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Material Safety Data Sheet A-1480 Part A

Date of Preparation: 01/05/06

24 HOUR EMERGENCY ASSISTANCE	
CHEMTREC: (800)-424-9300	
HEALTH HAZARD→ 2 FIRE→1 REACTIVITY→1 SPECIAL→0	

*For acute and chronic health effects refer to the discussion in Section III

SECTION I: NAME

PRODUCT NAME: Clear Top Coat Sealer 60% Solids Polyurethane
CHEMICAL NAME: 1,6-Hexamethylene Diisocyanate Based Polyisocyanate
SYNONYMS: Polymeric Hexamethylene Diisocyanate In Organic Solvents
CHEMICAL FAMILY: Aliphatic Polyisocyanate
TYPE OF USE: Coatings

<u>HAZARDOUS INGREDIENTS</u>	<u>CAS #</u>	<u>%</u>
Homopolymer of Hexamethylene Diisocyanate(HDI)	28182-81-2	80%
Hexamethylene Diisocyanate (HDI)	822-06-0	<.7%
Benzene, 1-Chloro-4-(trifluoromethyl)-	98-56-6	5-20%

SECTION II: COMPOSITION/OCCUPATIONAL EXPOSURE LIMITS

<u>HAZARDOUS INGREDIENTS</u>	<u>CAS #</u>	<u>%</u>
Homopolymer of Hexamethylene Diisocyanate(HDI)	28182-81-2	80%
OSHA – Not Established ACGIH – Not Established The recommended Manufacturer Guideline Level (MGL) For HDI based Polyisocyanates is: 0.5 mg/m3 (TWA- Averaged over 8 hours) and 1.0 mg/m3 Short Term Exposure (STEL – averaged over 15 minutes)		

Hexamethylene Diisocyanate (HDI)	822-06-0	*
OSHA – Not Established ACGIH: .005 ppm TWA		
*Monomer content is less than 0.7% based on resin solids at the time of manufacture. However, after 3-6 months storage, the free monomer content may rise to a maximum of 1.6%		
Benzene, 1-Chloro-4-(trifluoromethyl)-	98-56-6	5-20%

SECTION III: HAZARD IDENTIFICATION

Emergency Overview:	This material is HAZARDOUS by OSHA Hazard Communication definition
Signal Word:	Danger
Hazards:	May cause respiratory tract irritation; may cause allergic skin reaction; may cause skin irritation; may cause eye irritation; harmful if swallowed; may cause lung damage; closed container may explode under extreme heat or when contaminated with water; use cold water spray to cool fire-exposed containers to minimize the risk of rupture; toxic gases/fumes are given off during burning or thermal decomposition.
Physical State:	Liquid
Color:	Clear, pale yellow.
Odor:	Nearly Odorless
Potential Health Effects:	
Routes of Exposure:	Eye, Inhalation, Skin, Ingestion
Acute Skin:	This material is a severe skin irritant. Causes irritation seen as local redness, rash, scaling, possible swelling or blistering. Repeated or prolonged skin contact may cause sensitization and an allergic skin reaction.
Chronic Skin:	Prolonged contact with isocyanate can cause reddening, swelling, rash, scaling or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material or even as a result of vapor only exposure.
Acute Inhalation:	HDI vapors or mist at concentrations above the TLV or MGL 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, non-specific bronchial hyper-reactivity can respond to concentrations below the TLV or MGL with similar symptoms as well as an asthma attack. Exposure well above the TLV or MGL 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.
Chronic Inhalation:	As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitizations (chemical asthma) that will cause them to react to a later exposure to isocyanate at levels well below the TLV or MGL. These symptoms, which 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 sensitivity can persist for weeks and in

severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent.

- Acute Eye Contact:** Liquid, aerosols and vapors of this product are irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes.
- Chronic Eye Contact:** may result in corneal opacity (clouding of the eye surface).
- Acute Ingestion:** Ingestion can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract.
- Chronic Ingestion:** None found
- Carcinogenicity:** This product is not listed by NIP, IARC, or regulated as a carcinogen by OSHA.
- Medical Conditions Aggravated by Exposure:** Asthma and other respiratory disorders (bronchitis, emphysema, hyper reactivity) skin allergies, eczema and existing eye conditions.

IV. FIRST AID MEASURES

- General:** Prolonged observation may be indicated.
- Inhalation:** If overcome by exposure, remove victim to fresh air immediately. Call a physician. Give oxygen or artificial respiration as needed.
- Eye:** Immediately flush eyes thoroughly with plenty of clean, lukewarm water and continue flushing for at least 15 minutes while lifting eyelids with fingers to ensure that the chemical is being flushed from the eyes. Refer individual to physician or ophthalmologist for immediate follow up.
- Skin:** Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. Flush with lukewarm water for 15 minutes. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposure, seek medical attention if ill effect or irritation develops. Wash clothing before wearing again.
- Ingestion:** If ingested, give 1-2 cups of milk or lukewarm water (pint or ½ litre) if victim is fully conscious and alert. **DO NOT INDUCE VOMITING.** Obtain emergency medical attention.
- Note to Physician:** **Eyes:** Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision.
Skin: This product is a known skin sensitizer. Treat symptomatically. There is no specific antidote.
Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the product.
Inhalation: This product is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material must be removed from any further exposure to any isocyanate.

SECTION V: FIRE-FIGHTING MEASURES

- Flash Point/Method:** 109°F Setaflash (ASTM D-3243, D-3278, D-3828)
- Auto-Ignition Temperature** >500°F
- Lower Flammable Limit** No data available
- Upper Flammable Limit** No data available

- Extinguishing Media:** Dry Chemical; Carbon Dioxide; Foam; Water spray for large fires.
- Special Fire Fighting Procedures:** Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, HDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Closed container may explode when exposed

to extreme heat or burst when contaminated with water (CO₂ evolved). Cool fire exposed containers with water to prevent rupture. Combustible liquid material does not sustain combustion and flammable limits in air by % volume – upper 10.5/lower 0.9

SECTION VI: ACCIDENTAL RELEASE MEASURES

SPILL OR LEAK PROCEDURES: Evaluate nonessential personnel. Remove sources of ignition and ventilate the area. Notify appropriate authorities if necessary. Put on persona. Protective equipment. Dike or impound spilled material and control further spillage if feasible. Prevent from entering ground water supply, sewers and soil. Cover the spilled material with sawdust, vermiculite, Fuller's earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to a safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down spill area with decontamination solutions. Decontamination solutions: nonionic surfactant Union Carbide's Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%).

DISTRIBUTION EMERGENCIES: Chemtrec should be notified at (800) 424-9300 when this product is unintentionally released from its container during its course of distribution, regardless of the amount released. Distribution includes transportation, storage incidental to transportation, loading and unloading. Such notification must be immediate and made by the person having knowledge of the release.

SECTION VII: HANDLING AND STORAGE

Storage Temperature (Min/Max): -30°F (-34°C)/122°F (50°C)

Shelf Life: 6 months at 77°F (25°C)

Storage Conditions: If container is exposed to high heat, it can be pressurized and possibly rupture explosively. HDI reacts slowly with water to form CO₂ gas. This gas can cause sealed containers to expand and possibly rupture explosively.

Handling Procedures: Store in a cool, dry area in original or similar container. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. At maximum storage temperatures noted, material may slowly polymerize without hazard. Ideal storage temperature range for ease of handling is 50-81°F (10-27°C). Avoid contact with skin and eyes. Do not breathe vapors if generated. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

SECTION VIII: EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protection:

Ventilation: Good industrial hygiene practice dictates that worker protection should be achieved through engineering controls, such as ventilation, whenever feasible. When such controls are not feasible to achieve full protection, the use of respirators and other personal protective equipment is mandated. Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (i.e. they are released into the work area), it is possible to be exposed to airborne monomeric HDI.

Respirator Requirements: A respirator that is recommended or approved for use in isocyanate-containing environments (air-purifying or fresh air-supplied) may be necessary for spray applications or other situations such as high temperature use that may product inhalation exposures. A supplied-air respirator (either positive pressure or continuous flow-type) is recommended. Before an air-purifying respirator can be used, air monitoring must be performed to measure airborne concentrations of HDI monomer and HDI polyisocyanate. Specific conditions under which air-purifying respirators can be used are outlined in the following sections. Observe OSHA regulations for respirator use (29 CR 1910.134).

Spray Application:

Good industrial hygiene practice dictates that when isocyanate-based coatings are spray applied, some form of

respiratory protection should be worn. During the spray application of coatings containing this product, the use of a supplied-air (either positive pressure or continuous flow-type) respirator is mandatory when one or more of the following conditions exists:

- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); or
- the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits); or
- operations are performed in a confined space (See OSHA confined Space Standard, 29 CFR 1910.146).

A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met:

- the airborne isocyanate monomer concentrations are known to be below 0.05 ppm averaged over eight (8) hours (10 times 8 hour TWA exposure limit); and
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits and
- A NIOSH-certified End of Service Life Indicator or a change schedule based upon objective information or data is used to ensure that cartridges are replaced before the end of their service life. In addition, prefilters should be changed whenever breathing resistance increases due to particulate buildup.

Non-Spray Operations:

During non-spray operations such as mixing, batch making, brush or roller application, etc., at elevated temperatures (for example, heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vapors. Therefore, when the coatings system will be applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow-type) respirator is mandatory when one or more of the following conditions exist:

- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); or
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits and
- operations are performed in a confined space (See OSHA confined Space Standard, 29 CFR 1910.146).

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- A NIOSH-certified End of Service Life Indicator or a change schedule based upon objective information or data is used to ensure that cartridges are replaced before the end of their service life. In addition, prefilters should be changed whenever breathing resistance increases due to particulate buildup.

Monitoring: Refer to Patty's Industrial Hygiene and Toxicology-volume 1 (3rd edition) Chapter 17 and volume 3 (1st edition). Chapter 3 for guidance concerning appropriate air sampling strategy to determine airborne concentrations of isocyanate.

Medical Surveillance: Medical supervision of all employees who handle or come in contact with this isocyanate product is recommended. This should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC, as a minimum.) Persons with asthma-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be

permitted.

Additional Protective Measures: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions.

Skin: Permeation resistant gloves (nitrile rubber, butyl rubber, PVA). Note Polyvinyl alcohol degrades in water. Based on laboratory assessment tests, it is recommended that latex gloves not be worn when working with isocyanates. Cover as much of the exposed skin area as possible with appropriate clothing (long sleeve shirts, trousers, etc.) If skin creams are used, keep the area protected only by the cream to a minimum.

Eye: Liquid chemical goggles. Vapor resistant goggles should be worn when contact lenses are in use. In a splash hazard environment chemical goggles should be used in combination with a full face-shield.

Recommended Work Practices: Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY	: -1.11 – 1.13 , @ 25°C/77°F
VAPOR DENSITY	: No Data Available
BOILING PRESSURE	: Not measurable due to decomposition
pH	: NOT APPLICABLE
APPEARANCE	: CLEAR
COLOR	: COLORLESS
STATE	: LIQUID
ODOR CHARACTERISTIC	: SWEET
VAPOR PRESSURE	: HDI Polyisocyanate: 4.7 x 10 ⁻⁷ mm Hg @ 20 C (68 F)
VISCOSITY	: Approx. 2500 mPa.s @ 23°C/73.4°F-DIN EN ISO 3219/A.3
SOLUBILITY IN WATER	: Resin is insoluble – reacts slowly with water to liberate CO ₂ gas.
MELTING/FREEZING POINT	: No Data Available
DRY POINT	: No Data Available
MOLECULAR WEIGHT	: (Polyisocyanate) 500 g/mol

SECTION X: STABILITY AND REACTIVITY

Chemical Stability: This material is stable when properly handled and stored.

Hazardous Polymerization: May occur; Contact with moisture or other materials which react with isocyanates or temperatures above 400 F (204 C) may cause polymerization.

Incompatibility with: Water, Amines, strong bases, alcohols, metal compounds and surface-active materials.

Decomposition Products: By fire and thermal decomposition; carbon dioxide, carbon monoxide, oxides of nitrogen, HCN, HDI and other undetermined aliphatic fragments.

SECTION XI: TOXICOLOGICAL INFORMATION

TOXICITY DATA FOR: HDI homopolymer materials except where indicated.

ACUTE TOXICITY

ORAL LD50: Estimated to be greater than 10000 mg/kg (rats). (Based on the results of actual tests conducted using specific HDI-homopolymer products)

DERMAL LD50: Estimated to be greater than 5000 mg/kg rabbits). (Based on the results of actual tests conducted using specific HDI-homopolymer products)

INHALATION LC50: Lower respiratory (pulmonary) irritant. LC50 values ranging from 137-1150 mg/m³

were obtained in rats exposed to aerosols. (4-hour exposure)

EYE EFFECTS: Severe irritant capable of inducing corneal injury (rabbit); maximum primary eye irritation score: 54.6/110 for a 24-hour exposure.

SKIN EFFECTS: Moderate irritant; primary dermal irritation score: 3.4/8.0 (rabbit).

SENSITIZATION: Pulmonary and dermal sensitizer in animals and humans. Evidence exists that cross-sensitization between HDI and other isocyanates particular hydrogenated MDI and TDI, can occur.

OTHER ACCUTE EFFECTS: Ames Test: Negative

SUBCHRONIC TOXICITY: Rats exposed to an HHDI homopolymer (biuret type, specifically, the solvent-free product Desmodur N-3200), at 3.7, 17.5 and 76.6 mg/m³ for three weeks (6 hrs/day, 5 days/wk) exhibited respiratory distress and many inflamed areas of tissue in the lungs and upper respiratory tract when exposed to 17.5 mg/m³ and above. The No Observable Effect Level (NOEL) was 3.7 mg/m³. Rats exposed for three months (6 hrs/day, 5 day/wk) to a HDI homopolymer (biuret type, specifically, the solvent-free product Desmodur N-3200, at aerosol concentrations of 0.4, 3.4 and 21 mg/m³ exhibited lung weight increases at the highest dose. Histopathologic diagnosis of the test animals revealed swelling and thickening in the lower respiratory tract as well as thickening of the bronchio-alveolar areas of the lung and thickening of the septum in the 21 mg/m³ animals. There were no effects noted in the upper and central respiratory tract. The No Observable Effect Level (NOEL) in this study is considered to be 3.4 mg/m³.

OTHER TOXICITY DATA: Mice were exposed to a liquid aerosol of an HDI homopolymer (isocyanurate type, specifically, the solvent-free product Desmodur N-3300), mixed with acetone for three hours. The irritation potential expressed as the RD50 (the concentration which is predicted to reduce the respiratory rate 50%) was 20.8 mg/m³ (95% confidence interval = 18.3 to 23.9 mg/m³). Pulmonary (lung) irritation was observed first, followed by sensory (eye, nose, and throat) irritation.

SECTION XII: ECOLOGICAL INFORMATION

Ecotoxicity: No Data Available

Environmental Fate: No Data Available

Bioaccumulation: No Data Available

Biodegradation: No Date Available

SECTION XIII: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. If incinerated, toxic and corrosive combustion gases must be properly handled.

EMPTY CONTAINER PRECAUTIONS: Empty containers retain product residue (liquid and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

SECTION XIV: TRANSPORT INFORMATION

TECHNICAL SHIPPING NAME: Polyisocyanate containing Hexamethylene Diisocyanate In Organic

FREIGHT CLASS BULK: Solvent
FREIGHT CLASS PACKAGE: Isocyanate
PRODUCT LABEL: Chemicals, NOI (Isocyanate), NMFC 60000
Product Label Established

DOT:

PROPER SHIPPING NAME: Other Regulated Substances Liquid, N.O.S. * SEE NOTE BELOW
HAZARD CLASS OR DIVISION: 9

UN/NA NUMBER: NA3082
PACKING GROUP: III
DOT PRODUCT RQ LBS. (KGS): 6250 LBS. (2834.0 KGS)
HAZARD LABEL: Class 9
HAZARD PLACARD: Class 9

*When in individual containers of less than the Product RQ, this material ships as non-regulated.

IMO/IMDG CODE (OCEAN):
HAZARD CLASS DIVISION NUMBER: Non regulated

ICAO/IATA (AIR):
HAZARD CLASS DIVISION NUMBER: Non regulated

SECTION XV: REGULATORY INFORMATION

OSHA STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CR 1910.1200.

TSCA STATUS: On TSCA Inventory

CERCLA REPORTABLE QUANTITY: Hexamethylene-1,6-Diisocyanate (CAS#822-06-0) = 100 lbs.

SARA TITLE III:

SECTION 302 EXTREMELY

HAZARDOUS SUBSTANCES: NONE

SECTION 311/312 HAZARD

CATEGORIES:

Immediate Health Hazard; Delayed Health Hazard,
Reactive Hazard

SECTION 313 TOXIC CHEMICALS:

Hexamethylene-1,6-Diisocyanate, (CAS# 822-06-0),
.70 to 1.6 %

RCRA STATUS:

If discarded in its purchased form, this product would not
Be a hazardous waste either by listing or by characteristic.
However, under RCRA, it is the responsibility of the
product user to determine at the time of disposal whether a
Material containing the product or derived from the
product should be classified as a hazardous waste. (40 CFA
261.20-24)

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements, you should contact the appropriate agency in your state.

<u>COMPONENT NAME/CAS NUMBER</u>	<u>CONCENTRATION</u>	<u>STATE CODE</u>
Homopolymer of Hexamethylene Diisocyanate (HDI) 28182-81-2	Essentially 100%	PA3, NJ4
Hexamethylene Diisocyanate (HDI) 822-06-0	*	CN2

NJ4 – New Jersey Other – included in 5 predominant ingredients > 1 %

PA3 – Pennsylvania Non-hazardous present at 3 % or greater.

CN2 – Canada WHMIS Ingredient Disclosure List over 0.1 %

CALIFORNIA PROPOSITION 65

To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.

MASSACHUSETTS SUBSTANCE LIST (MSL)

Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. To the best of our knowledge, this product contains no substances at a level that could require reporting under the statute.

SECTION XVI: OTHER INFORMATION

HMIS RATINGS:

Health	2*
Flammability	1
Reactivity	1

0= Minimal 1= Slight 2= Moderate 3= Serious 4=Severe

* Chronic Health Hazard

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