



# Material Safety Data Sheet

The Dow Chemical Company

**Product Name:** STYROFOAM(TM) RS 2030 POLYOL

**Issue Date:** 09/21/2009  
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The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

## 1. Product and Company Identification

### Product Name

STYROFOAM(TM) RS 2030 POLYOL

### COMPANY IDENTIFICATION

The Dow Chemical Company  
2030 Willard H. Dow Center  
Midland, MI 48674  
USA

Customer Information Number: 800-258-2436

### EMERGENCY TELEPHONE NUMBER

**24-Hour Emergency Contact:** 989-636-4400  
**Local Emergency Contact:** 989-636-4400

## 2. Hazards Identification

### Emergency Overview

**Color:** Blue

**Physical State:** Liquid.

**Odor:** Amine.

### Hazards of product:

WARNING! Causes eye irritation. May be harmful if inhaled. Vapor reduces oxygen available for breathing. May cause anesthetic effects. May cause central nervous system effects; may cause respiratory tract irritation. Isolate area. Keep upwind of spill. Highly toxic to fish and/or other aquatic organisms.

### OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### Potential Health Effects

**Eye Contact:** May cause severe eye irritation. May cause corneal injury. Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously.

**Skin Contact:** Brief contact may cause slight skin irritation with local redness.

**Skin Absorption:** Prolonged skin contact is unlikely to result in absorption of harmful amounts. Massive contact with damaged skin or of material sufficiently hot to burn skin may result in absorption of potentially lethal amounts.

**Skin Sensitization:** For the minor component(s): Skin contact may cause an allergic skin reaction in a small proportion of individuals.

**Inhalation:** Prolonged excessive exposure may cause adverse effects. In confined or poorly ventilated areas, vapor can easily accumulate and can cause unconsciousness and death due to displacement of oxygen. May cause respiratory irritation and central nervous system depression. Excessive exposure may increase sensitivity to epinephrine and increase myocardial irritability (irregular heartbeats). Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.

**Ingestion:** Oral toxicity is expected to be moderate in humans due to diethylene glycol even though tests with animals show a lower degree of toxicity. Ingestion of quantities (approximately 65 mL (2 oz.) for diethylene glycol or 100 mL (3 oz.) for ethylene glycol) has caused death in humans. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. The data presented are for the following material: Diethylene glycol. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure.

**Effects of Repeated Exposure:** Contains a component which is reported to be a weak organophosphate-type cholinesterase inhibitor. Excessive exposure may produce organophosphate type cholinesterase inhibition. Signs and symptoms of excessive exposure may be headache, dizziness, incoordination, muscle twitching, tremors, nausea, abdominal cramps, diarrhea, sweating, pinpoint pupils, blurred vision, salivation, tearing, tightness in chest, excessive urination, convulsions. Contains component(s) which have been reported to cause effects on the following organs in humans: Gastrointestinal tract. Kidney. Contains component(s) which have been reported to cause effects on the following organs in animals: Liver. Central nervous system. Respiratory tract. Bladder. Heart.

**Cancer Information:** For the minor component(s): Findings from a chronic skin painting study by NTP include liver tumors in mice. Mechanistic studies indicate that tumor formation is of questionable relevance to humans.

**Birth Defects/Developmental Effects:** Diethylene glycol has caused toxicity to the fetus and some birth defects at maternally toxic, high doses in animals. Other animal studies have not reproduced birth defects even at much higher doses that caused severe maternal toxicity.

**Reproductive Effects:** Diethylene glycol did not interfere with reproduction in animal studies except at very high doses.

### 3. Composition Information

Component	CAS #	Amount
Phenol, polymer with formaldehyde , propylene oxide and ethylene oxide	25134-86-5	>= 10.0 - <= 30.0 %
1,1,1,3,3 - Pentafluoropropane	460-73-1	>= 10.0 - <= 30.0 %
Triethyl phosphate	78-40-0	>= 5.0 - <= 10.0 %
Diethylene glycol	111-46-6	>= 5.0 - <= 10.0 %
2-(2-Hydroxyethoxy)ethyl-2-hydroxypropyl-3,4,5,6-tetrabromo phthalate	20566-35-2	>= 3.0 - <= 7.0 %
Oxirane, 2-methyl-, polymer with oxirane, ether with 2,6-bis[[bis-(2-hydroxyethyl)amino]methyl]-4-branched nonylphenol	940912-28-7	>= 1.0 - <= 5.0 %
N,N-Dimethylcyclohexylamine	98-94-2	>= 1.0 - <= 5.0 %
Tris(dimethylamino)propyl amine	33329-35-0	>= 1.0 - <= 5.0 %
Amine	Trade Secret	>= 1.0 - <= 5.0 %

### 4. First-aid measures

**Eye Contact:** Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Eye wash fountain should be located in immediate work area.

**Skin Contact:** Immediately flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated leather items such as shoes, belts, and watchbands. Safety shower should be located in immediate work area.

**Inhalation:** Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

**Ingestion:** Do not induce vomiting. Seek medical attention immediately. If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tbsp.) for a 40 pound child or 36 ml for an 18 kg child].

**Notes to Physician:** Maintain adequate ventilation and oxygenation of the patient. If burn is present, treat as any thermal burn, after decontamination. Due to structural analogy and clinical data, this material may have a mechanism of intoxication similar to ethylene glycol. On that basis, treatment similar to ethylene glycol intoxication may be of benefit. In cases where several ounces (60 - 100 ml) have been ingested, consider the use of ethanol and hemodialysis in the treatment. Consult standard literature for details of treatment. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability". Do not administer sympathomimetic drugs such as epinephrine unless absolutely necessary. Exposure to amine vapors may cause minor transient edema of the corneal epithelium (glauropsia) with blurred vision, blue haze and halos around bright objects. Effects disappear in a few hours and temporarily reduce ability to drive vehicles. Cholinesterase inhibition has been noted in human exposure but is not of benefit in determining exposure and is not correlated with signs of exposure. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

**Emergency Personnel Protection:** First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

## 5. Fire Fighting Measures

**Extinguishing Media:** Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be

moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

**Special Protective Equipment for Firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

**Unusual Fire and Explosion Hazards:** Container may rupture from gas generation in a fire situation. Blowing agent vaporizes quickly at room temperature. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

**Hazardous Combustion Products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide. Hydrogen halides.

## 6. Accidental Release Measures

**Steps to be Taken if Material is Released or Spilled:** Contain spilled material if possible. Absorb with materials such as: Dirt. Sand. Sawdust. Collect in suitable and properly labeled containers. Wash the spill site with water. See Section 13, Disposal Considerations, for additional information.

**Personal Precautions:** Isolate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of confined or poorly ventilated areas. Keep upwind of spill. Spilled material may cause a slipping hazard. Ventilate area of leak or spill. Confined space entry procedures must be followed before entering the area. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental Precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

## 7. Handling and Storage

### Handling

**General Handling:** Avoid contact with eyes. Avoid breathing vapor. Do not enter confined spaces unless adequately ventilated. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. This material is hygroscopic in nature. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

**Other Precautions:** Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

### Storage

Protect from atmospheric moisture. Store in a dry place. Avoid prolonged exposure to heat and air. Avoid temperatures above 50°C (122°F) See Section 10 for more specific information.

**Storage Period:**  
3 Months

**Storage temperature:**  
15 - 32 °C

## 8. Exposure Controls / Personal Protection

### Exposure Limits

Component	List	Type	Value
1,1,1,3,3 - Pentafluoropropane	WEEL	TWA	1,644 mg/m <sup>3</sup> 300 ppm
Diethylene glycol	WEEL	TWA	10 mg/m <sup>3</sup>

<b>N,N-Dimethylcyclohexylamine</b>	Dow IHG	TWA	1 ppm	SKIN
<b>Bis-(N,N-dimethylaminoethyl)ether</b>	ACGIH	TWA	0.05 ppm	SKIN
	ACGIH	STEL	0.15 ppm	SKIN

A "skin" notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

### Personal Protection

**Eye/Face Protection:** Use chemical goggles. Eye wash fountain should be located in immediate work area. If exposure causes eye discomfort, use a full-face respirator.

**Skin Protection:** Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task. When handling hot material, protect skin from thermal burns as well as from skin absorption.

**Hand protection:** Use gloves chemically resistant to this material. Use gloves with insulation for thermal protection, when needed. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Styrene/butadiene rubber. Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl").  
NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

**Respiratory Protection:** Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. When respiratory protection is required, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.

**Ingestion:** Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

### Engineering Controls

**Ventilation:** Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only in enclosed systems or with local exhaust ventilation. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. Lethal concentrations may exist in areas with poor ventilation.

## 9. Physical and Chemical Properties

<b>Physical State</b>	Liquid.
<b>Color</b>	Blue
<b>Odor</b>	Amine.
<b>Odor Threshold</b>	No test data available
<b>Flash Point - Closed Cup</b>	100 °C (212 °F) <i>Calculated</i>
<b>Flammability (solid, gas)</b>	Not applicable to liquids
<b>Flammable Limits In Air</b>	<b>Lower:</b> No test data available <b>Upper:</b> No test data available
<b>Autoignition Temperature</b>	No test data available
<b>Vapor Pressure</b>	27.2 psi @ 32 °C <i>Measured</i>
<b>Boiling Point (760 mmHg)</b>	No test data available.
<b>Vapor Density (air = 1)</b>	No test data available

<b>Specific Gravity (H2O = 1)</b>	1.206 <i>ASTM D891</i>
<b>Freezing Point</b>	No test data available
<b>Melting Point</b>	Not applicable to liquids
<b>Solubility in water (by weight)</b>	No test data available
<b>pH</b>	No test data available
<b>Decomposition Temperature</b>	No test data available
<b>Partition coefficient, n-octanol/water (log Pow)</b>	No data available for this product. See Section 12 for individual component data.
<b>Evaporation Rate (Butyl Acetate = 1)</b>	No test data available
<b>Kinematic Viscosity</b>	375 cSt @ 25 °C <i>ASTM D4878</i>

## 10. Stability and Reactivity

### Stability/Instability

Stable under recommended storage conditions. See Storage, Section 7.

**Conditions to Avoid:** Product can oxidize at elevated temperatures. Elevated temperatures can cause pressure buildup in closed containers due to the release of blowing agents. Generation of gas during decomposition can cause pressure in closed systems.

**Incompatible Materials:** Avoid contact with oxidizing materials. Avoid contact with: Strong acids. Strong bases. Avoid contact with metals such as: Brass. Zinc. Copper. Avoid unintended contact with isocyanates. The reaction of polyols and isocyanates generates heat.

### Hazardous Polymerization

Will not occur by itself.

### Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Carbon dioxide. Alcohols. Ethers. Hydrocarbons. Hydrogen halides. Ketones. Polymer fragments.

## 11. Toxicological Information

### Acute Toxicity

#### Ingestion

Single dose oral LD50 has not been determined.

The data presented are for the following material: Diethylene glycol. Estimated. Lethal Dose, Human, adult 2 Ounces

#### Skin Absorption

The dermal LD50 has not been determined.

### Sensitization

#### Skin

For the minor component(s): Skin contact may cause an allergic skin reaction in a small proportion of individuals.

### Repeated Dose Toxicity

Contains a component which is reported to be a weak organophosphate-type cholinesterase inhibitor. Excessive exposure may produce organophosphate type cholinesterase inhibition. Signs and symptoms of excessive exposure may be headache, dizziness, incoordination, muscle twitching, tremors, nausea, abdominal cramps, diarrhea, sweating, pinpoint pupils, blurred vision, salivation, tearing, tightness in chest, excessive urination, convulsions. Contains component(s) which have been reported to cause effects on the following organs in humans: Gastrointestinal tract. Kidney. Contains component(s) which have been reported to cause effects on the following organs in animals: Liver. Central nervous system. Respiratory tract. Bladder. Heart.

**Chronic Toxicity and Carcinogenicity**

For the minor component(s): Findings from a chronic skin painting study by NTP include liver tumors in mice. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. Diethylene glycol has been tested for carcinogenicity in animal studies and is not believed to pose a carcinogenic risk to man.

**Developmental Toxicity**

Diethylene glycol has caused toxicity to the fetus and some birth defects at maternally toxic, high doses in animals. Other animal studies have not reproduced birth defects even at much higher doses that caused severe maternal toxicity.

**Reproductive Toxicity**

Diethylene glycol did not interfere with reproduction in animal studies except at very high doses.

**Genetic Toxicology**

For the component(s) tested: In vitro genetic toxicity studies were predominantly negative.

## 12. Ecological Information

**ENVIRONMENTAL FATE**

Data for Component: **Phenol, polymer with formaldehyde , propylene oxide and ethylene oxide**

**Movement & Partitioning**

No bioconcentration is expected because of the relatively high molecular weight (MW greater than 1000).

**Persistence and Degradability**

Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

**OECD Biodegradation Tests:**

Biodegradation	Exposure Time	Method
16 %	28 d	OECD 301B Test

Data for Component: **1,1,1,3,3 - Pentafluoropropane**

**Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is medium (Koc between 150 and 500).

**Henry's Law Constant (H):** 6.89E-02 atm\*m3/mole; 25 °C Estimated.

**Partition coefficient, n-octanol/water (log Pow):** 1.35 Measured

**Partition coefficient, soil organic carbon/water (Koc):** 280 Estimated.

**Persistence and Degradability**

Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
2.97E-14 cm3/s	360 d	Estimated.

**OECD Biodegradation Tests:**

Biodegradation	Exposure Time	Method
8 %	28 d	OECD 301D Test

**Theoretical Oxygen Demand:** 0.60 mg/mg

Data for Component: **Triethyl phosphate**

**Movement & Partitioning**

Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

**Henry's Law Constant (H):** 3.60E-08 atm\*m3/mole; 25 °C Measured

**Partition coefficient, n-octanol/water (log Pow):** 0.80 Measured

**Partition coefficient, soil organic carbon/water (Koc):** 48 Estimated.

**Persistence and Degradability**

Biodegradation under aerobic laboratory conditions is below detectable limits (BOD20 or BOD28/ThOD < 2.5%).

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
5.794E-11 cm <sup>3</sup> /s	0.18 d	Estimated.

**Biological oxygen demand (BOD):**

BOD 5	BOD 10	BOD 20	BOD 28
0 %			

**Theoretical Oxygen Demand:** 1.58 mg/mg

Data for Component: Diethylene glycol

**Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

**Henry's Law Constant (H):** 7.96E-10 atm\*m<sup>3</sup>/mole; 25 °C Estimated.

**Partition coefficient, n-octanol/water (log Pow):** -1.47 Estimated.

**Partition coefficient, soil organic carbon/water (Koc):** < 1 Estimated.

**Persistence and Degradability**

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
2.23E-11 cm <sup>3</sup> /s	5.7 h	Estimated.

**OECD Biodegradation Tests:**

Biodegradation	Exposure Time	Method
92 %	28 d	OECD 301C Test
82 - 98 %	28 d	OECD 302C Test

**Theoretical Oxygen Demand:** 1.51 mg/mg

Data for Component: 2-(2-Hydroxyethoxy)ethyl-2-hydroxypropyl-3,4,5,6-tetrabromo phthalate

**Movement & Partitioning**

Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

**Henry's Law Constant (H):** 2.74E-16 atm\*m<sup>3</sup>/mole; 25 °C Estimated.

**Partition coefficient, n-octanol/water (log Pow):** 3.83 Estimated.

**Partition coefficient, soil organic carbon/water (Koc):** 10 Estimated.

**Bioconcentration Factor (BCF):** 39; Estimated.

**Persistence and Degradability**

No relevant information found.

**Theoretical Oxygen Demand:** 0.74 mg/mg

Data for Component: Oxirane, 2-methyl-, polymer with oxirane, ether with 2,6-bis[[bis-(2-hydroxyethyl)amino]methyl]-4-branched nonylphenol

**Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Expected to be relatively immobile in soil (Koc > 5000).

**Partition coefficient, n-octanol/water (log Pow):** 0.2 Measured

**Persistence and Degradability**

No relevant information found.

Data for Component: N,N-Dimethylcyclohexylamine

**Movement & Partitioning**

Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is high (Koc between 50 and 150).



**Henry's Law Constant (H):** 2.35E-05 atm\*m3/mole; 25 °C Measured  
**Partition coefficient, n-octanol/water (log Pow):** 2.31 Estimated.  
**Partition coefficient, soil organic carbon/water (Koc):** 70 Estimated.

#### Persistence and Degradability

Biodegradation under aerobic static laboratory conditions is low (BOD20 or BOD28/ThOD between 2.5 and 10%). Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

#### Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.0289E-10 cm3/s	0.104 d	Estimated.

#### OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
88 %	24 d	OECD 302B Test

#### Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
4.7 %	5 %	5.3 %	8.2 %

**Theoretical Oxygen Demand:** 3.40 mg/mg

Data for Component: Tris(dimethylamino)propyl amine

#### Movement & Partitioning

Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Expected to be relatively immobile in soil (Koc > 5000). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

**Henry's Law Constant (H):** 3.01E-14 atm\*m3/mole Estimated.

**Partition coefficient, n-octanol/water (log Pow):** 0.6 Estimated.

**Partition coefficient, soil organic carbon/water (Koc):** > 5,000 Estimated.

#### Persistence and Degradability

Material is not readily biodegradable according to OECD/EC guidelines.

#### Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
3.40E-10 cm3/s	0.031 d	Estimated.

**Theoretical Oxygen Demand:** 3.41 mg/mg

## ECOTOXICITY

Data for Component: Phenol, polymer with formaldehyde, propylene oxide and ethylene oxide

Material is slightly toxic to fish on an acute basis (LC50 between 10 and 100 mg/L).

#### Fish Acute & Prolonged Toxicity

LC50, zebra fish (Brachydanio rerio), static, 96 h: 57.1 mg/l

#### Toxicity to Micro-organisms

EC50, OECD 209 Test; activated sludge, respiration inhibition, 30 min: > 200 mg/l

Data for Component: 1,1,1,3,3 - Pentafluoropropane

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

#### Fish Acute & Prolonged Toxicity

LC50, rainbow trout (Oncorhynchus mykiss), static renewal, 96 h: > 100 mg/l

#### Aquatic Invertebrate Acute Toxicity

EC50, water flea Daphnia magna, static, 48 h, immobilization: > 100 mg/l

Data for Component: Triethyl phosphate

Material is practically non-toxic to fish on an acute basis (LC50 > 100 mg/L).

#### Fish Acute & Prolonged Toxicity

LC50, Japanese medaka (Oryzias latipes), static, 48 h: > 500 mg/l

Data for Component: Diethylene glycol

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**

LC50, rainbow trout (*Oncorhynchus mykiss*), 96 h: > 1,000 mg/l

**Aquatic Invertebrate Acute Toxicity**

EC50, water flea *Daphnia magna*, 48 h, immobilization: 48,900 mg/l

**Aquatic Plant Toxicity**

EC50, green alga *Pseudokirchneriella subcapitata* (formerly known as *Selenastrum capricornutum*), biomass growth inhibition, 7 d: > 100 mg/l

**Toxicity to Micro-organisms**

IC50, OECD 209 Test; activated sludge, respiration inhibition, 3 h: > 1,000 mg/l

Data for Component: **2-(2-Hydroxyethoxy)ethyl-2-hydroxypropyl-3,4,5,6-tetrabromo phthalate**

Material is slightly toxic to fish on an acute basis (LC50 between 10 and 100 mg/L).

**Fish Acute & Prolonged Toxicity**

LC50, bluegill (*Lepomis macrochirus*), 96 h: 12 mg/l

Data for Component: **Oxirane, 2-methyl-, polymer with oxirane, ether with 2,6-bis[[bis-(2-hydroxyethyl)amino]methyl]-4-branched nonylphenol**

Based on information for a similar material: Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Data for Component: **N,N-Dimethylcyclohexylamine**

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in the most sensitive species).

**Fish Acute & Prolonged Toxicity**

LC50, rainbow trout (*Oncorhynchus mykiss*), static, 96 h: 28.1 mg/l

**Aquatic Invertebrate Acute Toxicity**

LC50, water flea *Daphnia magna*, static, 48 h: 75 mg/l

**Aquatic Plant Toxicity**

EC50, alga *Scenedesmus* sp., biomass growth inhibition, 96 h: 0.0885 mg/l

Data for Component: **Tris(dimethylamino)propyl amine**

Material is practically non-toxic to fish on an acute basis (LC50 > 100 mg/L).

**Fish Acute & Prolonged Toxicity**

LC50, Japanese medaka (*Oryzias latipes*), 48 h: 430 mg/l

## 13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device. For additional information, refer to: Handling & Storage Information, MSDS Section 7 Stability & Reactivity Information, MSDS Section 10 Regulatory Information, MSDS Section 15

## 14. Transport Information

**DOT Non-Bulk**

NOT REGULATED

**DOT Bulk**

NOT REGULATED

**IMDG**

NOT REGULATED

**ICAO/IATA**

NOT REGULATED

*This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.*

<b>15. Regulatory Information</b>
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**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312**

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

**Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313**

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

**Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:**

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Diethylene glycol	111-46-6	>= 5.0 - <= 10.0 %
Amine	Trade Secret	>= 1.0 - <= 5.0 %

**Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:**

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

**California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)**

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

**US. Toxic Substances Control Act**

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

**CEPA - Domestic Substances List (DSL)**

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

## 16. Other Information

### Product Literature

Additional information on this product may be obtained by calling your sales or customer service contact.

### Recommended Uses and Restrictions

Component(s) for the manufacture of urethane polymers. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

### Revision

Identification Number: 1038793 / 0000 / Issue Date 09/21/2009 / Version: 2.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

### Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

*The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.*