

Material Safety Data Sheet

Reviewed 11/01

Section I

Manufacturer's Name
SEAMLESS TECHNOLOGIES, INC.

Non-Emergency Telephone #
1-800-666-6216

Address
PO Box 428
Chestertown, MD 21620

Emergency Telephone #
1-800-535-5053

Chemical Name & Synonyms
1,6 Hexamethylene Diisocyanate
Based Polyisocyanate

Chemical Family
Aliphatic Isocyanate

Trade Name & Synonyms
UP550
PART B

Section II - Hazardous Ingredients

	%	TLV	CAS #
Homopolymer of HDI	75%	OSHA: Not Established ACGIH: Not Established	28182-81-2
The manufacturer recommended guideline level for exposure to HDI based polyisocyanates is:			
	0.5 mg/m ³ TWA over 8 hours & 1.0 mg/m ³ stel over 15 minutes		
Hexamethylene Diisocyanate (HDI)	*	OSHA: Not Established ACGIH: 0.05 ppm TWA	822-06-0

*Residual monomer content less than 0.5% 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%. Manufacturer recommends a ceiling level of 0.02 ppm.

Section II - Hazardous Ingredients (cont.)

	%	TLV	CAS #
Xylene	12.5%	OSHA: 100 ppm TWA 150 ppm stel ACGIH: 100 ppm TWA 150 ppm stel	1330-20-7
N Butyl Acetate	12.5%	OSHA: 150 ppm TWA 200 ppm stel ACGIH: 150 ppm TWA 200 ppm stel	123-86-4

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not "hazardous" per this OSHA standard may be listed.

Section III - Physical Data

Specific Gravity ~~~~~	1.06 @ 68° F. (20° C.)
% Volatile by Volume ~~~~~	Approximately 30%
Bulk Density ~~~~~	8.85 lb./gallon
Vapor Pressure ~~~~~	Polyisocyanate: Approx. 7.5 x 10 ⁻⁵ mm hg @ 20° C. Butyl Acetate: 15 mm hg @ 25° C. Xylene: 9 mm hg @ 20° C.
Molecular Weight ~~~~~	Approx. 500 (Polyisocyanate)
Water Solubility ~~~~~	Resin is insoluble - reacts slowly with water to liberate CO ₂ gas
Appearance & Odor ~~~~~	Clear/pale yellow liquid with solvent odor

Section IV - Fire and Explosion Data

Flash point ~~~~~	91.0° F. (32.7° C.) Setaflash
Flammable Limits:	
UEL:	7.0 Xylene 7.6 N-Butyl Acetate
LEL:	1.0 Xylene 1.38 N-Butyl Acetate
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 fire fighters. During a fire, HDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. (see Section VIII). Isolate from heat, electrical equipment, sparks and open flame. Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO₂ evolved). Solvent vapors may be heavier than air. Stagnant air may cause vapors to accumulate and

Special Fire Fighting Procedures (cont.)

travel along the ground to an ignition source which may result in a flash back to the source of the vapors.

Section V - Human Health Data

Route of entry ~~~~~ Inhalation; skin contact; eye contact.

Human Effects and Symptoms of Overexposure:

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 preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV or the manufacturer's suggested guideline with similar symptoms as well as an asthma attack. Exposure well above the TLV or manufacturer's suggested guideline 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. Solvent vapors may be irritating to the eyes, nose and throat. Symptoms of irritation may include: redness, burning, and itching of the eyes, dryness of the throat and tightness of the chest. Other possible symptoms of overexposure include: headache, nausea, narcosis, fatigue and loss of appetite. A concentration of 200 ppm Butyl Acetate can cause eye, nose, and throat irritation. At 300 ppm these effects can become severe. Persons exposed to 200 ppm of xylene experienced eye, nose and throat irritation. Concentrations of 10,000 ppm of Xylene can be immediately dangerous to life and health.

Chronic Inhalation: As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV or manufacturer's suggested guideline.

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 isocyanate has also been reported to cause lung damage, including decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent. Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage. Symptoms include: loss of memory, loss of intellectual ability and loss of coordination.

Acute Skin Contact: Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, swelling, rash, scaling or blistering. Some persons may develop skin sensitization from skin contact. Cured material is difficult to remove. Repeated or

prolonged skin contact with solvents can result in dry, defatted and cracked skin causing increased susceptibility to infection. In addition, skin irritation (i.e. redness, swelling), which may develop into dermatitis, may occur from skin contact. Solvents can penetrate the skin and may cause systemic effects similar to those identified under acute inhalation symptoms.

Chronic Skin Contact: Prolonged contact with the 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. Chronic skin exposure to solvents may cause effects similar to those identified under chronic inhalation effects.

Human Effects and Symptoms of Overexposure (cont.)

Acute Eye Contact: Liquid, aerosols and vapors of this product (isocyanate and solvents) are irritating and can cause tearing, reddening and swelling accompanied by a stinging sensation and/or feeling like that of fine dust in the eyes.

Chronic Eye Contact: May result in corneal opacity (clouding of the eye surface). Prolonged vapor contact may cause conjunctivitis.

Acute Ingestion: Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. Vomiting may cause aspiration of the solvent resulting in chemical pneumonitis.

Chronic Ingestion: None found

Carcinogenicity

NTP	~~~~~	Not Listed
IARC	~~~~~	Not Listed
OSHA	~~~~~	Not Regulated

Medical Conditions Aggravated by Exposure: Asthma and other respiratory disorders (bronchitis, emphysema, hyperreactivity), skin allergies, eczema.

Exposure Limits: Not established for product as a whole. Refer to Section II for exposure limits of hazardous constituents. The manufacturer suggested guidelines of 0.5 mg/m³ TWA and 1.0 mg/m³ stel

for the homopolymer of HDI and 0.02 ppm ceiling for HDI monomer are guides based on limited data; provided pending the review of future data.

Section VI - Emergency and First Aid Procedures**First Aid for Eyes:**

Flush with clean, lukewarm water (low pressure) for at least 15 minutes, while lifting eyelids. Refer individual to physician or ophthalmologist for immediate follow up.

First Aid for Skin:

Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

First Aid for Inhalation:

Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

First Aid for Ingestion:

Do not induce vomiting. Give 1 to 2 cups of milk or water to drink. **Do not give anything by mouth to an unconscious or convulsing person.** Consult physician.

Note to Physician.....

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steriod preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision.

Skin: This product is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn.

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 VII - Employee Protection Recommendations

Required work/hygiene procedures:

Precautions must be taken so that persons handling product do not breathe the vapors or have it contact the eyes or skin. In spray operations, protection must be afforded against exposure to both vapor and spray mist.

Eye protection requirements:

Safety glasses, splash goggles or face shield. Contact lenses should not be worn.

Skin protection requirements:

Permeation resistant gloves. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected only by the cream to a minimum.

Respirator requirements:

A respirator that is recommended or approved for use in isocyanate containing environments (air purifying or fresh air supplied) may be necessary. Consider type of application and environmental concentrations. Observe OSHA regulations for respirator use (29CFR1910.134).

Note on Odor Warning Properties: Pure isocyanate materials have odor thresholds that are higher than the TLV, PEL or manufacturer's suggested guidelines. Thus, if a vapor/particulate air-purifying respirator has exceeded its service life, breakthrough of the filter can result in exposure over the allowable limit without the wearer being able to smell the isocyanate. However, when a polyurethane coating system contains organic solvents, the wearer of a vapor particulate respirator will be warned of filter breakthrough by the odor of solvents before being exposed to isocyanates because:

- 1) Organic solvents have low odor thresholds.
- 2) Testing has demonstrated that solvents break through filters before isocyanates do.

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 organic solvent containing coatings systems, the use of a positive pressure supplied air respirator is mandatory when:

- ~ the airborne isocyanate concentrations are not known, or
 - ~ the airborne HDI monomer concentrations exceed 0.05 ppm (10 times the TLV) or the polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes (10 times the manufacturer's suggested guideline) or
 - ~ spraying is performed in a confined space or in an area with limited ventilation.
- A properly fitted air purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing spray paint environments, will provide adequate protection when:
- ~ the airborne HDI monomer concentrations is known to be below 0.05 ppm (10 times the TLV)
 - ~ the 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 manufacturer's suggested guideline).

