

ISOBUTANE

IBT

CAUTIONARY RESPONSE INFORMATION

Common Synonyms 2-Methylpropane		Liquefied compressed gas	Colorless	Odorless
Floats and boils on water. Flammable visible vapor cloud is produced.				
<p>Evacuate. Keep people away. Shut off ignition sources and call fire department. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies.</p>				
Fire	<p>FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Stop flow of gas if possible. Cool exposed containers and men effecting shutoff with water. Let fire burn.</p>			
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes. If inhaled, will cause dizziness, difficult breathing or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. IF IN EYES, hold eyelids open and flush with plenty of water.</p>			
Water Pollution	Not harmful to aquatic life.			

<p>1. CORRECTIVE RESPONSE ACTIONS Stop discharge Chemical and Physical Treatment: Burn</p>	<p>2. CHEMICAL DESIGNATIONS 2.1 CG Compatibility Group: 31; Paraffin 2.2 Formula: CH₃CH(CH₃)₂ 2.3 IMO/UN Designation: 2.0/1969 2.4 DOT ID No.: 1969 2.5 CAS Registry No.: 75-28-5 2.6 NAERG Guide No.: 115 2.7 Standard Industrial Trade Classification: 51114</p>
<p>3. HEALTH HAZARDS</p> <p>3.1 Personal Protective Equipment: Self-contained breathing apparatus; safety goggles.</p> <p>3.2 Symptoms Following Exposure: Central nervous system depression ranging from dizziness and incoordination to anesthesia and respiratory arrest, depending on concentration and extent of inhalation. Irregular heartbeat is rare but is a dangerous complication at anesthetic levels.</p> <p>3.3 Treatment of Exposure: INHALATION: protect victim against self-injury if he is stuporous, confused, or anesthetized; apply artificial respiration if breathing has stopped; avoid administration of epinephrine or other sympathomimetic amines; prevent aspiration of vomitus by proper positioning of head; give symptomatic and supportive treatment. INGESTION OR ASPIRATION: no treatment required.</p> <p>3.4 TLV-TWA: Not listed. 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Not pertinent 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: None 3.10 Vapor (Gas) Irritant Characteristics: None 3.11 Liquid or Solid Characteristics: No appreciable hazard. Practically harmless to skin because it is very volatile and evaporates quickly. Some frostbite possible. 3.12 Odor Threshold: Currently not available 3.13 IDLH Value: Not listed. 3.14 OSHA PEL-TWA: Not listed. 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: Not listed. 3.17 EPA AEGL: Not listed</p>	

<p>4. FIRE HAZARDS</p> <p>4.1 Flash Point: -117°F C.C. 4.2 Flammable Limits in Air: 1.8%-8.4% 4.3 Fire Extinguishing Agents: Stop flow of gas 4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent 4.5 Special Hazards of Combustion Products: Not pertinent 4.6 Behavior in Fire: Not pertinent 4.7 Auto Ignition Temperature: 890°F 4.8 Electrical Hazards: Not pertinent 4.9 Burning Rate: 9.3 mm/min. 4.10 Adiabatic Flame Temperature: Currently not available 4.11 Stoichiometric Air to Fuel Ratio: 30.9 (calc.) 4.12 Flame Temperature: Currently not available 4.13 Combustion Molar Ratio (Reactant to Product): 9.0 (calc.) 4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed</p>	<p>7. SHIPPING INFORMATION</p> <p>7.1 Grades of Purity: Pure; technical 7.2 Storage Temperature: Ambient 7.3 Inert Atmosphere: No requirement 7.4 Venting: Safety relief 7.5 IMO Pollution Category: Currently not available 7.6 Ship Type: 2 7.7 Barge Hull Type: Currently not available</p>								
<p>5. CHEMICAL REACTIVITY</p> <p>5.1 Reactivity with Water: No reaction 5.2 Reactivity with Common Materials: No reaction 5.3 Stability During Transport: Stable 5.4 Neutralizing Agents for Acids and Caustics: Not pertinent 5.5 Polymerization: Not pertinent 5.6 Inhibitor of Polymerization: Not pertinent</p>	<p>8. HAZARD CLASSIFICATIONS</p> <p>8.1 49 CFR Category: Flammable gas 8.2 49 CFR Class: 2.1 8.3 49 CFR Package Group: Not pertinent. 8.4 Marine Pollutant: No 8.5 NFPA Hazard Classification:</p> <table border="1"> <tr> <td>Category</td> <td>Classification</td> </tr> <tr> <td>Health Hazard (Blue).....</td> <td>1</td> </tr> <tr> <td>Flammability (Red).....</td> <td>4</td> </tr> <tr> <td>Instability (Yellow).....</td> <td>0</td> </tr> </table> <p>8.6 EPA Reportable Quantity: Not listed. 8.7 EPA Pollution Category: Not listed. 8.8 RCRA Waste Number: Not listed 8.9 EPA FWPCA List: Not listed</p>	Category	Classification	Health Hazard (Blue).....	1	Flammability (Red).....	4	Instability (Yellow).....	0
Category	Classification								
Health Hazard (Blue).....	1								
Flammability (Red).....	4								
Instability (Yellow).....	0								
<p>6. WATER POLLUTION</p> <p>6.1 Aquatic Toxicity: None 6.2 Waterfowl Toxicity: None 6.3 Biological Oxygen Demand (BOD): None 6.4 Food Chain Concentration Potential: None 6.5 GESAMP Hazard Profile: Not listed</p>	<p>9. PHYSICAL & CHEMICAL PROPERTIES</p> <p>9.1 Physical State at 15° C and 1 atm: Gas 9.2 Molecular Weight: 58.12 9.3 Boiling Point at 1 atm: 10.8°F = -11.8°C = 261.4°K 9.4 Freezing Point: -427.5°F = -255.3°C = 17.9°K 9.5 Critical Temperature: 275.0°F = 135°C = 408.2°K 9.6 Critical Pressure: 529 psia = 36.0 atm = 3.65 MN/m² 9.7 Specific Gravity: 0.557 at 20°C (liquid) 9.8 Liquid Surface Tension: 14 dynes/cm = 0.014 N/m at -10°C 9.9 Liquid Water Interfacial Tension: (est.) 50 dynes/cm = 0.05 N/m at -10°C 9.10 Vapor (Gas) Specific Gravity: 2.0 9.11 Ratio of Specific Heats of Vapor (Gas): 1.095 9.12 Latent Heat of Vaporization: 158 Btu/lb = 87.5 cal/g = 3.66 X 10⁵ J/kg 9.13 Heat of Combustion: -19,458 Btu/lb = -10,810 cal/g = -452.59 X 10³ J/kg 9.14 Heat of Decomposition: Not pertinent 9.15 Heat of Solution: Not pertinent 9.16 Heat of Polymerization: Not pertinent 9.17 Heat of Fusion: 18.96 cal/g 9.18 Limiting Value: Currently not available 9.19 Reid Vapor Pressure: Currently not available</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
-55	39.520	0	0.527		N	-55	0.389
-50	39.330	5	0.530		O	-50	0.373
-45	39.140	10	0.534		T	-45	0.359
-40	38.950					-40	0.345
-35	38.760				P	-35	0.332
-30	38.570				E	-30	0.320
-25	38.380				R	-25	0.309
-20	38.190				T	-20	0.298
-15	38.000				I	-15	0.288
-10	37.810				N	-10	0.279
-5	37.620				E	-5	0.270
0	37.430				N	0	0.261
5	37.240				T	5	0.253
10	37.040					10	0.245

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	-35	4.793	-35	0.06110	0	0.348
	N	-30	5.488	-30	0.06915	25	0.364
	S	-25	6.261	-25	0.07799	50	0.381
	O	-20	7.119	-20	0.08767	75	0.397
	L	-15	8.068	-15	0.09823	100	0.413
	U	-10	9.113	-10	0.10970	125	0.429
	B	-5	10.260	-5	0.12220	150	0.444
	L	0	11.520	0	0.13570	175	0.460
	E	5	12.900	5	0.15030	200	0.475
		10	14.400	10	0.16600	225	0.490
		15	16.040	15	0.18290	250	0.505
		20	17.810	20	0.20110	275	0.519
		25	19.740	25	0.22050	300	0.534
		30	21.810	30	0.24120	325	0.548
		35	24.060	35	0.26330	350	0.562
		40	26.470	40	0.28680	375	0.576
		45	29.060	45	0.31180	400	0.590
		50	31.840	50	0.33830	425	0.603
		55	34.820	55	0.36630	450	0.617
		60	38.000	60	0.39590	475	0.630
		65	41.390	65	0.42710	500	0.643
		70	45.010	70	0.46000	525	0.655
		75	48.850	75	0.49470	550	0.668
						575	0.680
						600	0.693