

ISOPROPYL ETHER

IPE

CAUTIONARY RESPONSE INFORMATION

| | | |
|---|--|---|
| Common Synonyms Diisopropyl ether Diisopropyl oxide 2-Isopropoxy propane | Liquid Colorless Sweet odor | Floats and mixes slowly with water. Flammable, irritating vapor is produced |
| <p>Evacuate. Keep people away. Shut off ignition sources. Call fire department. Stay upwind. Use water spray to "knock down" vapor. Notify local health and pollution control agencies.</p> | | |
| Fire | <p>FLAMMABLE. Containers may explode on fire. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with dry chemicals, alcohol foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p> | |
| Exposure | <p>Call for medical aid.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled will cause headache, dizziness, or nausea. Move victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to 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.</p> | |
| Water Pollution | <p>Effect of low concentrations on aquatic life is unknown. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p> | |

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge
Contain
Collection Systems: Skim
Chemical and Physical Treatment: Burn;
Absorb

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 41; Ethers
2.2 Formula: (CH₃)₂CHOCH(CH₃)₂
2.3 IMO/JN Designation: 3.1/1159
2.4 DOT ID No.: 1159
2.5 CAS Registry No.: 108-20-3
2.6 NAERG Guide No.: 127
2.7 Standard Industrial Trade Classification: 51616

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Air pack or organic canister mask; rubber gloves; goggles.
3.2 **Symptoms Following Exposure:** Inhalation causes anesthesia, nausea, headache, dizziness, and irritation of the eyes and nose. Contact of liquid with eyes causes only minor injury; repeated contact with skin will remove natural oils and may cause dermatitis.
3.3 **Treatment of Exposure:** INHALATION: remove victim to fresh air and obtain medical attention immediately; keep him warm and at rest, and give artificial respiration if breathing stops; maintain an open airway. EYES: flush with water for 15 min. SKIN: flush with water. INGESTION: do NOT induce vomiting; get medical attention.
3.4 **TLV-TWA:** Not listed.
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** Not listed.
3.7 **Toxicity by Ingestion:** Grade 1; oral LD₅₀ = 8,470 mg/kg (rat)
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available
3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
3.11 **Liquid or Solid Characteristics:** Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
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:** -15°F O.C., • -18°F C.C.
4.2 **Flammable Limits in Air:** 1.4%-7.9%
4.3 **Fire Extinguishing Agents:** Dry chemical, alcohol foam, carbon dioxide
4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective.
4.5 **Special Hazards of Combustion Products:** Not pertinent
4.6 **Behavior in Fire:** Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. Containers may explode when heated.
4.7 **Auto Ignition Temperature:** 830°F
4.8 **Electrical Hazards:** Currently not available
4.9 **Burning Rate:** 5.0 mm/min.
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 42.8 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 13.0 (calc.)
4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** N₂ diluent: 10.0%

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction
5.2 **Reactivity with Common Materials:** No reaction
5.3 **Stability During Transport:** Unstable peroxides may form on long standing in contact with air; these may explode spontaneously or when heated.
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:** Currently not available
6.2 **Waterfowl Toxicity:** Currently not available
6.3 **Biological Oxygen Demand (BOD):** Currently not available
6.4 **Food Chain Concentration Potential:** None
6.5 **GESAMP Hazard Profile:**
Bioaccumulation: 0
Damage to living resources: 2
Human Oral hazard: 0
Human Contact hazard: 0
Reduction of amenities: 0

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 94+% May contain 0.01% hydroquinone or other inhibitor to prevent peroxide formation.
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** No requirement
7.4 **Venting:** Pressure-vacuum
7.5 **IMO Pollution Category:** D
7.6 **Ship Type:** 3
7.7 **Barge Hull Type:** 3

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Flammable liquid
8.2 **49 CFR Class:** 3
8.3 **49 CFR Package Group:** II
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|----------------------|----------------|
| Health Hazard (Blue) | 2 |
| Flammability (Red) | 3 |
| Instability (Yellow) | 1 |
- 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:** Liquid
9.2 **Molecular Weight:** 102.2
9.3 **Boiling Point at 1 atm:** 156°F = 69°C = 342°K
9.4 **Freezing Point:** -123°F = -86°C = 187°K
9.5 **Critical Temperature:** 440.4°F = 226.9°C = 500.1°K
9.6 **Critical Pressure:** 418 psia = 28.4 atm = 2.88 MN/m²
9.7 **Specific Gravity:** 0.724 at 20°C (liquid)
9.8 **Liquid Surface Tension:** 17.1 dynes/cm = 0.0171 N/m at 25°C
9.9 **Liquid Water Interfacial Tension:** 17.1 dynes/cm = 0.0171 N/m at 25°C
9.10 **Vapor (Gas) Specific Gravity:** 3.5
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.0590
9.12 **Latent Heat of Vaporization:** 131 Btu/lb = 73 cal/g = 3.1 X 10⁵ J/kg
9.13 **Heat of Combustion:** -16,900 Btu/lb = -9,390 cal/g = -393 X 10⁶ 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:** 25.79 cal/g
9.18 **Limiting Value:** Currently not available
9.19 **Reid Vapor Pressure:** High

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 |
| 35 | 46.450 | 0 | 0.476 | 42 | 1.048 | 28 | 0.589 |
| 40 | 46.260 | 5 | 0.478 | 44 | 1.048 | 30 | 0.577 |
| 45 | 46.070 | 10 | 0.480 | 46 | 1.048 | 32 | 0.566 |
| 50 | 45.880 | 15 | 0.482 | 48 | 1.048 | 34 | 0.555 |
| 55 | 45.690 | 20 | 0.485 | 50 | 1.048 | 36 | 0.545 |
| 60 | 45.500 | 25 | 0.487 | 52 | 1.048 | 38 | 0.534 |
| 65 | 45.310 | 30 | 0.489 | 54 | 1.048 | 40 | 0.524 |
| 70 | 45.120 | 35 | 0.491 | 56 | 1.048 | 42 | 0.515 |
| 75 | 44.930 | 40 | 0.494 | 58 | 1.048 | 44 | 0.505 |
| 80 | 44.740 | 45 | 0.496 | 60 | 1.048 | 46 | 0.496 |
| 85 | 44.540 | 50 | 0.498 | 62 | 1.048 | 48 | 0.487 |
| 90 | 44.350 | 55 | 0.500 | 64 | 1.048 | 50 | 0.478 |
| 95 | 44.160 | 60 | 0.502 | 66 | 1.048 | 52 | 0.470 |
| 100 | 43.970 | 65 | 0.505 | 68 | 1.048 | 54 | 0.461 |
| 105 | 43.780 | 70 | 0.507 | 70 | 1.048 | 56 | 0.453 |
| 110 | 43.590 | 75 | 0.509 | 72 | 1.048 | 58 | 0.445 |
| 115 | 43.400 | 80 | 0.511 | 74 | 1.048 | 60 | 0.437 |
| 120 | 43.210 | 85 | 0.514 | 76 | 1.048 | 62 | 0.430 |
| 125 | 43.020 | | | | | 64 | 0.423 |
| 130 | 42.830 | | | | | 66 | 0.415 |
| 135 | 42.640 | | | | | 68 | 0.408 |
| 140 | 42.450 | | | | | 70 | 0.402 |
| | | | | | | 72 | 0.395 |
| | | | | | | 74 | 0.388 |
| | | | | | | 76 | 0.382 |
| | | | | | | 78 | 0.376 |

| 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 |
| 68 | 1.200 | 35 | 0.975 | 35 | 0.01876 | 0 | 0.310 |
| | | 40 | 1.119 | 40 | 0.02132 | 20 | 0.321 |
| | | 45 | 1.281 | 45 | 0.02416 | 40 | 0.333 |
| | | 50 | 1.462 | 50 | 0.02732 | 60 | 0.344 |
| | | 55 | 1.665 | 55 | 0.03081 | 80 | 0.355 |
| | | 60 | 1.892 | 60 | 0.03466 | 100 | 0.366 |
| | | 65 | 2.144 | 65 | 0.03891 | 120 | 0.377 |
| | | 70 | 2.424 | 70 | 0.04357 | 140 | 0.388 |
| | | 75 | 2.734 | 75 | 0.04869 | 160 | 0.398 |
| | | 80 | 3.077 | 80 | 0.05429 | 180 | 0.409 |
| | | 85 | 3.456 | 85 | 0.06041 | 200 | 0.419 |
| | | 90 | 3.873 | 90 | 0.06708 | 220 | 0.428 |
| | | 95 | 4.331 | 95 | 0.07434 | 240 | 0.438 |
| | | 100 | 4.834 | 100 | 0.08223 | 260 | 0.448 |
| | | 105 | 5.385 | 105 | 0.09079 | 280 | 0.457 |
| | | 110 | 5.987 | 110 | 0.10010 | 300 | 0.466 |
| | | 115 | 6.644 | 115 | 0.11010 | 320 | 0.475 |
| | | 120 | 7.361 | 120 | 0.12090 | 340 | 0.484 |
| | | 125 | 8.140 | 125 | 0.13250 | 360 | 0.492 |
| | | 130 | 8.986 | 130 | 0.14510 | 380 | 0.501 |
| | | 135 | 9.904 | 135 | 0.15860 | 400 | 0.509 |
| | | 140 | 10.900 | 140 | 0.17300 | 420 | 0.517 |
| | | 145 | 11.970 | 145 | 0.18850 | 440 | 0.525 |
| | | 150 | 13.130 | 150 | 0.20510 | | |
| | | 155 | 14.380 | 155 | 0.22280 | | |