PHOSPHORUS TRIBROMIDE

PBR

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
Phosphorus bromide	Liquid	Colorless to pale yellow	Sharp, penetrating odor
	Sinks and mixes violently with water.		

Evacuate.
Keep people away. Avoid contact with liquid.
Wear rubber overclothing (including gloves).
Notify local health and pollution control agencies.
Protect water intakes.

Fire	Not flammable. Irritating gases may be produced when heated.
Exposure	CALL FOR MEDICAL AID. LIQUID Will burn skin and eyes. If swallowed will cause nausea. 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. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.
Water Pollution	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.

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: PBr_3
2.3 IMO/UN Designation: 8/1808
2.4 DOT ID No.: 1808
2.5 CAS Registry No.: Currently not available
2.6 NAERG Guide No.: 137
2.7 Standard Industrial Trade Classification: 52329

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Acid-gas canister-type mask (full face type for emergencies); chemical safety goggles; apron, gloves, clothing, and safety shoes all made from rubber
3.2 Symptoms Following Exposure: Inhalation causes severe irritation of nose, throat, and lungs. Ingestion causes burns of mouth and stomach. Contact with eyes or skin causes severe burns.
3.3 Treatment of Exposure: INHALATION: remove victim to clear air; if necessary, apply artificial respiration and/or administer oxygen. INGESTION: dilute by drinking water, then neutralize with milk of magnesia, egg white, etc.,; do not use sodium bicarbonate. EYES: immediately flush with large amounts of water for at least 15 min. SKIN: immediately flush with large amounts of water; remove contaminated clothing.
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
4.2 Flammable Limits in Air: Not flammable
4.3 Fire Extinguishing Agents: Not pertinent
4.4 Fire Extinguishing Agents Not to Be Used: Do not use water on adjacent fires.
4.5 Special Hazards of Combustion Products: Irritating hydrogen bromide and phosphoric acid vapors may form in fire.
4.6 Behavior in Fire: Acids formed by reaction with water will attack metals and generate flammable hydrogen gas, which may form explosive mixtures in enclosed spaces.
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 Stoichometric 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 violently with water, evolving hydrogen bromide, an irritating and corrosive gas apparent as white fumes
5.2 Reactivity with Common Materials: In the presence of moisture, highly corrosive to most metals except lead and nickel
5.3 Stability During Transport: Unstable if heated
5.4 Neutralizing Agents for Acids and Caustics: Flush with water and rinse with dilute aqueous sodium bicarbonate or soda ash.
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: -
Human Oral hazard: 1
Human Contact hazard: II
Reduction of amenities: XX

7. SHIPPING INFORMATION

7.1 Grades of Purity: Purified, 88.55%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Open
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: Corrosive material
8.2 49 CFR Class: 8
8.3 49 CFR Package Group: II
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: 270.73
9.3 Boiling Point at 1 atm: 343°F = 173°C = 446°K
9.4 Freezing Point: –42.9°F = –40.5°C = 232.7°K
9.5 Critical Temperature: Not pertinent
9.6 Critical Pressure: Not pertinent
9.7 Specific Gravity: 2.862 at 30°C (liquid)
9.8 Liquid Surface Tension: 45.8 dynes/cm = 0.0458 N/m at 24°C
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: Not pertinent
9.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
9.12 Latent Heat of Vaporization: 64.4 Btu/lb = 35.8 cal/g = 1.50 X 10^5 J/kg
9.13 Heat of Combustion: Not pertinent
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: –446 Btu/lb = –248 cal/g = –10.4 X 10^5 J/kg
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
52	180.599	85	0.100		N	45	2.243
54	180.599				O	50	2.167
56	180.500				T	55	2.094
58	180.400					60	2.025
60	180.400				P	65	1.960
62	180.299				E	70	1.898
64	180.199				R	75	1.839
66	180.199				T	80	1.783
68	180.099				I	85	1.729
70	180.000				N	90	1.678
72	179.900				E	95	1.630
74	179.900				N	100	1.583
76	179.799				T		
78	179.699						
80	179.699						
82	179.599						
84	179.500						
86	179.500						

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	110	0.161	110	0.00712	46	0.067
	E	120	0.210	120	0.00916	48	0.067
	A	130	0.273	130	0.01167	50	0.067
	C	140	0.351	140	0.01474	52	0.067
	T	150	0.447	150	0.01848	54	0.067
	S	160	0.565	160	0.02300	56	0.067
		170	0.709	170	0.02841	58	0.067
		180	0.884	180	0.03485	60	0.067
		190	1.094	190	0.04248	62	0.067
		200	1.346	200	0.05145	64	0.067
		210	1.645	210	0.06195	66	0.067
		220	1.999	220	0.07417	68	0.067
		230	2.415	230	0.08832	70	0.067
		240	2.902	240	0.10460	72	0.067
		250	3.470	250	0.12330	74	0.067
		260	4.128	260	0.14470	76	0.067
		270	4.887	270	0.16890	78	0.067
		280	5.760	280	0.19640	80	0.067
		290	6.759	290	0.22740		
		300	7.897	300	0.26220		
		310	9.190	310	0.30120		
		320	10.650	320	0.34460		
		330	12.300	330	0.39300		