

DI-N-BUTYL ETHER

DBE

CAUTIONARY RESPONSE INFORMATION

Common Synonyms		Liquid	Colorless	Mild pleasant odor
1-Butoxy butane Butyl ether n-Butyl ether Dibutyl ether n-Dibutyl ether Dibutyl oxide		Floats on water. Flammable, irritating vapor is produced.		
<p style="color: red;">Keep people away. Shut off ignition sources. Call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>				
Fire	<p>FLAMMABLE. Containers may explode in 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. Move victim to fresh air. 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

Stop discharge
Contain
Collection Systems: Skim
Chemical and Physical Treatment: Burn
Clean shore line
Salvage waterfowl

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** 41; Ethers
2.2 **Formula:** C₄H₁₀OC₄H₉
2.3 **IMO/UN Designation:** 3.3/1149
2.4 **DOT ID No.:** 1149
2.5 **CAS Registry No.:** 142-96-1
2.6 **NAERG Guide No.:** 127
2.7 **Standard Industrial Trade Classification:** 51616

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Goggles or face shield; rubber gloves.
3.2 **Symptoms Following Exposure:** Inhalation causes irritation of nose and throat. Liquid irritates eyes and may irritate skin on prolonged contact. Ingestion causes irritation of mouth and stomach.
3.3 **Treatment of Exposure:** INHALATION: remove to fresh air. EYES: after contact with liquid, flush with water for at least 15 min. SKIN: wipe off, wash well with soap and water. INGESTION: induce vomiting.
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 = 7,400 mg/kg (rat)
3.8 **Toxicity by Inhalation:** Currently not available.
3.9 **Chronic Toxicity:** Currently not available
3.10 **Vapor (Gas) Irritant Characteristics:** Currently not available
3.11 **Liquid or Solid Characteristics:** Currently not available
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:** 92°F O.C.
4.2 **Flammable Limits in Air:** 1.5%-7.6%
4.3 **Fire Extinguishing Agents:** Dry chemical, "alcohol" foam, or 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.
4.7 **Auto Ignition Temperature:** 382°F
4.8 **Electrical Hazards:** Currently not available
4.9 **Burning Rate:** Currently not available
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 57.1 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 17.0 (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:** 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: I
Reduction of amenities: X

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Ambient
7.2 **Storage Temperature:** No requirement
7.3 **Inert Atmosphere:** Currently not available
7.4 **Venting:** Open (flame arrester)
7.5 **IMO Pollution Category:** Currently not available
7.6 **Ship Type:** Currently not available
7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Flammable liquid
8.2 **49 CFR Class:** 3
8.3 **49 CFR Package Group:** III
8.4 **Marine Pollutant:** No
8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|---------------------------|----------------|
| Health Hazard (Blue)..... | 2 |
| Flammability (Red)..... | 3 |
| 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:** Liquid
9.2 **Molecular Weight:** 130.2
9.3 **Boiling Point at 1 atm:** 288°F = 142°C = 415°K
9.4 **Freezing Point:** -139.7°F = -95.4°C = 177.8°K
9.5 **Critical Temperature:** Not pertinent
9.6 **Critical Pressure:** Not pertinent
9.7 **Specific Gravity:** 0.767 at 20°C (liquid)
9.8 **Liquid Surface Tension:** 23 dynes/cm = 0.023 N/m at 20°C
9.9 **Liquid Water Interfacial Tension:** (est.) 30 dynes/cm = 0.030 N/m at 20°C
9.10 **Vapor (Gas) Specific Gravity:** 4.5
9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.0434
9.12 **Latent Heat of Vaporization:** 120 Btu/lb = 68 cal/g = 2.8 X 10⁵ J/kg
9.13 **Heat of Combustion:** -17,670 Btu/lb = -9,820 cal/g = -411 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:** Currently not available
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
-35	51.050	-30	0.483	0	0.964	0	1.245
-30	50.890	-20	0.486	10	0.953	10	1.127
-25	50.740	-10	0.488	20	0.942	20	1.025
-20	50.590	0	0.491	30	0.931	30	0.935
-15	50.440	10	0.494	40	0.920	40	0.857
-10	50.280	20	0.497	50	0.909	50	0.788
-5	50.130	30	0.499	60	0.898	60	0.727
0	49.980	40	0.502	70	0.887	70	0.672
5	49.830	50	0.505	80	0.877	80	0.624
10	49.670	60	0.508	90	0.866	90	0.580
15	49.520	70	0.511	100	0.855	100	0.541
20	49.370	80	0.513	110	0.844	110	0.506
25	49.210	90	0.516	120	0.833	120	0.474
30	49.060	100	0.519	130	0.822	130	0.445
35	48.910	110	0.522	140	0.811	140	0.419
40	48.760	120	0.524	150	0.800	150	0.395
45	48.600	130	0.527	160	0.789	160	0.374
50	48.450	140	0.530	170	0.778	170	0.354
55	48.300			180	0.768		
60	48.150						
65	47.990						
70	47.840						
75	47.690						
80	47.540						
85	47.380						
90	47.230						

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	0.030	70	0.103	70	0.00237	0	0.336
		80	0.142	80	0.00319	20	0.345
		90	0.192	90	0.00424	40	0.354
		100	0.258	100	0.00558	60	0.363
		110	0.342	110	0.00728	80	0.372
		120	0.449	120	0.00940	100	0.381
		130	0.585	130	0.01203	120	0.390
		140	0.755	140	0.01526	140	0.398
		150	0.966	150	0.01921	160	0.407
		160	1.226	160	0.02400	180	0.416
		170	1.545	170	0.02976	200	0.425
		180	1.932	180	0.03664	220	0.434
		190	2.401	190	0.04482	240	0.443
		200	2.963	200	0.05448	260	0.452
		210	3.634	210	0.06582	280	0.461
		220	4.430	220	0.07906	300	0.469
		230	5.370	230	0.09445	320	0.478
		240	6.474	240	0.11220	340	0.487
		250	7.763	250	0.13270	360	0.496
		260	9.262	260	0.15610	380	0.505
						400	0.514
						420	0.523
						440	0.532
						460	0.540
						480	0.549
						500	0.558