

HYDROGEN BROMIDE

HBR

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Hydrobromic acid, anhydrous Hydrogen bromide, anhydrous	Gas	Colorless	Irritating odor
Sinks and mixes with water. Poisonous visible vapor cloud is produced.			
Evacuate. Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR. Wear chemical protective suit with self-contained breathing apparatus. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.			
Fire	Not flammable. Flammable gas may be produced on contact with metals. Wear chemical protective suit with self-contained breathing apparatus.		
Exposure	CALL FOR MEDICAL AID. VAPOR POISONOUS IF INHALED. Irritating to eyes, nose and throat. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID POISONOUS IF SWALLOWED. Will burn skin and eyes. Will cause frostbite. 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. DO NOT RUB AFFECTED AREAS.		
Water Pollution	Dangerous to aquatic life in high concentrations. 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

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
2.2 **Formula:** HBr
2.3 **IMO/UN Designation:** 2/1048
2.4 **DOT ID No.:** 1048
2.5 **CAS Registry No.:** 10035-10-6
2.6 **NAERG Guide No.:** 125
2.7 **Standard Industrial Trade Classification:** 52241

3. HEALTH HAZARDS

3.1 **Personal Protective Equipment:** Full face mask and acid gas canister; self-contained breathing apparatus; chemical goggles; rubber apron and gloves; acid-proof clothing; safety shower

3.2 **Symptoms Following Exposure:** Inhalation causes severe irritation of nose and upper respiratory tract, lung injury. Ingestion causes burns of mouth and stomach. Contact with eyes causes severe irritation and burns. Contact with skin causes irritation and burns.

3.3 **Treatment of Exposure:** Get medical attention after all overexposures to this chemical. **INHALATION:** move victim to fresh air and keep him warm and quiet; if a qualified person is available to give oxygen, such treatment may be helpful. **INGESTION:** give large amounts of water or milk; do NOT induce vomiting. **EYES:** flush with water for at least 15 min. **SKIN:** flush with water; treat acid burns.

3.4 **TLV-TWA:** Not listed.
3.5 **TLV-STEL:** Not listed.
3.6 **TLV-Ceiling:** 3 ppm
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:** 30 ppm
3.14 **OSHA PEL-TWA:** 3 ppm
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:** Not pertinent

4.5 **Special Hazards of Combustion Products:** Not pertinent

4.6 **Behavior in Fire:** Pressurized container may explode and release toxic, irritating vapor.

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:** Moderate reaction with evolution of heat

5.2 **Reactivity with Common Materials:**
Rapidly absorbs moisture, forming hydrobromic acid. Highly corrosive to most metals, with evolution of flammable hydrogen gas.

5.3 **Stability During Transport:** Stable

5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water; apply powdered limestone, slaked lime, soda ash, or sodium bicarbonate.

5.5 **Polymerization:** Not pertinent

5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

6.1 **Aquatic Toxicity:**
10-100 ppm/96 hr/*TL_m/*
*Species and water type not specified.

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: -
Human Oral hazard: -
Human Contact hazard: II
Reduction of amenities: XX

7. SHIPPING INFORMATION

7.1 **Grades of Purity:** 99.8+%

7.2 **Storage Temperature:** Ambient or lower

7.3 **Inert Atmosphere:** No requirement

7.4 **Venting:** Safety relief

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:** Poison gas

8.2 **49 CFR Class:** 2.3

8.3 **49 CFR Package Group:** Not pertinent.

8.4 **Marine Pollutant:** No

8.5 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	0
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:** 80.92

9.3 **Boiling Point at 1 atm:** -88.2°F = -66.8°C = 206.4°K

9.4 **Freezing Point:** Not pertinent

9.5 **Critical Temperature:** 193.6°F = 89.8°C = 363°K

9.6 **Critical Pressure:** 1,235 psia = 84 atm = 8.52 MN/m²

9.7 **Specific Gravity:** 2.14 at -67°C (liquid)

9.8 **Liquid Surface Tension:** 27.1 dynes/cm = 0.0271 N/m at -67.1°C

9.9 **Liquid Water Interfacial Tension:** Not pertinent

9.10 **Vapor (Gas) Specific Gravity:** 2.71

9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.38

9.12 **Latent Heat of Vaporization:** 92.3 Btu/lb = 51.3 cal/g = 2.15 X 10⁵ J/kg

9.13 **Heat of Combustion:** Not pertinent

9.14 **Heat of Decomposition:** Not pertinent

9.15 **Heat of Solution:** 445 Btu/lb = 247 cal/g = 10.3 X 10⁵ J/kg

9.16 **Heat of Polymerization:** Not pertinent

9.17 **Heat of Fusion:** 7.1 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
-126	145.199	-102	0.176		N		N
-124	144.599	-101	0.176		O		O
-122	144.000	-100	0.176		T		T
-120	143.400	-99	0.176				
-118	142.799	-98	0.176		P		P
-116	142.199	-97	0.176		E		E
-114	141.500	-96	0.176		R		R
-112	140.900	-95	0.176		T		T
-110	140.300	-94	0.176		I		I
-108	139.699	-93	0.176		N		N
-106	139.099	-92	0.176		E		E
-104	138.500	-91	0.176		N		N
-102	137.900	-90	0.176		T		T
-100	137.199	-89	0.176				
-98	136.599						
-96	136.000						
-94	135.400						
-92	134.799						
-90	134.199						

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
34	219.799	-90	13.990	-90	0.28520	40	0.089
36	218.500	-85	16.090	-85	0.32370	50	0.089
38	217.299	-80	18.440	-80	0.36600	60	0.089
40	216.000	-75	21.050	-75	0.41260	70	0.089
42	214.799	-70	23.960	-70	0.46350	80	0.089
44	213.500	-65	27.180	-65	0.51910	90	0.089
46	212.299	-60	30.730	-60	0.57960	100	0.089
48	211.000	-55	34.640	-55	0.64530	110	0.089
50	209.799	-50	38.940	-50	0.71640	120	0.089
52	208.599	-45	43.640	-45	0.79330	130	0.089
54	207.299	-40	48.780	-40	0.87620	140	0.089
56	206.099	-35	54.390	-35	0.96540	150	0.089
58	204.799	-30	60.480	-30	1.06100	160	0.089
60	203.599	-25	67.089	-25	1.16400	170	0.089
62	202.299	-20	74.250	-20	1.27300	180	0.089
64	201.099	-15	81.990	-15	1.39000	190	0.089
66	199.799	-10	90.339	-10	1.51400	200	0.089
68	198.599	-5	99.320	-5	1.64700	210	0.089
70	197.400	0	109.000	0	1.78700		
72	196.099	5	119.299	5	1.93600		
74	194.900	10	130.400	10	2.09300		
76	193.599						
78	192.400						
80	191.099						
82	189.900						
84	188.599						