

# MATERIAL SAFETY DATA SHEET

Shield Products  
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TRANSPORTATION EMERGENCY  
CALL CHEMTREC: (800) 424-9300

Shield Emergency Phone: (904) 880 6959

Shield Information Phone: (904) 880 6060

## 1. Product and Company Identification

**Product Name: 70014 Crosslinker**

**Chemical Family: Aliphatic Polyisocyanate in Organic Solvent**

Chemical Name: 1,6-Hexamethylene Diisocyanate Based Polyisocyanate in n-Butyl Acetate and Solvent Naphtha 100 (AR100)

Synonyms: Polymeric Hexamethylene Diisocyanate in Organic Solvent

## 2. Hazards Identification

### Emergency Overview

**WARNING!** Color: Clear, Pale yellow Form: liquid Odor: Solvent.

**Flammable.** Toxic gases/fumes may be given off during burning or thermal decomposition. Closed container may forcibly rupture under extreme heat or when contents have been contaminated with water. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Vapors may spread long distances and ignite. Vapors or mist may be a fire and explosion hazard when exposed to high temperature or ignition.

Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal. Causes respiratory tract irritation. May cause allergic respiratory reaction.

**Harmful if inhaled.** Respiratory sensitizer. Lung damage and respiratory sensitization may be permanent. Causes skin irritation. May cause allergic skin reaction. Skin sensitizer. Causes eye irritation. May cause lung damage.

### Potential Health Effects

**Primary Routes of Entry: Skin Contact, Inhalation, Eye Contact**

Medical Conditions Aggravated by Exposure: Skin Allergies, Eczema, Asthma, Respiratory disorders

## HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Inhalation

## Acute Inhalation

For Product: 70014 Crosslinker

Diisocyanate or polyisocyanate vapors or mist at concentrations above the exposure limits or guidelines can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) with symptoms of runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing difficulty). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits or guidelines with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the exposure limits or guidelines may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g. fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible. Inhalation of the solvents may cause central nervous system depression with symptoms of nausea, lightheadedness, drowsiness, dizziness and loss of coordination.

For Component: n-Butyl Acetate. Causes respiratory tract irritation with symptoms of coughing, sore throat and runny nose. May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion.

For Component: Petroleum solvent. Causes respiratory tract irritation with symptoms of coughing, sore throat and runny nose.

For Component: 1,2,4-Trimethylbenzene. May be harmful by inhalation. May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion. May cause respiratory tract irritation with symptoms of coughing, sore throat and runny nose. May cause pulmonary edema with symptoms of breathing difficulty and tightness of chest.

## Chronic Inhalation

For Product: 70014 Crosslinker

As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to diisocyanates or polyisocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to diisocyanates or polyisocyanates at levels well below the exposure limits or guidelines. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. 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. Sensitization can be permanent. Chronic overexposure to diisocyanates has also been reported to cause lung damage (including fibrosis, decrease in lung function) that may be permanent. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

For Component: n-Butyl Acetate. Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

For Component: Petroleum solvent. Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

For Component: 1,2,4-Trimethylbenzene. Repeated and prolonged contact may cause an allergic respiratory reaction in sensitive individuals. Prolonged or repeated exposure may result in adverse respiratory effects including cough, tightness of chest and shortness of breath.

## **Skin**

Acute Skin

For Product: 70014 Crosslinker

Causes irritation with symptoms of reddening, itching, and swelling. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove.

For Component: n-Butyl Acetate. May cause irritation with symptoms of reddening and itching. If sufficient amounts are absorbed, systemic toxicity may occur with symptoms similar to those described in acute inhalation.

For Component: Petroleum solvent. May cause irritation with symptoms of reddening and itching.

For Component: 1,2,4-Trimethylbenzene

May cause irritation with symptoms of reddening and itching.

#### Chronic Skin

For Product: 70014 Crosslinker

Prolonged contact can cause reddening, swelling, rash, and, in some cases, skin sensitization.

For Component: n-Butyl Acetate . May cause defatting of the skin with symptoms of dryness and cracking.

#### ***For Component: Petroleum solvent***

May cause defatting of the skin with symptoms of dryness and cracking. Prolonged or repeated skin contact may cause dermatitis with symptoms of red, itchy, dry skin.

For Component: 1,2,4-Trimethylbenzene . Prolonged or repeated skin contact may cause dermatitis with symptoms of red, itchy, dry skin. May cause defatting of the skin with symptoms of dryness and cracking.

#### Acute Eye

For Product: 70014 Crosslinker

Causes irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor may cause irritation with symptoms of burning and tearing.

For Component: n-Butyl Acetate. Causes irritation with symptoms of reddening, tearing, stinging, and swelling.

For Component: Petroleum solvent. Causes irritation with symptoms of reddening, tearing, stinging, and swelling.

For Component: 1,2,4-Trimethylbenzene. Causes irritation with symptoms of reddening, tearing, stinging, and swelling.

#### Chronic Eye

For Product: 70014 Crosslinker

Prolonged vapor contact may cause conjunctivitis.

For Component: n-Butyl Acetate

Prolonged vapor contact may cause conjunctivitis.

For Component: Petroleum solvent

Prolonged vapor contact may cause conjunctivitis.

For Component: 1,2,4-Trimethylbenzene

Prolonged vapor contact may cause conjunctivitis.

#### Ingestion

Acute Ingestion

For Product: 70014 Crosslinker

Ingestion and/or vomiting may cause aspiration into the lungs resulting in chemical pneumonitis (inflammation of the lungs).

### **For Component: n-Butyl Acetate**

Symptoms of ingestion may include abdominal pain, nausea, vomiting, and diarrhea. Ingestion and/or vomiting may cause aspiration into the lungs resulting in chemical pneumonitis (inflammation of the lungs). May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion.

### **For Component: Petroleum solvent**

Symptoms of ingestion may include abdominal pain, nausea, vomiting, and diarrhea.

For Component: 1,2,4-Trimethylbenzene. May cause nervous system effects which can include symptoms of dizziness, incoordination, headache, numbness, and/or confusion. Symptoms of ingestion may include abdominal pain, nausea, vomiting, and diarrhea.

#### Chronic Ingestion

For Product: 70014 Crosslinker

Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

### **For Component: n-Butyl Acetate**

Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

For Component: Petroleum solvent

Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

#### Carcinogenicity:

No Carcinogenic substances as defined by IARC, NTP and/or OSHA

#### 3. Composition/Information on Ingredients

##### Hazardous Components

Residual diisocyanate monomer content: <0.15%

Weight %	Components	CAS-No.
60 - 100%	Homopolymer of Hexamethylene Diisocyanate	28182-81-2
3 - 7%	n-Butyl Acetate	123-86-4
1 - 5%	Petroleum solvent	64742-95-6
1 - 5%	1,2,4-Trimethylbenzene	95-63-6
<=0.15%	Hexamethylene-1,6-Diisocyanate	822-06-0

#### 4. First Aid Measures

### **Eye Contact**

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Then remove contact lenses, if easily removable, and continue eye irrigation for not less than 15 minutes. Get medical attention if irritation develops.

## **Skin Contact**

Immediately remove contaminated clothing and shoes. In case of skin contact, wash affected areas with soap and water. Use lukewarm water if possible. Wash contaminated clothing before reuse. For severe exposures, immediately get under safety shower and begin rinsing. Get medical attention if irritation develops and persists.

## **Inhalation**

Move to an area free from further exposure. Get medical attention immediately. Administer oxygen or artificial respiration as needed. Asthmatic symptoms may develop and may be immediate or delayed up to several hours. Extreme asthmatic reactions can be life threatening.

## **Ingestion**

Do not induce vomiting. Wash mouth out with water. Do not give anything by mouth to an unconscious person. Get medical attention.

Notes to physician

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This compound is a 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 compound. Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

## **5. Fire-Fighting Measures**

Suitable Extinguishing Media: dry chemical, carbon dioxide (CO<sub>2</sub>), foam, water spray for large fires.

### **Special Fire Fighting Procedures**

Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion.

Unusual Fire/Explosion Hazards Closed container may forcibly rupture under extreme heat or when contents are contaminated with water (CO<sub>2</sub> formed). Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot diisocyanate can be vigorous.

Flammable Liquid. Vapors may spread long distances and ignite. Vapors or mist may be a fire and explosion hazard when exposed to high temperature or ignition. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flashback.

## **6. Accidental release measures**

### **Spill and Leak Procedures**

Evacuate non-emergency personnel. Isolate the area and prevent access. Remove ignition sources. Notify management. Put on protective equipment. Control source of the leak. Ventilate. Contain the spill to prevent spread into drains, sewers, water supplies, or soil. Call Shield at 904-880-6959 for assistance and advice. Major Spill or Leak (Standing liquid): To minimize vapor, cover the spillage with fire fighting foam (AFFF). Released material may be pumped into closed, but not sealed, metal container for disposal. Process can generate heat. Minor Spill or Leak (Wet surface): Cover spill area with suitable absorbent material (Kitty Litter, Oil-Dri, etc). Saturate absorbent material with neutralization solution and mix. Wait 15 minutes. Collect material in open-head metal containers. Repeat applications of decontamination solution, with scrubbing, followed by absorbent until the surface is decontaminated.

Check for residual surface contamination. Swype test kits have been used for this purpose. Apply lid loosely and allow containers to vent for 72 hours to let carbon dioxide (CO<sub>2</sub>) escape.

### ***Additional Spill Procedures/Neutralization***

Neutralization solutions:

- (1) Colorimetric Laboratories Inc. (CLI) decontamination solution.
- (2) A mixture of 75% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL- 62, Tergitol TMN-10) and 5% n-propanol.
- (3) A mixture of 80% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL- 62, Tergitol TMN- 10).
- (4) A mixture of 90% water, 3-8% ammonium hydroxide or concentrated ammonia, and 2% liquid detergent.

Shield requires that CHEMTREC be immediately notified (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.

### **7. Handling and Storage**

Storage Temperature:

minimum: -34.44 deg C (-30 deg F)

maximum: 50 deg C (122 deg F)

Storage Period

**6 Months** @ 25 deg C (77 deg F): after receipt of material by customer

### ***Handling/Storage Precautions***

Do not breathe vapors, mists, or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent 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. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash thoroughly after handling. Do not breathe smoke and gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Ground and bond containers and equipment before transferring to avoid static sparks.

### ***Further Info on Storage Conditions***

Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard 29 CFR 1910.1200.

### **8. Exposure Controls / Personal Protection**

n-Butyl Acetate (123-86-4)

US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 150 ppm

US. ACGIH Threshold Limit Values

Short Term Exposure Limit (STEL): 200 ppm  
Contaminants (29 CFR 1910.1000)

US. OSHA Table Z-1 Limits for Air

## **PEL: 150 ppm, 710 mg/m<sup>3</sup>**

1,2,4-Trimethylbenzene (95-63-6)

US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 25 ppm

Hexamethylene-1,6-Diisocyanate (822-06-0)

US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 0.005 ppm

Bayer Exposure Limit

Ceiling Limit Value: 0.02 ppm

Homopolymer of Hexamethylene Diisocyanate (28182-81-2)

### ***Bayer Exposure Limit***

Time Weighted Average (TWA): 0.5 mg/m<sup>3</sup>

Bayer Exposure Limit

Short Term Exposure Limit (STEL): 1.00 mg/m<sup>3</sup> (15-min)

Industrial Hygiene/Ventilation Measures 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.

### ***Respiratory Protection***

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 which may produce 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 CFR 1910.134). **SPRAY APPLICATION:** A. 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/m<sup>3</sup> averaged over 8 hours or 10 mg/m<sup>3</sup> 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/m<sup>3</sup> averaged over 8 hours or 10 mg/m<sup>3</sup> 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:** A. 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 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/m<sup>3</sup> averaged over 8 hours or 10 mg/m<sup>3</sup> 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 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 concentrations of the isocyanate monomer are below 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); and - the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m<sup>3</sup> averaged over eight (8) hours or 10 mg/m<sup>3</sup> 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.

#### Hand Protection

Gloves should be worn., Nitrile rubber gloves. Butyl rubber gloves, Neoprene gloves

#### **Eye Protection**

When handling liquid product, chemical goggles should be worn. Chemical safety goggles in combination with a full face shield if a splash hazard exists.

#### **Skin and body protection**

Avoid all skin contact. Depending on the conditions of use, cover as much of the exposed skin area as possible with appropriate clothing to prevent skin contact., Gloves, long sleeved shirts and pants.

#### **Medical Surveillance**

All applicants who are assigned to an isocyanate work area should undergo a pre-placement medical evaluation. A history of eczema or respiratory allergies such as hay fever, are possible reasons for medical exclusion from isocyanate areas. Applicants who have a history of adult asthma should be

restricted from work with isocyanates. Applicants with a history of prior isocyanate sensitization should be excluded from further work with isocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentially exposed to diisocyanates.

Once a worker has been diagnosed as sensitized to any isocyanate, no further exposure can be permitted

### ***Additional Protective Measures***

Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of this product. Follow all label instructions.

## **9. Physical and chemical properties**

Form: liquid

Color: Clear, Pale yellow

Odor: Solvent

pH: Not Established

Freezing Point: -48 deg C (-54.4 deg F)

Boiling Point/Range: 104.44 deg C (220 deg F) Estimated based on component(s)

Flash Point: 60.00 deg C (140 deg F) (Setaflash (ASTM D-3243, D-3278, D-3828))

Lower Explosion Limit: 1.0 %(V) for the solvent

Upper Explosion Limit: 7.5 %(V) for the solvent

Vapor Pressure: HDI Polyisocyanate: 5.2 X 10<sup>-9</sup> @ 68 F (20 C) mmHg 15 mmHg @ 20 deg C (68 deg F) for the solvent, For a solvent. 4 mmHg @ 37.78 deg C (100 deg F) For a solvent.

Specific Gravity: Approximately 1.13 @ 20 deg C (68 deg F) Solubility in Water: Insoluble -  
Reacts slowly with water to liberate CO<sub>2</sub> gas Autoignition

Temperature: Approximately 470 deg C (878 deg F) VOC Content: Approximately 5 - 15 %

Estimated based on component(s)

Viscosity, Dynamic: Approximately 550 mPa.s @ 23 deg C (73.4 deg F)

Bulk Density: Approximately 9.4 lb/gal

Molecular Weight: 500 Approximate Value, For the polyisocyanate

## **10. Stability and Reactivity**

### **Hazardous Reactions**

Contact with moisture, other materials that react with isocyanates, or temperatures above 350 F (177 C), may cause polymerization.

### **Stability**

Stable under normal conditions of use and storage.

### **Materials to avoid**

Water, Amines, Strong bases, Alcohols, copper alloys

### **Conditions to avoid**

Heat, flames and sparks.

### **Hazardous decomposition products**

By Fire and High Heat: Carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), dense black smoke, Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

## 11. Toxicological Information

Toxicity Data for 700.14 Crosslinker

Toxicity Note

Toxicity data is based on a similar product.

Acute Oral Toxicity

LD50: > 5,000 mg/kg (Rat)

Acute Inhalation Toxicity

LC50: 430 - 450 mg/m<sup>3</sup>, aerosol, 4 h (Rat)

Skin Irritation

rabbit, Exposure Time: 24 h, Non-irritating

Eye Irritation

rabbit, Slightly irritating

Toxicity Data for Homopolymer of Hexamethylene Diisocyanate

Acute Oral Toxicity

LD50: > 5,000 mg/kg (Rat)

Estimated Value

Acute Inhalation Toxicity

LC50: 390-453 mg/m<sup>3</sup>, aerosol, 4 hrs (Rat, Male/Female)

RD50: 20.8 mg/m<sup>3</sup>, 3 hrs

Acute dermal toxicity

LD50: > 5,000 mg/kg (rabbit)

Skin Irritation

rabbit, Draize, Slightly irritating

Eye Irritation

rabbit, Draize, Slightly irritating

Sensitization

dermal: sensitizer (guinea pig, Maximisation Test (GPMT))

dermal: non-sensitizer (Guinea pig, Buehler)

inhalation: non-sensitizer (guinea pig)

Repeated Dose Toxicity

3 wks, inhalation: NOAEL: 3.7 - 4.3 mg/m<sup>3</sup>, (Rat)

90 days, inhalation: NOAEL: 3.3 - 3.4 mg/m<sup>3</sup>, (Rat)

Irritation to lungs and nasal cavity.

### **Mutagenicity**

Genetic Toxicity in Vitro:

Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)

Toxicity Data for n-Butyl Acetate

Acute Oral Toxicity  
LD50: > 5,000 mg/kg (Rat, Female)

Acute Inhalation Toxicity  
LC50: > 29.2 mg/l, vapor, 4 hrs (Rat)  
LC50: > 23.4 mg/L, aerosol, 4 hrs (Rat)

Acute dermal toxicity  
LD50: > 5,000 mg/kg (rabbit, male)

### ***Skin Irritation***

Guinea pig, Acute Dermal Irritation, Exposure Time: 24 hrs, Non-irritating  
Human, Patch Test, Exposure Time: 48 hrs, Non-irritating  
Eye Irritation  
rabbit, Draize, Exposure Time: 24 hrs, Non-irritating  
rabbit, Draize, Exposure Time: 24 hrs, Slightly irritating

Sensitization  
dermal: non-sensitizer (Guinea pig, Maximization Test)  
dermal: non-sensitizer (Human, Magnusson/Kligmann (Maximization Test))

Repeated Dose Toxicity  
13 Weeks, inhalation: NOAEL: 500 ppm, (Rat, )

### ***Mutagenicity***

Genetic Toxicity in Vitro:

Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)

Cytogenetic assay: negative (other mammalian cell line, Metabolic Activation:  
without)

Developmental Toxicity/Teratogenicity  
16, 7 hrs/day, NOAEL (teratogenicity): 1,500 ppm, Rat, Female, inhalation, gestation days 1-19, 7 hrs/day, NOAEL (teratogenicity): 1500 ppm, Teratogenic effects seen only with maternal toxicity.

rabbit, female, inhalation, gestation days 1-19, 7 hrs/day, NOAEL (teratogenicity): 1500 ppm, No Teratogenic effects observed at doses tested.

Toxicity Data for Petroleum solvent

Acute Oral Toxicity  
LD50: 3,500 mg/kg (Rat, Female)  
LD50: > 5,000 mg/kg (Rat, Male/Female)

Acute Inhalation Toxicity  
LC50: 10.2 mg/L, 4 hrs (Rat)  
LC50: 5.2 mg/L, 4 hrs (Rat)

Acute dermal toxicity  
LD50: > 3,160 mg/kg (rabbit)

Skin Irritation

rabbit, Draize, Exposure Time: 24 hrs, Slightly irritating

#### Eye Irritation

rabbit, Draize, Exposure Time: 24 hrs, Slightly irritating

#### Sensitization

dermal: non-sensitizer (Guinea pig, Maximization Test)

dermal: non-sensitizer (Human, Other method)

#### Repeated Dose Toxicity

90 Days, inhalation: NOAEL: 6.6 mg/L, (Rat)

14 Days, dermal: NOAEL: 3,750 mg/kg, (rabbit)

### **Mutagenicity**

#### Genetic Toxicity in Vitro:

Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)

#### Carcinogenicity

mouse, Male, dermal, 2 Years,  
negative

rat, Male/Female, inhalation, 109 weeks, 6 hrs/day 5 days/week                      positive Kidney carcinomas were  
found in male rats only at all dose levels.

#### Toxicity to Reproduction/Fertility

Two generation study, inhalation, 6 hrs/day 7 days/week, (Rat, Male/Female)

NOAEL (F1): 500 ppm,

NOAEL (F2): 500 ppm

No effects on Reproductive parameters observed at doses tested.

Three generation study, inhalation, 6 hrs/day 7 days/week, (Rat, Male/Female)

No effects on Reproductive parameters observed at doses tested.

#### Developmental Toxicity/Teratogenicity

Rat, Female, inhalation, NOAEL (teratogenicity): > 1,573 ppm,

No Teratogenic effects observed at doses tested.

#### Toxicity Data for 1,2,4-Trimethylbenzene

##### Acute Oral Toxicity

LD50: 3,400 - 6,000 mg/kg (Rat)

##### Acute Inhalation Toxicity

LC50: 18,000 mg/m<sup>3</sup>, 4 hrs (Rat)

##### Acute dermal toxicity

LD50: > 3,160 mg/kg (rabbit)

#### Skin Irritation

rabbit, Moderately irritating

#### Eye Irritation

Rat, Slightly irritating

#### Sensitization

dermal: non-sensitizer (Guinea pig, Maximization Test)

Repeated Dose Toxicity

20 Days, inhalation: NOAEL: < 100 ppm, (rat, )

CNS depression.

28 Days, oral: NOAEL: < 500 mg/kg, (rat, )

Changes in: kidney

## **Mutagenicity**

Genetic Toxicity in Vitro:

Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)

Genetic Toxicity in Vivo:

Sister Chromatid Exchange: (mouse, )

Positive and negative results were seen in various in vivo studies.

Cytogenetic assay: negative (Rat, )

Developmental Toxicity/Teratogenicity

rat, female, inhalation, daily, NOAEL (teratogenicity): 0.19%,

No Teratogenic effects observed at doses tested. No fetotoxicity observed at doses tested.

## **12. Ecological Information**

Ecological Data for 700.14 Crosslinker

Additional Ecotoxicological Remarks

No data available for this product.

Ecological Data for Homopolymer of Hexamethylene Diisocyanate Biodegradation

0 %, Exposure time: 28 Days, Not readily biodegradable.

Acute and Prolonged Toxicity to Fish

LCO: > 100 mg/L (Zebra fish (Brachydanio rerio), 96 hrs)

Acute Toxicity to Aquatic Invertebrates

ECO: > 100 mg/L (Water flea (Daphnia magna), 48 hrs)

Toxicity to Aquatic Plants

EC50: > 1,000 mg/L, (Green algae (Scenedesmus subspicatus), 72 hrs)

Toxicity to Microorganisms

EC50: > 1,000 mg/L, (Activated sludge microorganisms, 3 hrs)

Ecological Data for n-Butyl Acetate

Biodegradation

aerobic, 98 %, Exposure time: 28 Days

Biological Oxygen Demand (BOD)

1,020 mg/g

Chemical Oxygen Demand (COD)

2,320 mg/g

Theoretical Biological Oxygen Demand (ThBOD)  
2,207 mg/g

Bioaccumulation  
approximately 4 - 14 BCF

Acute and Prolonged Toxicity to Fish  
(Pimephales promelas), 96 hrs) LC50: 18 mg/L (Fathead minnow  
LC50: 185 mg/L (Silverside Minnow (Menidia peninsulae), 96  
hrs)

Acute Toxicity to Aquatic Invertebrates  
EC50: 72.8 mg/L (Water flea (Daphnia magna), 48 hrs)  
EC50: 32 mg/L (brine shrimp (Artemia salina), 48 hrs)

### ***Toxicity to Aquatic Plants***

EC50: 670 mg/L, End Point: growth (Cryptomonad (Chilomonas paramecium), 48 hrs)  
674.7 mg/L, End Point: growth (Green algae (Scenedesmus subspicatus), 72 hrs)  
Toxicity to Microorganisms  
EC50: 959 mg/L, (Pseudomonas putida, 18 hrs)

Additional Ecotoxicological Remarks  
No data available for this component.  
Ecological Data for Petroleum solvent  
Biological Oxygen Demand (BOD)  
5 Days, 190 mg/L

Chemical Oxygen Demand (COD)  
440 mg/g

Acute and Prolonged Toxicity to Fish  
LC50: 320 - 435 mg/L (Golden orfe (Leuciscus idus), 48 hrs)  
LC50: 9.22 mg/L (Rainbow (Donaldson) Trout (Oncorhynchus mykiss), 96 hrs)

Acute Toxicity to Aquatic Invertebrates  
EC50: 170 mg/L (Water flea (Daphnia magna), 24 hrs)  
EC50: 226 mg/L (Water flea (Daphnia magna), 24 hrs)

Toxicity to Aquatic Plants  
EC50: 56 mg/L, (Green algae (Selenastrum capricornutum), 72 hrs)  
EC50: 19 mg/L, (Green algae (Selenastrum capricornutum), 72 hrs)

### ***Toxicity Other Non-Mammal Terrestrial Species***

- 2,250 mg/kg, (Bobwhite quail)

Ecological Data for 1,2,4-Trimethylbenzene  
Biological Oxygen Demand (BOD)  
approximately 190 mg/L

Chemical Oxygen Demand (COD)  
approximately 440 mg/g

Bioaccumulation  
Carp, 31 - 207 BCF

Acute and Prolonged Toxicity to Fish  
LC50: 7.72 mg/L (Fathead minnow (*Pimephales promelas*), 96 hrs)

Acute Toxicity to Aquatic Invertebrates  
EC50: 3.6 mg/L (Water flea (*Daphnia magna*), 48 hrs)

### 13. Disposal considerations

#### ***Waste Disposal Method***

Waste disposal should be in accordance with existing federal, state and local environmental control laws.  
Incineration is the preferred method.

#### ***Empty Container Precautions***

Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without thorough commercial cleaning and reconditioning.

### 14. Transportation information

Land transport (DOT)

Proper Shipping Name: Resin solution (contains n-Butyl Acetate, Petroleum solvent, Xylene)

Hazard Class or Division: 3

UN/NA Number: UN1866

Packaging Group: III

Hazard Label(s): Flammable Liquid

Sea transport (IMDG)

Proper Shipping Name: RESIN SOLUTION (contains n-Butyl Acetate, Petroleum solvent, Xylene)

Hazard Class or Division: 3

UN-No: UN1866

Packaging Group: III

Hazard Label(s): Flammable liquids

Air transport (ICAO/IATA)

Proper Shipping Name: Resin solution (contains n-Butyl Acetate, Petroleum solvent, Xylene)

Hazard Class or Division: 3

UN-No: UN 1866

Packaging Group: III

Hazard Label(s): Flammable liquids

### 15. Regulatory Information

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory.

US. EPA CERCLA Hazardous Substances (40 CFR 302):

Components

n-Butyl Acetate      Reportable quantity: 5,000 lbs



Reactivity 1

Other

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

HMIS Rating

Health 2\*

Flammability 2

Physical Hazard 1

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

\* = Chronic Health Hazard

Shield Products' method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by Shield Products as a customer service.

The handling of products containing reactive HDI polyisocyanate/prepolymer and/or monomeric HDI requires appropriate protective measures referred to in this MSDS. These products are therefore recommended only for use in industrial or trade (commercial) applications. They are not suitable for use in Do-It-Yourself applications.