



Approval Date: 02/26/2009  
 Supersedes Date: N/A

# MATERIAL SAFETY DATA SHEET

## Section 1. Chemical Product and Company Identification

**Product Name:** *EcoSpray® 350C (Part A)*  
**Chemical Name:** Aromatic Isocyanate  
**Manufacturer:** TSE Industries, Inc.  
 5260 113<sup>th</sup> Avenue North  
 Clearwater, FL 33760  
 Tel: (727) 573-7676  
 Fax: (727) 572-0415

**Emergency Telephone Numbers:** INFOTRAC: Domestic, 1-800-535-5053  
 International, +1-352-323-3500

## Section 2. Composition/Information on Ingredients

Name	CASRN	Percent (By Weight)	Exposure Limits		Carcinogen  IARC/NTP /OSHA	Skin
			OSHA PEL TWA/STEL	ACGIH TLV TWA/STEL		
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	<23	0.02 ppm, 0.2 mg/m3 Ceiling	0.005 ppm, 0.051 mg/m3	No	Yes

## Section 3. Hazards Identification

**Emergency Overview**

**WARNING!** Color: Dark Brown Form: Viscous Liquid Odor: Musty  
 Toxic gases/fumes may be given off during burning or thermal decomposition. 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. Causes respiratory tract irritation. May cause allergic skin reaction. Skin sensitizer. Animal tests and other research indicate that skin contact with MDI can play a role in causing Isocyanate sensitization and respiratory reaction. Causes eye irritation. May cause lung damage.

The following ratings are subjective. They are provided as a quick hazard guide only. Read the entire MSDS before using the product.

### Hazard Rating System:

	Health	Flammability	Reactivity	Incompatibility	PPE
NFPA:	2	1	1	0	
HMIS:	2	1	1	0	

0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe, \* chronic health hazard

### Potential Health Effects, Signs, and Symptoms of Exposure:

**Primary Routes of Entry:** For solids and liquids include eye and skin contact, ingestion and inhalation. For gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

#### Medical Conditions

**Aggravated by Exposure:** Asthma, Respiratory disorders, Skin Allergies, Eczema

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

**Chronic Skin:** Prolonged vapor contact may cause conjunctivitis.

**Acute Skin:** Causes irritation with symptoms of reddening, itching and swelling. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove. Contact with MDI can cause discoloration.

**Chronic Skin:** Prolonged contact can cause reddening, swelling, rash, and in some cases skin sensitization. Animal tests and other research indicate that skin contact with MDI can play a role in causing isocyanate sensitization and respiratory reaction.

**Acute Inhalation:** Diisocyanate vapors may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Air-borne overexposure well above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed. Gastrointestinal symptoms include nausea, vomiting and abdominal pain.

**Chronic Inhalation:** As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. 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. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed

a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material, or even as a result of vapor-only exposure.

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

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

### **Carcinogenicity**

NO COCINOGENIC SUBSTANCES AS DEFINED BY IARC, NTP AND/OR OSHA.

## **Section 4. First Aid Measures**

**General Advice:** Remove contaminated clothing.

**If inhaled:** Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

**If on skin:** Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

**If in eyes:** In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

**If swallowed:** Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

**Hazards:** Symptoms can appear later.

**Antidote:** Specific antidotes or neutralizers to isocyanates do not exist.

**Treatment:** Treatment should be supportive and based on the judgment of the physician in response to the reaction of the patient.

## **Section 5. Fire Fighting Measures**

**Flash Point:** 221 °C (430°F) (Seta Closed Cup)

**Auto-Ignition Temperature:** No data available.

**UEL/LEL:** No data available

**Extinguishing Media:** Water, dry extinguishing media, carbon dioxide, foam

**Special Fire Fighting Procedures:** Nitrous gases, fumes/smoke, isocyanate, vapor

**Protective Equipment for Fire-fighting:** Firefighters should be equipped with self-contained breathing apparatus and turn-out gear

**Special Fire Fighting Procedures:** Firefighters should wear NFPA compliant 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 next use. During a fire, isocyanate vapors other irritating; highly toxic gases may be generated by thermal decomposition or combustion. Exposure to heated Diisocyanate can be extremely dangerous.

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

## Section 6. Accidental Release Measures

**Spill or Release Procedures:** Clear area. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment. Dike spillage. For small amounts: Absorb isocyanate with suitable absorbent material (see § 40 CFR, sections 260, 264 and 265 for further information). Shovel into open container. Do not make container pressure tight. Move container to a well-ventilated area (outside). Spill area can be decontaminated with the following recommended decontamination solution: Mixture of 90 % water, 8 % concentrated ammonia, 2 % detergent. Add at a 10 to 1 ratio. Allow to stand for at least 48 hours to allow escape of evolved carbon dioxide. For large amounts: If temporary control of isocyanate vapor is required, a blanket of protein foam or other suitable foam (available from most fire departments) may be placed over the spill. Transfer as much liquid as possible via pump or vacuum device into closed but not sealed containers for disposal. For residues: The following measures should be taken for final cleanup: Wash down spill area with decontamination solution. Allow solution to stand for at least 10 minutes.

Do not discharge into drains/surface waters/groundwater.

*TSE REQUIRES THAT INFOTRAC BE IMMEDIATELY NOTIFIED (1-800-535-5053) WHEN THIS PRODUCT IS UNINTENTIONALLY RELEASED FROM ITS CONTAINER DURING ITS COURSE OF DISTRIBUTION, REGARDLESS OF THE AMOUNT RELEASED. DISTRIBUTION INCLUDES TRANSPORTATION, STORAGE INCIDENTAL TO TRANSPORTATION, LOADING AND UNLOADING. SUCH NOTIFICATION MUST BE IMMEDIATE AND MADE BY THE PERSON HAVING KNOWLEDGE OF THE RELEASE.*

## Section 7. Handling and Storage

### Handling:

**General advice:** If bulging of drum occurs, transfer to well-ventilated area, puncture to relieve pressure, open vent and let stand for 48 hours before resealing.

**Protection against fire and explosion:** No explosion proofing necessary.

### Storage:

**General advice:** Formation of CO<sub>2</sub> and build up of pressure possible. Keep container tightly closed and in a well-ventilated place. Outage of containers should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture.

**Storage incompatibility:** General: Segregate from bases.

**Storage stability:** Storage temperature: 65 - 86 °F. Protect against moisture

**Storage Period:** 6 Months

## Section 8. Exposure Controls/Personal Protection

### Exposure Controls:

#### Components with workplace control parameters

#### 4, 4'- Diphenylmethane Diisocyanate (MDI)

US. ACGIH Threshold Limit Values:

Time Weighted Average (TWA): 0.005 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29CFR 1910.1000)

Ceiling Limit Value: 0.02ppm, 0.2 mg/m<sup>3</sup>

### Personal Protection:

**Respiratory protection:** For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use NIOSH-certified full face piece pressure demand self-contained breathing apparatus (SCBA) or a full face piece pressure demand supplied-air respirator (SAR) with escape provisions. When atmospheric levels may exceed the occupational exposure limit (PEL or TLV) NIOSH-certified air-purifying respirators equipped with an organic vapor sorbent and particulate filter can be used as long as appropriate precautions and change out schedules are in place.

**Hand protection:** Chemical resistant protective gloves, Suitable materials, chloroprene rubber (Neoprene), nitrile rubber (Buna N), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, Fluoroelastomer (Viton)

**Eye protection:** Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

**Skin and Body protection:** Avoid contact with the skin. Depending on the conditions of use, cover as much of the exposed skin area as possible with appropriate clothing to prevent skin contact. Animal tests and other research indicate that skin contact with MDI can play a role in causing isocyanate in sensitization and respiratory reaction. This data reinforces the need to prevent skin contact with isocyanates.

**General safety and hygiene measures:** Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

**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.

**General:** Local Exhaust should be used to maintain levels below the TLV whenever MDI is heated, sprayed, or aerosolized. Standard references sources regarding industrial ventilation (e.g. ACGIH Industrial Ventilation Manual) should be consulted for guidance about adequate ventilation. To ensure that published exposure limits have not been exceeded, monitoring for airborne Diisocyanate should become part of the overall employee exposure characterization program. NOISH and OSHA have developed sampling and analytical methods for measuring the airborne levels of Diisocyanate

## Section 9. Physical and Chemical Properties

**Form:** Liquid

**Color:** Dark brown to coffee

**Odor:** Musty

**pH:** Not Applicable

**Freezing Point:** < 0 °C (< 32 °F)

**Boiling Point/Range:** Approximately 208 °C (406.4 °F)

**Flash Point:** 221 °C (430°F) (Seta Closed Cup)

**Vapor Pressure:** <0.0001mmHg @ 25 °C (77 °F)

**Specific Gravity:** ~1.67 @ 25 °C (77 °F)

**Solubility in Water:** Insoluble – Reacts slowly with water to liberate CO<sub>2</sub> gas

**Viscosity:** ~8,000 cps @ 25 °C (77 °F)

**Bulk Density:** ~14.0 lb/ gal

## Section 10. Stability and Reactivity

**Chemical Stability:** The product is chemically stable.

**Incompatibility with Other Materials:** water, alcohols, strong bases, Substances/products that react with isocyanates. Reacts with water, with formation of carbon dioxide. Risk of bursting. Reacts with alcohols. Reacts with acids. Reacts with alkalies. Reacts with amines. Risk of exothermic reaction. Risk of violent reaction. Risk of polymerization. Contact with certain rubbers and plastics can cause brittleness of the substance/product with subsequent loss in strength.

**Hazardous Polymerization:** No data available

**Hazardous Decomposition Products:** Hazardous decomposition products: carbon monoxide, hydrogen cyanide, nitrogen oxides, aromatic isocyanates, gases/vapors. No data is available for Thermal Decomposition but it is believed to be higher than 260 °C

## Section 11. Toxicological Information

**Acute Oral Toxicity:** LD50: > 2,000 mg/kg (rat, Male/Female)

**Acute Inhalation:** LC50: 490 mg/m<sup>3</sup>, aerosol, 4h (rat)

**Skin Irritation:** Rabbit, slightly irritating

**Repeated Dose Toxicity:** 90 days, inhalation: NOAEL: 1 mg/m<sup>3</sup>, (rat, Male/Female, 6hs/day 5 days/week). Irritation to lungs and nasal cavity. 2years, inhalation: NOAEL: 0.2 mg/m<sup>3</sup>, (rat, Male/Female, 6hs/day 5 days/week) Irritation to lungs and nasal cavity.

**Mutagenicity:** Genetic Toxicity in Vitro: Bacterial – gene mutation assay: Negative salmonella typhimurium, Metabolic Activation: with/without)

**Carcinogenicity:** Rat, Male/Female, inhalation, 2 years, 6hs/day 5 days/week) Exposure to a level of 6mg/m<sup>3</sup> polymeric MDI was related to the occurrence of lung tumors. This level is significantly over the TLV for MDI.

**Developmental Toxicity/Teratogenicity:** Rat, female, inhalation, gestation days 6-15, 6 hrs.day, NOAEL (Teratogenicity): 12 mg/m<sup>3</sup>, NOAEL (maternal): 4 mg/m<sup>3</sup> No Teratogenic effects observed at doses tested. Fetotoxicity seen only with maternal toxicity.

### Toxicity Data for 4, 4'-Diphenylmethane Diisocyanate (MDI)

**Acute Inhalation:**

LC50: 369 mg/m<sup>3</sup>, 4hrs (rat, Male/Female)

LC50: 2240 mg/m<sup>3</sup>, aerosol, 1h (rat)

**Acute Dermal Toxicity:**

LD50: >10,000 mg/kg (rabbit)

**Carcinogenicity:**

Rat, female, inhalation 2 years, 17 hrs/day 5 day/week

NEGATIVE

## Section 12. Ecological Information

**Chemical Fate Information:****Biodegradation:**

0% Exposure time 28 Days

**Bioaccumulation:**

Rainbow Trout, Exposure time: 112d, < 1 BCF

Does Not Bioaccumulate.

**Acute and Prolonged Toxicity to Fish:**

LC0: > 1,000 mg/l (Zebra Fish (Brachydanio rerio), 96 hrs)

LC0: > 3,000 mg/l (Killifish (Oryzias latipes), 96 Hrs)

**Acute Toxicity to Aquatic Invertebrates:**

EC50: > 1,000 mg/l (Water Flea (Daphnia Magna), 24 Hrs)

**Toxicity to Aquatic Plants:**

NOEC: 1,640 mg/l, End Point: growth (Green Algae (Scenedesmus subspicatus), 72 Hrs)

**Ecological Data for 4, 4'-Diphenylmethane Diisocyanate (MDI)****Acute and Prolonged Toxicity to fish:**

LC50: > 500mg/l (Zebra Fish (Brachydanio rerio), 96 hrs)

**Acute Toxicity to Aquatic Invertebrates:**

EC50: > 500 mg/l (Water Flea (Daphnia Magna), 24 Hrs)

## Section 13. Disposal Considerations

As shipped, this material is not regulated. However, it is the responsibility of the generator to make a determination at the time of disposal whether the material meets any of the listing or characteristic properties of a hazardous waste. Dispose of in accordance with applicable local, state and federal laws. Incineration is the preferred method of disposal.

## Section 14. Transport Information

**Freight Classification:****Land Transport (DOT)**

**Proper Shipping Name:** Other regulated substances, Liquid, n.o.s. (contains 4, 4'-Diphenylmethane Diisocyanate (MDI))

**Hazard Class or Division:** 9

**UN/NA Number:** NA3082

**Packaging Group:** III

**Hazard Label(s):** Class 9

**RSPA/DOT Regulated Components:** 4, 4'- Diphenylmethane Diisocyanate (MDI)

**Reportable Quantity:** 11,111 lb

**Sea Transport (IMDG)**

Non-regulated

**Air Transport (ICAO/IATA)**

Non-regulated

**Additional Transportation Information:** When in individual containers of less than the Product RQ, this material ships as non-regulated.

## **Section 15. Regulatory Information**

**OSHA Hazcom Standard Rating:** Hazardous

**SARA 302 Components:** None.

**Section 311/312 Hazard Class:** Acute Health Hazard, Chronic Health Hazard

**Section 313 Components:**

Polymeric Diphenylmethane Diisocyanate (pMDI)

4, 4'- Diphenylmethane Diisocyanate (MDI)

**U.S. EPA CERCLA Hazardous Substances (40CFR 302):**

**Components**

4, 4'- Diphenylmethane Diisocyanate (MDI) Reportable quantity: 5,000 lbs

**US Toxic Substance Control Act:** All components of this material are listed on the TSCA Inventory.

**State Right-to-Know Information**

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

This Product contains a trace (ppm) amount of phenyl isocyanate (CAS# 103-71-9) and monochlorobenzene (CAS# 108-90-7) as impurities.

**Massachusetts, New Jersey or Pennsylvania Right-to-Know Substance Lists:**

<u>Weight %</u>	<u>Components</u>	<u>CAS-No.</u>
< 28	Polymeric Diphenylmethane	9016-87-9
< 23	4, 4'-Diphenylmethane Diisocyanate (MDI)	101-68-8
< 6	Diphenylmethane Diisocyanate (MDI)	26447-40-5
	Mixed Isomers	

**New Jersey Environmental Hazardous Substance List and/or New Jersey RTK Special Hazardous Substance Lists:**

<u>Weight %</u>	<u>Components</u>	<u>CAS-No.</u>
< 28	Polymeric Diphenylmethane	9016-87-9
< 23	4, 4'-Diphenylmethane Diisocyanate (MDI)	101-68-8

**California Prop. 65:** To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

## Section 16. Other Information

### Abbreviations:

ACGIH – American Conference of Governmental Industrial Hygienists  
CASRN – Chemical Abstracts Service Registry Number  
IARC – International Agency for Research on Cancer  
N/A – Not Applicable  
N/D – Not Determined  
N/E – Not Established  
NTP – National Toxicology Program  
OSHA – Occupational Safety & Health Administration  
PEL – Permissible Exposure Limit  
PPE – Personal Protective Equipment  
STEL – Short Term (15 min.) Exposure Limit  
STP – Standard Temperature and Pressure  
TLV – Threshold Limit Value  
TWA – Time Weighted Average (8 hr.)

**TSE Industries, Inc. makes no representations or warranties with respect to the information in this Material Safety Data Sheet. The information is, however, correct and up to date to the best of TSE's knowledge. This list of information is not intended to be all inclusive. Actual conditions of use and handling may require considerations of information other than or in addition to that, which is provided herein.**