


# TECHNICAL & SAFETY DATA SHEET

<b>Technical Data Sheet</b>		
<b>U-21 Urespartic™</b> <b>Clear Hybrid WB</b>		
<p><b>Product Overview:</b> U-21 is a breakthrough technology combining urethane and polyaspartic polyols to create our state-of-the-art Urespartic™. By combining our Urespartic™ resin with our proprietary Iso blend we are able to create a high-solids, clear finish that will not yellow, maintains its existing sheen and passes 2500 MEK double rubs! It is manufactured in a gloss but the sheen can be reduced using PN C-20 Sheen Reducer.</p> <p><b>Uses:</b> U-21 is primarily used as a clear topcoat due to its unsurpassed UV, stain, mar and abrasion resistance. It can be applied to floors and walls and adheres well to many substrates including concrete, gypsum, cement board, metals, vinyl, PVC and fiberglass. It can also be applied direct to concrete as a primer and topcoat.</p> <p><b>Preparation:</b> The preparation method for each project is determined by a full understanding of the substrate to be coated, the chemistry of the coating system being used, the coating system thickness, and numerous other factors. The coating installer should fully read and understand ICRI Guideline NO.03732 and OSHA 29 CFR 1926.1153 before starting preparatory work. The aim, of preparing a substrate for coating applications, is to roughen the surface, remove weak layers, contaminants, dirt, debris and present a solid, clean, dry substrate for the primer. If unsure as to the level of preparation needed contact Polymer Nation at Lab@polymerNation.com.</p> <p>The data below represents the most pertinent information needed by a professional installer to understand and efficiently install this material. The data was gathered at temperatures of 72-75 F and 30-50% RH. A wide array of independent and company test data has been compiled on this product but is too large to place on this Technical Data Sheet. Please direct inquiries for detailed test reports on this product to Lab@polymerNation.com.</p>		
<b>Description</b>	<b>Results</b>	<b>Notes</b>
Kit Yield in Gallons	3	Special packaging is available based on size of order and time constraints
Number of Components	2	
Mix Ratio Liquids by Volume	2:1	It is always preferred to mix the entire kit, whenever possible, to avoid off-ratio mixtures
Ideal Application Temperatures	70F-80F 40-60% RH	Verify that substrate temperature is above 5 degrees of dewpoint during application and cure of material to avoid a potential amine blush
Mixed Viscosity in cP@25C/77F	900-1150	Warmer temperatures will reduce viscosity and lower temperatures will increase viscosity
Working Time	45 min.	
Dry to Touch	3 Hours	Warmer temperatures will reduce time and colder temperatures will increase time. Higher RH will lengthen Dry time data
Through Dry	11 Hours	Warmer temperatures will reduce time and colder temperatures will increase time. Higher RH will lengthen Dry time data
Dry to Walk	12 Hours	Warmer temperatures will reduce time and colder temperatures will increase time. Higher RH will lengthen Dry time data
Dry to Lightly Use	16 Hours	Warmer temperatures will reduce time and colder temperatures will increase time. Higher RH will lengthen Dry time data
Full Cure	7 Days	
Pendulum Hardness (König) at 24 hrs	12	Warmer temperatures at RH of 60% or less will increase the hardness number reported
Pendulum Hardness (König) at 7 days	46	Warmer temperatures at RH of 60% or less will increase the hardness number reported
Gloss @ 60 Degree Angle	80-88	See PN C-20 for information on how to adjust finish gloss levels
VOC's of Mixed Material	<0 g/L	EPA Method 24
Color Scale per ASTM D1500	.5-1.0	Clear to slightly amber
Solids by Volume Mixed	>65%	
Storage	60F-90F	Store material between 60-90 degrees F in a protected dry location.
Odor	None	
Application Thickness in Mills	As a floor topcoat 5-8. As a wall topcoat 4-6. As a primer 4-8. Do not allow to puddle as this will have a negative effect on the finish.	
Disposal	Dispose of material, containers, solvents, etc., per Federal, State and local guideline, rules and laws	
Available Colors	This material is manufactured in clear.	
Mixing & Installation	Combine all of part A and B into a single container, large enough to accept the entire kit. Mix at 350 RPM for 2-3 minutes using an appropriate mixing blade and making sure not to introduce excessive air into the solution (material can be thinned up to 10% with clean potable water). Pour material needed from the container onto the floor and spread with a 5-7 mil squeegee. Back roll perpendicular to evenly spread the material. Strike off the material in the same direction as material was squeegeed. Material can also be bucket-rolled using a 3/8" nap roller cover. For a non-skid finish add 288 grams per 3 gallon kit of PN 1337 S (1-12 oz cup struck off at the top) or 4 lbs of PN 1335 AO and stir to completely incorporate. Recoat within 24 hours. Clean tools with a hot soapy water or solvent similar to Xylene or Acetone. PN C-55 can be used to accelerate the cure.	
<p>Polymer Nation believes the information contained herein to be true and accurate. Information contained herein is for evaluation purposes only. Polymer Nation makes no warranty, express or implied based upon this literature and assumes no liability or responsibility for consequential or incidental damages as a result of the use of these products and systems described herein, including any warranty of merchantability or fitness. Last Rev. 4.14.22</p>		
<a href="http://PolymerNation.com">PolymerNation.com</a>		

# TECHNICAL & SAFETY DATA SHEET

DATE PRINTED:	8/22/22
MSDS REF. No:	U-21 Part A

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** U-21 Part A  
**PRODUCT CODE:** P3

**Supplier/Manufacturer:** POLYMER NATION CHEMICAL  
1949 Swanson Court  
Gurnee, IL 60031  
(847) 774-5038

**EMERGENCY PHONE:** CHEMTREC, US: (800) 424-9300 24-hours  
**ORIGINAL DATE ISSUED:** 8/18/21 **REVISION DATE:** 7/6/22

**Recommended end use:** Half of a two-component system designed for application and use as a protective coating.

## 2. HAZARDS IDENTIFICATION



**SIGNAL WORD:** Warning

### Hazard Statements

H361 Suspected of damaging fertility or the unborn child

### Precautionary Statements

P201 Obtain special instructions before use

P202 + P280 Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection.

P308 + P313 If exposed or concerned get medical advice/attention

P405 Store locked up

P501 Dispose of contents/container in accordance with regulations

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances: N/A. Mixtures: Hazardous components within the meaning of 29 CFR 1910.1200 and related classification.

Quantity	Name	Ident. Numb.	Classification
50-75%	Proprietary Polyester Resin		
25-35%	Water		
5-10%	Triethanolamine	CAS: 102-71-6	
1-5%	Zinc Compound		Repr. 2, H361, Eye Irrit. 2B, H320
0.5-1%	Tertiary Amine		Eye Dam. 1, H318; Acute Tox. 4, H302; Acute Tx 4, H312

## 4. FIRST AID MEASURES

**EYES:** Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

**SKIN:** Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**INGESTION:** Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

**INHALATION:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48-hours. In the event of any complaints or symptoms, avoid further exposure.

# TECHNICAL & SAFETY DATA SHEET

## 5. FIRE FIGHTING MEASURES

**SUITABLE EXTINGUISHING MEDIA:** Water. Carbon Dioxide (CO<sub>2</sub>).

**For safety reasons, unsuitable extinguishing agents:** Do not use a solid water stream as it may scatter and spread fire.

**SPECIAL FIRE & UNUSUAL HAZARD:** Do not inhale explosion or combustion gases. Burning produces heavy smoke.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS:** Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full-face piece operated in positive pressure mode. Fire fighters should wear positive pressure self-contained breathing apparatus and personal protective equipment, such as a jacket (Standard: EN469), helmet (Standard: EN443), gloves (Standard: EN407), boots (Standard: EN345-S3 HI WRU HRO).

**ADDITIONAL INFORMATION:** Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Move undamaged containers from immediate hazard area if it can be done safely.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Use personal protective equipment and emergency procedures.

**Environmental precautions:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers waterways, soil, or air). Suitable materials for taking up: absorb with inert, absorbent material. In case of heavy spills, wash with plenty of water.

See protective measures under Sections 7 and 8.

## 7. HANDLING AND STORAGE

**HANDLING:** Avoid contact with skin and eyes, inhalation of vapors and mists. Exercise the greatest care when handling or opening the container. Don't use empty containers before they have been cleaned. Before making transfer operations, assure that there aren't any incompatible material residuals in the containers. Contaminated clothing should be changed before entering eating areas. Don't eat, drink, or smoke while working. See Section 8 for recommended protective equipment.

**STORAGE:** Store in accordance with local regulations.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Ventilation:** Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, etc.) below recommended exposure limits. Handle in accordance with good industrial hygiene and safety practices.

**Personal Protection Equipment:** Use close fitting safety goggles, don't use eye lens. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases, or dusts. Use clothing that provides comprehensive protection to the skin, e.g., cotton, rubber, PVC, or Viton. Use protective gloves that provides comprehensive protection, e.g., PVC, neoprene, or rubber (EN374).

**Hygienic Practices:** Wash hands, forearms, and face thoroughly after handling chemical products, before eating, smoking, and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Volatile Organic Content:</b>	<b>Solubility in Water:</b> N/A
<b>Color:</b> Milky White	<b>Specific Gravity @ 20°C:</b>
<b>Odor:</b> N/A	<b>pH @ 100%:</b> N/A
<b>Physical Appearance:</b> Liquid	<b>Melting/Freezing Point:</b> N/A
<b>Boiling Point:</b> N/A	<b>Flashpoint:</b> >100°C (212°F)
<b>Ignition Temperature:</b>	<b>Auto-ignition Temperature:</b> N/A
<b>Explosion Limits:</b>	<b>Water Solubility:</b> N/A
<b>Lower:</b> N/A	<b>Partition coefficient (in-octanol/water):</b> N/A
<b>Upper:</b> N/A	<b>Relative Vapor Density:</b> N/A
<b>Odor Threshold:</b>	<b>Evaporation Rate:</b> N/A
N/A – Not Available    N/D = Not Determined    Ca = Approximate	

## 10. STABILITY AND REACTIVITY

**STABILITY:** Stable under normal conditions.

**HAZARDOUS POLYMERIZATION:** Under normal conditions of storage and use, hazardous reactions will not occur.

**INCOMPATIBILITY:** None in particular.

**HAZARDOUS DECOMPOSITION:** Under normal conditions of storage and use, hazardous reactions will not occur.

# TECHNICAL & SAFETY DATA SHEET

## 11. TOXICOLOGICAL INFORMATION

Component Toxicological Information: (Acute)

Likely routes of entry:

Triethanolamine

LD50	Oral	Rat	6400.00000 mg/kg
LD50	Skin	Rabbit	>2000.00000 mg/kg

Zinc Compound

LD50	Skin	Rat	2000.00000 mg/kg
LC50	Inhalation Rat		>5700.00000 mg/m3

Not a skin irritant. Eye irritant yes. No observed adverse effects on reproductive toxicity.

Tertiary Amine

LD50	Skin	Rabbit	
LD50	Oral	Rat	

Skin corrosive positive. Eye corrosive positive.

Substance(s) listed on the IARC Monographs: None

Substance(s) listed as OSHA Carcinogen(s): None

Substance(s) listed as NIOSH Carcinogen(s): None

Substance(s) listed on the NTP report on Carcinogens: None

## 12. ECOLOGICAL INFORMATION

Triethanolamine

Ident.	CAS Numb	Ecotox Info
Persistence and degradability	102-71-6	Aquatic acute toxicity: LC50 Fish Pimephales promelas (fathead minnow) 1800.00000 mb/L 96h – ECHA

Zinc Compound

Ident.	CAS Numb	Ecotox Info
Bioaccumulative potential	N/A	Aquatic acute toxicity: EC50 Daphnia Ceriodaphnia dubia (water flea) 609.88000 mg/L 48h = ECHA Aquatic acute toxicity: LC50 Fish Cyprinus carpio 30-70 mg/l, 96 Hours
Other adverse effects	N/A	Effects in sewage plants: IC50 > 1000.00000 mg/L 3h – static test IC50 – activated sludge OECD Test Guideline 209

Tertiary Amine

Ident.	CAS Numb	Ecotox Info
Mobility in soil	N/A	Aquatic acute toxicity: ErC50 Algae Desmodesmus subspicatus (green algae) 16.00000 mg/L 72h-ECHA

## 13. DISPOSAL CONSIDERATIONS

**DISPOSAL METHODS:** Recover, if possible. Send to authorized disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

## 14. TRANSPORT INFORMATION

UN number

ADR-UN number: N/A  
DOT-UN number: N/A  
IATA-Un number: N/A  
IMDG-Un number: N/A

UN proper shipping name

ADR/RID-Shipping Name: N/A  
DOT Proper Shipping Name: N/A  
IATA-Technical name: N/A  
IMDG-Technical name: N/A

Transport hazard class(es)

ADR/RID-Class: N/A  
DOT Hazard Class: N/A  
IATA-Class: N/A  
IMDG-Class: N/A

Packing group

ADR/RID-Packing Group: N/A  
DOT-Packing group: N/A  
IATA-Packing group: N/A  
IMDG-Packing group: N/A

Environmental hazards

Marine pollutant: No

# TECHNICAL & SAFETY DATA SHEET

Environmental Pollutant: N.A.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code  
N.A.

Special precautions

Department of Transportation (DOT):

DOT Special Provision(S): N/A

DOT Label(s): N/A

DOT Symbol: N/A

DOT Cargo Aircraft: N/A

DOT Passenger Aircraft: N/A

DOT Bulk: N/A

DOT Non-Bulk: N/A

Road and Rail (ADR-RID):

ADR-Label: N/A

ADR-Hazard identification number: N/A

ADR-Transport category (Tunnel restriction code): N/A

Air (IATA):

IATA-Passenger Aircraft: N/A

IATA-Cargo Aircraft: N/A

IATA-Label: N/A

IATA-Subsidiary hazards: N/A

IATA-Erg: N/A

IATA-Special Provisioning: N/A

See (IMDG):

IMDG-Stowage Code: N/A

IMDG-Stowage Note: N/A

IMDG-Subsidiary hazards: N/A

IMDG-Special Provisioning: N/A

IMDG-Page: N/A

## 15. REGULATORY INFORMATION

### U.S. FEDERAL REGULATIONS AS FOLLOWS-

TSCA – Tox Substances Control Act – included in the TSCA inventory:

TSCA Inventory: Proprietary Polyester Resin; Triethanolamine; Zinc Compound, Tertiary amine. List of substances not included in the TSCA inventory: Water.

TSCA listed substances: Proprietary Polyester Resin is listed in TSCA Section Sb.

SARA – Superfund Amendments and Reauthorization Act.

Section 302 – Extremely Hazardous Substances: No substances listed.

Section 304 - Hazardous Substances: No substances listed.

Section 313 – Toxic chemical list: ZINC COMPOUND

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

Substance(s) listed under CERCLA: ZINC COMPOUND

CAA – Clean Air Act

CAA listed substances: No substances listed

CWA – Clean Water Act

CWA listed substances: No substances listed

USA – State specific regulations, California Proposition 65

Substance(s) listed under California Proposition 65 – No substances listed

Massachusetts Right to know

Substance(s) listed under Massachusetts Right to know: Triethanolamine

Pennsylvania Right to know

Substance(s) listed under Pennsylvania Right to know: Triethanolamine

New Jersey Right to know

Substance(s) listed under New Jersey Right to know: Triethanolamine

Additional classification information



HMIS Health: 3=SERIOUS

HMIS Flammability: 1=Combustible if heated HMIS Reactivity: 0=MINIMAL

# TECHNICAL & SAFETY DATA SHEET

HMIS P.P.E.: G-Safety glasses, gloves, vapor respirators  
NFPA Health: 3=SERIOUS  
NFPA Flammability: 1=Combustible if heater NFPA Reactivity: 0=MINIMAL  
NFPA Special Risk: NONE

## 16. OTHER INFORMATION

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality. The information relates only to the specific material and may not be valid for such material used in combination with any other material or in any process. This document was prepared by a competent person who has received appropriate training. It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended. This MSDS cancels and replaces any preceding release.

Legend to abbreviations and acronyms used in the safety data sheet:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road. RID: Regulation Concerning the International Transport of Dangerous Goods by Rail.

IMDG: International Maritime Code for Dangerous Goods. IATA: International Air Transport Association.

IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA).

! CAO: International Civil Aviation Organization.

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO). GHS: Globally Harmonized System of Classification and Labeling of Chemicals.

CLP: Classification, Labeling, Packaging.

EINECS: European Inventory of Existing Commercial Chemical Substances. Incan: International Nomenclature of Cosmetic Ingredients.

CAS: Chemical Abstracts Service (division of the American Chemical Society). GefStofNO: Ordinance on Hazardous Substances, Germany.

LCSO: Lethal concentration, for 50 percent of test population. LOSO: Lethal dose, for 50 percent of test population.

DNEL: Derived No Effect Level.

PNEC: Predicted No Effect Concentration. TLV: Threshold Limiting Value.

TWATLV: Threshold Limit Value for the Time Weighted Average 8-hour day. (ACGIH Standard). STEL: Short Term Exposure limit.

STOT: Specific Target Organ Toxicity.

WGK: German Water Hazard Class. KSt: Explosion coefficient.

y for the damage.

Paragraphs modified from the previous revision:

SECTION 1: Identification of the substance/mixture and of the company/undertaking

SECTION 3: Composition/information on ingredients

SECTION 11: Toxicological information

SECTION 12: Ecological information

SECTION 15: Regulatory information

THE INFORMATION HEREIN HAS BEEN COMPILED FROM SOURCES BELIEVED TO BE RELIABLE AND IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, POLYMER NATION CHEMICAL CANNOT GIVE ANY GUARANTEES REGARDING INFORMATION FROM OTHER SOURCES, AND EXPRESSLY DOES NOT MAKE ANY WARRANTIES, NOR ASSUMES ANY LIABILITY FOR ITS USE.

# TECHNICAL & SAFETY DATA SHEET

DATE PRINTED:	8/22/22
MSDS REF. No:	U-20/U-21 Part B/ISO4

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** U-20/U-21 Part B  
**PRODUCT CODE:** ISO4

**Supplier/Manufacturer:** POLYMER NATION CHEMICAL  
1949 Swanson Court  
Gurnee, IL 60031  
(847) 774-5038

**EMERGENCY PHONE:** CHEMTREC, US: (800) 424-9300 24-hours  
**ORIGINAL DATE ISSUED:** 06/16/16 **REVISION DATE:** 06/16/16

**Recommended end use:** Half of a two-component system designed for application and use as a protective coating.

## 2. HAZARDS IDENTIFICATION

Acute Oral Toxicity, Category 4  
Skin Sensitization, Category 1  
Respiratory Sensitization, Category 1  
Specific Target Organ Toxicity (Single Exposure), Category 3



**SIGNAL WORD:** Danger

**Hazard-determining components of labeling:** Homopolymer of Hexamethylene Diisocyanate

### Hazard Statements

H317 May cause an allergic skin reaction  
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled  
H332 Harmful if inhaled  
H335 May cause respiratory irritation

### Precautionary statements

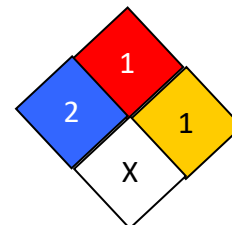
P260 Do not breathe dust/fume/gas/mist/vapors/spray.  
P284 In case of inadequate ventilation wear respiratory protection.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
P302+P352 If on skin: Wash with plenty of water.  
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.  
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

### Hazard description:

CAUTION! HARMFUL IF INHALED. MAY CAUSE SKIN, EYE AND RESPIRATORY TRACT IRRITATION. POSSIBLE SENSITIZER. REACTS WITH COMMON MATERIALS INCLUDING WATER, ALCOHOLS, BASES, AND AMINES RELEASING LARGE AMOUNTS OF CARBON DIOXIDE.

### NFPA CODES

HMIS RATING	
Health:	2
Flammability:	1
Reactivity:	1
Personal Protection:	X



\* Chronic Health Hazard

### Potential Health Effects:

**SKIN:** Acute: Causes irritation with symptoms of reddening, itching, and swelling. Can cause sensitization. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove. Chronic: Prolonged contact can cause reddening, swelling, rash, and, in some cases, skin sensitization. Animal tests and other research indicate that skin contact with diisocyanates can play a role in causing isocyanate sensitization and respiratory reaction. This data reinforces the need to prevent direct skin contact with isocyanates.

**EYES:** 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. Prolonged vapor contact may cause conjunctivitis.

**INHALATION:** Acute: 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

# TECHNICAL & SAFETY DATA SHEET

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. Chronic: 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.

**INGESTION:** May cause irritation; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.

**CHRONIC HAZARDS:** No Carcinogenic substances as defined by IARC, NTP and/or OSHA. Medical conditions aggravated by exposure include skin allergies, eczema, asthma, and respiratory disorders.

## 3. COMPOSITION INFORMATION ON INGREDIENTS

This document is a pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). Where a proprietary ingredient is shown, the identity may be made available as provided in this standard. All components of this product are included in the EPA Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

Chemical Name	Weight %	CAS Number
Homopolymer of Hexamethylene Diisocyanate	100%	28182-81-2
Hexamethylene-1,6-Diisocyanate	<0.2%	822-06-0

## 4. FIRST AID MEASURES

**GENERAL ADVICE:** Consult a physician. Show this safety data sheet to physician in attendance.

**EYES:** 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:** Immediately remove contaminated clothing and shoes. Wash off 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.

NOTE TO PHYSICIANS

**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.

**For safety reasons, unsuitable extinguishing agents:** Water

**SPECIAL FIRE & UNUSAL HAZARD:** 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 if safe to do so. 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.

**SPECIAL FIREFIGHTING INSTRUCTIONS:** 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. Exposure to heated diisocyanate can be extremely dangerous.

**ADDITIONAL INFORMATION:** None available

**HAZARDOUS COMBUSTION PRODUCTS** formed under fire conditions: Carbon oxides, explosive rupture



# TECHNICAL & SAFETY DATA SHEET

## 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions:** 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 Chemtrec at 800-424-9300 for assistance and advice.

**Environmental precautions:**

**Major Spill or Leak (Standing liquid):** To minimize vapor, cover the spillage with firefighting foam (AFFF). Released material may be pumped into closed, but not sealed, metal container for disposal. Process can generate heat. Cover spill with neutralization solution for 1 hour. Cover with inert absorbent. Collect washings for disposal.

**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 1 hour. 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 (CO2) escape. See Section 7 for information on safe handling.

See section 8 for information on personal protection equipment.

See Section 13 for disposal information.

## 7. HANDLING AND STORAGE

**HANDLING:** 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. 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.

**STORAGE:** Store between -29.2°F and 122°F. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Do not store near food stuffs. Storage period is approximately 6 months at 77°F after receipt of material by customer.

## 8. EXPOSURE CONTROLS/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.

**Exposure Controls:**

Homopolymer of Hexamethylene Diisocyanate (28182-81-2)

Exposure Limit: time weighted average 0.5 mg/m<sup>3</sup>

Short Term Exposure Limit (STEL): 1.0 mg/m<sup>3</sup> (15-min)

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

US. ACGIH Threshold Limit Values: Time Weighted Average (TWA): 0.005 ppm

Ceiling Limit Value: 0.02 ppm

**Personal Protection Equipment:**



**Respiratory Protection:** When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations. Under normal conditions, in the absences of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by the appropriate OSHA, WHMIS or ANSI standard(s): Full-face air-purifying respirators are required in work environments where isocyanate airborne concentrations exceed the action level but are significantly lower than the IDLH provided that the cartridges are changed daily. Use combination HEPA filter for the polyisocyanate aerosol and an organic vapor cartridge for the solvents used. Install organic vapor cartridge closest to face. Full-face supplied-air respirators (SAR) are required in work environments where isocyanate airborne concentrations have not been characterized or are expected to exhibit considerable and sudden variations such as in spray type application.



**Skin Protection:** Use impervious gloves (neoprene, butyl rubber or nitrile). Gloves should be tested for chemical resistance before reliable use. (penetration times, rates of diffusion and rate of degradation). Wear long sleeves and pants, exposing as little skin as possible.

# TECHNICAL & SAFETY DATA SHEET



**Eye Protection:** When directly handling liquid product, eye protection is required. Examples of eye protection include a chemical safety goggle, or chemical safety goggle in combination with a full-face shield when there is a greater risk of splash. DO NOT WEAR CONTACT LENSES when working with this material!!!

**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. Refer to the Bayer pamphlet (Medical Surveillance Program for Isocyanate Workers) for additional guidance.

**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.

**Hygienic Practices:** Wash hands before eating. Remove contaminated clothing and wash before reuse. Follow all MSDS/label precautions even after container is emptied because they may retain product residues. Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Volatile Organic Content:</b> Negligible	<b>Solubility in Water:</b> Insoluble, reacts slowly with water to liberate CO <sub>2</sub>
<b>Color:</b> Colorless to pale yellow	<b>Specific Gravity @ 20°C:</b> 1.16
<b>Odor:</b> Slight	<b>pH @ 100%:</b> N.A.
<b>Physical Appearance:</b> Colorless to Light Yellow Liquid.	<b>Melting/Freezing point:</b> N/A
<b>Boiling Point:</b> >220°C (428°F) @ 1.33hPa	<b>Flashpoint:</b> 137°C (279°F)
<b>Ignition Temperature:</b> 460 °C (860 °F) (Spontaneous)	<b>Auto-ignition temperature:</b> N/A
<b>Explosion Limits:</b> Lower: N/A Upper: N/A	<b>Water solubility:</b> Insoluble, reacts slowly with water to liberate CO <sub>2</sub>
	<b>Partition coefficient (n-octanol/water):</b> N/A
<b>Odor Threshold:</b> N/A	<b>Relative vapor density:</b> N/A
	<b>Evaporation rate:</b> N/A

N/A = Not Available N/D = Not Determined Ca. = Approximate

## 10. STABILITY AND REACTIVITY

**STABILITY:** Stable under recommended and normal conditions of use and storage.

**HAZARDOUS POLYMERIZATION:** Hazardous polymerization may occur. Contact with moisture, other materials that react with isocyanates, or temperatures above 350 F (177 C), may cause polymerization.

**INCOMPATIBILITY:** Avoid: Water, amines, strong bases, alcohols, copper alloys.

**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. By hydrolysis: Carbon Oxides

**CONDITIONS TO AVOID:** Fire. Heat. Flame. Sources of ignition. Sparks. Moisture.

## 11. TOXICOLOGICAL INFORMATION

### Component Toxicological Information:

Toxicity Data for Homopolymer of Hexamethylene Diisocyanate

Oral LD<sub>0</sub> > 2500 mg/kg (rat) (OECD 423 (female))

Dermal LD<sub>0</sub> > 2000 mg/kg (rabbit) (OECD 402) and > 2000 mg/kg (rat) (OECD 402)

Inhalative LC<sub>50</sub>/4h 0.390 mg/l (rat) (OECD 403 (female))

822-06-0 hexamethylene-di-isocyanate

Oral LD<sub>50</sub> 746 mg/kg (rat) (OECD 401)

Dermal LD<sub>50</sub> > 7000 mg/kg (rat) (OECD 402)

Inhalative LC<sub>50</sub>/4h 0.124 mg/l (rat) (OECD 403)

Chronic Toxicity: This product does not contain any substances that are considered by OSHA, NTP, IARC, or ACGIH to be "probable" or "suspected" human carcinogens.

## 12. ECOLOGICAL INFORMATION

Ecological Data for Product

Aquatic toxicity:

The product does not have any known adverse effects on the aquatic organisms tested.

28182-81-2 Hexamethylene diisocyanate oligomers, Isocyanurate

EC10/72h (static) 370 mg/l (Desmodesmus subspicatus) (EU C.3)

EL50/48h (static) 127 mg/l (Daphnia magna) (EU C.2)

ErC50(0-72h) (static) > 1000 mg/l (Desmodesmus subspicatus) (EU C.3)

LL0/96h ≥ 82.8 mg/l (Brachydanio rerio) (EU C.1)

822-06-0 hexamethylene-di-isocyanate

EC0/48h (static) ≥ 89.1 mg/l (Daphnia magna) (EU C.2)

ErC50(0-72h) (static) > 77.4 mg/l (Desmodesmus subspicatus) (EU C.3)

# TECHNICAL & SAFETY DATA SHEET

LC0/96h (static)  $\geq$  82.8 mg/l (Brachydanio rerio) (EU C.1)  
NOEC/72h (static) 11.7 mg/l (Desmodesmus subspicatus) (EU C.3)

Persistence and degradability - The product is not readily biodegradable.

28182-81-2 Hexamethylene diisocyanate oligomers, Isocyanurate  
BOD28 1 % (bacteria) ((EU C.4-E) (Unpublished report))  
DT50 3 h (Photolysis) ((25 °C) (AOPWIN v1.92) (Internal evaluation))  
7.7 h (Hydrolysis) ((23 °C) (ASTM D4666) (Internal evaluation))

822-06-0 hexamethylene-di-isocyanate  
BOD28 42 % (bacteria) (EU C.4-D)  
DT50 25 °C, 48.44 h (Photolysis) (AOPWIN v1.92)  
23 °C, 0.23 h (Hydrolysis) (ASTM D4666)

· Behavior in environmental systems:  
· Components: No information available.  
· Bio accumulative potential  
Not potentially bio accumulable.

Log Pow, see Section 9.

28182-81-2 Hexamethylene diisocyanate oligomers, Isocyanurate  
BCF 3.2 (fish) (BCFWIN v. 2.17)  
822-06-0 hexamethylene-di-isocyanate  
BCF 58 (fish) (BCFWIN v.2.17)

· Mobility in soil

28182-81-2 Hexamethylene diisocyanate oligomers, Isocyanurate  
Log Koc 7.8 (.) (PCKOC v1.66)  
822-06-0 hexamethylene-di-isocyanate  
Log Koc 5861 (.) (PCKOC v1.66)

· Other information: Formation of insoluble polyurea and/or amine derivative.  
· Ecotoxicological effects:

· Behavior in sewage processing plants:

28182-81-2 Hexamethylene diisocyanate oligomers, Isocyanurate  
EC50/3h (static) 3828 mg/l (activated sludge) (OECD 209)  
822-06-0 hexamethylene-di-isocyanate  
EC50/3h (static) 842 mg/l (bacteria) (OECD 209)

## 13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Recommendation: Discharging waste into rivers and drains is forbidden. Incinerate at a licensed installation. Disposal must be made according to federal, state, and local regulations. Waste disposal key: EPA Hazardous Waste – NO. Uncleaned packaging: Contaminated packaging materials must be disposed of in the same manner as the product. Recommendation: Allow it to drain thoroughly. Thoroughly emptied and clean packaging may be recycled.

Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste.

## 14. TRANSPORT INFORMATION

DOT SHIPPING INFORMATION

DOT Proper Shipping Name: Not regulated

DOT Technical Name: N/A

DOT Hazard Class: N/A

Hazard Subclass: N/A

DOT I.D. Number: N/A

Packing Group: N/A

Additional Transportation Information: When in individual containers of less than the Product RQ, this material ships as non-regulated. RQ: 15119kg ( 33332lb)

IMDG

Technical Name: OTHER REGULATED SUBSTANCES, LIQUID, N.O.S. (contains Hexamethylene- 1,6-Diisocyanate)

Hazard Class: 9

Hazard Subclass: N/A

I.D. Number: UN3082

Packing Group: III

INTERNATIONAL REGULATIONS:

CANADIAN WHMIS: This MSDS has been prepared in compliance with the GHS criteria.

## 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS AS FOLLOWS-

OSHA Hazard Communication Standard (29 CFR 1910.1200): Hazardous by definition of Hazard Communication Standard.  
Sensitizer. Corrosive.

CERCLA/ Super Fund (40 CFR 117, 302): Hexamethylene-1, 6-Diisocyanate CAS#: 822-06-0 Reportable Quantity: 100lbs

CERCLA - SARA HAZARD CATEGORY:

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories: Immediate Health Hazard (Acute) Delayed Health Hazard (Chronic) Reactivity Hazard

# TECHNICAL & SAFETY DATA SHEET

## SARA Toxic Chemicals (40 CFR 372):

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Hexamethylene-1,6-Diisocyanate CAS#: 822-06-0 Reportable Quantity: 100lbs

**TOXIC SUBSTANCES CONTROL ACT:** All chemicals in this compound are listed on the TSCA

## NEW JERSEY RIGHT-TO-KNOW:

Chemical Name	CAS Number	Weight Percent
Hexamethylene-1,6-Diisocyanate	822-06-0	0.1-0.3%
Homopolymer of Hexamethylene Diisocyanate	28182-81-2	≥95%

## PENNSYLVANIA RIGHT-TO-KNOW / MASSACHUSETTS RIGHT-TO-KNOW:

Chemical Name	CAS Number	Weight Percent
Homopolymer of Hexamethylene Diisocyanate	28182-81-2	≥95%

**California Proposition 65:** To the best of our knowledge, this product does not contain any chemical(s) regulated under California Proposition 65.

## 16. OTHER INFORMATION

THE INFORMATION HEREIN HAS BEEN COMPILED FROM SOURCES BELIEVED TO BE RELIABLE AND IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, POLYMER NATION CHEMICAL CANNOT GIVE ANY GUARANTEES REGARDING INFORMATION FROM OTHER SOURCES, AND EXPRESSLY DOES NOT MAKE ANY WARRANTIES, NOR ASSUMES ANY LIABILITY FOR ITS USE.