# ISOBUTANE

**IBT**

## CAUTIONARY RESPONSE INFORMATION

| **Common Synonyms** | Liquefied compressed gas | Colorless | Odorless |
|---|---|---|---|
| 2-Methylpropane | Floats and boils on water. Flammable visible vapor cloud is produced. | | |

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.

**Fire**

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.

**Exposure**

CALL FOR MEDICAL AID.

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.

**Water Pollution**

Not harmful to aquatic life.

### 1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Chemical and Physical Treatment: Burn

### 2. CHEMICAL DESIGNATIONS

**2.1 CG Compatibility Group:** 31; Paraffin
**2.2 Formula:** $CH_3CH(CH_3)_2$
**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

### 3. HEALTH HAZARDS

**3.1 Personal Protective Equipment:** Self-contained breathing apparatus; safety goggles.
**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.
**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.
**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

### 4. FIRE HAZARDS

**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 Stoichometric 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

### 5. CHEMICAL REACTIVITY

**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

### 6. WATER POLLUTION

**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

### 7. SHIPPING INFORMATION

**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

### 8. HAZARD CLASSIFICATIONS

**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:**

| Category | Classification |
|---|---|
| Health Hazard (Blue)..... | 1 |
| Flammability (Red)..... | 4 |
| Instability (Yellow)..... | 0 |

**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

### 9. PHYSICAL & CHEMICAL PROPERTIES

**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 $MN/m^2$
**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 $10^5$ J/kg
**9.13 Heat of Combustion:** –19,458 Btu/lb = –10,810 cal/g = –452.59 X $10^5$ 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

**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 |