SODIUM BOROHYDRIDE

SBH

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
Borohydride	Solid powder or pellets	White	Odorless

Sinks and mixes with water. Flammable gas is produced.

Keep people away. Avoid contact with solid and dust.
Wear rubber overclothing (including gloves) and dust respirator.
Shut off ignition sources and call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Combustible.
Flammable, explosive gas may be produced on contact with metals, acids or when heated.
DO NOT USE WATER, FOAM, CARBON DIOXIDE, OR VAPORIZING LIQUIDS.
Extinguish with dry graphite, powdered limestone, soda ash, or powdered sodium chloride.

Exposure

CALL FOR MEDICAL AID.
DUST
Harmful if inhaled.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

SOLID
Irritating to skin and eyes.
Harmful if swallowed or if skin is exposed.
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.

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

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.
2.2 Formula: $NaBH_4$
2.3 IMO/UN Designation: 4.3/1426
2.4 DOT ID No.: 1426
2.5 CAS Registry No.: 16940-66-2
2.6 NAERG Guide No.: 138
2.7 Standard Industrial Trade Classification: 52495

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Goggles, rubber gloves, and protective clothing.
3.2 Symptoms Following Exposure: Solid irritates skin. If ingested can form large volume of gas and lead to a gas embolism.
3.3 Treatment of Exposure: INGESTION: do NOT induce vomiting; give dilute vinegar, lemon juice, milk, or olive oil; call a doctor. SKIN AND EYES: flood with large amount of water.
3.4 TLV-TWA: Not listed.
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Violent reaction with acid in stomach. Considered toxic because of boron content.
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Non-volatile.
3.11 Liquid or Solid Characteristics: Irritates skin.
3.12 Odor Threshold: Odorless
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: Flammable solid
4.2 Flammable Limits in Air: Not pertinent
4.3 Fire Extinguishing Agents: Graphite, limestone, soda ash, sodium chloride powders
4.4 Fire Extinguishing Agents Not to Be Used: Water, carbon dioxide, or halogenated extinguishing agents.
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Decomposes and produces highly flammable hydrogen gas.
4.7 Auto Ignition Temperature: Not pertinent
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: Not pertinent
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 9.5 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 3.0 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: Reacts to form flammable hydrogen gas.
5.2 Reactivity with Common Materials: Reacts with acids to form toxic, flammable diborane gas. Slowly corrodes glass.
5.3 Stability During Transport: Stable unless mixed with acids or overheated, when flammable hydrogen gas is formed.
5.4 Neutralizing Agents for Acids and Caustics: Caustic formed by reaction with water can be diluted and/or neutralized with acetic acid.
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: Not listed

7. SHIPPING INFORMATION

7.1 Grades of Purity: 95-98% minimum purity; dry powder; pellets; 12% solution in 43% aqueous sodium hydroxide
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Sealed containers must be stored in well-ventilated area
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: Dangerous When Wet
8.2 49 CFR Class: 4.3
8.3 49 CFR Package Group: I
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	1
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: Solid
9.2 Molecular Weight: 37.83
9.3 Boiling Point at 1 atm: Decomposes
9.4 Freezing Point: Not pertinent
9.5 Critical Temperature: Not pertinent
9.6 Critical Pressure: Not pertinent
9.7 Specific Gravity: 1.074 at 20°C (solid)
9.8 Liquid Surface Tension: Not pertinent
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: Not pertinent
9.13 Heat of Combustion: Not pertinent
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
	NOT PERTINENT		NOT PERTINENT		NOT PERTINENT		NOT PERTINENT

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	26.320		NOT PERTINENT		NOT PERTINENT		NOT PERTINENT
36	27.650						
38	28.990						
40	30.320						
42	31.650						
44	32.990						
46	34.320						
48	35.650						
50	36.990						
52	38.320						
54	39.650						
56	40.990						
58	42.320						
60	43.650						
62	44.990						
64	46.320						
66	47.650						
68	48.990						
70	50.320						
72	51.650						
74	52.990						
76	54.320						
78	55.650						
80	56.990						
82	58.320						
84	59.650						