

# TOLUENE 2,4-DIISOCYANATE

TDI

CAUTIONARY RESPONSE INFORMATION				4. FIRE HAZARDS	7. SHIPPING INFORMATION					
Common Synonyms Hybrane T Mondur TDS Nacconate 100 TDI 2,4-Toluene diisocyanate	Liquid	Colorless to light yellow	Sharp, sweet, fruity odor	4.1 Flash Point: 270°F O.C. 4.2 Flammable Limits in Air: 0.9%-9.5% 4.3 Fire Extinguishing Agents: Water, foam, dry chemical, or carbon dioxide 4.4 Fire Extinguishing Agents Not to Be Used: Water or foam may cause frothing. 4.5 Special Hazards of Combustion Products: Irritating vapors are generated when heated. 4.6 Behavior in Fire: Not pertinent 4.7 Auto Ignition Temperature: >300 4.8 Electrical Hazards: Not pertinent 4.9 Burning Rate: Currently not available 4.10 Adiabatic Flame Temperature: Currently not available 4.11 Stoichiometric Air to Fuel Ratio: 54.7 (calc.) 4.12 Flame Temperature: Currently not available 4.13 Combustion Molar Ratio (Reactant to Product): 15.0 (calc.) 4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed	7.1 Grades of Purity: Commercial distilled, 99% total diisocyanate. The following isomer ratios are shipped: (a) 100% 2, 4-; (b) 80% 2, 4-; 20% 2, 6- (most common); (c) 65% 2, 4-; 35% 2, 6-. All mixtures have similar characteristics. 7.2 Storage Temperature: 75-100°F 7.3 Inert Atmosphere: Inerted 7.4 Venting: Pressure-vacuum 7.5 IMO Pollution Category: C 7.6 Ship Type: 2 7.7 Barge Hull Type: 1					
Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Call fire department. Notify local health and pollution control agencies. Protect water intakes.				8. HAZARD CLASSIFICATIONS						
Fire	Combustible. POISONOUS GAS IS PRODUCED IN FIRE. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Extinguish with dry chemical or carbon dioxide. Water and foam may be ineffective on fire. Cool exposed containers with water.				8.1 49 CFR Category: Poison 8.2 49 CFR Class: 6.1 8.3 49 CFR Package Group: II 8.4 Marine Pollutant: No 8.5 NFPA Hazard Classification:					
Exposure	CALL FOR MEDICAL AID.  LIQUID POISONOUS IF SWALLOWED. Will burn skin and eyes. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES: hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.				Category.....Classification Health Hazard (Blue).....3 Flammability (Red).....1 Instability (Yellow).....1 Special (White).....W					
Water Pollution	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.				8.6 EPA Reportable Quantity: 100 pounds 8.7 EPA Pollution Category: B 8.8 RCRA Waste Number: U223 8.9 EPA FWPCA List: Not listed					
1. CORRECTIVE RESPONSE ACTIONS		2. CHEMICAL DESIGNATIONS								
Stop discharge Collection Systems: Pump Do not burn		2.1 CG Compatibility Group: 12; Isocyanate 2.2 Formula: 1-C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>4</sub> NCO <sub>2</sub> -2, 4 2.3 IMO/UN Designation: Not listed 2.4 DOT ID No.: 2078 2.5 CAS Registry No.: 584-84-9 2.6 NAERG Guide No.: 156 2.7 Standard Industrial Trade Classification: 51489								
3. HEALTH HAZARDS										
<p><b>3.1 Personal Protective Equipment:</b> Organic vapor canister; goggles or face shield; rubber gloves, boots and apron.</p> <p><b>3.2 Symptoms Following Exposure:</b> Irritates eyes and skin. Potent sensitizer and lung irritant if inhaled. May produce bronchospasm (asthma), pneumonitis, bronchitis, and pulmonary edema. Nocturnal cough and shortness of breath are common. Repeated low-level exposure may produce chronic lung disease. Oral toxicity is low.</p> <p><b>3.3 Treatment of Exposure:</b> INHALATION: remove victim to fresh air; administer artificial respiration and oxygen if needed; call a doctor at once. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min.; call a doctor at once. SKIN: flush with water; wipe off; wipe with rubbing alcohol; wash with soap and water.</p> <p>3.4 TLV-TWA: 0.005 ppm 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: 0.02 ppm 3.7 Toxicity by Ingestion: Grade 2; LD<sub>50</sub> = 0.5 to 5 g/kg 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: Currently not available 3.10 Vapor (Gas) Irritant Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations. 3.11 Liquid or Solid Characteristics: Fairly severe skin irritant; may cause pain and second-degree burns after a few minutes' contact. 3.12 Odor Threshold: 0.4-2.14 ppm 3.13 IDLH Value: 2.5 ppm 3.14 OSHA PEL-TWA: Not listed. 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: 0.02 ppm 3.17 EPA AEGL: Not listed</p>										
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5. CHEMICAL REACTIVITY										
<p><b>5.1 Reactivity with Water:</b> Forms carbon dioxide gas and an organic base; the reaction is not violent. <b>5.2 Reactivity with Common Materials:</b> No reaction <b>5.3 Stability During Transport:</b> Stable <b>5.4 Neutralizing Agents for Acids and Caustics:</b> Not pertinent <b>5.5 Polymerization:</b> Slow, not hazardous, above 113°F <b>5.6 Inhibitor of Polymerization:</b> Not pertinent</p>										
6. WATER POLLUTION										
<p><b>6.1 Aquatic Toxicity:</b> Currently not available <b>6.2 Waterfowl Toxicity:</b> Currently not available <b>6.3 Biological Oxygen Demand (BOD):</b> Currently not available <b>6.4 Food Chain Concentration Potential:</b> None <b>6.5 GESAMP Hazard Profile:</b> Not listed</p>										
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<p><b>8.1 49 CFR Category:</b> Poison <b>8.2 49 CFR Class:</b> 6.1 <b>8.3 49 CFR Package Group:</b> II <b>8.4 Marine Pollutant:</b> No <b>8.5 NFPA Hazard Classification:</b></p>										
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9. PHYSICAL & CHEMICAL PROPERTIES										
<p><b>9.1 Physical State at 15° C and 1 atm:</b> Solid <b>9.2 Molecular Weight:</b> 174.16 <b>9.3 Boiling Point at 1 atm:</b> 482°F = 250°C = 523°K <b>9.4 Freezing Point:</b> 68-72°F = 20-22°C = 293-295°K <b>9.5 Critical Temperature:</b> Not pertinent <b>9.6 Critical Pressure:</b> Not pertinent <b>9.7 Specific Gravity:</b> 1.22 at 25°C (liquid) <b>9.8 Liquid Surface Tension:</b> (est.) 25 dynes/cm = 0.025 N/m at 25°C <b>9.9 Liquid Water Interfacial Tension:</b> (est.) 45 dynes/cm = 0.045 N/m at 25°C <b>9.10 Vapor (Gas) Specific Gravity:</b> Not pertinent <b>9.11 Ratio of Specific Heats of Vapor (Gas):</b> Not pertinent <b>9.12 Latent Heat of Vaporization:</b> Not pertinent <b>9.13 Heat of Combustion:</b> (est.) -10,000 Btu/lb = -5720 cal/g = -239 X 10<sup>3</sup> J/kg <b>9.14 Heat of Decomposition:</b> Not pertinent <b>9.15 Heat of Solution:</b> Not pertinent <b>9.16 Heat of Polymerization:</b> Not pertinent <b>9.17 Heat of Fusion:</b> Currently not available <b>9.18 Limiting Value:</b> Currently not available <b>9.19 Reid Vapor Pressure:</b> Low</p>										
NOTES										

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
80	76.049	85	0.398	77	1.179	68	5.770
85	75.879	90	0.400	78	1.179	69	5.623
90	75.700	95	0.402	79	1.179	70	5.481
95	75.530	100	0.403	80	1.179	71	5.342
100	75.360	105	0.405	81	1.179	72	5.207
105	75.179	110	0.407	82	1.179	73	5.077
110	75.009	115	0.409	83	1.179	74	4.950
115	74.839	120	0.411	84	1.179	75	4.826
120	74.660	125	0.413	85	1.179	76	4.707
125	74.490	130	0.415	86	1.179	77	4.590
130	74.320	135	0.417	87	1.179	78	4.477
135	74.139	140	0.419	88	1.179	79	4.367
140	73.969	145	0.421	89	1.179	80	4.260
		150	0.423	90	1.179	81	4.156
				91	1.179	82	4.056
				92	1.179	83	3.957
				93	1.179	84	3.862
				94	1.179	85	3.769
				95	1.179		
				96	1.179		
				97	1.179		
				98	1.179		
				99	1.179		
				100	1.179		
				101	1.179		
				102	1.179		

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
I	130	0.004	130	0.00011		N	
N	140	0.006	140	0.00015		O	
S	150	0.008	150	0.00022		T	
O	160	0.012	160	0.00031			
L	170	0.017	170	0.00044		P	
U	180	0.024	180	0.00060		E	
B	190	0.033	190	0.00082		R	
L	200	0.045	200	0.00112		T	
E	210	0.062	210	0.00150		I	
	220	0.084	220	0.00199		N	
	230	0.112	230	0.00263		O	
	240	0.149	240	0.00344		T	
	250	0.196	250	0.00447		P	
	260	0.256	260	0.00577		E	
	270	0.332	270	0.00738		R	
	280	0.428	280	0.00938		T	
	290	0.547	290	0.01184		I	
	300	0.696	300	0.01486		N	