

SAFETY DATA SHEET



TRI-CHEM

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| PRINTED DATE : | 11/29/2016 |
| MSDS REF. No : | R770-000 |

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 144 G

PRODUCT CODE: R770-000, R770-018

PRODUCT USE/CLASS: RESIN

Supplier/ Manufacturer
TRI-CHEM CORPORATION
431 Stephenson Hwy.
Troy, MI 48083
800-456-6255

TRI-CHEM CORPORATION; PHONE: 800-456-6255;

EMERGENCY PHONE: 800-535-5053

ORIGINAL DATE ISSUED: 8/16/16 **REVISION DATE:** 8/16/16

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

Acute Skin Toxicity, Category 4

Acute Aquatic Hazard, Category 3

Germ Cell Mutagenicity, Category 2

Eye Irritation, Category 2B

Skin Irritation, Category 3

Specific Target Organ Toxicity, Single Exposure (Respiratory Tract), Category 3

Skin Sensitization, Category 1B



SIGNAL WORD: Warning

Hazard-determining components of labeling: Trimethylolpropane poly(oxypropylene)triamine

Hazard Statements

H302 Harmful if swallowed

H312 Harmful if in contact with skin

H412 Harmful to aquatic life

H341 Suspected of causing genetic defects

H319 Causes Eye Irritation

H315 Causes skin irritation

H335 May cause respiratory irritation

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Precautionary Statements

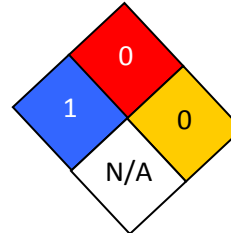
P273 Avoid Release to the Environment

P280 Wear protective gloves/ protective clothing/eye protection/face protection.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue Rinsing.

P310 Immediately Call a POISON CENTER or doctor/physician.

NFPA CODES



| HMIS RATING | |
|-----------------------|---|
| Health : | 1 |
| Flammability : | 0 |
| Reactivity : | 0 |
| Personal Protection : | X |

Potential Health Effects:

SKIN: May cause irritation with symptoms of reddening and itching

EYES: May cause irritation with symptoms of reddening, tearing and stinging.

INHALATION: If misted or handled at elevated temperatures, high concentrations may cause respiratory tract irritation. Overexposure to vapor may produce dizziness, drowsiness, or nausea.

INGESTION:

Acute Ingestion - Symptoms of ingestion may include abdominal pain, nausea, vomiting, and diarrhea. May be harmful if swallowed.

Chronic Ingestion - May cause liver damage. May cause kidney damage.

CHRONIC HAZARDS: Not expected to cause any chronic health effects.

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 | CAS Number | Weight % |
|--|--------------|----------|
| bis(4-(1,2-bis(ethoxycarbonyl)ethylamino)-3-methylcyclohexyl)methane | 136210-32-7 | 1-5% |
| Proprietary Polyester Polymer | TRADE SECRET | 0.1-1% |
| N,N-Dimethylethanolamine | 108-01-0 | 0.1-1% |
| Triethanolamine | 102-71-6 | 0.1-1% |
| Dibutyltin Dilaurate | 77-58-7 | 0.1-1% |
| Bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate | 41556-26-7 | 0.1-1% |
| 2-[(8-methylnonyl)oxy]ethanol | 61827-42-7 | 0.1-1% |
| alpha-[3-(3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-yl)-4-hydroxyphenyl]-1-oxopropyl]-omega-[3-[3-(2H-benzotriazol-2-yl)-5-(1,1-d | 104810-47-1 | 0.1-1% |
| Poly(oxy-1,2-ethanediyl), .alpha.-[3-[3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxyphenyl]-1-oxopropyl]- .omega.-hydroxy- | 104810-48-2 | 0.1-1% |
| Methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate | 82919-37-7 | 0.1-1% |
| White Tint Base also contains: | | |
| Titanium Dioxide | 13463-67-7 | 10-30 |
| Aluminum Hydroxide | 21645-51-2 | 0.1-1 |
| Amorphous silicon dioxide | 7631-86-9 | 0.1-1 |
| Fatty acids, tall-oil, reaction products with 2-[(2-aminoethyl)amino]ethanol | 68919-76-6 | 0.1-1 |

4. FIRST AID MEASURES

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

EYES: Do NOT wear contact lenses while using this product. In case of contact, flush eyes with plenty of lukewarm water. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Get medical attention if irritation develops or persists.

SKIN: In case of skin contact, wash affected areas with soap and water. Get medical attention if irritation develops. Thoroughly clean shoes before reuse. Wash clothing before reuse.

INHALATION: If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration.

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INGESTION: If ingested, do not induce vomiting unless directed to do so by medical personnel. Get medical attention. Dilute with 1-2 glasses of water. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: Carbon dioxide. Dry chemical. Foam. Water spray for large fires. Limestone Powder. Dry sand.

For safety reasons, unsuitable extinguishing agents: Alcohol Foam.

SPECIAL FIRE & UNUSUAL HAZARDS: Combustion products may include, but are not limited to: Carbon dioxide, carbon monoxide, nitrogen oxides, silicone compounds. Formaldehyde.

SPECIAL FIREFIGHTING INSTRUCTIONS: Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

ADDITIONAL INFORMATION: Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Dried out product can burn.

HAZARDOUS COMBUSTION PRODUCTS formed under fire conditions: carbon oxides, nitrogen oxides, silicone compounds. Formaldehyde.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Avoid breathing vapors, mist or gas. Evacuate personnel to safe area. Ensure adequate ventilation.

Environmental precautions:

Prevent further leaking if safe to do so. Dike Spill Area. Flush area with water spray. Absorb spill with inert material (ex. dry sand or earth) and place in a chemical waste container for disposal. Avoid runoff into storm sewers and ditches which lead into waterways. Discharge into the environment must be avoided. If seepage into the environment has occurred, notify respective authorities.

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: Handle in accordance with good industrial hygiene and safety practices. Wash hands and arms thoroughly after handling and before eating, smoking, or using the toilet. Do not use near spark, flame or sources of excessive heat. Stir well before use.

STORAGE: Store product between the temperatures of 41°F and 95°F for up to 6 months after date received in the original container. Store separate from food stuffs. Keep container closed when not in use. Protect from freezing and excessive heat.

8. EXPOSURE CONTROLS\PERSONAL PROTECTION

Ventilation: General dilution and local exhaust as necessary to control airborne vapors, mists, dusts and thermal decomposition products below appropriate airborne concentration standards/guidelines. Thermal processing operations should be ventilated to control gases and fumes given off during processing. Curing ovens must be ventilated to prevent the build-up of explosive atmospheres and to prevent off gases from entering the work place.

Exposure Control Parameters:

| | | |
|--|--|--|
| Dibutyltin Dilaurate | ACGIH Time Weighted Average (TWA) | 0.1 mg/m ³ |
| | ACGIH Short Term Exposure Limit (STEL) | 0.2 mg/m ³ |
| | Permissible Exposure Limit: OSHA Z1 | 0.1 mg/m ³ |
| | TWA PEL US CA OEL | 0.1 mg/m ³ |
| | STEL US CA OEL | 0.2 mg/m ³ |
| | Recommended Exposure Limit: NIOSH | 0.1 mg/m ³ |
| Poly (ethylene oxide) | TWA TN OEL | 0.1 mg/m ³ |
| | US WEEL: TWA AEROSOL | 10 mg/m ³ |
| | Ammonia Vapor | OSHA PEL TWA (8hr) |
| 2-Methoxymethylethoxypropanol | NIOSH STEL | 27 mg/m ³ |
| | NIOSH REL TWA (10 hr) | 18 mg/m ³ |
| | ACGIH TWA | 100ppm |
| alpha-[3-(3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-yl)-4-hydroxyphenyl]-1-oxopropyl]-omega-[3- | ACGIH STEL | 150ppm |
| | OSHA Z1 TWA | 100ppm/ 600 mg/m ³ |
| | NIOSH REL TWA | 100ppm/ 600 mg/m ³ |
| | NIOSH REL STEL | 150ppm/ 900 mg/m ³ |
| | CIEL | 8h TWA: 1 mg/m ³ (Inhalable) Skin Sensitization observed in animal |

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| | | |
|---|------|--|
| [3-(2h-benzotriazol-2-yl)-5-(1,1-d | | study |
| Poly(oxy-1,2-ethanediyl), .alpha.-[3-[3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxyphenyl]-1-oxopropyl]-.omega.-hydroxy- | CIEL | 8h TWA: 1 mg/m ³ (Inhalable) Skin Sensitization observed in animal study |

- **WEEL: USA Workplace Environmental Exposure Levels**

Personal Protection Equipment:

Respiratory Protection: None required under normal conditions of use. NIOSH approved air-supplied respirator during screening and/or sanding of established flooring, high temperature processing or when thermal decomposition is suspected.



Skin Protection: Permeation resistant gloves. Butyl rubber gloves. Nitrile rubber gloves. Permeation resistant clothing. 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.



Eye Protection: Safety glasses with side-shields. In the event of an emergency, use eye goggles with a full face shield. DO NOT WEAR CONTACT LENSES when working with this material!!

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

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

SECTION 9 – PHYSICAL & CHEMICAL PROPERTIES

| | |
|--|---|
| Volatile Organic Content: 0.19 g/L | Solubility in Water: miscible |
| Color: clear to white to pigmented | Specific Gravity @ 20°C: 1.0075 |
| Odor: mild ammonia, characteristic | pH @ 100%: 6 to 8.5 |
| Physical Appearance: liquid | Melting/Freezing point: Ca. 32°F (0°C) |
| Boiling Point: Ca. 212°F (100°C) | Flashpoint: Not applicable, however, solid material will support combustion upon evaporation of water. |
| Ignition Temperature: N/A | Auto-ignition temperature: N/A |
| Explosion Limits: Lower: N/A Upper: N/A | % solids by weight: 48-49 % NVM |
| | Partition coefficient (n-octanol/water): N/A |
| | Vapor pressure: 0.31 kPa (2.333 mm Hg) [at 20° C] |
| Odor Threshold: N/A | Evaporation rate: 0.09 (butyl acetate = 1) |
| N/A = Not Available N/D = Not Determined Ca. = Approximate | |

SECTION 10 – STABILITY & REACTIVITY

STABILITY: This product is stable under recommended and normal conditions.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

INCOMPATIBILITY: Water reactives. Oxidizing agents. Isocyanates. Strong Acids. Acids. Strong Alkalis. Strong Bases.

HAZARDOUS DECOMPOSITION PRODUCTS: By Fire and Thermal Decomposition include but are not limited to: Carbon dioxide (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x), dense black smoke, Aldehydes, Ketones, Isocyanates, Isocyanic Acid, organic acids, silicone compounds, chlorinated compounds.

CONDITIONS TO AVOID: Protect from freezing and excessive heat.

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SECTION 11 – TOXICOLOGICAL INFORMATION

Component Toxicological Information: (Acute)

Likely routes of entry: Skin Contact, Skin absorption, Inhalation

No information available on product.

Ammonia [ammonium hydroxide] may cause mutagenic effects in humans-mucus membranes, skin, eyes.

SECTION 12 – ECOLOGICAL INFORMATION

Marine Pollutant/Ecotoxicity: May be harmful to aquatic life based on component information.

Ammonia is highly toxic to aquatic organisms.

Environmental Fate: The product is not readily biodegradable base on potential pigment concentration. Bioaccumulation potential is very low.

Additional Information: Do not allow to escape into waterways, wastewater or soil.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: The generation of waste should be avoided or minimized wherever possible. Do not dispose of with household waste. Do not dispose of in landfill. Do not allow contact with sewers or waterways. Comply with all Federal, State and Local regulations.

14. TRANSPORT INFORMATION

DOT SHIPPING INFORMATION

DOT Proper Shipping Name: Resin compound- 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

IMDG

Technical Name: Resin compound- Not Regulated

Hazard Class: N/A

Hazard Subclass: N/A

I.D. Number: N/A

Packing Group: N/A

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS AS FOLLOWS-

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

CERCLA/ Super Fund (40 CFR 117, 302):

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:

Acute Health Hazard

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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: **none.**

TOXIC SUBSTANCES CONTROL ACT: All intentional ingredients are listed in the TSCA inventory or comply with TSCA Polymer Exemption criteria per 40 CFR 723.

California Proposition 65: To the best of our knowledge, this product may contain these listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm:

Methanol 67-56-1 <0.1%

N,N-Diethanolamine 111-42-2 <0.1%

1,4-Dioxane 123-91-1 <0.1%

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, TRI-CHEM CORPORATION CANNOT GIVE ANY GUARANTEES REGARDING INFORMATION FROM OTHER SOURCES, AND EXPRESSLY DOES NOT MAKE ANY WARRANTIES, NOR ASSUMES ANY LIABILITY FOR ITS USE.

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| | |
|----------------|------------|
| PRINTED DATE : | 11/29/2016 |
| MSDS REF. No : | LV |

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 14 G
PRODUCT CODE: LV
PRODUCT USE/CLASS: HARDENER

Supplier/ Manufacturer

TRI-CHEM CORPORATION
431 Stephenson Hwy.
Troy, MI 48083
800-456-6255

TRI-CHEM CORPORATION; PHONE: 800-456-6255

EMERGENCY PHONE: 800-535-5053

ORIGINAL DATE ISSUED: 6/6/16 **REVISION DATE:** 6/6/16

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

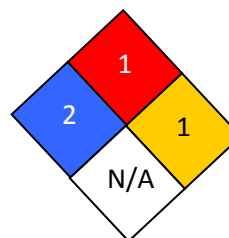
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WITH COMMON MATERIALS INCLUDING WATER, ALCOHOLS, BASES AND AMINES RELEASING LARGE AMOUNTS OF CARBON DIOXIDE.

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

* Chronic Health Hazard

NFPA CODES



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 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 |

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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 (CO₂), 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 (CO₂ 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

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 or 703-527- 3887 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

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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/m³

Short Term Exposure Limit (STEL): 1.0 mg/m³ (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 absence 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.



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.

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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

| | |
|--|---|
| Volatile Organic Content: Negligible | Solubility in Water: Insoluble, reacts slowly with water to liberate CO ₂ |
| Color: Colorless to pale yellow | Specific Gravity @ 20°C: 1.16 |
| Odor: Slight | pH @ 100%: N.A. |
| Physical Appearance: Colorless to Light Yellow Liquid. | Melting/Freezing point: N/A |
| Boiling Point: >220°C (428°F) @ 1.33hPa | Flashpoint: 137°C (279°F) |
| Ignition Temperature: 460 °C (860 °F) (Spontaneous)) | Auto-ignition temperature: N/A |
| Explosion Limits: Lower: N/A Upper: N/A | Water solubility: Insoluble, reacts slowly with water to liberate CO ₂ |
| | Partition coefficient (n-octanol/water): N/A |
| | Relative vapor density: N/A |
| Odor Threshold: N/A | Evaporation rate: 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 (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x), 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 LD₀ > 2500 mg/kg (rat) (OECD 423 (female))

Dermal LD₀ > 2000 mg/kg (rabbit) (OECD 402)

> 2000 mg/kg (rat) (OECD 402)

Inhalative LC₅₀/4h 0.390 mg/l (rat) (OECD 403 (female))

822-06-0 hexamethylene-di-isocyanate

Oral LD₅₀ 746 mg/kg (rat) (OECD 401)

Dermal LD₅₀ > 7000 mg/kg (rat) (OECD 402)

Inhalative LC₅₀/4h 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.

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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 \geq 82.8 mg/l (Brachydanio rerio) (EU C.1)

822-06-0 hexamethylene-di-isocyanate

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

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

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.

· Bioaccumulative potential

Not potentially bioaccumulable.

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

· Waste treatment methods

· 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:**

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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

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

SAFETY DATA SHEET

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, TRI-CHEM CORPORATION CANNOT GIVE ANY GUARANTEES REGARDING INFORMATION FROM OTHER SOURCES, AND EXPRESSLY DOES NOT MAKE ANY WARRANTIES, NOR ASSUMES ANY LIABILITY FOR ITS USE.