METHYL ISOCYANATE

4. FIRE HAZARDS
4.1 Flash Point: Currently not available
4.2 Flammable Limits in Air: 5.3%-26%
4.3 Fire Extinguishing Agents: Small fires: dry chemical, CO2, or foam. Large fires: water, fog, or foam
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Contains toxic, irritating gases, including HCN and NOx.
4.6 Behavior in Fire: Very flammable, may be ignited by heat, sparks or flames. May travel to a source of ignition and flashback. Container may explode violently.
4.7 Auto-Ignition Temperature: 995°F
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: Currently not available
4.10 Acidic Flame Temperature: Currently not available
4.11 Stoichiometric Air to Fuel Ratio: 15.5:1
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 4.5:1
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY
5.1 Reactivity with Water: Reacts slowly with water at room temperature (20°C) to produce gaseous CO2, methylene (b.p. -34°C), and heat (about 255 Btu/ lb of methylene isocyanate or about 3,700 Btu/ lb of water). Resulting pressure increase may cause relief valves to open. Acids and alkalis accelerate the reaction. Reactivity accelerates as temperature rises.
5.2 Reactivity with Common Materials: Avoid contact with all metals other than stainless steel and nickel. The metal may catalyze polymerization reactions. The heat of reaction can cause the material to detonate to explosive violence. Also attacks some plastics, polyurethane emulsions and reaction with water.
5.3 Stability During Transport: Drums may be stored at ambient temperatures out of direct sunlight. Cool bulk quantities to approx. 0°C. Do not expose to heat or flames. Avoid contact with water. When shipped in steel drums, cool drums to approx. 0°C. Even though drums may be stored at ambient temperatures out of direct sunlight, storage temperature should not exceed 30°C.
5.4 Inhibit of Polymerization: Not pertinent
5.5 Neutralizing Agents for Acids and Caustics: Caustic soda, NaOH
5.6 Polymerization: Pure methyl isocyanate spontaneously polymerizes. Commercial product requires only heat or a trace of catalyst to initiate a potentially violent reaction.
5.7 Inhibitor of Polymerization: No inhibitor identified as such. Residual trace ions from production inhibit polymerization and reaction with water.

6. WATER POLLUTION
6.1 Aquatic Toxicity: Currently not available
6.2 Waterfront Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): Currently not available
6.4 Food Chain Concentration Potential: Not pertinent
6.5 GESAMP Hazard Profile: Bioaccumulation: Currently not available
6.6 Damage to Living Resources: Not pertinent
6.7 Marine Pollutant: Not pertinent
6.8 Aquatic Toxicity: Currently not available
6.9 Water Treatment Considerations: Not pertinent
6.10 Miscellanea: Not pertinent

7. SHIPPING INFORMATION
7.1 Grades of Purity: Commercial (99%)
7.2 Storage Temperature: It is recommended that bulk quantities be cooled to approximately 0°C. Drums may be stored at ambient temperature out of direct sunlight. Storage temperature should not exceed 30°C.
7.3 Inert Atmosphere: Must be protected by a dry nitrogen dew point (4°C or lower) atmosphere.
7.4 Venting: Not listed
7.5 IMO Pollution Category: Not listed
7.6 Ship Type: Currently not available
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS
8.1 49 CFR Category: Poison
8.2 49 CFR Class: II
8.3 49 CFR Package Group: I
8.4 Marine Pollutant: Not listed
8.5 NFFA Hazard Classification: Not listed
8.6 EPA Reportable Quantity: 10 pounds
8.7 EPA Pollution Category: A
8.8 RCRA Waste Number: P064
8.9 EPA-FINCA List: Not listed

9. PHYSICAL & CHEMICAL PROPERTIES
9.1 Physical State at 15°C and 1 atm: Liquid
9.2 Molecular Weight: 57.05
9.3 Boiling Point at 1 atm: 102.4°F = 39.1°C = 193°F
9.4 Freezing Point: c. -112°F, < -80°C = -193°F
9.5 Critical Temperature: 242°F = 119°C
9.6 Critical Pressure: 820 psia = 55 atm = 5.6 MN/m²
9.7 Specific Gravity: 0.9599 at 20°C
9.8 Liquid Surface Tension: Currently not available
9.9 Liquid Water Interface Tension: Currently not available
9.10 Vapor (Gas) Specific Gravity: 2.0
9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available
9.12 Latent Heat of Vaporization: 223 Btu/lb = 124 cal/g = 5.19 X 10^6 J/kg
9.13 Heat of Combustion: 8,441 Btu/lb = 4,467 cal/g = 1.87 X 10^6 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: Not pertinent
9.16 Heat of Polymerization: 540 Btu/lb = 300 cal/g = 12.56 X 10^6 J/kg
9.17 Heat of Fusion: Currently not available
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Currently not available

1. CORRECTIVE RESPONSE ACTIONS
Stop discharge

2. CHEMICAL DESIGNATIONS
2.1 CG Compatibility Group: Not listed
2.2 Formula: CHNCO
2.3 IM/DDU Designation: 3.2/2480
2.4 DOT No.: 2490
2.5 CAS Registry No.: 524-83-9
2.6 NAERG Guide No.: 155
2.7 Standard Industrial Trade Classification: 51489

3. HEALTH HAZARDS
3.1 Personal Protective Equipment: Positive pressure breathing apparatus and special protective clothing
3.2 Symptoms Following Exposure: INHALATION: Poisonous: may be fatal if inhaled. Experimental exposure of four human subjects for 1 to 5 minutes to: 0.02 ppm - no effects; 0.4 ppm - irritation of nose and skin; 2 ppm - irritation of nose and throat; 4 ppm - irritation more marked; 21 ppm - unbearable irritation of nose and throat.
3.3 Treatment of Exposure: Stop discharge
3.4 TLV-TWA: Not listed
3.5 TLV-STEL: Not listed
3.6 TLV-Ceiling: Not listed
3.7 Toxicity by Ingestion: Grade 3; LD50 = 71 mg/kg (rat)
3.8 Toxicity by Inhalation: Currently not available
3.9 Chronic Toxicity: Susceptible individuals may become sensitized so that subsequent exposure to extremely low concentrations provokes true asthma attacks. Cross sensitization to other isocyanates could also occur.
3.10 Vapor (Gas) Irritant Characteristics: Vapors cause severe irritation of eyes and throat, and can cause eye and lung injury. They cannot be tolerated even at low concentrations.
3.11 Liquid or Solid Characteristics: Severe skin irritant. Causes second and third-degree burns on short contact and is very injurious to the eyes.
3.12 Odor Threshold: Currently not available
3.13 IDLH Value: 3 ppm
3.14 OSHA PEEL-TWA: 0.02 ppm
3.15 OSHA PEEL-STEL: Not listed
3.16 OSHA PEEL-Ceiling: Not listed
3.17 EPA AEGEL: Not listed

JUNE 1999
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