

Section 1: Product and Company Identification

Middlesex Gases & Technologies

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Product Code: Diborane

Section 2: Hazards Identification



Danger

Hazard Classification:

Acute Gas Inhale Toxicity (Category 1)
Flammable (Category 1)
Gases Under Pressure

Hazard Statements:

Contains gas under pressure; may explode if heated
Extremely flammable gas
Fatal if inhaled

Precautionary Statements

Prevention:

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not breathe dust/fume/gas/mist/ vapors/spray..
Use only outdoors or in a well-ventilated area.
[In case of inadequate ventilation] wear respiratory protection.

Response:

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Immediately call a poison center or doctor.
Eliminate all ignition sources if safe to do so.
Specific treatment is urgent.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If inhaled: Remove person to fresh air and keep comfortable for breathing.

Storage:

Store in a well-ventilated place. Keep container tightly closed.

Protect from sunlight.
Store locked up.

Disposal:
Dispose of contents and/or container in accordance with applicable regulations.

Section 3: Composition/Information on Ingredients

CAS #
19287-45-7

Chemical Substance	Chemical Family	Trade Names
Diborane		Boroethane, Boron hydride, Diboron hexahydride

Section 4: First Aid Measures

Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.	Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If swallowed, drink plenty of water, DO NOT induce vomiting. Get immediate medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen. Avoid gastric lavage or emesis.

Section 5: Fire Fighting Measures

Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Firefighting should be done from an explosion-resistant location. Use water from unmanned monitors or hose holders to keep fire-exposed containers cool. If it is necessary to stop flow of gas, use water spray to protect personnel effecting shut-off. Personnel should be evacuated immediately. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. (EPA, 1998)	Hydrogen and boric acid	<ul style="list-style-type: none">Self-contained breathing apparatus and full protective clothing should be worn.

Section 6: Accidental Release Measures

Personal Precautions	Environmental Precautions	Methods for Containment
Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Isolate area.	Prevent entry into waterways, sewers, basements or confined areas.	Stop leak if possible without personal risk. FOR CHLOROSILANES, use AFFF alcohol-resistant medium expansion foam to reduce vapors.

Methods for Cleanup	Other Information
If possible, turn leaking containers so that gas escapes rather than liquid.	Do not direct water at spill or source of leak. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

Section 7: Handling and Storage

Handling	Storage
Store in a well-ventilated area. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Store below 52 C. Store in a cool, dry place. Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). Always use personal protective equipment.

Section 8: Exposure Controls/Personal Protection

Exposure Guidelines
NIOSH REL: TWA 0.1 ppm (0.1 mg/m ³) OSHA PEL: TWA 0.1 ppm (0.1 mg/m ³)

Engineering Controls

No specific controls are needed.

Eye Protection	Skin Protection	Respiratory Protection
Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	Wear appropriate chemical resistant clothing.	Self-contained breathing apparatus and full protective clothing should be worn.

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
Gas	Colorless	Colorless	N/A	Gas	Offensive, sweet	N/A

Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
-130 ° F	2.3	Not available	100 to 126 ° F	0.8 %	88 %

Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
-135 ° F at 760.0 mm Hg	-265 ° F	224 mm Hg at -169.6 ° F	1 (relative to air)	0.447 at -169.6 ° F	Decomposes	N/A	2 mg/m ³	Not available	Not available

Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
27.69	B2H6	Not available	Not available	Not available	Not available	

Section 10: Stability and Reactivity

Stability	Conditions to Avoid	Incompatible Materials
It ignites in air. It is very explosive when exposed to heat or flame, on contact with moisture it produces hydrogen gas. Explosive reaction with benzene vapor, chlorine, nitric acid and tetravinyllead [Bretherick, 5th ed., 1995, p. 77]. Explosive reaction with dimethyl sulfoxide [Shriver, 1969, p. 209], violent reaction with halocarbon liquids used as fire extinguishants (e.g., carbon tetrachloride). Reaction with Al or Li produces complex hydrides that may ignite spontaneously in air [Haz. Chem. Data, 1975, p. 114].	It ignites in air. It is very explosive when exposed to heat or flame, on contact with moisture it produces hydrogen gas. Explosive reaction with benzene vapor, chlorine, nitric acid and tetravinyllead [Bretherick, 5th ed., 1995, p. 77]. Explosive reaction with dimethyl sulfoxide [Shriver, 1969, p. 209], violent reaction with halocarbon liquids used as fire extinguishants (e.g., carbon tetrachloride). Reaction with Al or Li produces complex hydrides that may ignite spontaneously in air [Haz. Chem. Data, 1975, p. 114].	Water, halogenated compounds, aluminum, lithium, oxidized surfaces, acids

Hazardous Decomposition Products	Possibility of Hazardous Reactions

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Hydrogen and boric acid	May polymerize.

Section 11: Toxicology Information

Acute Effects

Oral LD50	Dermal LD50	Inhalation
44 mg/m3/4hr	Not available	Chest tightness, precordial pain, short breath, nonproductive cough, nausea; headache, dizziness, chills, fever, lassitude (weakness, exhaustion), tremor, muscle fasciculation; in animals: liver, kidney damage; pulmonary edema; hemorrhage

Eye Irritation	Skin Irritation	Sensitization
Not likely route of exposure	Chest tightness, precordial pain, short breath, nonproductive cough, nausea; headache, dizziness, chills, fever, lassitude (weakness, exhaustion), tremor, muscle fasciculation; in animals: liver, kidney damage; pulmonary edema; hemorrhage	Highly toxic by inhalation, skin absorption or ingestion. They may produce acute or chronic poisoning. Diborane is an irritant to the lungs and kidneys. The primary effect of diborane poisoning is lung congestion caused by local tissue irritation produced by the exothermic reaction of hydrolysis. (EPA, 1998)

Chronic Effects

Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Not classified	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

Section 13: Disposal Considerations

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D003.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Diborane, compressed	UN1911	2.3	Not applicable	Poison gas (inhalation hazard) and flammable gas	Not available	Not available	Not available

Canadian Transportation of Dangerous Goods

Shipping Name	UN Number	Class	Packing Group / Risk Group
Diborane, compressed	UN1911	2.3	Not applicable

Section 15: Regulatory Information

U.S. Regulations

CERCLA Sections	SARA 355.30	SARA 355.40
100 RQ	Not available	Not available

SARA 370.21

Acute	Chronic	Fire	Reactive	Sudden Release
Not available	Not available	Not available	Not available	Not available

SARA 372.65

Not available

OSHA Process Safety

Not available

State Regulations

CA Proposition 65

Not regulated

Canadian Regulations

WHMIS Classification

A, B-1, D-1A

National Inventory Status

US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Listed on inventory.	Not available	Not available

Section 16: Other Information

NFPA Rating

HEALTH=4 FIRE=4 REACTIVITY=3

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard