



KRETUS®

Safety Data Sheet

SECTION 1: IDENTIFICATION

Product Name: KRETUS® Polyaspartic 72 (PA72) and Polyaspartic 85 (PA85), Part A EZ, FAST, or XFC

Recommended Use: For residential and industrial use

Manufacturer: Kretus, 1055 W. Struck Ave., Orange, CA 92867

Telephone: (714) 694-2061

24 Hour Emergency Telephone Number: (800) 255-3924 (CHEMTEL)

Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

Comments: To the best of our knowledge, this Safety Data Sheet conforms to the requirements of US OSHA 29 CFR1910.1200.

SECTION 2: HAZARD IDENTIFICATION

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

Flammable liquids: Category 2

Serious eye damage/eye irritation: Category 2A

Skin sensitization: Category 1

Carcinogenicity: Category 2

Specific target organ toxicity (repeated exposure): Category 2

Danger

Flammable liquid and vapor. Causes skin irritation and serious eye irritation. May cause respiratory irritation or an allergic skin reaction. Toxic to aquatic life with long-lasting effects.



Keep container tightly closed and away from heat/sparks/open flames/hot surfaces. - No smoking. Use explosion-proof electrical/ventilating/lighting equipment and only non-sparking tools. Take precautionary measures against static discharge. Ground/bond container and receiving equipment.

Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapors/spray. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling.

In case of fire, use dry chemical to extinguish.

IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

Store container tightly closed and locked up in a cool/well-ventilated place. Dispose of contents/container according to local, state and federal regulations.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

The specific chemical identity and/or exact percentage (concentration) of composition is withheld as a trade secret.

Chemical Name	CAS No.	Concentration (% by Weight)
Parachlorobenzotrifluoride	000098-56-6	10-30%
Aspartic ester		60-85%
Monoaspartate		5-10%
Aliphatic carboxylic ester		1-5%

SECTION 4: FIRST-AID MEASURES

Contact with Eyes

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Contact with Skin

Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion

If ingested, do not induce vomiting. Parachlorobenzotrifluoride is not soluble. Do not give fluids. If spontaneous vomiting is inevitable, prevent aspiration by keeping the victim's head below the knees. Get medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Special Protective Equipment for Fire-Fighting

Wear protective clothing and self-contained breathing apparatus to protect against potentially toxic and irritating fumes. Cool exposed containers with water spray.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Wear suitable protective equipment. Prevent unnecessary people from area of spill. Cover with absorbent material such as sand or earth.

Environmental Precautions:

Collect and dispose in accordance with federal, state, and local laws and regulations. Prevent runoff into open drains and waterways.

Methods and Materials for Containment and Clean-up:

Dispose of in accordance with all federal, state, and local laws. Dispose of empty containers in accordance with government regulations. Do not reuse empty containers without proper cleaning.

SECTION 7: HANDLING AND STORAGE**Precautions for Safe-Handling**

Use self-contained breathing apparatus if airborne concentration is unknown or mist from spraying occurs in an area with limited ventilation. Use local exhaust as necessary to control airborne vapors or mists. Use of ventilated curing ovens is recommended.

Put on appropriate personal protective equipment, ppe (see section 8). Eating and drinking should be prohibited in areas where this material is handled, stored and processed. Remove contaminated ppe or clothing, wash hands and face before eating and drinking. Use only in area provided with appropriate exhaust ventilation. Empty containers retain product residue and can be hazardous. Do not get in eyes, skin or clothing. Do not ingest. Avoid release to the environment.

Conditions for Safe Storage

Store between 40 to 100°F in accordance with local regulations away from sources of heat, ignition, and direct sunlight. Store in original container. Keep in a dry, well-ventilated area, and away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled, unapproved or reactive containers. Use appropriate containment to avoid environmental contamination.

Incompatible Materials or Ignition Sources

Hazardous polymerization does not occur. Avoid oxidizing agents. Avoid heat, flames and sparks.

Hazardous decomposition products include chlorine and fluorine containing gases, carbon dioxide, carbon monoxide, and other undetermined compounds.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Parachlorobenzotrifluoride	TWA: 20 ppm	TWA: 20 ppm	TWA: 20 ppm
Aspartic ester	Not established	Not established	Not established
Monoaspartate	Not established	Not established	Not established
Aliphatic carboxylic ester	Not established	Not established	Not established

Engineering measures: Work in well ventilated area. Provide natural or explosion-proof fan to ensure adequate ventilation, especially in confined area. Avoid contact with skin, eyes, and clothing.

Environmental exposure controls: Construct a dike to prevent spreading. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating and drinking, smoking or using the lavatory and at the end of the working period. 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.

Personal Protection

Respiratory: In case of inadequate ventilation wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Eyes: Splash proof safety glasses.

Skin: Rubber or plastic apron. Rubber or plastic gloves. Long sleeved clothing or wear protective sleeves. Remove and wash contaminated clothing before re-use.

Other protective equipment information: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Neoprene gloves. PVC disposable gloves. Nitrile rubber. Butyl-rubber. Impervious gloves. (The breakthrough time of the selected glove(s) must be greater than the intended use period.)

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid; slight yellow
Odor	No data available
Odor Threshold	<1 ppm
pH	not established
Melting/Freezing Point	not established
Initial Boiling Point and Boiling Range	136 -138°C (277- 280°F)
Flash Point	43°C (109°F), closed cup
Evaporation Rate	<1
Upper/Lower Flammability or Explosive Limits	not applicable
Explosion Limits: lower	not applicable
Auto-ignition Temperature	not applicable
Vapor Pressure	4.5 kPa (34 mm Hg) [at 20°C]
Vapor Density	3.94 [Air = 1]
Relative Density	1.08
Water Solubility(ies)	Negligible
WPG	8.96 – 9.06
VOC	<100 g/L
Partition Coefficient: n-octanol/water	No data available
Decomposition Temperature	No data available
Viscosity	No data available

SECTION 10: STABILITY AND REACTIVITY

Reactivity: No specific test data related to reactivity available for this product or its ingredients.

Chemical stability: The product is stable.

Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials

Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: TOXICOLOGICAL INFORMATION

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Parachlorobenzotrifluoride	>6.8 g/kg (rat)	>2.7 g/kg (rabbit)	>4479 ppm (rat)
Aspartic ester	Not established	Not established	Not established
Monoaspartate	Not established	Not established	Not established
Aliphatic carboxylic ester	Not established	Not established	Not established

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure Kidney Liver spleen Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: May cause pulmonary edema: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

SECTION 12: ECOLOGICAL INFORMATION

Prevent from entering sewer or waterway. This material is not expected to be harmful to aquatic life. Component Analysis - Ecotoxicity - Aquatic Toxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Parachlorobenzotrifluoride	IC50 (72 hr.) (Green & Blue-green algae) 500 mg/L	LC50 (96 hr.) (Rainbow trout) 13.5 mg/L LC50 (96 hr.) (Bluegill sunfish) 12.0 mg/L MATC (31 day) (Fathead minnow) >0.54		LC50 (48 hr.) (Water flea) 12.4 mg/L MATC (21 day) (Water flea) >0.03 < 0.05 mg/L*

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility

Component	LOG KOW
Parachlorobenzotrifluoride	3.7

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose in accordance with federal, state, and local regulations.

The generation of waste should be avoided or minimized wherever possible. Empty containers should be taken to an approved waste handling site for recycling or disposal. Incineration or landfill should only be considered when

recycling is not feasible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: TRANSPORT INFORMATION

DANGER



	UN Number	UN Proper Shipping Name	Transport Hazard Class(es)	Packing Group	Environmental Hazards
DOT	UN1866	Resin Solution	3	III	Marine Pollutant
IMO/IMDG	UN1866	Resin Solution	3	III	Marine Pollutant
IATA/CAO	UN1866	Resin Solution	3	III	Marine Pollutant

The transportation information listed above is suitable for all modes of transportation. TDG, IMO/IMDG, ICAO/IATA, 49 CFR

Limitations: 49 CFR 173.27 and 175.75 – Cargo Aircraft Only: 220 L; Passenger Aircraft: 60 L

SECTION 15: REGULATORY INFORMATION

U.S. Federal Regulations

OSHA: This product is considered hazardous.

CERCLA SARA Hazard Category:

Section 311 AND 312: 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. Fire. Acute Health Hazard. Chronic Health Hazard.

Section 313: 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:

Component	CAS No.
Parachlorobenzotrifluoride	000098-56-6

U.S. State Regulations

⚠ WARNING: This product can expose you to PCBTF (Parachlorobenzotrifluoride), which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

WHMIS Classification

B2- Flammable Liquid

D2B- Toxic Material

This product has been classified in accordance with the hazard criteria of the Controlled Products.

Regulations and the SDS contain all the information required by the Controlled Products Regulations.

SECTION 16: OTHER INFORMATION

HMIS

HMIS

Health	2
Flammability	3
Reactivity	0

Personal Protection

Safety goggles, neoprene rubber gloves, vapor respirator

Prepared by Kretus Inc

Revision Date 1/17/23

Revision Note Reformatting

The information and recommendations presented herein are accurate to the best of our knowledge. User must conduct their own tests to determine the suitability of these products for their particular purposes and usage. Because of numerous factors affecting results, KRETUS® and its affiliation makes no warranty of any kind, express or implied, including those of merchantability and fitness for purpose, other than material conforms to our applicable current specifications. KRETUS® assumes no legal responsibility for use or reliance on the information contained in this safety data sheet.



KRETUS®

Safety Data Sheet

SECTION 1: IDENTIFICATION

Product Name: KRETUS® Polyaspartic 72 (PA72) or Polyaspartic 85 (PA85), Part B

Recommended Use: For professional use only.

Manufacturer: KRETUS, 1055 W. Struck Ave., Orange, CA 92867

Telephone: (714) 694-2061

24 Hour Emergency Telephone Number: (800) 255-3924 (CHEMTEL)

Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

Comments: To the best of our knowledge, this Safety Data Sheet conforms to the requirements of US OSHA 29 CFR1910.1200, 91/155/EEC.

SECTION 2: HAZARD IDENTIFICATION

Emergency Overview: Combustible. May cause sensitization by skin contact (H317). Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment (H412). May cause skin, eye, and respiratory tract irritation. Harmful by inhalation and if swallowed. Vapors or mist may be a fire and explosion hazard when exposed to high temperatures or ignition.

Component Information/Information on Non-Hazardous Components: Contains Parachlorobenzotrifluoride (Benzene, 1-Chloro-4 (Trifluoromethyl))

PHYSICAL HAZARDS: Flammable Liquid. Will burn under fire conditions but will not sustain combustion.

GHS Classification of the Substance or Mixture (29 CFR 1910.1200):

Flammable Liquid: Category 3

Specific Organ Toxicity (single exposure): Category 3

Inhalation—Acute Toxicity: Category 4

Oral—Acute Toxicity: Category 4

Respiratory Sensitization: Category 1

Skin Sensitization: Category 1

DANGER

May cause an allergic skin reaction. Harmful to aquatic life with long lasting effects. Flammable liquid and vapor. May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure.



Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust/fume/gas/mist/vapors/spray. Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. Use personal protective equipment as required.

Response: In case of fire, use water spray, carbon dioxide, dry chemical or foam for extinction.

IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing. If eye irritation persists: Get medical advice/attention.

Storage: Keep container tightly closed and locked in a cool, well-ventilated place.

Disposal: Dispose of contents/container to an approved waste disposal plant following applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): None known.

Other Information: Not known.

General Information: This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Repeated or prolonged contact causes sensitization, asthma and eczemas.

Read the entire SDS for a more thorough evaluation of the hazards.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

Chemical Name	CAS No.	Concentration (% by Weight)	Comments
Homopolymer of Hexamethylene Diisocyanate	28182-81-2	100ca	Acute toxicity Category 4 Inhalation. Respiratory sensitization Category 1. Specific target organ toxicity – single exposure Category 3 Respiratory system. Specific target organ toxicity – repeated exposure Category 2 Inhalation Lungs.
Hexamethylene-1,6-Diisocyanate	822-06-0	<0.3ca	Acute toxicity Category 4 Oral. Acute toxicity Category 1 Inhalation. Skin corrosion Category 1. Serious eye damage Category 1. Respiratory sensitization Category 1. Skin Sensitization Category 1.

			Specific target organ toxicity – single exposure Category 3 Respiratory System.
Benzene, 1-Chloro-4(Trifluoromethyl)	98-56-6	13ca	Flammable Liquid Category 3 Skin Irritant Category 2 Eye Irritant Category 2A

See Section 11 for Toxicological Information.

SECTION 4: FIRST-AID MEASURES

General Advice: Seek medical advice or medical attention if condition persists.

Eye contact: Rinse immediately with plenty of water for 15 minutes and seek advice of an eye specialist/physician. Continue rinsing eyes during transport to hospital. Do not remove contact lens if worn.

Skin contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Take victim immediately to hospital to obtain medical attention. Destroy or thoroughly clean contaminated shoes before reuse.

Inhalation: Move victims into fresh air. If breathing is labored, administer oxygen. If not breathing, give artificial respiration. Consult a doctor immediately.

Ingestion: If ingested, do not induce vomiting. Parachlorobenzotrifluoride is not soluble. Do not give fluids. If spontaneous vomiting is inevitable, prevent aspiration by keeping the victim's head below the knees. Get medical attention.

Notes to Physician: No specific treatment. Treat symptomatically. Call the poison control center immediately if large quantities have been ingested.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: All extinguishing media are suitable. Use water with caution. Material will float and may ignite on surface of water. Use water spray to keep fire-exposed containers cool.

Unsuitable Extinguishing Media: None known.

Unusual Fire and Explosion Hazards: Firefighters should wear NFPA approved self-contained breathing apparatus and full protective clothing.

Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. Toxic and irritating gases/fumes, including heated diisocyanate that is considered extremely dangerous, may be given off during burning or thermal decomposition.

Hazardous Combustion Products: carbon dioxide, carbon monoxide, oxides of nitrogen, dense black smoke and other undetermined compounds.

Advice for Fire Fighters: NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing must be worn in case of fire. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Vapors or mist may be a fire and explosion hazard when exposed to high temperature or ignition. Closed container may forcibly rupture under extreme heat. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Toxic gases/fumes may be given off during burning or thermal decomposition. Contain spill or release with a dike to prevent flow into sewers or streams. Pump into container for disposal or reclamation. Soak up small spills with absorbent material.

SECTION 6: ACCIDENTAL RELEASE MEASURES**Personal Precautions, Protective Equipment and Emergency Procedures**

Wear appropriate personal protective equipment. Evacuate surrounding areas and isolate the area. Keep unnecessary and unprotected personnel from entering. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Implement site emergency response plan.

Environmental Precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers. Inform authorities if the product has caused environmental pollution (sewers, drains, waterways or soil).

Containment/Clean-up Measures: Cleanup personnel must use appropriate personal protective equipment. Evacuate and keep unnecessary personnel out of spill area. Remove all sources of ignition, including flames, heat, and sparks. Stop leak if without risk. Move containers from spill area. Dike or dam spilled material with non-combustible, absorbent material (e.g., sand, earth, vermiculite or diatomaceous earth) and control further spillage, where possible. Make certain the absorbent material soaks up all liquids.

Collect and place spilled material in container (e.g., 55-gal salvage drum) for proper disposal according to appropriate local, state and federal regulations. Repeat application of absorbent material until all liquid has been removed from the surface. Do not fill the salvage container more than two-thirds full to allow for any expansion, and do not tighten the lid on the container. Store salvage container (make certain lid is loose to allow release of carbon dioxide) in a well-ventilated, isolated, and cool area for at least 72 hours. Properly dispose of the waste material and any contaminated equipment in accordance with existing federal, state and local regulations.

Decontaminate the spill surface area with a neutralization solution. A neutralization solution can be prepared with a combination of two solutions mixed 1:1 by volume: (Solution 1): Mineral Spirits (80%), VVM&P Naptha (15%) and Household Detergent (5%); (Solution 2): Monoethanolamine (50%) and water (50%). Other neutralization solutions include: ZEP® Commercial Heavy-Duty Floor Stripper, EASY OFF® Grill and Oven Cleaner, a solution of Simple Green® Pro HD Heavy-Duty Cleaner (50%) and Household Ammonia (50%), and a solution of Fantastic® Heavy Duty All Purpose Cleaner (90%) and Household Ammonia (10%). Check for residual contamination using Swype® test kits from Colorimetric Laboratories, Inc. (Telephone 847-803-3737) and follow directions provided by the test kits. Repeat decontamination as necessary.

Do not allow spilled material or wash water to enter sewers, surface waters or groundwater systems.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe-Handling: Put on appropriate personal protective equipment, PPE (see Section 8). Eating and drinking should be prohibited in areas where this material is handled, stored and processed. Remove contaminated PPE or clothing, wash hands and face before eating and drinking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Use only in area provided with appropriate exhaust ventilation. Empty containers retain product residue and can be hazardous. Do not get in eyes, skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment.

Conditions for Safe Storage: Storage period is 6 months after delivery. Maximum storage temperature is 26°C (80°F). Keep away from food products during use and storage. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled, unapproved or reactive containers. Use appropriate containment to avoid environmental contamination. Personnel education and training in the safe use and handling of this product are required under OSHA Hazard Communication Standard 29 CFR 1910.1200.

Incompatible Materials or Ignition Sources: Hazardous polymerization does not occur. Avoid oxidizing agents. Avoid heat, flames and sparks. Hazardous decomposition products include chlorine and fluorine containing gases, carbon dioxide, carbon monoxide and other undetermined compounds.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Special Note for Exposure Control: Consult local authorities for further acceptable exposure limits.

Exposure Limits/ Guidelines

Chemical Name	Result	ACGIH/OSHA
Homopolymer of Hexamethylene Diisocyanate (CAS 28182-81-2)	STEL	0.0111 pm
	TWA	0.005 ppm
	PEL	No data available.

Engineering Measures/Controls

General dilution and local exhaust as necessary to control airborne vapors, mists, dusts, and thermal decomposition products below appropriate airborne concentration standards and guidelines.

Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent the build-up of explosive atmospheres and to prevent off-gases from entering the work place. Environmental Exposure Controls: Avoid release to the environment. Construct a dike to prevent spreading of spills. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Hygiene Measures

Wash hands, forearms, and face thoroughly after handling chemical products, before eating and drinking, smoking, or using the lavatory, and at the end of the working period. 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.

Personal Protective Equipment

Respiratory: In case of inadequate ventilation, wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Use positive pressure supplied air respirator when airborne concentrations are not known, when airborne levels are 10 times the appropriate TLV, and when spraying is performed or product is applied by aerosol in a confined space or area with limited ventilation. If respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Contact health and safety professional or manufacturer for specific information.

A respirator that is recommended or approved for use in isocyanate-containing environments, including air-purifying or fresh air-supplied, may be necessary for spray applications or other situations such as high temperature use that may produce unacceptable 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 provided herein. Observe OSHA regulations for respirator use (29 CFR 1910.134).

When coatings containing isocyanate are spray applied, good industrial safety practice requires the use of some form of respiratory protection. During spray application of coatings containing this product, the use of a supplied-air (either positive pressure or continuous flow-type) respiratory is mandatory when one or more of the following conditions exist:

1. The airborne isocyanate concentrations are not known;
2. The airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours. This is 10 times the 8- hour TWA or the 15 minute STEL exposure limits.

3. The airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes. This is 10 times the 8 hour TWA or the 15 minute STE'L exposure limits.
4. 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:

1. The airborne isocyanate monomer concentrations are not known;
2. The airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours. This is 10 times the 8- hour TWA or the 15 minute STEL exposure limits.
3. The airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes. This is 10 times the 8 hour TWA or the 15 minute STE'L exposure limits.
4. 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, pre-filters should be changed whenever breathing resistance increases due to particulate buildup.

During non-spray operations such as mixing, batch-making, brush, or roller application, etc., at elevated temperatures (such as in the case where material is heated or material is applied to a hot substrate), exposure to airborne isocyanate vapors is possible. In this case, when the coatings system is applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow-type) respiratory is mandatory when one or more of the following conditions exists:

1. The airborne isocyanate concentrations are not known;
2. The airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours (10 times the 8-hour TWA exposure limit);
3. The airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m³ averaged over 8 hours or 10 mg/m³ averaged over 15 minutes (10 times the 8-hour TWA or the 15-minute STEL exposure limits);
4. 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, pre-filters should be changed whenever breathing resistance increases due to particulate buildup.

Eye/Face: Use chemical resistant goggles. Chemical safety goggles in combination with a full face shield must be used if a splash hazard exists.

Hands: Use permeation-resistant gloves such as butyl rubber, nitrile rubber, or neoprene.

Skin/Body: Wear rubber or plastic apron and permeation resistant clothing, chemical-resistant gloves, and long-sleeved shirts, and pants. Remove and wash contaminated clothing before reuse.

Special Requirements: 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 work areas. 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 should be permitted.

General Industrial Hygiene Considerations: Keep away from food and drink. Wash hands and face after use. Educate and train workers in the safe use and handling of this product. Emergency showers and eye wash stations should be available. Follow all label instructions.

Key to Abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

MSHA = Mine Safety and Health Administration
 NIOSH = National Institute of Occupational Safety and Health exposures
 OSHA = Occupational Safety and Health Administration
 STEL = Short Term Exposure Limits are based on 15-minute exposures
 TWA = Time-Weighted Averages are based on 8h/day 40hr/week

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid; clear colorless to pale yellow.
Odor	Naphthalenic-like.
Initial Boiling Point and Boiling Range	-32.8°C (-36°F)
Flash Point	43°C (109°F)
Bulk Density	No data available.
Relative Density/Specific Gravity	1.12 ± 0.1
Water Solubility	Reacts.
UEL	10.5% (V) Solvent
LEL	0.9% (V) Solvent
NVW	100% ca
VOC	<50 g/L
Odor Threshold	No data available
pH	No data available
Melting/Freezing Point	No data available
Evaporation Rate	No data available
Flammability	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Auto-Ignition Temperature	No data available
Decomposition Temperature	No data available

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: Stable

Possibility of Hazardous Reactions: Contact with moisture, other materials that react with isocyanates, or temperatures above 177°C (350°F) may cause polymerization.

Conditions to Avoid: Heat, flames and sparks.

Incompatible Materials: Water, amines, strong bases, alcohols, copper alloys.

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide, oxides of nitrogen, dense black smoke, hydrogen cyanide, isocyanate, isocyanic acid, and other compounds unidentified.

SECTION 11: TOXICOLOGICAL INFORMATION

Data on the product is not available. Data on a similar product is provided.

ACUTE TOXICITY

Hexamethylene-1,6-diisocyanate Homopolymer (CAS 28182-81-2)

LD50 Oral Rat, Female ≥2,500 mg/kg

LD50 Inhalation Rat, Female 0.390 – 0.543 mg/l 4h

LD50 Dermal Rabbit >2,000 mg/kg

LD50 Dermal Rat >2,000 mg/kg

Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

LD50 Oral Rat, Female 746 mg/kg

LD50 Inhalation Rat, Female 0.124 mg/l 4h

LD50 Dermal Rat >7,000 mg/kg

Parachlorobenzotrifluoride (CAS 98-56-6)

LD50 Oral Rat 13000 mg/kg

LC50 Inhalation Rat 33mg/l 4h

LD50 Dermal Rabbit >2,000 mg/kg

IMMEDIATE (ACUTE) EFFECTS**Hexamethylene-1,6-diisocyanate Homopolymer (CAS 28182-81-2)**

Skin Corrosion/Irritation (Rabbit, 4h): Slight skin irritation. Skin sensitizer.

Eye Irritation (Rabbit): Slight irritant.

Inhalation (Mouse): Respiratory sensitizer.

STDT (One-time exposure): May cause respiratory irritation.

Carcinogenicity: No data available.

Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

Skin Irritation (Rabbit): Corrosive.

Eye Irritation (Rabbit): Corrosive.

Dermal (Human): Sensitizer.

Respiratory (Guinea Pig): Sensitizer.

OTHER INFORMATION RELATING TO Parachlorobenzotrifluoride (PCBTF):

A 28-day range-finding inhalation study was conducted in male and female Sprague-Dawley rats exposed to 0, 100, 250, 500, or 1000 ppm for 6 hour/day, 5 days/week. Clinical signs included increased activity at 250 ppm and above. Liver and kidney weights were increased. Microscopic change in male kidneys stained positive for alpha-2-U globulin and the effects were considered not relevant to humans. Liver cell hypertrophy was seen at all exposure in males. Liver changes were consistent with clinical chemistry and PCBTF-blood level analysis and are believed to be an adaptive response, due to increased liver metabolism.

Gavage studies in laboratory rodents for treatment periods of 14, 28, and 90 days have demonstrated significant liver and kidney toxicity at dose levels of 400-1000 mg/kg/day. Evidence of target organ toxicity included significant increases in relative liver and kidney weights, clinical chemistry values and histopathological findings. Renal toxicity, which occurred only in male rats, was apparently due to "hyaline droplet" nephropathy and is, therefore, highly unlikely to develop in man. The NOAEL's for all these studies range from 10 to 100 mg/kg/day.

CNS effects were observed in rats exposed to PCBTF at or above 2822 ppm for 4 hours.

A 90-day (13 weeks) rat inhalation toxicity and neurobehavioral study was conducted using exposures of 6 hours/day, 5 days/week, at concentrations of 0, 10, 50, and 250 ppm. There were no PCBTF-related macroscopic observations. Microscopically, PCBTF-related centrilobular hypertrophy was present only in the livers of males and females at the high dose (250 ppm) after 13 weeks of exposure. No centrilobular hypertrophy was observed at any level among recovery animals. There were no PCBTF-related effects on the nervous system as measured by a functional observation battery, muscular activity measurements and neuropathology. A NOEL of 50 ppm was established in this study for liver hepatocyte hypertrophy in male and female rats. If the hepatocyte hypertrophy observed is considered to be an adaptive response to PCBTF, the NOAEL for this study is 250 ppm.

SECTION 12: ECOLOGICAL INFORMATION**Toxicity****Hexamethylene-1,6-diisocyanate Homopolymer (CAS 28182-81-2)**

Acute and Prolonged Toxicity to Fish: LC50 100 mg/l (Zebra Fish, 96h), Acute Toxicity to Aquatic Invertebrates: EC50 100 mg/l (water flea, 48 h).

Persistence and Degradability: Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

Not readily degradable.

Bioaccumulative Potential: Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

Accumulation is not expected.

Other Adverse Effects: Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

An accumulation in aquatic organisms is not expected.

Other Information: Hexamethylene-1,6-diisocyanate (CAS 822-06-0)

LC0: ≥82.8 mg/l (Zebra Fish, 48 h)

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Treatment Methods: Dispose in accordance with Federal, State, and Local laws and regulations. The generation of waste should be avoided or minimized wherever possible. Empty containers should be taken to an approved waste handling site for recycling or disposal. Incineration or landfill should only be considered when recycling is not feasible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Empty Container Precautions: Do not heat or cut container with electric or gas torch. Recondition or dispose of empty container in accordance with governmental laws and regulations. Do not reuse empty container without proper cleaning. Label precautions also apply to this container when empty.

SECTION 14: TRANSPORT INFORMATION

DANGER



	UN Number	UN Proper Shipping Name	Transport Hazard Class(es)	Packing Group	Environmental Hazards
DOT	UN1866	Resin Solution	3	III	Marine Pollutant
IMO/IMDG	UN1866	Resin Solution	3	III	Marine Pollutant
IATA/CAO	UN1866	Resin Solution	3	III	Marine Pollutant

* Parachlorobenzotrifluoride does not sustain combustion as determined by ASTM D4206. It is therefore excepted from classification as a flammable liquid (see 40 CFR 175.20(a)(3)).

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: REGULATORY INFORMATION

Safety and Environmental Regulations/ Legislation Specific for the Substance or Mixture SARA Hazard Classifications

Component	CAS	MA	NJ	PA
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Hexamethylene-1,6-diisocyanate Homopolymer	28182-81-2	CAS 28182-81-2	CAS 28182-81-2	CAS 28182-81-2
Hexamethylene-1,6-diisocyanate	822-06-0	-	822-06-0	-

Inventory

Component	CAS	Canada DSL	Canada NDSL	TSCA
Hexamethylene-1,6-diisocyanate Homopolymer	28182-81-2	Listed	-	Listed
Hexamethylene-1,6-diisocyanate	822-06-0	Listed	-	Listed

United States

Environment

U.S. – CERCLA/SARA – Hazardous Substances and their Reportable Quantities: None

U.S. – SARA – Section 311/312 Hazard Categories: Acute Health Hazard, Chronic Health Hazard

U.S. – CERCLA/SARA – Section 302 Extremely Hazardous Substances TPQs: None

U.S. – CERCLA/SARA – Section 313 – Emissions Reporting: None

U.S. – CERCLA/SARA – Section 313 – PBT Chemical Listing: None

U.S. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A) Components: None

U.S. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 372.65) Supplier Notification Required Components: None

U.S. Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261): 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.

United States

California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

 **WARNING:** This product can expose you to parachlorobenzotrifluoride (PCBTF), which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

SECTION 16: OTHER INFORMATION

Hazardous Material Information System (HMIS)

Scale 0-4		NFPA	HMIS
4 – Severe Hazard	Health	2	2
3 – Serious Hazard	Flammability	1	1
2 – Moderate Hazard	Reactivity	0	0
1 – Slight Hazard			
0 – Minimal Hazard			

Personal Protection: Safety goggles, neoprene rubber gloves, vapor respirator

Prepared by Kretus, Inc.

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Revision Note Reformatting

Disclaimer

The information and recommendations presented herein are accurate to the best of our knowledge. User must conduct their own tests to determine the suitability of these products for their particular purposes and usage. Because of numerous factors affecting results, KRETUS® and its affiliation makes no warranty of any kind, express or implied, including those of merchantability and fitness for purpose, other than material conforms to our applicable current specifications. KRETUS® assumes no legal responsibility for use or reliance on the information contained in this safety data sheet.