitization properties have also been issued. Product also contains petroleum oils similar to ones categorized by the International Agency for Research on Cancer (IARC) as causing skin cancer in mice after prolonged and repeated contact. Repeated exposure may also cause pulmonary sensitization or skin and eye irritation. Potential hazards can be minimized by use of proper ventilation. Any potential hazard can be minimized by using recommended personal protective equipment to avoid skin contact and by washing thoroughly after each handling.

Sensitized persons should not be exposed to any mixture containing unreacted TDI.

Physical Hazards: Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Read the entire MSDS for a more thorough evaluation of the hazards.

Risk Phrases: **R26, R40, R42/43, R45**
Safety Phrases: **S4, S7, S9, S14, S23, S51, S53, S56, S57, S60, S61, S62, S63**

III. Composition/Information on Ingredients

Hazardous Ingredients	*% (w/w)*	*TLV*	*CAS NO.*
Toluene diisocyanate (TDI)	<11.5%	0.005 ppm TWA	26471-62-5
Petroleum hydrocarbons	47-58%	5 mg/m^3 TWA/PEL	64742-03-6

IV. First Aid Measures

Eyes: Flush immediately with water for at least 15 minutes. Get medical attention if irritation occurs.

Skin: Remove contaminated clothing. Wipe affected area with Isopropyl alcohol (IPA), followed by thorough washing with soap and water.

Inhalation: Remove person to fresh air. Get medical attention.

Ingestion: Give large amounts of water and consult a physician.

Note to Physicians: Symptomatic and supportive therapy as needed. Following severe exposure, medical follow-up should be monitored for at least 48 hours.

V. Fire Fighting Measures

For information on Flammable Properties, see Section IX, "Physical and Chemical Properties".

OSHA Flammability Class: Class IIIB Combustible Liquid

NFPA Ratings: Fire – 1, Health – 2, Reactivity – 1
Special Instructions – Water Reactive

Combustion Products: Carbon monoxide, carbon dioxide, nitrogen oxides and some HCN.

Fire and Explosion Hazards: Containers may burst under intense heat.

Due to reaction with water, a hazardous build-up of pressure could result if contaminated containers are resealed.

Extinguishing Media: Carbon dioxide, dry chemical or appropriate foam. If water is used, very large quantities are required. Reaction between water and hot isocyanate may be vigorous. Contain run-off water with temporary barriers.

VI. Accidental Release Measures

For major spills call Chemtrec: 0011-1-(703) 527-3887- International (800-424-9300) – United States

Spills, Leaks, or Releases: Clean-up should only be performed by trained personnel. People dealing with major spills should wear full protective clothing including full air supplied respirator. Evacuate the area. Prevent further leakage, spillage or entry into drains. Contain and absorb large spills onto an inert, non-flammable absorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Test atmosphere for TDI. Neutralize small spills with decontaminant. Remove and properly dispose of residues. Notify applicable government authorities if release is reportable. Spills of this product may be reportable under CERCLA requirements, check with your local Reporting Agency for reporting requirements.

Preparation of Decontamination Solution: Prepare a decontamination solution of 0.2-0.5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material data safety sheet when preparing and using the solution.

Use of Decontamination Solution: Allow deactivated material to stand for at least 30 minutes before shoveling into drums. Do not tighten the bungs. Mixing wet earth is also effective, but slower.

VII. Handling and Storage

Handling: Avoid direct physical contact with the product or reaction mixture. Use only with adequate ventilation to ensure that the occupational exposure limit is not exceeded. The efficiency of the ventilation system must be inspected regularly and maintained to accumulation of material and restriction. Avoid breathing aerosols, mists and vapors. When the product is sprayed or heated, an approved MSHA/NIOSH positive-pressure, supplied-air respirator may be required.

Storage Requirements: Keep containers properly sealed and when stored indoors, in a well-ventilated area. Keep contents away from moisture. Due to reaction with water, producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys or galvanized surfaces.

Storage Temperature: Ideal storage temperature is 70-95°F (21-35°C).

Keep stocks of decontaminant (See Section 6) readily available.

VIII. Exposure Controls and Personal Protection

Preventive Measures: Conditions for use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices in the workplace. Accessible safety showers and eye wash stations are recommended.

Engineering Controls: Use exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to the ACGIH publication "Industrial Ventilation".

Personal Protective Equipment:
Eye Protection: Chemical safety goggles. If there is a potential for splashing, operators must use a face shield.

Skin Protection: The following protective materials are recommended: Gloves - neoprene, nitrile rubber, butyl rubber. Thin latex disposable gloves should be avoided for repeated or long term use.

Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.
Respiratory Protection: Use an approved NIOSH/MSHA positive pressure air-supplied respirator equipped with a full facepiece if airborne concentrations exceed or are expected to exceed the occupational exposure standard. **NOTE: Air purifying (cartridge type) respirators are not approved for protection against diisocyanates.**

Exposure Guidelines: Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Persons with respiratory problems including asthmatic-like conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or skin allergies should be evaluated for their suitability for working with this material. Once a person is diagnosed as sensitized, no further exposure to the material that caused sensitization should be permitted.

Hazardous Ingredients:
Toluene Diisocyanate

ACGIH TLV	0.005 ppm TWA
OSHA PEL CEILING	0.02 ppm ceiling
NIOSH REL/TWA	0.005 ppm (10-hr, 40 hrs/wk)
NIOSH REL/CEILING	0.02 ppm (10-minute)

IX. Physical and Chemical Properties

Chemical Name:	Not Applicable (mixture)
Chemical Family:	Aromatic Isocyanate Prepolymer
Molecular Formula:	Not applicable (mixture)
Appearance:	Coffee brown liquid
Odor:	Low to slight odor
Odor Threshold:	> TLV of 0.005 ppm*
pH:	Not applicable
Flash Point:	270°F (132°C) (COC)
Vap. Press.: (mm Hg @ 20°C):	Approx. 4 x 10-6
Vapor Density: (Air = 1):	8.5 approx.
Boiling Point:	> 480°F (250°C)
Melting Point:	Not applicable

*for Toluene Diisocyanate

Solubility (Water):	(Reacts with water)
Solubility (Other):	Soluble in most organic solvents.
Specific Gravity:	1.01 – 1.05
Evaporation Rate:	Not available
Flammable Limits:	LFL: Not Available
	UFL: Not Available
Auto Ignition Temperature:	Not Determined
Decomposition Temperature:	646°F (341.1°C)
Rate of Burning:	Not Available
Explosive Power:	None
Sensitivity to Mechanical Impact:	None
Sensitivity to Static Discharge:	None

X. Stability and Reactivity

Hazardous Decomposition Products: Highly unlikely under normal industrial use. See Section 5.
Chemical Stability: Stable at room temperature.
Conditions To Avoid: Avoid temperature extremes.

Incompatibility with Other Substances: This product will react with any materials containing active hydrogens such as water, alcohol, amines, bases and acids. The reaction with water is very slow at temperatures below 122°F (50°C) but is accelerated at higher temperatures.

Hazardous Polymerization: Prolonged heating above 160°F, may cause polymerization but does not constitute a safety hazard.

XI. Toxicological Information

Toluene Diisocyanate

Oral LD50 (rat):	> 4130-5110 mg/kg bw
Dermal LD50 (rabbit):	> 9400 mg/kg bw
Inhalation LC50 (rat):	350-360 mg/m^3 – 4 hrs (respir. aerosol)

POTENTIAL HEALTH EFFECTS
Acute Inhalation: TDI vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a pre-existing, nonspecific bronchial hyper-reactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever/chills), has also been reported. These symptoms can be delayed up to several hours after exposure.

Chronic Inhalation: As a result of previous repeated overexposures or a single large dose, certain individuals

may develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms, which can include chest tightness, wheezing cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized, an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung damage (including decrease in lung function) may be permanent. There has been a preliminary report on a possible new finding on sensitization. A TDI manufacturer, BASF, reported that 15 out of 269 TDI production employees developed asthma-like reactions attributed to TDI exposure. They indicated that the number of employees experiencing these reactions (about 1% per year) is not unusual. What is unusual is that 7 out of 15 individuals had experienced prior exposures to respiratory irritants, such as phosgene and chlorine, which may have led to an increased risk of sensitization to chlorine, and this may have led to an increased risk of sensitization to TDI. Chlorine and phosgene are used in the synthesis of TDI and are not expected to be present in user facilities.*

Skin Contact: Isocyanates react with skin protein and moisture and can cause irritation which may include symptoms such as reddening and swelling. A single prolonged exposure is not likely to result in the material being absorbed through the skin in harmful amounts. TDI dermal LD_{50} is above 5.8 grams/kg.

NOTE: Some evidence suggests that sensitization can occur from dermal exposure to isocyanates, thus exposure should be controlled using proper personal protective equipment at all times.

Eye Contact: The aerosol, vapor or liquid will irritate human eyes following contact.

Ingestion: Ingestion may cause irritation of the gastrointestinal tract. Based on the acute oral LD50, this product is considered practically non-toxic by ingestion.

Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH or IARC, not regulated as carcinogens by OSHA, and not listed as carcinogens by NTP.

Mutagenicity: There is no substantial evidence of mutagenic potential.

Reproductive Effects: No adverse effects are anticipated.

Teratogenicity and Fetotoxicity: No birth defects were seen in two independent animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations in excess of the defined occupational limits.

***Ref.: BASF 8(e) Notification to EPA dated Feb. 3, 1998.**

XII. Ecological Information

Environmental Fate and Distribution: It is unlikely that significant environmental exposure in the air or water will arise, based on consideration of the production and use of the substance.
Persistence and Degradation: Immiscible with water, but will react with water to produce inert and non-biodegradable solids.

LC50 (Zebra Fish) > 1000 mg/l (At the highest level tested of 1000 mg/l there were no deaths)
EC50 (Daphnia magna) (24 hour) > 1000 mg/l
EC50 (E.Coli) > 100 mg/l

XIII. Disposal Considerations

The generation of waste should be avoided or minimized wherever possible.

Disposal should be in accordance with state, local, provincial or national regulations. This material is not a hazardous waste under RCRA 40 CFR 261. Small quantities should be treated with a decontaminant solution (See Section 6).

The treated waste is not a hazardous material under RCRA 40 CFR 261. Chemical waste, even small quantities should never be poured down drains, sewers or waterways.

Empty containers should be decontaminated and either passed to an approved drum recycler or destroyed.

XIV. Transport Information

US DOT: Material classified ORM (Otherwise Regulated Material)

Transportation Emergency Telephone Number: Chemtrec: 0011-1-(703) 527-3887(International Emergencies)
1-800-424-9300 (Chemtrec, U.S.)

TDG: Not regulated.

IMO: Not regulated

IATA/ICAO CLASS: Single containers with less than 100 lbs. TDI are not regulated. Single containers with 100 lbs. or more of Toluene Diisocyanate are regulated as: Other Regulated Substances, Liquid, N.O.S. (Toluene Diisocyanate), 6.1, UN2078, PGIII

XV. Regulatory Information

OSHA Classification: This product is classified as a hazardous material under the criteria outlined in the OSHA Hazard Communication Standard (HCS) (29 CFR 1910.1200).
TSCA (Toxic Substances Control Act) Regulations: All ingredients are on the TSCA Chemical Substance Inventory.

EPCRA Section 313 (40 CFR 372): This product contains the following chemical(s) subject to reporting requirements:
Toluene Diisocyanate, (Mixed isomers,) CAS# 26471-62-5, <6%
Toluene Diisocyanate, (Mixed isomers,) – de minimis concentration for Section 313 = 0.10%

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): Toluene Diisocyanate (CAS 26471-62-5) has a 100 lb. RQ (reportable quantity). Any spill or release above the RQ must be reported to the National Response Center (800-424-8802). The % of TDI in this product is listed in Section 2 of this MSDS. *SARA 313 Information:* This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40CFR Part 372:

Chemical Name	CAS NUMBER	CONCENTRATION
Toluene Diisocyanate	26471-62-5	<11.5%

SARA Hazard Category: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A chronic health hazard

PROPOSITION 65 (California Safe Drinking Water & Toxic Enforcement Act of 1986): Based on information currently available, this product contains chemicals showing limited evidence for carcinogenicity in people and/or sufficient evidence in animals.

This product does not contain nor is it manufactured with ozone depleting substances.

Other Regulations/Legislation which apply to this product: Massachusetts Right-To-Know, Pennsylvania Right-To-Know, New Jersey Right-To-Know, CERCLA.

Canadian Classification: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

Controlled Products Regulations (WHMIS) Classification: D-1A, D-2A and D-2B.

CEPA / Canadian Domestic Substances List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).

XVI. Other Information

Glossary:		
	ACGIH:	American Conference of Governmental Industrial Hygienists
	IARC:	International Agency for Research on Cancer
	MSHA:	Mine Safety and Health Administration
	NIOSH:	National Institute for Occupational Safety and Health
	NTP:	National Toxicology Program
	OSHA:	Occupational Safety and Health Administration

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MSDS Revision Information:

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