2011 Emissions Report

Permit No. 1050192-010-AC
Carpenter Co.
5150 Frontage Rd South
Lakeland, Florida 33815

Permit Limits

The maximum total VOC emissions and maximum hazardous air pollutant (HAP) emissions from both facilities combined shall not exceed the following:

Emission Unit #1 (EPS): 471 tons VOC per any consecutive 12 month period, maximum
Emission Unit #2 (Urethane): 25 tons VOC per any consecutive 12 month period, maximum
TOTAL: 496 tons VOC (does not include the 5 tons from trivial/insignificant activities)

Combined total HAPs from both facilities shall not exceed 2.5 tons per any consecutive 12 month period.

Prime Pour - 2,4 TDI emissions are to be under 1,000 lbs./yr.
Bonded Foam - 2,4 TDI emissions are to be under 1,000 lbs./yr.

	Prime TDI		Rebond TDI/MDI		Amines/Flush	EU #1*	EU #2**	Total HAPs***	Trivial VOC
	2,4- (HAP)	Total (VOC)	HAP	Total (VOC)	VOC	VOC	VOC	Total	Total
	lbs	lbs	lbs	lbs	lbs	tons	tons	tons	tons
January 2011	2.51	21.03	68.30	68.30	272.14	10.067	0.18	0.0354	0.00
February 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
March 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
April 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
May 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
June 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
July 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
August 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
September 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
October 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
November 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
December 2011	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00
YTD Totals	2.51	21.03	68.30	68.30	272.14	10.067	0.18	0.0354	0.00
Rolling 12-Month Total	27	NA	205.89	NA	NA	89.57	0.94	0.29	3.81746
Permit Limits	1,000		1,000			471	25	2.5	5

***EU #1 VOCs = EPS Pentane**
****EU #2 VOCs = Prime Total TDI + Rebond Total TDI + Rebond MDI + Prime Amines + Prime Glycol Ether Flush**
*****HAPs = Prime 2,4 TDI + Rebond 2,4 TDI + Rebond MDI + Trivial HAP Emm**

2010 Emissions Report

Permit No. 1050192-010-AC
Carpenter Co.
5150 Frontage Rd South
Lakeland, Florida 33815

Permit Limits

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TOTAL: 496 tons VOC (does not include the 5 tons from trivial/insignificant activities)

Combined total HAPs from both facilities shall not exceed 2.5 tons per any consecutive 12 month period.

Prime Pour - 2,4 TDI emissions are to be under 1,000 lbs./yr.
Bonded Foam - 2,4 TDI emissions are to be under 1,000 lbs./yr.

	Prime TDI		Rebond TDI/MDI		Amines/Flush	EU #1*	EU #2**	Total HAPs***	Trivial VOC
	2,4-(HAP)	Total (VOC)	HAP	Total (VOC)	VOC	VOC	VOC	Total	Total
	lbs	lbs	lbs	lbs	lbs	tons	tons	tons	tons
January 2010	1.95	16.35	9.66	23.46	20.27	7.244	0.03	0.0328	0.47
February 2010	1.99	16.71	15.42	37.45	838.41	8.857	0.45	0.0209	0.12
March 2010	2.74	22.93	16.81	40.82	-269.87	8.650	-0.10	0.0232	0.08
April 2010	2.17	18.19	14.84	36.02	167.51	9.765	0.11	0.0143	0.04
May 2010	2.39	19.98	13.88	33.71	298.63	7.378	0.18	0.0206	0.07
June 2010	2.36	19.78	18.14	44.04	323.37	9.242	0.19	0.0219	0.08
July 2010	2.21	18.50	15.15	36.79	1090.73	10.198	0.57	0.0274	0.33
August 2010	2.61	21.87	13.44	32.62	393.14	11.234	0.22	0.0228	0.05
September 2010	2.58	21.59	13.11	31.84	382.07	8.096	0.22	0.0191	0.03
October 2010	1.83	15.31	40.75	40.75	1102.65	8.942	0.58	0.0384	0.40
November 2010	1.89	15.86	37.14	37.14	227.07	10.183	0.14	0.0331	0.34
December 2010	2.06	17.28	35.04	35.04	349.92	9.631	0.20	0.0186	0.00
YTD Totals	26.79	224.35	243.38	429.68	4923.92	109.420	2.79	0.2929	2.02
Rolling 12-Month Total	27	NA	243.38	NA	NA	109.42	2.79	0.29	2.01583
Permit Limits	1,000		1,000			471	25	2.5	5

***EU #1 VOCs = EPS Pentane**
****EU #2 VOCs = Prime Total TDI + Rebond Total TDI + Rebond MDI + Prime Amines + Prime Glycol Ether Flush**
*****HAPs = Prime 2,4 TDI + Rebond 2,4 TDI + Rebond MDI + Trivial HAP Emm**

2009 Emissions Report

Permit No. 1050192-007-AV
Carpenter Co.
5150 Frontage Rd South
Lakeland, Florida 33815

Permit Limits

The maximum total VOC emissions and maximum hazardous air pollutant (HAP) emissions from both facilities combined shall not exceed the following:

Emission Unit #1 (EPS): 471 tons VOC per any consecutive 12 month period, maximum
Emission Unit #2 (Urethane): 25 tons VOC per any consecutive 12 month period, maximum
TOTAL: 496 tons VOC (does not include the 5 tons from trivial/insignificant activities)

Combined total HAPs from both facilities shall not exceed 2.5 tons per any consecutive 12 month period.

Prime Pour - 2,4 TDI emissions are to be under 1,000 lbs./yr.
Bonded Foam - 2,4 TDI emissions are to be under 1,000 lbs./yr.

	Prime TDI		Rebond TDI/MDI		Amines/Flush	EU #1*	EU #2**	Total HAPs***	Trivial VOC
	2,4-(HAP)	Total (VOC)	HAP	Total (VOC)	VOC	VOC	VOC	Total	Total
	lbs	lbs	lbs	lbs	lbs	tons	tons	tons	tons
January 2009	2.24	18.78	12.69	27.39	419.15	9.216	0.23	0.0218	0.47
February 2009	2.07	17.36	11.22	27.24	8.50	9.055	0.03	0.0265	0.08
March 2009	2.45	20.50	11.63	28.24	8.37	9.031	0.03	0.0206	0.09
April 2009	2.39	20.00	12.35	29.98	850.93	8.909	0.45	0.0311	0.59
May 2009	2.04	17.07	13.11	31.84	0.00	6.367	0.02	0.0402	0.11
June 2009	2.41	20.22	13.93	33.82	437.90	8.355	0.25	0.0493	0.33
July 2009	1.95	16.34	10.51	25.51	8.85	6.191	0.03	0.0252	0.89
August 2009	2.42	20.26	11.61	28.18	42.31	6.602	0.05	0.0176	0.10
September 2009	2.09	17.50	11.55	28.04	-406.05	6.922	-0.18	0.0126	0.43
October 2009	1.90	15.90	12.10	29.37	12.23	5.771	0.03	0.0109	0.76
November 2009	2.00	16.78	15.14	36.76	8.15	5.461	0.03	0.0112	0.05
December 2009	2.51	21.03	14.45	35.09	4.14	6.837	0.03	0.0112	0.38
YTD Totals	26.48	221.73	150.28	361.45	1394.49	88.717	0.99	0.2782	4.28
Rolling 12-Month Total	26	NA	150.28	NA	NA	88.72	0.99	0.28	4.28401
Permit Limits	1,000		1,000			471	25	2.5	5

***EU #1 VOCs = EPS Pentane**
****EU #2 VOCs = Prime Total TDI + Rebond Total TDI + Rebond MDI + Prime Amines + Prime Glycol Ether Flush**
*****HAPs = Prime 2,4 TDI + Rebond 2,4 TDI + Rebond MDI + Trivial HAP Emm**

Carpenter Co.
Lakeland, FL
Facility ID No. 1050192
Emission Unit 003

2010 CaCO3 Usage

Month	Truck Unloads	CaCO3 Transferred to Silo (lbs)	CaCO3 Transfer Time (minutes)	CaCO3 Transfer Time (hours)
January 2009	0	0	0	0.00
February 2009	0	0	0	0.00
March 2009	0	0	0	0.00
April 2009	0	0	0	0.00
May 2009	0	0	0	0.00
June 2009	0	0	0	0.00
July 2009	0	0	0	0.00
August 2009	0	0	0	0.00
September 2009	0	0	0	0.00
October 2009	0	0	0	0.00
November 2009	0	0	0	0.00
December 2009	0	0	0	0.00
January 2010	0	0	0	0.00
February 2010	1	45840	96	1.60
March 2010	0	0	0	0.00
April 2010	0	0	0	0.00
May 2010	0	0	0	0.0000
June 2010	0	0	0	0.0000
July 2010	0	0	0	0.0000
August 2010	0	0	0	0.0000
September 2010	0	0	0	0.0000
October 2010	0	0	0	0.0000
November 2010	0	0	0	0.0000
December 2010	0	0	0	0.0000

YTD 2010 Total	**1**	**45840**	**96**	**1.6**
12 Month Period Total	**1**	**45840**	**96**	**1.6**

Emissions Factors

Prime TDI Factors from Riverside 10/99 Stack Test

2,4 TDI = 6.25 lbs emitted/1,000,000 lbs TDI pumped
Total TDI = 52.34 lbs emitted/1,000,000 lbs TDI pumped

Prime Amines

As a conservative estimate, it is assumed that 95% of all fugitive amine catalysts are emitted from the foam mass
5% Emitted during Production
90% Emitted during Cure Time in Slab Room
JC-283, Dabco NE-330, and DMEA catalysts are considered non-fugitive amines, and emissions are 0.

Rebond TDI Factors from Richmond 12/94 Stack Test

2,4 TDI = 74.3 lbs emitted/1,000,000 lbs Binder Used (Assuming Binder = 50% TDI)
2,4 TDI = 148.6 lbs emitted/1,000,000 lbs TDI
Total TDI = 180.4 lbs emitted/1,000,000 lbs Binder Used (Assuming Binder = 50% TDI)
Total TDI = 360.8 lbs emitted/1,000,000 lbs TDI

Rebond MDI Factors: Total Rebond TDI factors are used for MDI

EPS Pentane: Block Mold and Shape Mold

Each batch of beads has a % Pentane concentration from the manufacturer. The "Adjusted Nominal" % Pentane is 91% of the Manufacturer Analysis due to Pentane loss in transit.
Block Mold (IDRO): The Block Mold retains 24% of the Adjusted Pentane %
Shape Mold: The Shape Mold retains 15% of the Adjusted Pentane %

EF Note 1: Until January 2008, Rebond TDI factors were used as a Worst Case scenario for Prime Emissions. Due to high emissions with that calculation, the Prime EF submitted during permitting will be used effective 1/1/08.

EF Note 2: Until January 2008, the Rebond TDI Emission Factors were mistakenly interpreted as xx.xx lbs TDI emm/1,000,000 TDI pumped as opposed to xx.xx lbs TDI emm/1,000,000 lbs Binder Pumped. The calculation was corrected effective 1/1/08.

Emissions Report Footnotes

1. EU1 VOCs = EPS Pentane
2. EU2 VOCs = Prime Total TDI + Rebond Total TDI + Rebond MDI + Prime Amines + Prime Glycol Ether Flush
3. HAPs = Prime 2,4 TDI + Rebond 2,4 TDI + Rebond MDI + Trivial HAP Emissions
4. Marsh Printer Ink and Solvent are Recorded through Purchase Records

5. "Krylon Spray Colors" each have different HAP concentrations, but the highest % of each is assumed for ease of recordkeeping

MATERIAL SAFETY DATA SHEET

Bayer MaterialScience

Bayer MaterialScience LLC
Product Safety & Regulatory Affairs
100 Bayer Road
Pittsburgh, PA 15205-9741
USA

TRANSPORTATION EMERGENCY

CALL CHEMTREC:	(800) 424-9300
INTERNATIONAL:	(703) 527-3887

NON-TRANSPORTATION

Emergency Phone:	Call Chemtrec
Information Phone:	(800) 662-2927

1. Product and Company Identification

Product Name:	MONDUR TD 80 GRADE A
Material Number:	1677199
Chemical Family:	Aromatic Isocyanate
Chemical Name:	Toluene Diisocyanate (TDI)

2. Hazards Identification

Emergency Overview

Danger Color: Colorless to light yellow **Form:** liquid **Odor:** pungent, strong.
Toxic. Toxic gases/fumes may be given off during burning or thermal decomposition. Closed container may forcibly rupture under extreme heat or when contents have been 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 reaction. Harmful if inhaled. Respiratory sensitizer. Lung damage and respiratory sensitization may be permanent. Causes skin irritation. May cause allergic skin reaction. Skin sensitizer. Animal tests and other research indicate that skin contact with TDI can play a role in causing isocyanate sensitization and respiratory reaction. Causes eye irritation. May cause lung damage.

Potential Health Effects

Primary Routes of Entry:	Inhalation, Skin Contact, Eye Contact
Medical Conditions Aggravated by Exposure:	Asthma, Respiratory disorders, Skin Allergies, Eczema

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Inhalation
Acute Inhalation
For Product: MONDUR TD 80 GRADE A
Diisocyanate vapors or mist at concentrations above the TLV or PEL can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV or PEL

with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the TLV or PEL may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g., fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

Chronic Inhalation
For Product: MONDUR TD 80 GRADE A
As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to diisocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to diisocyanates at levels well below the TLV or PEL. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Sensitization can be permanent. Chronic overexposure to diisocyanates has also been reported to cause lung damage (including fibrosis, decrease in lung function) that may be permanent.

Skin
Acute Skin
For Product: MONDUR TD 80 GRADE A
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.

Chronic Skin
For Product: MONDUR TD 80 GRADE A
Prolonged contact can cause reddening, swelling, rash, and, in some cases, skin sensitization. Animal tests and other research indicate that skin contact with TDI can play a role in causing isocyanate sensitization and respiratory reaction.

Eye
Acute Eye
For Product: MONDUR TD 80 GRADE A
Causes irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor may cause irritation with symptoms of burning and tearing.

Chronic Eye
For Product: MONDUR TD 80 GRADE A
Prolonged vapor contact may cause conjunctivitis.

Ingestion
Acute Ingestion
For Product: MONDUR TD 80 GRADE A
May cause irritation; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.

Carcinogenicity:
NTP and IARC evaluated TDI as a mixture of the 2,4 and 2,6 isomers.

2,4-Toluene Diisocyanate	**NTP** - Hazard Designation: Anticipated carcinogen. **IARC** - Overall evaluation: 2B Possibly carcinogenic to humans.
2,6-Toluene Diisocyanate	**NTP** - Hazard Designation: Anticipated carcinogen. **IARC** - Overall evaluation: 2B Possibly carcinogenic to humans.

3. Composition/Information on Ingredients

Hazardous components
The 2,4-TDI (CAS# 584-84-9) and the 2,6-TDI (CAS# 91-08-7) isomer mixture is known as Toluene Diisocyanate (CAS# 26471-62-5). For Regulatory and State Right to Know information on this product CAS# 26471-62-5 and its isomers 2,4-TDI and 2,6-TDI please refer to regulatory information section of this MSDS.

Weight percent	Components	CAS-No.
60 - 100%	2,4-Toluene Diisocyanate	584-84-9
15 - 25%	2,6-Toluene Diisocyanate	91-08-7

4. First aid measures

Eye contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Then remove contact lenses, if easily removable, and continue eye irrigation for not less than 15 minutes. Get medical attention.

Skin contact
Immediately remove contaminated clothing and shoes. Wash off with soap and water. Use lukewarm water if possible. Wash contaminated clothing before re-use. For severe exposures, immediately get under safety shower and begin rinsing. Get medical attention if irritation develops.

Inhalation
Move to an area free from further exposure. Get medical attention immediately. Administer oxygen or artificial respiration as needed. Asthmatic symptoms may develop and may be immediate or delayed up to several hours. Extreme asthmatic reactions can be life threatening.

Ingestion
Do NOT induce vomiting. Wash mouth out with water. Do not give anything by mouth to an unconscious person. Get medical attention.

Notes to physician
Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This compound is a skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the compound. Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

5. Fire-fighting measures

Suitable extinguishing media: Dry chemical, Carbon dioxide (CO2), Foam, water spray for large fires.

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

Exposure to heated diisocyanate can be extremely dangerous.

Unusual Fire/Explosion Hazards
Closed container may forcibly rupture under extreme heat or when contents are contaminated with water (CO_2 formed). 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 reaction between water and hot diisocyanate can be vigorous.

6. Accidental release measures

Spill and Leak Procedures
Evacuate non-emergency personnel. Isolate the area and prevent access. Remove ignition sources. Notify management. Put on protective equipment. Control source of the leak. Ventilate. Contain the spill to prevent spread into drains, sewers, water supplies, or soil. Call Bayer at 412-923-1800 for assistance and advice. Major Spill or Leak (Standing liquid): To minimize vapor, cover the spillage with fire fighting foam (AFFF). Released material may be pumped into closed, but not sealed, metal container for disposal. Process can generate heat. Minor Spill or Leak (Wet surface): Cover spill area with suitable absorbent material (Kitty Litter, Oil-Dri®, etc). Saturate absorbent material with neutralization solution and mix. Wait 15 minutes. Collect material in open-head metal containers. Repeat applications of decontamination solution, with scrubbing, followed by absorbent until the surface is decontaminated. Check for residual surface contamination. Swype® test kits have been used for this purpose. Apply lid loosely and allow containers to vent for 72 hours to let carbon dioxide (CO_2) escape.

Additional Spill Procedures/Neutralization
Neutralization solutions:
(1) Colorimetric Laboratories Inc. (CLI) decontamination solution.
(2) A mixture of 75% water, 20% non-ionic surfactant (e.g. Plurafac SL-62, Tergitol TMN-10) and 5% n-propanol.
(3) A mixture of 80% water, 20% non-ionic surfactant (e.g. Plurafac SL-62, Tergitol TMN-10).
(4) A mixture of 90% water, 3-8% ammonium hydroxide or concentrated ammonia, and 2% liquid detergent.

Bayer requires that CHEMTREC be immediately notified (800-424-9300) 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.

7. Handling and storage

Storage temperature:

minimum:	21 °C (69.8 °F)
maximum:	43 °C (109.4 °F)

Storage period
12 Months

Handling/Storage Precautions
Do not breathe vapors, mists, or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear

appropriate eye and skin protection. Wash thoroughly after handling. Do not breathe smoke and gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected.

Further Info on Storage Conditions
Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard 29 CFR 1910.1200.

8. Exposure controls/personal protection

The sum of the 2,4 and 2,6 isomer concentration should not exceed the guideline limits.

2,4-Toluene Diisocyanate (584-84-9)
US. ACGIH Threshold Limit Values
Time Weighted Average (TWA): 0.005 ppm
US. ACGIH Threshold Limit Values
Short Term Exposure Limit (STEL): 0.02 ppm
US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Ceiling Limit Value: 0.02 ppm, 0.14 mg/m3
US. ACGIH Threshold Limit Values
Hazard Designation: Sensitiser.
US. ACGIH Threshold Limit Values
Hazard Designation: Group A4 Not classifiable as a human carcinogen.

2,6-Toluene Diisocyanate (91-08-7)
US. ACGIH Threshold Limit Values
Time Weighted Average (TWA): 0.005 ppm
US. ACGIH Threshold Limit Values
Short Term Exposure Limit (STEL): 0.02 ppm
US. ACGIH Threshold Limit Values
Hazard Designation: Sensitiser.
US. ACGIH Threshold Limit Values
Hazard Designation: Group A4 Not classifiable as a human carcinogen.

Industrial Hygiene/Ventilation Measures
Local exhaust should be used to maintain levels below the TLV and PEL whenever diisocyanate is handled, processed, or spray-applied. At normal room temperatures (70 F) TDI levels quickly exceed the TLV or PEL unless properly ventilated. Standard reference 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. NIOSH, OSHA, Bayer, and others have developed sampling and analytical methods. Bayer methods can be made available, upon request.

Respiratory protection
At normal room temperatures, airborne TDI can exceed the ACGIH TLV-TWA; therefore, in inadequately ventilated environments, respiratory protection must be worn. The type of respiratory protection selected must comply with the requirements set forth in OSHA's Respiratory Protection Standard (29 CFR 1910.134). The type of respiratory protection available includes (1) an atmosphere-supplying respirator such as a self-contained breathing apparatus (SCBA) or a supplied air respirator (SAR) in the positive pressure or continuous flow mode, or (2) an air-purifying respirator (APR). If an APR is selected then (a) the cartridge must be equipped with an end-of-service life indicator (ESLI) certified by NIOSH, or(b) a change out schedule, based on objective information or data that will ensure that the cartridges are changed out before the end of their service life, must be developed and implemented. The basis for the change out

schedule must be described in the written respirator program. Further, if an APR is selected, the airborne diisocyanate concentration must be no greater than 10 times the TLV or PEL. An organic vapor (OV) cartridge is recommended for APR use.

Hand protection
Gloves should be worn. Nitrile rubber showed excellent resistance. Butyl rubber, neoprene, and PVC are also effective.

Eye protection
When directly handling liquid product, eye protection is required. Examples of eye protection include a chemical safety goggle, or chemical safety goggle in combination with a full face shield when there is a greater risk of splash.

Skin and body protection
Avoid all skin contact. 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 TDI can play a role in causing isocyanate sensitization and respiratory reaction., This data reinforces the need to prevent direct skin contact with isocyanates.

Medical Surveillance
All applicants who are assigned to an isocyanate work area should undergo a pre-placement medical evaluation. A history of eczema or respiratory allergies such as hay fever, are possible reasons for medical exclusion from isocyanate areas. Applicants who have a history of adult asthma should be restricted from work with isocyanates. Applicants with a history of prior isocyanate sensitization should be excluded from further work with isocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentially exposed to diisocyanates. Once a worker has been diagnosed as sensitized to any isocyanate, no further exposure can be permitted. Refer to the Bayer pamphlet (Medical Surveillance Program for Isocyanate Workers) for additional guidance.

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.

9. Physical and chemical properties

Form:	liquid
Color:	Colorless to light yellow
Odor:	pungent, strong
pH:	Not Applicable
Freezing Point:	10 °C (50 °F)
Boiling point/boiling range:	252 - 254 °C (485.6 - 489.2 °F)
Flash point:	126.67 °C (260.0 °F) (Pensky-Martens Closed Cup (ASTM D-93))
Vapour pressure:	0.025 mmHg @ 25 °C (77 °F)
Specific Gravity:	1.22 @ 20 °C (68 °F)
Solubility in Water:	Insoluble - Reacts slowly with water to liberate CO2 gas
Decomposition temperature:	176 °C (348.8 °F)
Molecular Weight:	174

10. Stability and reactivity

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

Materials to avoid
Water, Amines, Strong bases, Alcohols, Copper alloys

Hazardous decomposition products
By Fire and High Heat: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke., Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

11. Toxicological information

Toxicity Data for MONDUR TD 80 GRADE A
Toxicity Note
Toxicity data is for TDI mixed isomers

Acute oral toxicity
LD50: 4,130 - 5,110 mg/kg (rat, Male/Female)

Acute inhalation toxicity
LC50: 66 ppm (480 mg/m3), 1 h (rat, Male/Female)
LC50: 49 - 50.4 ppm, 4 h (rat, Male/Female)
aerosol
RD50: 2.12 ppm, 3 h (rat, male)
vapor

Acute dermal toxicity
LD50: > 9,400 mg/kg (rabbit, Male/Female)

Skin irritation
rabbit, Draize, Exposure Time: 24 h, Moderately irritating

Eye irritation
rabbit, Draize, Severely irritating

Sensitisation
dermal: sensitizer (guinea pig, Maximization Test)
inhalation: sensitizer (guinea pig, Other method)

Repeated dose toxicity
113 weeks, Inhalation: NOAEL: 0.05 ppm, (rat, Male/Female, 6 hrs/day 5 days/week)
Irritation to lungs and nasal cavity. No systemic effects were observed.
90 day, Oral: NOAEL: 30 mg/kg, LOAEL: 60 mg/kg, (rat, Male/Female, 5 days/week)
Reduced body weight gain. Changes in lungs.

Mutagenicity
Genetic Toxicity in Vitro:
Ames: positive, negative (Salmonella typhimurium, Metabolic Activation: with/without)
Positive and negative results were seen in various in vitro studies. Questionable validity of studies due to rapid hydrolysis in solvents.
Genetic Toxicity in Vivo:
Micronucleus Assay: negative (rat,)
Unscheduled DNA synthesis: negative (rat,)

Carcinogenicity
rat, Male/Female, inhalation, 113 w, 6 hrs/day 5 days/week,
negative
rat, Male/Female, oral, 106 w, daily,

Positive, however the study validity is questioned due to the dose exceeding maximum tolerated dose and irregularities in compound storage and analysis.

Toxicity to Reproduction/Fertility
Two generation study, inhalation, 6 hrs/day 7 days/week, (rat) NOAEL (parental): 0.08 ppm, NOAEL (F1): 0.02 ppm, NOAEL (F2): 0.3 ppm
No effects on Reproductive parameters observed at doses tested.

Developmental Toxicity/Teratogenicity
rat, female, inhalation, gestation days 6-15, 6 hrs/day 7 days/week, NOAEL (teratogenicity): 0.1 ppm, NOAEL (maternal): 0.1 ppm
No Teratogenic effects observed at doses tested., Fetotoxicity seen only with maternal toxicity.

12. Ecological information

Ecological Data for MONDUR TD 80 GRADE A
Biodegradation
0 %, Exposure time: 28 d
Not readily biodegradable.

Bioaccumulation
Cyprinus carpio (Carp), Exposure time: 56 d, < 1 BCF
Not expected to bio-accumulate.

Acute and Prolonged Toxicity to Fish
LC50: > 100 mg/l (Danio rerio (zebra fish), 96 h)
LC50: 133 mg/l (Rainbow (Donaldson)Trout (Oncorhynchus mykiss), 96 h)

Acute Toxicity to Aquatic Invertebrates
EC50: 12.5 mg/l (Water flea (Daphnia magna), 48 h)
EC50: > 500 mg/l (Grass shrimp, 24 h)

Toxicity to Aquatic Plants
EC50: 3,230 - 4,300 mg/l, End Point: growth (other: algae, 96 h)

Toxicity to Microorganisms
EC50: > 100 mg/l, (Activated sludge microorganisms, 3 h)

Additional Ecotoxicological Remarks
Ecotoxicity data is for TDI mixed isomers

13. Disposal considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state and local environmental control laws. Incineration is the preferred method.

Empty Container Precautions
Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without

thorough commercial cleaning and reconditioning. If container is to be disposed, ensure all product residues are removed prior to disposal.

14. Transport information

Land transport (DOT)

Proper shipping name:	Toluene diisocyanate
Hazard Class or Division:	6.1
UN/NA Number:	UN2078
Packaging group:	II
Hazard Label(s):	Toxic

RSPA/DOT Regulated Components:
2,4-Toluene Diisocyanate
2,6-Toluene Diisocyanate

Reportable Quantity: 45 kg

Sea transport (IMDG)

Proper shipping name:	TOLUENE DIISOCYANATE
Hazard Class or Division:	6.1
UN-Number:	UN2078
Packaging group:	II
Hazard Label(s):	TOXIC

Air transport (ICAO/IATA)

Proper shipping name:	Toluene diisocyanate
Hazard Class or Division:	6.1
UN-Number:	UN2078
Packaging group:	II
Hazard Label(s):	TOXIC

Additional Transportation Information
MARPOL/IBC
PRODUCT NAME: Toluene Diisocyanate
POLLUTION CATEGORY:Y
SHIP TYPE: 2
FLASH POINT: 260°F

15. Regulatory information

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory.

US. EPA CERCLA Hazardous Substances (40 CFR 302):

Components	
2,4-Toluene Diisocyanate	Reportable quantity: 100 lbs
2,6-Toluene Diisocyanate	Reportable quantity: 100 lbs

SARA Section 311/312 Hazard Categories:
Acute Health Hazard, Chronic Health Hazard, Reactivity Hazard

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):
Components
2,4-Toluene Diisocyanate
2,6-Toluene Diisocyanate

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required:
Components
2,4-Toluene Diisocyanate
2,6-Toluene Diisocyanate

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
When discarded in its purchased form, this product is a listed RCRA hazardous waste and should be managed as a hazardous waste. (40 CFR 261.20-24), Any contaminated soil, water, debris, or residue resulting from the cleanup of a spill of this product is considered to be a hazardous waste.

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.

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

Weight percent	Components	CAS-No.
60 - 100%	2,4-Toluene Diisocyanate	584-84-9
15 - 25%	2,6-Toluene Diisocyanate	91-08-7

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

Weight percent	Components	CAS-No.
15 - 25%	2,6-Toluene Diisocyanate	91-08-7
80 - 90%	2,4-Toluene Diisocyanate	584-84-9

Pennsylvania Right to Know Special Hazard Substance List:

Weight percent	Components	CAS-No.
60 - 100%	2,4-Toluene Diisocyanate	584-84-9

MA Right to Know Extraordinarily Hazardous Substance List:

Weight percent	Components	CAS-No.
60 - 100%	2,4-Toluene Diisocyanate	584-84-9
15 - 25%	2,6-Toluene Diisocyanate	91-08-7

California Prop. 65:
Warning! This product contains chemical(s) known to the State of California to be Carcinogenic.

Weight percent	Components	CAS-No.
15 - 25%	2,6-Toluene Diisocyanate	91-08-7

16. Other information

NFPA 704M Rating

Health	3
Flammability	1
Reactivity	1
Other	

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

HMIS Rating

Health	3*
Flammability	1
Physical Hazard	1

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
* = Chronic Health Hazard

The method of hazard communication for Bayer MaterialScience LLC is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by Bayer MaterialScience LLC as a customer service.

The handling of products containing reactive TDI polyisocyanate/prepolymer and/or monomeric TDI requires appropriate protective measures referred to in this MSDS. These products are therefore recommended only for use in industrial or trade (commercial) applications. They are not suitable for use in Do-It-Yourself applications.

Contact person:	Product Safety Department
Telephone:	(412) 777-2835
MSDS Number:	112000032040
Version Date:	02/28/2010
Report version:	1.7

Material Safety Data Sheet

HUNTSMAN
Enriching lives through innovation

1 . Product and company identification

Product name : **SUPRASEC® 7050** **MSDS # 00008372**

Product use : **Component of a Polyurethane System**

Huntsman Polyurethanes (an international business unit of Huntsman International LLC.)

10003 Woodloch Forest Drive
The Woodlands, TX 77380

For Polyurethanes product information/assistance:
The Woodlands: (800) 257-5547
Auburn Hills: (800) 553-8624
Canada: (905) 678-9150
Email: MSDS@huntsman.com

Validation date : **10/27/2010.**

In case of emergency

Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300
In Mexico: 01 800 00 214 00
In Columbia: 01 800 91 6012

2 . Hazards identification

Physical state : Liquid.

Odor : slightly musty

OSHA/HCS status : This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : WARNING!

Harmful by inhalation. Irritating to eyes and respiratory system. May cause sensitization by inhalation and skin contact. This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. A hyper-reactive response to even minimal concentrations of diisocyanates may develop in sensitised persons. The onset of the respiratory symptoms may be delayed for several hours after exposure.

Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Harmful by inhalation. Irritating to eyes and skin. May cause sensitization by inhalation and skin contact. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Contains material that can cause target organ damage. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

3 . Composition/information on ingredients

Name	CAS number	%
Diphenylmethanediisocyanate, isomers and homologues	9016-87-9	60 - 100

4 . First aid measures

Eye contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin contact After contact with skin, wash immediately with plenty of warm soapy water. Get medical attention if irritation develops. Wash clothing before reuse. Clean shoes thoroughly before reuse. An MDI study has demonstrated that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention immediately. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is laboured, oxygen should be administered by qualified personnel.

Ingestion Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur. Never give anything by mouth to an unconscious person.

Notes to physician : Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

5 . Fire-fighting measures

Flash point : Closed cup: >110°C (>230°F)

Flammable limits : Not explosive

Products of combustion : Combustion products may include: carbon oxides (CO, CO_2) nitrogen oxides (NO, NO_2 etc .) hydrocarbons and HCN

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : In a fire or if heated, a pressure increase will occur and the container may burst.

No specific hazard.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. PVC boots, gloves, safety helmet and protective clothing should be worn. PVC boots, gloves, safety helmet and protective clothing should be worn.

Special remarks on explosion hazards : Due to reaction with water producing CO2-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Containers may burst if overheated.

6 . Accidental release measures

Personal precautions : Immediately contact emergency personnel. Evacuate the area. Keep upwind to avoid inhalation of vapours. Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection. Use suitable protective equipment (section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Contain and absorb large spillages onto an inert, non-flammable adsorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Test atmosphere for MDI. Neutralize small spillages with decontaminant. Remove and properly dispose of residues. (See Section 13 for disposal considerations.) Notify applicable government authorities if release is reportable. The CERCLA RQ for 4,4-MDI is 5,000 lbs (see CERCLA in Section 15).

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Keep container in a cool, well-ventilated area. Keep container tightly closed. Keep away from moisture. Due to reaction with water producing CO2-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys or galvanized surfaces.

8 . Exposure controls/personal protection

Product name	**Exposure limits**
Diphenylmethane 4,4'- diisocyanate	**ACGIH TLV (United States, 2/2010).** TWA: 0.005 ppm 8 hour(s). **OSHA PEL (United States, 11/2006).** CEIL: 0.2 mg/m³ 0 hour(s). CEIL: 0.02 ppm 0 hour(s).

Consult local authorities for acceptable exposure limits.

Preventive Measures : Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace. Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Persons with respiratory problems including asthmatic-type conditions , chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or skin allergies should be evaluated for their suitability of working with this product. Once a person is diagnosed as sensitized, no further exposure to the material that caused the sensitization should be permitted.

Engineering controls : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'

Personal protection

Eyes : Chemical safety goggles. If there is a potential for splashing, use a full face shield.

Skin : The following protective materials are recommended: Gloves - neoprene, nitrile rubber, butyl rubber. Thin latex disposable gloves should be avoided for repeated or long term use. Protective clothing should be selected and used in accordance with 'Guidelines for the Selection of Chemical Protective Clothing' published by ACGIH.

Respiratory : When the product is sprayed or heated without adequate ventilation, an approved MSHA/ NIOSH positive-pressure, supplied-air respirator may be required. Air purifying respirators equipped with organic vapor cartridges and a HEPA (P100) particulate filter may be used under certain conditions when a cartridge change-out schedule has been developed in accordance with the OSHA respiratory protection standard (29 C.F.R. 1910.134).

Hands : 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.

Other protection : Consult your supervisor or S.O.P. for special handling instructions.

9 . Physical and chemical properties

General information

Appearance

Physical state	: Liquid.
Color	: Not available.
Odor	: slightly musty
Odor threshold	: Not available.

Important health, safety and environmental information

pH	: Not applicable.
Boiling point	: >300°C decomposes
Melting point	: Not available.
Flash point	: Closed cup: >110°C (>230°F)
Oxidizing properties	: Not available.
Saturated vapor concentration	: > 32 µg/m^3 @ 20 Deg C
Vapor pressure	: Not available.
Relative density	: Not available.
Vapor density	: 8.5
Auto-ignition temperature	: >600°C
VOC content	: Not available.

10 . Stability and reactivity

Stability and reactivity	: Stable at room temperature. Reaction with water (moisture) produces CO2-gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.
Conditions of instability	: Avoid high temperatures.
Incompatibility with various substances	: water, alcohols, amines, bases, and acids
Hazardous polymerization	: Polymerization may occur at elevated temperatures in the presence of alkalies, tertiary amines and metal compounds.
Hazardous decomposition products	: Combustion products may include: carbon oxides (CO, CO_2) nitrogen oxides (NO, NO_2 etc .) hydrocarbons and HCN

11 . Toxicological information

Toxicity data

Acute toxicity

Product/ingredient name	Test	Species	Result	Exposure
Diphenylmethane 4,4'- diisocyanate	LD50 Dermal	Rabbit - Male, Female	>9400 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Intraperitoneal	Rabbit - Male	100 mg/kg	-
	LD50 Oral	Rat - Male	>10000 mg/kg	-
	LD50 Oral	Rat - Male, Female	>2000 mg/kg	-
	LC50 Inhalation	Rat - Male,	>2.24 mg/L	1 hours

11 . Toxicological information

	Dusts and mists	Female		
Methylenediphenyldiisocyanate, isomers and homologues	LD50 Dermal	Rabbit - Male, Female	>9400 mg/kg	-
	LD50 Oral	Rat - Male	>10000 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat - Male, Female	310 mg/m3	4 hours

Sensitizer

Diphenylmethane 4,4'- diisocyanate	skin	Guinea pig	Not sensitizing
	Respiratory	Guinea pig	Sensitizing
Methylenediphenyldiisocyanate, isomers and homologues	skin	Guinea pig	Not sensitizing
	Respiratory	Rat	Sensitizing

Chronic toxicity

Product/ingredient name	Test	Species	Result	Exposure
Methylenediphenyldiisocyanate, isomers and homologues	Chronic NOEC Inhalation Dusts and mists	Rat - Male, Female	0.2 mg/m3	2 years; 5 days per week

Carcinogenicity

Product/ingredient name	Test	Species	Result	Exposure
Diphenylmethane 4,4'- diisocyanate	Negative - Inhalation - NOAEL	Rat - Male, Female	1 mg/m3	2 years; 5 days per week
	Negative - Inhalation - NOAEL	Rat - Female	0.7 mg/m3	2 years; 5 days per week
Methylenediphenyldiisocyanate, isomers and homologues	Negative - Inhalation - NOAEL	Rat - Male, Female	1 mg/m3	2 years; 5 days per week
	Negative - Inhalation - NOAEL	Rat - Female	0.7 mg/m3	2 years; 5 days per week

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Diphenylmethane 4,4'- diisocyanate	-	3	-	-	-	-
Methylenediphenyldiisocyanate, isomers and homologues	-	3	-	-	-	-

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Diphenylmethane 4,4'- diisocyanate	EU	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	OECD 474 Mammalian Erythrocyte Micronucleus Test	Experiment: In vivo Subject: Mammalian-Animal	Negative
Methylenediphenyldiisocyanate, isomers and homologues	OECD 474	Experiment: In vivo Subject: Mammalian-Animal	Negative
	-	Experiment: In vivo Subject: Mammalian-Human	Equivocal

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure

11 . Toxicological information

Diphenylmethane 4,4'- diisocyanate	Negative - Inhalation	Rat - Male, Female	12 mg/m3	20 days
Methylenediphenyldiisocyanate, isomers and homologues	Negative - Inhalation	Rat - Male, Female	4 mg/m3	20 days

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Diphenylmethane 4,4'- diisocyanate	-	-	-	Rat - Male, Female	Inhalation	20 days
Methylenediphenyldiisocyanate, isomers and homologues	-	-	-	Rat - Male, Female	Inhalation	-

Potential acute health effects

Ingestion : Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Inhalation : Toxic by inhalation. May cause sensitization by inhalation.

Eyes : Irritating to eyes.

Skin : Irritating to skin. May cause sensitisation by skin contact

Potential chronic health effects

Chronic effects : Contains material that can cause target organ damage. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Target organs : Contains material which causes damage to the following organs: lungs, upper respiratory tract, skin.

Carcinogenicity : Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m3), there was a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours at 1 mg/m3 and no effects at 0.2 mg/m3. Overall, the tumour incidence, both benign and malignant, and the number of animals with the tumours were not different from controls. The increased incidence of lung tumours is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumour formation will occur.

Mutagenicity : There is no substantial evidence of mutagenic potential.

Teratogenicity : No birth defects were seen in two independant animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.

Fertility effects : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Diphenylmethane 4,4'- diisocyanate	-	Acute EC50 > 1000 mg/L	Daphnia	48 hours
	-	Acute LC50 > 1000 mg/L	Fish	96 hours

Biodegradability

Product/ingredient name	Test	Result	Dose	Inoculum

12 . Ecological information

Diphenylmethane 4,4'- diisocyanate	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	0 % - Not readily - 28 days	30 mg/L	-
Methylenediphenyldiisocyanate, isomers and homologues	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	0 % - Not readily - 28 days	30 mg/L Oxygen consumption	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Diphenylmethane 4,4'- diisocyanate	-	-	Not readily
Methylenediphenyldiisocyanate, isomers and homologues	Fresh water 0.8 days	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Diphenylmethane 4,4'- diisocyanate	-	200	high
Methylenediphenyldiisocyanate, isomers and homologues	-	200	high

Mobility : By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise. Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino- diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, by calculation and by analogy with related diisocyanates.

Environmental effects : By comparison with an analogous product, the following values are anticipated. The measured ecotoxicity is that of the hydrolised product, generally under conditions maximising production of soluble species. Even so, the observed ecotoxicity is low/ very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora in all trophic levels (including fish), no detectable diaminodiphenylmethane (MDA), and no evidence of bioaccumulation of MDI or MDA.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

14 . Transport information

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	NA3082	OTHER REGULATED SUBSTANCES, LIQUID, N.O.S. (Methylene Diphenyl Diisocyanate)	9	III		**Reportable quantity** 5000 lbs. (2270 kg) Single containers less than 5,000 lbs. are not regulated.
TDG Classification	Not regulated.					-
IMDG Class	Not regulated.		-	-		-
IATA-DGR Class	Not regulated.		-	-		-

PG* : Packing group
The transport regulations may change in the different countries. Check for the appropriate regulations in the country of transport or usage of this product.

15 . Regulatory information

United States

HCS Classification : Toxic material
Irritant
Sensitizer

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.
TSCA 12(b) annual export notification: Chlorobenzene

CERCLA: Hazardous substances.

Components	Concentration	Section 304 CERCLA Hazardous Substance	CERCLA Reportable Quantity	Product Reportable Quantity
Diphenylmethane 4 ,4'- diisocyanate	68.14536	Listed	5000	7337

Release of more than any reportable quantity to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675).

This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313	Product name	CAS number	Concentration
Form R - Reporting requirements	: Diisocyanate compound (category code N120)		92%

California Prop 65 : 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.

Canada

WHMIS (Canada) : WHMIS Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
WHMIS Class D-2A: Material causing other toxic effects (Very toxic).
WHMIS Class D-2B: Material causing other toxic effects (Toxic).

CEPA (DSL) : All components are listed or exempted.

15 . Regulatory information

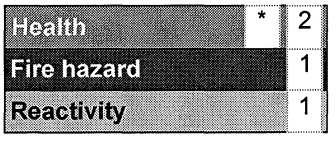
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

16 . Other information

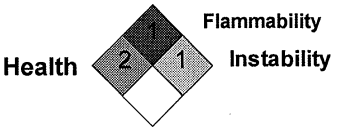
Label requirements : Harmful by inhalation. Irritating to eyes and respiratory system. May cause sensitization by inhalation and skin contact. This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. A hyper-reactive response to even minimal concentrations of diisocyanates may develop in sensitised persons. The onset of the respiratory symptoms may be delayed for several hours after exposure.

Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :



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Notice to reader

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.
IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.
THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.
NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.

Indicates information that has changed from previously issued version.

FLINT HILLS resources®

MATERIAL SAFETY DATA SHEET

1 CHEMICAL PRODUCT & COMPANY IDENTIFICATION

TRADE NAME(S)	**GRADE 54 EXPANDABLE POLYSTYRENE (NORTH AMERICA - ENGLISH)**
CAS NUMBER	Mixture
MSDS NUMBER	21503
PRODUCT CODE(S)	3354; 3454; 3654; 5354; 5454; 5654; 7654; I5354; I7454; S5354; S5454; S5654; S7354; S7454; S7654
MANUFACTURER / SUPPLIER	Flint Hills Resources, LP 501 Brunner Street Peru, IL 61354 USA

TELEPHONE NUMBERS - 24 HOUR EMERGENCY ASSISTANCE

CHEMTREC (US)	800-424-9300
CHEMTREC	703-527-3887
CARECHEM24 (Asia)	65 633 44 177
CARECHEM24 (Europe)	44 208 762 8322 (UK)
CARECHEM24 (No. & So. America)	44 208 762 8322 (UK)
Flint Hills Resources, LP	815-224-5223

TELEPHONE NUMBERS - GENERAL ASSISTANCE

8-5 (M-F, CST)	815-224-5257
8-5 (M-F, CST) MSDS Assistance	316-828-7988
Email: msdsrequest@fhr.com	

2 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING!

HEALTH HAZARDS
DUST MAY CAUSE SKIN, EYE AND RESPIRATORY TRACT IRRITATION
FUMES FROM HOT PRODUCT CAN CAUSE IRRITATION TO THE EYES, SKIN AND RESPIRATORY SYSTE
HOT MATERIAL MAY CAUSE THERMAL BURNS

SEE "TOXICOLOGICAL INFORMATION" (SECTION 11) FOR MORE INFORMATION

FLAMMABILITY HAZARDS
DUST MAY FORM EXPLOSIVE MIXTURE IN AIR WHEN DISPERSED IN A CONFINED SPACE
SOLID WITH EXTREMELY FLAMMABLE SOLVENT AND VAPORS
FLAMMABLE GASES MAY EVOLVE FROM THIS MATERIAL
MAY CAUSE FLASH FIRE

REACTIVITY HAZARDS
STABLE

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

POTENTIAL HEALTH EFFECTS, SKIN

Dusts may cause irritation due to abrasion. Repeated or prolonged skin contact may cause reddening, itching and inflammation.

Contains a component(s) that may cause allergic skin reactions in some individuals.

Contact with hot material may cause thermal burns.

POTENTIAL HEALTH EFFECTS, EYE

Dusts may cause mechanical irritation including pain, lacrimation and redness. Effects may become more serious with repeated or prolonged contact.

POTENTIAL HEALTH EFFECTS, INHALATION

Dusts may cause irritation to the nose, throat and lungs by mechanical abrasion.

Fumes or vapors from the heated material may be irritating to the respiratory tract. In confined or poorly ventilated areas, vapors can readily accumulate and can cause unconsciousness and death.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

POTENTIAL HEALTH EFFECTS, INGESTION

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

3 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Concentration*	Exposure Limits / Health Hazards
POLYSTYRENE	9003-53-6	92 - 97 %	No Data

Ingredient Name	CAS Number	Concentration*	Exposure Limits / Health Hazards
PENTANES	Mixture	2.5 - 7.5 %	1000 ppm 8-Hour TWA (OSHA) 600 ppm 8-Hour TWA (ACGIH)
MODIFIERS - ADDITIVES	Mixture	0.01 - 3 %	No Data

*Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

COMPOSITION COMMENTS

This Material Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

4 FIRST AID MEASURES

SKIN

If hot material gets on skin, immediately flush affected area with large amounts of cool water. Do not attempt to remove the material from the skin, or to remove contaminated clothing. Get immediate medical attention.

For cold material, immediately wash skin with plenty of soap and water after removing contaminated clothing and shoes. Get medical attention if irritation persists.

EYE

If hot material comes in contact with eyes hold the eyelids apart and flush the eye with a large amount of cool water for at least 15 minutes. Get immediate medical attention.

If eyes become irritated from contact with dust, flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists.

INHALATION

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR).

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION

If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty.

Never give anything by mouth to an unconscious person.

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

5 FIRE FIGHTING MEASURES

HAZARDOUS COMBUSTION PRODUCTS

A variety of decomposition products may occur including simple hydrocarbons to toxic and irritating gases such as carbon, carbon monoxide, carbon dioxide, styrene, acids, ketones, and aldehydes.

EXTINGUISHING MEDIA

Use water spray, dry chemical, carbon dioxide or fire-fighting foam for Class B fires to extinguish fire.

BASIC FIRE FIGHTING PROCEDURES

Material is a solid containing an extremely flammable liquid and vapor. Material will burn on contact with flame or exposure to high temperature.

Evacuate area and fight fire from a safe distance.

If spilled material has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel. Use water spray to cool adjacent structures.

Containers can build up pressure if exposed to heat (fire). Stay away from storage container ends. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage container due to fire.

Be aware that a BLEVE (Boiling Liquid Expanding Vapor Explosion) may occur unless surfaces are kept cool with water.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

UNUSUAL FIRE & EXPLOSION HAZARDS

This material releases a flammable blowing agent. When in its finely divided form as dust, this material presents an explosion hazard when dispersed in a confined area and ignited in air. Risk of dust-air explosion is increased if flammable vapors are present.

Extremely flammable vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back. Eliminate ignition sources (including static spark) and prevent vapor accumulation.

Explosion hazard if exposed to extreme heat.

This material may accumulate static charge which can cause an electrical spark (ignition source) in some cases.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

This material, as produced and not in its finely divided form as dust, is not explosive as defined by established regulatory criteria.

Hazardous melting and dripping may occur at elevated temperatures. May burn at or above flash point, and airborne dust may explode if ignited.

Flash Point	-60 °F (-51.1 °C) (As Pentanes) (Estimated)
Autoignition Temperature	500 °F (260.0 °C) (As Pentanes) (Estimated)
Flammability Limits in Air, Lower, % by Volume	1.4 % (As Pentanes)
Flammability Limits in Air, Upper, % by Volume	8.3 % (As Pentanes)

6 ACCIDENTAL RELEASE MEASURES

EMERGENCY ACTION

Eliminate and/or shut off ignition sources and keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. Isolate for 800 meters (1/2 mile) in all directions if tank, rail car or tank truck is involved in fire. Evacuate area endangered by release as required. (See Exposure Controls/Personal Protection, Section 8.)

ENVIRONMENTAL PRECAUTIONS

If material is released to the environment, take immediate steps to stop and contain release. Prevent or minimize formation of a dust cloud or layer. Eliminate all sources of ignition. Isolate hazard area and deny entry. Caution should be exercised regarding personnel safety and exposure to the released material. Notify local, provincial and/or federal authorities, if required.

SPILL OR LEAK PROCEDURE

Eliminate all sources of ignition (no smoking, flares, sparks or flames in immediate area). Prevent or minimize formation of a dust cloud or layer during cleanup. This material releases a flammable blowing agent. In its finely divided form, this material may present an explosion hazard when dispersed in a confined area and ignited in air.

Small spills can be cleaned up using non-sparking tools. Avoid procedures that may result in formation of a dust cloud or in water pollution. Place in an appropriate container for disposal or recycle.

For large spills and releases follow the handling and storage recommendations as detailed in NFPA 654, NFPA 499 and NFPA 77. Grounding, bonding, and intrinsic safety of equipment used should be considered.

See Exposure Controls/Personal Protection (Section 8).

7 HANDLING & STORAGE

HANDLING

Minimize vapor accumulation in confined spaces with positive ventilation. Minimize dust generation during handling and contact.

Dusts may become explosive when dispersed in a confined space such as a building or vessel and in the presence of oxygen and heat (spark). Risk of dust-air explosion is increased if flammable vapors are present.

This material may accumulate electrostatic charge which may cause an electrical spark (ignition source) in some cases.

Ground and bond lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. When airborne dust or a dust cloud is present, do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

Facilities using this material should assess their potential for combustible dust and static spark hazards and follow applicable federal, state and local laws and regulations and accepted codes and standards.

Avoid accumulation of dust on surfaces and hidden areas where dust may collect in the interior of buildings. Clean up dust using approved methods that do not generate dust clouds if ignition sources are present.

Avoid inhaling dust and contact with skin and eyes.

Do not eat, drink or smoke in areas of use or storage.

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

STORAGE

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles.

Avoid contact with strong oxidizers.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Do not eat, drink or smoke in areas of use or storage.

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

General or local exhaust ventilation and other forms of engineering controls are the preferred means for controlling exposures.

It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment.

Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

Use only appropriately classified electrical equipment and powered industrial trucks.

EYE PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Keep away from eyes. Eye contact can be avoided by using indirect-vent goggles and/or face shield. Have eye washing facilities readily available where eye contact can occur.

SKIN PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Avoid skin contact with this material. Use appropriate chemical protective gloves when handling. Additional protective clothing may be necessary, such as antistatic clothing and conductive footwear.

Good personal hygiene practices such as properly handling contaminated clothing, using wash facilities before entering public areas and restricting eating, drinking and smoking to designated areas are essential for preventing personal chemical contamination.

RESPIRATORY PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

A NIOSH approved dust respirator may be appropriate under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

9 PHYSICAL & CHEMICAL PROPERTIES

ODOR AND APPEARANCE

WHITE SOLID WITH HYDROCARBON ODOR

Flash Point	-60 °F (-51.1 °C) (As Pentanes) (Estimated)
Boiling Point	Not Applicable - Solid
Specific Gravity	Not Applicable
Melting Point	Softens & Expands @ 93.3-101.7 °C (200-215 °F) (EPS Beads Containing Pentanes)
Percent Volatile	7.5 Maximum (As Pentanes)
Vapor Pressure	< 100 mmHg @ 25°C
Evaporation Rate	No Data
Vapor Density	Not Applicable
Viscosity	No Data
Solubility in Water	Negligible (<1%)
Octanol/Water Partn	No Data
pH Value	Not Applicable
Freezing Point	No Data
Density	1.020 @25 °C, g/ml
Molecular Formula	Not Applicable
Molecular Weight	Not Applicable
Chemical Family	Polystyrene Thermoplastic Polymer
Odor Threshold	No Data

10 STABILITY & REACTIVITY

STABILITY/INCOMPATIBILITY

Avoid contact with strong oxidizers.

Avoid high temperatures, open flames, sparks and the use of ungrounded electrical equipment.

See precautions under Handling & Storage (Section 7).

HAZARDOUS REACTIONS/DECOMPOSITION PRODUCTS

Combustion may produce hazardous combustion products and other decomposition products in the case of incomplete combustion.

HAZARDOUS POLYMERIZATION

Will not occur.

11 TOXICOLOGICAL INFORMATION

ROUTES OF EXPOSURE

Inhalation, ingestion, skin and eye contact.

TOXICOLOGICAL DATA

POLYSTYRENE (EXPANDABLE): Dust may be irritating to the respiratory system. Prolonged and repeated inhalation of dust may cause impaired lung function and lung changes. Irritating vapors and fumes from the blowing agent or component additives or modifiers may be emitted from thermal processing or from storage in confined spaces. In addition, trace amounts of unreacted monomer may be present in the final polymer.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

HEXABROMOCYCLODODECANE: Findings from a dermal sensitization study in laboratory animals was positive. Reports of sensitization in humans are uncertain, but suggest this material is a weak allergic sensitizer. Evidence of adverse effects of the liver, prostate and disruption of thyroid function and homeostasis were observed in repeat-dose studies in laboratory animals receiving this material by the oral route of exposure. Findings from an oral reproduction study in laboratory animals included reduced pup viability and some evidence of abnormal neurobehavioral development.

Exposure to this material may cause adverse effects or damage to the following organs or organ systems: central nervous system, skin, eyes, respiratory tract, and heart.

PRE-EXISTING CONDITIONS AGGRAVATED BY EXPOSURE

Pre-existing medical conditions which may be aggravated by exposure include disorders of the respiratory tract.

12 ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

ECOTOXICITY:
Not classified as harmful to aquatic organisms.

PERSISTENCE/BIODEGRADATION:
Not readily biodegradable.

BIOACCUMULATION:
Not classified in terms of bioaccumulation in aquatic organisms.

MOBILITY IN ENVIRONMENT:
Not classified in terms of mobility in air, soil and water.

13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

Under RCRA, it is the responsibility of the user of the material to determine, at the time of disposal, whether the material meets RCRA criteria for hazardous waste.

In Canada, wastes should be disposed of according to federal, state, provincial and local regulations.

14 TRANSPORT INFORMATION

BILL OF LADING - BULK (U. S. DOT)

UN2211, Polymeric Beads, Expandable, 9, PGIII

BILL OF LADING - NON-BULK (U. S. DOT)

UN2211, Polymeric Beads, Expandable, 9, PGIII

BILL OF LADING (CTDG)

UN2211, Polymeric Beads, Expandable, 9, PGIII

COMMENTS

The above description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information.

15 REGULATORY INFORMATION

FEDERAL REGULATIONS

All ingredients are on the TSCA inventory, or are not required to be listed on the TSCA inventory.

This material, as supplied, contains no hazardous substances regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302), or any extremely hazardous substances regulated under the Emergency Planning and Community Right to Know Act (EPCRA) (40 CFR 355), and thus a release of this material as supplied has no reporting requirements under these regulations.

This material does not contain toxic chemicals (in excess of the applicable de minimis concentration) that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372).

This material contains substances subject to accident prevention regulations when present above the applicable threshold quantities (Section 112(r) of the Clean Air Act).

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to report may result in substantial civil and criminal penalties.

STATE REGULATIONS

Based on available information this product does not contain any components or chemicals currently known to the State of California to cause cancer, birth defects or reproductive harm at levels which would be subject to Proposition 65. Reformulation, use or processing of this material may affect its composition and require re-evaluation.

This product, as sold, meets the requirements of the Model Toxics Legislation of the Coalition of Northeastern Govenors (CONEG). Any alteration of this product may affect its compliance with this law.

CANADIAN REGULATIONS

All ingredients are on the Canadian Domestic Substance List (DSL), or are not required to be listed on the DSL.

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS STATUS

Controlled

WHMIS CLASSIFICATION

B4 - Flammable/Combustible

WHMIS LABELING

SARA 311/312 HAZARD CATEGORIES

Immediate Hazard:	X	Delayed Hazard:	X	Fire Hazard:	X	Pressure Hazard:
Reactivity Hazard:						

NFPA RATINGS

Health	1	Flammability	3	Instability	0	Special Hazards

HMIS RATINGS

Health	1*	Flammability	3	Physical Hazard	0

16 OTHER INFORMATION

DISCLAIMER

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. Adequate training and instruction should be given by you to your employees and affected personnel. Appropriate warnings and safe handling procedures should be provided by you to handlers and users. Additionally, the user should review this information, satisfy itself as to its suitability and completeness, and pass on the information to its employees or customers in accordance with the applicable federal, state, provincial or local hazard communication requirements. This MSDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, vendor neither assumes nor retains any responsibility for any damage or injury resulting from abnormal use, from any failure to adhere to appropriate practices, or from any hazards inherent in the nature of the material. Moreover, unless an employee or a customer accesses or receives a MSDS directly from the company, there is no assurance that a document obtained from alternate sources is the most currently available MSDS.

SECTIONS / SUBSECTIONS CHANGED

ACCIDENTAL RELEASE MEASURES: ENVIRONMENTAL PRECAUTIONS
ACCIDENTAL RELEASE MEASURES: SPILL OR LEAK PROCEDURE
CHEMICAL PRODUCT & COMPANY IDENTIFICATION: Product & Company Identification
COMPOSITION / INFORMATION ON INGREDIENTS: List of Ingredients
EXPOSURE CONTROLS / PERSONAL PROTECTION: ENGINEERING CONTROLS
EXPOSURE CONTROLS / PERSONAL PROTECTION: EYE PROTECTION: PERSONAL PROTECTION
FIRE FIGHTING MEASURES: Fire Fighting Measures: Fire & Explosion Properties
FIRE FIGHTING MEASURES: UNUSUAL FIRE & EXPLOSION HAZARDS
FIRST AID MEASURES: EYE
FIRST AID MEASURES: SKIN
HANDLING & STORAGE: HANDLING
HANDLING & STORAGE: STORAGE
HAZARDS IDENTIFICATION: EMERGENCY OVERVIEW
HAZARDS IDENTIFICATION: POTENTIAL HEALTH EFFECTS, INGESTION
HAZARDS IDENTIFICATION: POTENTIAL HEALTH EFFECTS, INHALATION
HAZARDS IDENTIFICATION: POTENTIAL HEALTH EFFECTS, SKIN
OTHER INFORMATION: DISCLAIMER
PHYSICAL & CHEMICAL PROPERTIES: ODOR AND APPEARANCE
PHYSICAL & CHEMICAL PROPERTIES: Physical & Chemical Properties
REGULATORY INFORMATION: CANADIAN REGULATIONS
REGULATORY INFORMATION: INTERNATIONAL REGULATIONS
TOXICOLOGICAL INFORMATION: PRE-EXISTING CONDITIONS AGGRAVATED BY EXPOSURE
TOXICOLOGICAL INFORMATION: TOXICOLOGICAL DATA
TOXICOLOGICAL INFORMATION: TOXICOLOGICAL DATA (continued)
TRANSPORT INFORMATION: COMMENTS

Completed By Flint Hills Resources, LP - Operations EH&S