

MATERIAL SAFETY DATA SHEET

SECTION 1: GENERAL INFORMATION

Product Name: Nylon Bonding Catalyst
Distributor: Performance Screen Supply LLC
Distributor's address: 919 Route 33, Freehold, NJ 07728
Telephone number for information: 1-800-659-8337
Telephone number for emergencies: Chemtel - 1-800-255-3924
Product Class: Aromatic Polyisocyanate
Preparer: Performance Screen Supply - EHS Department **Prepare Date:** 12/15/00
HMIS Information: Health: 3 Flammability: 1 Reactivity: 2 Personal Protection: To be determined by user as per MSDS

SECTION 2: HAZARDOUS INGREDIENTS

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt.</u>	<u>OSHA-PEL</u>	<u>ACGIH-TLV</u>
Dibutyl Phthalate (DBP) TWA	84-74-2	70%	5 mg/m ³ TWA	5 md/m ³
Toluene Diisocyanate Homopolymer Established	9017-01-0	30%	Not Established	Not
Toluene Diisocyanate (TDI) TWA	26471-62-5	*	(For 2, 4-TDI) 0.005 ppm TWA	(For 2, 4-TDI) 0.005 ppm
STEL			0.02 ppm STEL	0.02 ppm

* TDI residual monomer content is less than 0.7% based on resin solids, for section 302 and 313 information refer to Sec. IX.

SECTION 3: PHYSICAL DATA

Appearance:	Liquid	Color:	Clear
Odor: established	Aromatic	Melt Point/Freeze Point:	Not
Boiling Point: at 20°C	384° F (195° C)	Specific Gravity:	1.13
Vapor Pressure: lbs/gal	Below 10mmHg at 20° C	Bulk Density:	9.4
Solubility in Water:	Isocyanate - Insoluble - Reacts with water to liberate CO ² gas;DBP-0.5%		
% Volatile by Volume:	Nil		

SECTION 4: FIRE & EXPLOSION DATA

Flash Point F (C): 356° F (180° C) DIN 51758
Flammable Limits: DBP **LEL:** 0.5% at 255° C **UEL:** 2.5%
Extinguishing Media: Dry chemical (e.g. monoammonium phosphate, potassium sulfate, and potassium chloride), carbon dioxide, high expansion (proteinic) chemical foam, water spray for large fires. Caution: Reaction between water or foam and hot TDI can be vigorous.

Special Fire Fighting Procedures/

Unusual Fire or Explosion Hazards:

Full emergency equipment with self-contained breathing apparatus and full protective clothing (such as rubber gloves, boots, bands around legs, arms and waist) should be worn by fire fighters. No skin surface should be exposed. During a fire, TDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. (See Section VIII). Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO² evolved).

SECTION 5: HUMAN HEALTH DATA

Primary Route(s) of Exposure: Inhalation, Skin & Eye Contact from liquid, vapors or aerosols.

Human Effects and Symptoms of Overexposure:

INHALATION:Acute Exposure:

TDI vapors or mist at concentrations above the suggested 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 hyperreactivity can respond to concentrations below the TLV with similar symptoms as well as an 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. DBP vapors are irritating to the eyes, nose, throat and respiratory tract (mucous membrane). Inhalation may produce symptoms such

as coughing and choking sensation. Other possible symptoms of overexposure include: headache, nausea, narcosis, fatigue and loss of appetite. Deliberately breathing concentrated solvent vapor (glue sniffing) can result in permanent brain and nervous system damage or death.

Chronic Exposure:

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 sensitivity can persist for weeks and in severe cases for several years. Chronic over-exposure 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. 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.

SECTION 5: HUMAN HEALTH DATA (CONTINUED)

SKIN CONTACT:

Acute Exposure:

Isocyanates react with skin protein and moisture and can cause irritation which may include the following symptoms: 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 DBP can result in dry, defatted and cracked skin causing increased susceptibility to infection. In addition, dermatitis and skin rash and redness may occur from skin contact.

Chronic Exposure:

Prolonged contact with the isocyanate can cause reddening, swelling, rash, scaling, blistering and in some cases, skin sensitization. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very a small amounts of liquid material or even as a result of vapor-only exposure.

EYE CONTACT:

Acute Exposure:

Liquid, aerosols or vapors are severely irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and maybe a feeling like that of fine dust in the eyes. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible. See Section VI for treatment.

Chronic Exposure:

Prolonged vapor contact may cause conjunctivitis.

INGESTION:

Acute Exposure:

Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea. Vomiting may cause aspiration of the solvent resulting in chemical pneumonitis. A worker who accidentally ingested 140 mg/kg DBP developed symptoms of nausea, vomiting, and dizziness followed by headache, pain and irritation in the eyes and light sensitivity.

Chronic Exposure:

Based on animal tests, prolonged ingestion of DBP may cause reproductive effects such as testicular atrophy and loss of testicular zinc.

Medical Conditions Aggravated by Exposure:

Asthma and any other respiratory disorders (bronchitis, emphysema, bronchia hyperreactivity), skin allergies, eczema.

Carcinogenicity:

NTP:

The National Toxicology Program reported that TDI caused an increase in the number of tumors in exposed rats over those counted in non-exposed rats. The TDI was administered in corn-oil and introduced into the stomach through a tube. Based on this study, the NTP has listed TDI as a substance that may reasonably be anticipated to be a carcinogen in its Fourth Annual Report on Carcinogens.

IARC:

IARC has announced that it will list TDI as a substance for which there is sufficient evidence for its carcinogenicity in experimental animals but inadequate evidence for the carcinogenicity of TDI to humans (IARC Monograph 39).

OSHA:

Other:

mice.

Not regulated as a carcinogen.

Exposure Limits:

No carcinogenic activity was observed in lifetime inhalation studies in rats and

Not established for the product as a whole. Refer to Section II for exposure limits of the hazardous constituents.

SECTION 6: EMERGENCY & FIRST AID PROCEDURES

Eye Contact:

Flush with clean, lukewarm water (low pressure) for at least 15 minutes,

Skin Contact:	holding eyelids open all the time. Obtain medical attention. Refer individual to an ophthalmologist for immediate follow-up. Remove contaminated clothing immediately. Wash affected areas thoroughly with soap or tincture of green soap and water for at least 15 minutes. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, get medical attention, and consult physician. For lesser exposures, seek medical attention if irritation develops or persists after the area is washed.
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. Consult physician.
Ingestion:	DO NOT INDUCE VOMITING. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Give a glass of milk or water to drink. Consult physician.
Note to Physician:	Medical supervision of all employees who handle or come in contact with Desmodur N-75 is recommended. This should include pre-employment and periodic medical examinations with respiratory function tests (FEV ₁ , FVC as a minimum). Persons with asthmatic-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.
Eyes:	Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors have produced reversible corneal epithelial edema impairing vision.
Skin:	TDI is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns.
Ingestion:	Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound.
Respiratory:	TDI is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

SECTION 7: EMPLOYEE PROTECTION RECOMMENDATIONS

Eye Protection:	Liquid chemical goggles or full-faced shield. Contact lenses should not be worn.
Skin Protection:	Chemical resistant gloves (butyl rubber, nitrile rubber). Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected by the cream to a minimum.
Ventilation and Respiratory Protection:	Exhaust ventilation sufficient to keep the airborne concentrations of the solvents and TDI below their respective TLV's must be utilized. Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. In addition, 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 (29 CFR 1910.134). In spray applications, when the airborne isocyanate monomer concentrations are known to be below 0.05 ppm and if the polyisocyanate (polymeric, oligomer) concentrations are known to be below 10 mg/m, 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 sufficient protection. When the airborne isocyanate concentrations are not known, or if either of the above guidelines is exceeded, or if spraying is performed in a confined space or area with limited ventilation, the use of a positive pressure supplied air respirator is mandatory. Even during non-spray operations such as mixing, brush or roller application, etc., depending on the conditions (e.g. heating of material or application to a hot substrate). It is possible to be exposed to airborne solvent or isocyanate vapors. Therefore, when airborne concentrations during such non-spray operations exceed the suggested TLV of 0.005 ppm for isocyanate monomer, but are below 0.05 ppm, at least an air-purifying (organic vapor) respirator is required. If airborne concentrations are unknown or exceed 0.05 ppm; or if operations are performed in a confined space, a supplied air respirator must be worn. In addition, solvent concentrations should be considered when determining the selection and use of a respirator. Refer to Patty's Industrial Hygiene and Toxicology, Volume 1 (3 rd edition) Chapter 17 and Volume III (1 st edition) Chapter 3, for guidance concerning appropriate air sampling strategy to determine airborne concentrations.
Other:	Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions.

Monitoring: TDI, polyisocyanate and solvent exposure levels must be monitored by accepted monitoring techniques to ensure that the TLV's are not exceeded. See Volume 1 (Chapter 17) and Volume 3 (Chapter 3) in Patty's Industrial Hygiene and Toxicology for sampling strategy.

SECTION 8: REACTIVITY DATA

Stability: Stable under normal conditions.
Polymerization: None under normal conditions.
Incompatibility: None Known.
Materials to Avoid: Water, amines, strong bases, alcohols, metal compounds and surface active materials.
Haz. Decomp. Products: By high heat and fire: CO₂, CO oxides of nitrogen, HCN, TDI vapors and mist.

SECTION 9: SPILL OR LEAK PROCEDURES

Steps to be taken in case material is Released or Spilled:

Evacuate non-essential personnel. Remove all sources of ignition and ventilate area. Equip clean-up crew with appropriate protective equipment (i.e. clothing, respiratory, etc.). See employee Protection Recommendations. Dike or impound spilled material and control further spillage if feasible. Notify appropriate authorities if necessary. Cover spill with sawdust, vermiculite, Fuller's earth or other absorbent material. Pour liquid decontaminate 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 and flush spill area with water. Decontamination solutions: nonionic surfactant Union Carbide's Tergitol TMN-IO (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%). Respiratory protection is recommended during spill cleanup. (See Respiratory Protection, Section VII). CERCLA (SUPER FUND) REPORTABLE QUANTITY: Xylene; 1000 lbs., Butyl Acetate; 5000 lbs.

Waste Disposal Method: Follow all federal, state and local environmental control regulations. TDI must be disposed of in a permitted incinerator or landfill. Incineration is the preferred method for liquids. Solids are usually incinerated or landfilled. Empty containers must be handled with care due to product residue and flammable solvent vapor. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Sections IV and VIII). Vapors and gases may be highly toxic. DBP and TDI are listed as hazardous wastes (nos. U-069 and U-223, respectively) under 40 CFR 261.33.

RCRA Status:

Superfund Amendments and Reauthorization Act (SARA), Title III:

Section 302 - Extremely Hazardous

Substances:

2, 4 - Toluene Diisocyanate (TDI), CAS# 584-84-9, less than 0.35%
2, 6 - Toluene Diisocyanate (TDI), CAS# 91-08-7, less than 0.35%
2,4 - Toluene Diisocyanate (TDI), CAS# 584-84-9, less than 0.35%
2,6 - Toluene Diisocyanate (TDI), CAS# 91-08-7, less than 0.35%
Dibutyl Phthalate, CAS# 84-74-2, 70%

Section 313 - Toxic Chemicals:

SECTION 10: SPECIAL PRECAUTIONS & STORAGE DATA

Storage Temperature (Min./Max.): 32° F (0° C)/122° F (50° C)

Average Shelf Life: 6 months @ 77° F (25° C)

Special Sensitivity (Heat, Light, Moisture):

If container is exposed to heat it can be pressurized and possibly rupture explosively. The isocyanates react slowly with water to form polyureas and liberate CO₂ gas. This gas can cause sealed containers to expand and possibly rupture.

Precautions to be taken in handling and Storing:

Keep away from heat, sparks and open flame. Ground containers during storage and transfer operations. Store in tightly closed containers to prevent moisture contamination. Ideal storage temperature is 50-81° F (10-27° C). Do not reseal if contamination is suspected. Prevent all contact. Do not breathe the vapors. Warning properties of isocyanates (irritation of the eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

SECTION 11: ANIMAL TOXICITY DATA

Acute - Based on a similar product

Oral, LD50 (Ingestion):	Greater than 10g/kg (Rat)
Inhalation:	2500 mg/m3 (Rat)
Eye Effects:	Moderate irritation and inflammation observed (Rabbit)
Skin Effects:	Slightly irritating (Rabbit)
Animal Toxicity - DBP*	
Other:	Reproductive and teratogenic effects were observed when DBP was given orally or by intraperitoneal injection into pregnant rats and mice.
Animal Toxicity - TDI	
Oral, LD50:	Range of 4130-6170 mg/kg (Rats and Mice)
Dermal, LD50:	Greater than 10,000 mg/kg (Rabbits)
Inhalation, LC50 (4hr):	Range of 16-50 ppm (Rat), 10 ppm (Mouse), 11 ppm (Rabbit), 13 ppm (Guinea Pig)
Eye Effects:	Severe eye irritant capable of inducing corneal opacity.
Skin Effects:	Moderate skin irritant. Primary dermal irritation score: 4.12/8.0 (Draize). However, repeated prolonged contact may culminate in severe skin irritation and/or corrosion.
Sensitization:	Skin sensitizer in Guinea Pigs. One study using Guinea Pigs reported that repeated skin contact with TDI caused respiratory sensitization. Although poorly defined in experimental animal models, TDI is known to be a pulmonary sensitizer in humans. In addition, there is some evidence that cross-sensitization between different types of diisocyanates may occur.
Sub-Chronic/Chronic Toxicity:	Sub-chronic and chronic animal studies show that the primary effects of inhaling vapors and/or aerosols of TDI are restricted to the pulmonary systems. Emphysema, pulmonary edema, pneumonitis and rhinitis are common pathologic effects. Extended exposures to as low as 0.1 ppm TDI have induced pulmonary inflammation.
Other Carcinogenicity:	The NTP conducted carcinogenesis studies of a commercial grade TDI using rats and mice in which the test material was diluted in corn-oil and administered by gavage. The investigators concluded that TDI was carcinogenic in male and female rats (fibrosarcomas, pancreatic adenomas, neoplastic liver nodules and mammary gland fibrosarcomas) and female mice (heman glosarcomas and hepatocellular adenomas). However, chronic inhalation studies in which rats and mice were exposed to 0.05 and 0.15 ppm TDI (10-30 times recommended TLV, 8-hr level) induced no treatment-related tumorigenic effects. In these studies, both exposure levels produced extensive irritation to the nasal passages and upper respiratory system of the test animals indicating that suitable effective exposures were administered.
Mutagenicity:	TDI is positive in the Ames assay with activation. However, mammalian cell transformation assays using human lung cells and Syrian hamster kidney cells were negative, as were micronucleus tests using rats and mice.
Teratogenicity:	Rats were exposed to an 80:20 mixture of 2,4- and 2,6-toluene diisocyanate vapor at analytical concentrations of 0.021, 0.12 and 0.48 ppm. Minimal fetotoxicity was observed at a maternally toxic concentration of 0.48 ppm. The NOEL for maternal and developmental toxicity was 0.12 ppm. No embryotoxicity or teratogenicity was observed.
Aquatic Toxicity:	
LC50 - 96 hr (static):	165 mg/liter (Fathead minnow)
LC50 - 96 hr (static):	Greater than 508 mg/liter (Grass shrimp)
LC50 - 24 hr (static):	Greater than 500 mg/liter (Daphnia magna)

SECTION 12: SHIPPING INFORMATION

Technical Shipping Name:	Polyisocyanate in Dibutyl Phthalate contains Toluene Diisocyanate
Freight Class Bulk:	Isocyanate
Freight Class Package:	Chemicals NOI (Isocyanate) (NMFC 60000)
Product Label:	Bonding agent KL3-2001

SECTION 12: SHIPPING INFORMATION (CONTINUED)

DOT (HM-181) (DOMESTIC SURFACE)

Proper Shipping Name: Environmentally Hazardous Substance, Liquid, N.O.S.
Hazard Class or Division: 9
UN/NA Number: UN3082
Packing Group: PG III
DOT Product RQ lbs (kgs): 14 lbs. (6.4 kgs)
Hazard Label(s): Class 9
Hazard Placard(s): Class 9

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

IMO/ IMDG CODE (OCEAN)

Proper Shipping Name: Environmentally Hazardous Substance. Liquid, N.O.S.
Hazard Class Div. Number: 9
UN Number: UN3082
Packing Group: III
Hazard Label(s): Marine Pollutant (Marking)
Hazard Placard(s): Marine Pollutant

ICAO/ IATA (AIR)

Proper Shipping Name: Environmentally Hazardous Substance, Liquid, N.O.S.
Hazard Class Div. Number: 9
UN Number: UN3082
Subsidiary Risk: None
Packing Group: III
Hazard Label(s): Miscellaneous
Radioactive: Non-radioactive
Passenger Air - Max. Qty: Non-radioactive
Passenger Instruct. Number: 914
Cargo Air - Max Qty: No limit
Cargo Air Instruct. Number: 914

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