

# BROMINE TRIFLUORIDE

BTF

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b>	Liquid	Colorless	Extremely irritating odor
	Reacts violently with water. Poisonous gas is produced on contact with water. Freezing point is 28°F.		
	<p>Restrict access. Evacuate. AVOID CONTACT WITH LIQUID AND VAPOR. Call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>		
<b>Fire</b>	<p>Not flammable. May cause fire on contact with combustibles. POISONOUS GASES MAY BE PRODUCED IN FIRE. Containers may explode in fire. Wear goggles and self-contained breathing apparatus. Extinguish with dry chemicals or carbon dioxide. DO NOT USE WATER OR FOAM ON FIRE.</p>		
<b>Exposure</b>	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR POISONOUS IF INHALED. Irritating to eyes, nose and throat. Move victim to fresh air. If in eyes, hold eyelids open and flush with plenty of water. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>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.</p>		
<b>Water Pollution</b>	<p>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.</p>		

### 1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse  
Stop discharge  
Chemical and Physical Treatment:  
Neutralize  
Do not add water to undissolved material

### 2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.  
2.2 Formula: BrF<sub>3</sub>  
2.3 IMO/UN Designation: 8/1746  
2.4 DOT ID No.: 1746  
2.5 CAS Registry No.: 7787-71-5  
2.6 NAERG Guide No.: 144  
2.7 Standard Industrial Trade Classification: 52241

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Self-contained breathing apparatus; complete protective clothing; safety glasses; face shield.
- 3.2 **Symptoms Following Exposure:** Inhalation causes severe irritation of upper respiratory system. Contact with liquid or vapor causes severe burns of eyes and can cause ulcers and blindness. Contact with skin causes severe burns. Ingestion causes severe burns of mucous membranes.
- 3.3 **Treatment of Exposure:** Get immediate medical attention for all exposures. **INHALATION:** remove from exposure; support respiration. **EYES:** irrigate with copious amounts of water for at least 15 min. **SKIN:** wash with large amounts of water for at least 15 min., then rinse with sodium bicarbonate or lime solution.
- 3.4 **TLV-TWA:** Not listed.  
3.5 **TLV-STEL:** Not listed.  
3.6 **TLV-Ceiling:** Not listed.  
3.7 **Toxicity by Ingestion:** Currently not available.  
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:**  
Not flammable but may cause fire on contact with combustibles.
- 4.2 **Flammable Limits in Air:** Not flammable
- 4.3 **Fire Extinguishing Agents:** Dry chemical, carbon dioxide
- 4.4 **Fire Extinguishing Agents Not to Be Used:** Water, foam
- 4.5 **Special Hazards of Combustion Products:** Currently not available
- 4.6 **Behavior in Fire:** Forms very toxic and irritating fumes.
- 4.7 **Auto Ignition Temperature:** Not pertinent
- 4.8 **Electrical Hazards:** Not pertinent
- 4.9 **Burning Rate:** Not pertinent
- 4.10 **Adiabatic Flame Temperature:** Currently not available
- 4.11 **Stoichiometric Air to Fuel Ratio:** Not pertinent
- 4.12 **Flame Temperature:** Currently not available
- 4.13 **Combustion Molar Ratio (Reactant to Product):** Not pertinent
- 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

### 5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Reacts vigorously to generate toxic hydrogen fluoride gas (hydrofluoric acid).
- 5.2 **Reactivity with Common Materials:** Will cause severe corrosion of common metals and glass. May cause fire in contact with organic materials such as wood, cotton, or straw.
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water, rinse with sodium bicarbonate or lime solution.
- 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):** None
- 6.4 **Food Chain Concentration Potential:** None
- 6.5 **GESAMP Hazard Profile:**  
Bioaccumulation: 0  
Damage to living resources: (3)  
Human Oral hazard: (3)  
Human Contact hazard: II  
Reduction of amenities: XXX

### 7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 98+%
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Pressure-vacuum
- 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:** Oxidizer
- 8.2 **49 CFR Class:** 5.1
- 8.3 **49 CFR Package Group:** I
- 8.4 **Marine Pollutant:** No
- 8.5 **NFPA Hazard Classification:** Not listed
- 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:** 136.9
- 9.3 **Boiling Point at 1 atm:** 258.4°F = 125.8°C = 399.0°K
- 9.4 **Freezing Point:** 47.8°F = 8.8°C = 282.0°K
- 9.5 **Critical Temperature:** (est.) 621°F = 327°C = 600°K
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 2.81 at 20°C (liquid)
- 9.8 **Liquid Surface Tension:** 36.3 dynes/cm = 0.0363 N/m at 20°C
- 9.9 **Liquid Water Interfacial Tension:** Not pertinent
- 9.10 **Vapor (Gas) Specific Gravity:** 4.7
- 9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.1428
- 9.12 **Latent Heat of Vaporization:** 130 Btu/lb = 74 cal/g = 3.1 X 10<sup>5</sup> J/kg
- 9.13 **Heat of Combustion:** Not pertinent
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** Currently not available
- 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
55	176.500	52	0.220	51	1.612	51	4.064
60	176.099	54	0.220	52	1.612	52	4.005
65	175.699	56	0.220	53	1.612	53	3.948
70	175.199	58	0.220	54	1.612	54	3.892
75	174.799	60	0.220	55	1.612	55	3.836
80	174.400	62	0.220	56	1.612	56	3.782
85	173.900	64	0.220	57	1.612	57	3.729
90	173.500	66	0.220	58	1.612	58	3.677
95	173.099	68	0.220	59	1.612	59	3.625
100	172.599	70	0.220	60	1.612	60	3.575
105	172.199	72	0.220	61	1.612	61	3.525
110	171.799	74	0.220	62	1.612	62	3.476
115	171.299	76	0.220	63	1.612	63	3.428
120	170.900	78	0.220	64	1.612	64	3.381
125	170.500	80	0.220	65	1.612	65	3.335
130	170.000	82	0.220	66	1.612	66	3.290
135	169.599	84	0.220	67	1.612	67	3.245
140	169.199	86	0.220	68	1.612	68	3.201
145	168.699			69	1.612	69	3.158
150	168.299			70	1.612	70	3.116
155	167.900			71	1.612	71	3.074
				72	1.612	72	3.033
				73	1.612	73	2.993
				74	1.612	74	2.954
				75	1.612	75	2.915
				76	1.612	76	2.877

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
	R	70	0.118	70	0.00283	0	0.116
	E	75	0.141	75	0.00336	10	0.116
	A	80	0.168	80	0.00398	20	0.116
	C	85	0.200	85	0.00470	30	0.116
	T	90	0.238	90	0.00551	40	0.116
	S	95	0.281	95	0.00645	50	0.116
		100	0.330	100	0.00753	60	0.116
		105	0.387	105	0.00875	70	0.116
		110	0.453	110	0.01014	80	0.116
		115	0.528	115	0.01171	90	0.116
		120	0.613	120	0.01348	100	0.116
		125	0.709	125	0.01547	110	0.116
		130	0.819	130	0.01771	120	0.116
		135	0.943	135	0.02022	130	0.116
		140	1.082	140	0.02301	140	0.116
		145	1.239	145	0.02613	150	0.116
		150	1.414	150	0.02959	160	0.116
		155	1.611	155	0.03342	170	0.116
		160	1.830	160	0.03767		
		165	2.074	165	0.04235		
		170	2.345	170	0.04750		
		175	2.646	175	0.05317		
		180	2.978	180	0.05938		
		185	3.345	185	0.06618		
		190	3.750	190	0.07361		
		195	4.195	195	0.08172		