MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

PRODUCT NAME: TCC-5000A

CHEMICAL NAME: Cycloaliphatic Isocyanate Prepolymer

MANUFACTURER: CASS POLYMERS OF MICHIGAN, INC.
31200 STEPHENSON HWY
MADISON HEIGHTS MI 48071 USA

INFORMATION PHONE: (248) 588-2270
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Materials Information System (United States)

Health	**3**
Flammability	**1**
Physical Hazard	**0**

Hazard Codes: *=Chronic Hazard 0=Minimal Hazard, 1=Slight Hazard, 2=Moderate Hazard, 3=Serious Hazard, 4=Severe Hazard

Material Composition

Component	CAS.NO	EINECS/ELINCS No.	Percent
Dicyclohexylmethane Diisocyanate	5124-30-1	225-863-2	35% - 45%
Polyether Polyol	25322-69-4	Not Available	55% - 65%

Hazardous Materials are required to be listed if present in concentrations of 1.0% or higher. Materials posing a possible Chronic Health Risk are required to be listed at concentrations of 0.1% or higher. Materials listed in section 2 are not necessarily hazardous. See section 8-EXPOSURE CONTROLS/PERSONAL PROTECTION, and section 11-TOXICOLOGICAL INFORMATION for complete hazard/exposure limit information.

NOTE: This preparation is a reaction product of the materials listed above. The hazards presented by the individual raw materials have been listed in this MSDS in order that the maximum precautions appropriate for such materials may be taken. As a reaction product, this preparation may not present as serious a health risk as the individual components, but caution and careful handling are still required.

3. HAZARDS IDENTIFICATION

****Emergency Overview****

DANGER! Toxic gases and fumes may be given off during thermal decomposition or burning. Closed container may forcibly rupture under extreme heat or if contaminated with water. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Causes respiratory tract irritation. May cause allergic respiratory response. Harmful if inhaled. Respiratory sensitizer. Lung damage and respiratory sensitization may be permanent. Causes skin irritation. May cause allergic skin reaction. Skin sensitizer. Causes eye irritation. May cause lung damage.

EC Classification(s): Xn-Harmful; N- Hazardous for the Environment

Risk Phrases:
- R20: Harmful by inhalation
- R36/37/38: Irritating to the eyes, respiratory system and skin
- R42/43: May cause sensitization by inhalation and skin contact
- R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

(See Section 15-REGULATORY INFORMATION for complete risk phrases.)

Potential Acute Health Effects

Eyes

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

Respiratory

Diisocyanate vapors or mists at concentrations above the TLV or PEL can irritate the mucous membranes in the nose, throat and lungs, causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function. People with preexisting lung conditions or sensitivities may experience symptoms similar to asthma or asthma-like symptoms at

airborne concentrations below the TLV or PEL. Exposures at or above the PEL or TLV may cause bronchitis, bronchial spasms, and pulmonary edema (fluid in the lungs). Chemical or hypersensitivity pneumonitis with flu-like symptoms such as fever and chills have been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible in cases of acute exposure.

Skin

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

Potential Chronic Health Effects

Respiratory

Repeated overexposures or single large dose may result in development of a sensitization to isocyanates with asthma or asthma-like symptoms. This may cause the individual to react at a later date to isocyanate exposures well below the TLV or PEL. Symptoms including chest tightness, coughing, wheezing, shortness of breath or asthmatic attack may be immediate or delayed for several hours after exposure. Extreme asthma attacks can be life threatening. Reports indicate that, once sensitized, an individual can experience these symptoms with exposure to dust, cold air or other non-isocyanate irritants in addition to exposure to isocyanates. This increased lung sensitivity can persist for weeks to several years. Sensitization can be permanent. Chronic exposure has also been reported to cause lung damage that may be permanent, including fibrosis and decrease in lung function.

Eye

Prolonged vapor contact may cause conjunctivitis.

Skin

Repeated skin contact may cause a persistent irritation or dermatitis. Repeated or prolonged exposure may aggravate existing dermatitis. Potent skin sensitizer. Once sensitized, and individual may react to direct skin contact and even airborne vapors below the TLV with reddening, rash, swelling and in extreme cases blistering and hives. These symptoms may be immediate or in some cases delayed several hours.

4. FIRST AID MEASURES

Never give fluids or induce vomiting if patient is unconscious or is having convulsions.

Inhalation

Move effected persons to fresh air; if effects occur, consult a physician.

Skin Contact

Immediate, continued and thorough washing in flowing water for at least 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash clothing before reuse. Destroy contaminated leather items.

Eye Contact

Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

Ingestion

Do not induce vomiting. Give one glass (ca. 2.5 dL) of water or milk if available and transport to medical facility. Do not give anything by mouth to an unconscious person.

Note to Physician

Eyes: Stain for evidence of corneal injury.

Skin: This material is a skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn.

Ingestion: Treat symptomatically. No specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this material.

Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to isocyanates.

5. FIRE FIGHTING PRECAUTIONS

Extinguishing Media

Water fog or fine spray. Carbon dioxide. Alcohol resistant foam. Dry chemical fire extinguishers.

Unusual Fire/Explosion Hazards

Closed container may forcibly rupture under extreme heat or when contents are contaminated with water. Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since the reaction between water and hot diisocyanate can be vigorous.

Protection of Firefighters

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

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Wear adequate personal protective equipment, see Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION.

Methods of Cleaning Up

Large spills: Contain with dike. Pump into suitable and properly labeled containers. Cover spill area with absorbent material. Saturate absorbent material with neutralization and mix. Repeat application of neutralization solution, with scrubbing, followed by absorbent until surface is decontaminated.

DO NOT SEAL WASTE COLLECTION CONTAINERS PRESSURE-TIGHT FOR 72 HOURS AFTER COLLECTION to allow any generated gasses to escape. Failure to observe this practice may result in the forcible rupture (explosion) of the container causing severe injury to bystanders.

Neutralization/Cleaning Solution

Mix equal amounts of the following to total two times the estimated volume of spilled material:

(1) Mineral spirits (80%), VM&P Naptha (15%) and household detergent (5%) and (2) A 50% solution of monoethanolamine and water.

Additionally, a solution of 65% water, 20% isopropyl alcohol (rubbing alcohol), 10% household ammonia and 5% detergent is an effective cleaner and neutralizer for residual isocyanates if the mixture mentioned above is not readily available. Scrub the spill area with the neutralizing solution and a stiff bristle brush and absorb the washings for safe disposal. Repeat until no residue remains.

7. HANDLING AND STORAGE

Handling

Keep container dry. Do not ingest. Do not breathe gas/fumes/dust/spray/dust. Use adequate ventiliation to keep airborne isocyanate levels below exposure limits. Warning properties (odors, eye, nose and throat irritation) are not sufficient to prevent over exposure. Odors are not detectable until well over triple the exposure limits. This material can produce asthmatic sensitization upon a single concentration exposure, or repeated low-level exposures. Individuals with lung problems or previous sensitization must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate skin and eye protection. Wash thoughly after handling. Avoid breathing smoke or mist created from overheating or burning this material. Store in tightly sealed containers under a blanket of dry, inert gas. Do not reseal containers of moisture contamination is suspected.

Storage Temperature and Shelf Life

Store between 10ºC and 27ºC for maximum shelf life.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Hazardous Component Control Parameters –

Component	CAS. No.	EINECS	Percent	Exposure Limits	Source
Dicyclohexylmethane Diisocyanate	5124-30-1	225-863-2	35% - 45%	0.115ppm TWA TLV	ACGIH

-No Further Data Available-

Engineering Controls

Use of local exhaust is highly recommended. Local exhaust ventilation may also be necessary for operations involving machining of cured material to eliminate nuisance dusts.

Personal Protective Equipment

Respiratory Protection

Airborne exposures above the TLV can occur in inadequately ventilated areas when this material is heated, sprayed or otherwise aerosolized. In these cases, respiratory protection must be worn. Respiratory protection available for use includes supplied-air respirators such as SCBA apparatus or other positive pressure or continuous flow breathing apparatus. Air purifying respirators may also be used provided that the cartridges are either equipped with an end-of-service-life indicator or are part of a change-out schedule that ensures that cartridges are replaced well before the end of their service life. Use of the above safety equipment does not imply that airborne contaminate levels can or should be ignored.

Skin Protection

Stringent precautions should be taken to avoid skin contact. Spray application of materials based on this product enhances the risks of skin exposure. Wear impermeable protective clothing, preferably of the type that can be disposed of after use. Selection of specific items such as face shield, gloves, boots, apron, or full body suit will depend on operation. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection

Use of gloves is required. Use Nitrile rubber, Butyl rubber or Neoprene gloves.

NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all requisite workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), as well as the instructions/specifications provided by the glove supplier.

Eye/Face Protection

Eye wash fountain should be located in immediate work area. Use chemical goggles. A full-face shield and supplied-air vapor respirator is recommended for operations involving spraying or other operations placing this material under pressurized conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Viscous Liquid
Color:	Water-Clear
Odor:	None- Any detectable odor indicates overexposure to Diisocyanate vapors due to exceeded PEL.
Specific gravity:	1.00 – 1.10
Vapor pressure:	Not Determined
Boiling point/range:	Not Determined
Water solubility:	Slightly Soluble in Water
pH:	Not Determined
Flash point:	392ºF; 200ºC
Flammability-LFL:	Not Determined
Flammability-UFL:	Not Determined
% volatile:	0g/L (0%)

10. STABILITY AND REACTIVITY

Chemical Stability

Stable under normal handling and storage conditions, see Section 7,Handling and Storage.

Materials to Avoid

Avoid water, amines, strong bases, alcohols, copper alloys, aluminum or temperatures above 350ºF (177ºC) In combination with isocyanates, these materials will result in a temperature and/or pressure increase or polymerization.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

This finished product has not been tested to determine individual toxicological/ecological limits. Individual components of this mixture have been independently tested by the raw material manufacturers and any known results have been presented below. The results for the individual components may not be representative of the toxicity of this finished product.

Ingredient Name	CAS No.	%	Test	Result	Route	Species
Dicyclohexylmethane Diisocyanate	5124-30-1	35% - 45%	LD50	>11,000 mg/kg	Oral	Rat
			LD50	434 mg/m^3	Inhalation	Rat

-No Further Data Available-

Potential Chronic Health Effects

Respiratory

Repeated overexposures or single large dose may result in development of a sensitization to isocyanates with asthma or asthma-like symptoms. This may cause the individual to react at a later date to isocyanate exposures well below the TLV or PEL. Symptoms including chest tightness, coughing, wheezing, shortness of breath or asthmatic attack may be immediate or delayed several hours after exposure. Extreme asthma attacks can be life threatening. Reports indicate that, once sensitized, an individual can experience these symptoms with exposure to dust, cold air or other non-isocyanate irritants in addition to exposure to isocyanates. This increased lung sensitivity can persist for weeks to several years. Sensitization can be permanent. Chronic exposure has also been reported to cause lung damage that may be permanent, including fibrosis and decrease in lung function.

Eye

Prolonged vapor contact may cause conjunctivitis.

Skin

Repeated skin contact may cause a persistent irritation or dermatitis. Repeated or prolonged exposure may aggravate existing dermatitis. Potent skin sensitizer. Once sensitized, and individual may react to direct skin contact and even airborne vapors below the TLV with reddening, rash, swelling and in extreme cases blistering and hives. These symptoms may be immediate or in some cases delayed several hours.

Carcinogen

This product contains no materials that are reported as known or suspect carcinogens in levels above 0.1%

Mutagen

This product contains no materials that are reported as known or suspect mutagens in levels above 0.1%

Reproductive Hazard

This product contains no materials that are known or suspected of causing a reproductive hazard in levels above 0.1%.

12. ECOLOGICAL INFORMATION

Persistence/degradability:

The material contains components that show little or no evidence of biodegradability. Caution should be taken to prevent release to the environment. See Section 13 for further information.

Ecotoxicity Data:

Ingredient Name	CAS No.	%	Test	Result	Species
Dicyclohexylmethane Diisocyanate	5124-30-1	35% - 45%	LC50, 96 hrs LC50, 48 hrs	1.2 mg/L >5 mg/L	Zebra Fish Green Algae

-No Further Information Available-

Individual components of this mixture have been independently tested by the raw material suppliers and any known results have been presented above. The results for the individual components may not be representative of the ecological toxicity of this finished product. This finished product has not been tested to determine individual toxicological/ecological limits Great Caution should be taken to prevent release to the environment. See Section 13 for further information.

13. DISPOSAL CONSIDERATIONS

Disposal

Preferred method of disposal includes incineration under controlled conditions in accordance with all local and national laws and regulations. The generation of waste should be avoided or minimized wherever possible. Untreated material is not suitable for disposal. Waste, even small quantities, should never be poured down drains, sewers or watercourses. Waste must be disposed of in accordance with federal, state and local environmental control regulations. This material, when properly mixed and cured with its resin component at the proper mix ratio, may be safely land filled.

Contaminated packaging

Empty containers can only be disposed of when the remaining product adhering to the container walls has been removed. Hazard warning labels should be removed from the container only after it has been properly emptied.

14. TRANSPORT INFORMATION

Land/Air/Sea/Rail

Proper Shipping Name:	Environmentally Hazardous Substance, Liquid, NOS (Dicyclohexylmethane Diisocyanate)
UN Number:	UN-3082
Hazard Class:	9
Packing Group:	III, Marine Pollutant

15. REGULATORY INFORMATION

OSHA Hazcom Standard Rating:

Hazardous

Toxic Substances Control Act (TSCA) 12(b) Components:

None Known

OSHA Hazard Communication Standard (29CFR1910.1200) hazard class(es):

Acute health hazard, Chronic health hazard.

EPA SARA Title III section 302 (40CFR370) Extremely Hazardous Substances:

None Known

EPA SARA Title III section 313 (40 CFR 372) Toxic Chemicals above "de minimus" levels:

Dicyclohexylmethane-4,4'-Diisocyanate (CAS# 5124-30-1)

CALIFORNIA PROPOSTION 65: This product contains the following substance known to the State of California to cause cancer:

None Known

EUROPEAN REGULATIONS

Hazard symbol(s):

Xn **N**

EU Labeling Classification: Xn-Harmful; N- Hazardous for the Environment

Risk Phrases:
- R20: Harmful by inhalation.
- R36/37/38: Irritating to the eyes, respiratory system and skin.
- R42/43: May cause sensitization by inhalation and skin contact.
- R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Safety Phrases:
S23: Do not breathe vapor/gas/fumes/spray
S36/37: Wear suitable protective clothing and gloves.
S45: In case of accident or if you feel unwell, seek medical advice immediately (Show the label where possible)

EINECS Status: All components of this product are included in the European Inventory of Existing Chemical Substances (EINECS) in compliance with Council Directive 67/548/EEC and its amendments. CHIP3 Regulations have been applied and meets all requirements.

CANADA REGULATIONS

WHMIS Classification:
D2A - respiratory tract sensitizer
D2B - skin sensitizer
D2B - eye or skin irritant

WHMIS Symbol(s):

DSL: Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included on the Domestic Substances List.

16. OTHER INFORMATION

Abbreviations:

ACGIH: American Conference of Government Industrial Hygenists
PEL: Permissible Exposure Limit
TLV: Threshold Limit Value
TWA: Time-Weighted Average
LD50: Lethal Dose (50%)-The minimum dose required for lethal effects in 50% of a given population of test specimens.
LC50: Lethal Concentration (50%)- The minimum concentration required for lethal effects in 50% of a given population of test specimens
NIOSH: National Institute for Occupational Safety and Health
WHMIS: Workplace Hazardous Material Information System
DSL: Domestic Substances List
CAS: Chemical Abstracts Service

To the best of our knowledge, the information contained herein is accurate. Final determination of the suitability of any material is the sole responsibility of the users. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.