

**HONG KONG SPECIALTY GASES CO., LTD.**

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MATERIAL
SAFETY
DATA SHEET

PRODUCT NAME Diborane Mixtures	CAS# 19287-45-7
TRADE NAME AND SYNONYMS Diborane Mixtures, Compressed, (D.O.T.); Boron Hydride; Boroethane	DOT I.D. NO. Na 1911
CHEMICAL NAME AND SYNONYMS Boron Hydride	DOT HAZARD CLASS Division 2.1
ISSUE DATE AND REVISIONS Revised July 2001	FORMULA B ₂ H ₆

HEALTH HAZARD DATA

EMERGENCY OVERVIEW Diborane is a colorless, flammable, toxic gas, with a sickly sweet odor. It may cause headache, nausea, weakness, tremors, convulsions, general lassitude, tightness of chest, coughing, respiratory difficulties, pulmonary edema and hemorrhage..
SYMPTOMS OF EXPOSURE It is an irritant to the respiratory system causing headache, fatigue, drowsiness, shortness of breath, coughing and eventual convulsions and death.
TOXICOLOGICAL PROPERTIES LC ₅₀ Human, Inhalation = 159 molar PPM for 15 Minutes Also Lethal Dose, Human, Inhalation = 30-90 mg/m ³ for 4 hours Its toxicity seems to be similar to that for phosgene, chlorine, fluorine, and arsine. Damage to the lungs resulting in pulmonary edema will most probably occur as well as kidney and liver damage. The signs of the intoxication may be delayed for up to 24 hours or occur immediately after the exposure. Persons in ill health where such illness would be aggravated by exposure to diborane should not be allowed to work with or handle this product.
RECOMMENDED FIRSTAID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO DIBORANE. RESCUERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD. Inhalation: Move affected person to an uncontaminated area. If breathing has stopped, give assisted respiration. Oxygen should be administered by a qualified person. Keep victim warm and calm. Seek immediate medical assistance. Continued treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Pure diborane is flammable in air over a very wide range. It will ignite spontaneously in moist air at room temperatures. It also reacts violently with oxides, ammonia, alcohols, lithium and similar reactive metals, halogens and halogenated compounds.

PHYSICAL DATA

BOILING POINT -134.5 °F (-92.5 °C)	LIQUID DENSITY AT BOILING POINT 26.3 lb/ft ³ (421kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C): Above the critical temp. of 62°F (16.7°C)	GAS DENSITY AT 70°F, 1 atm .0711 lb/ft ³ (1.141 kg/m ³)
SOLUBILITY IN WATER Hydrolyzes	FREEZING POINT -264.7°F (-164.9°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1 °C) = 0.95
APPEARANCE AND ODOR Colorless gas with characteristic sickly sweet odor.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A (Gas)	AUTO IGNITION TEMPERATURE 100°F (38°)	FLAMMABLE LIMITS % BY VOLUME LEL 0.9 UEL 98
EXTINGUISHING MEDIA Only acceptable are protein based foams with a nitrogen carrier		ELECTRICAL CLASSIFICATION Class 1, Group not specified
SPECIAL FIRE FIGHTING PROCEDURES Diborane reacts with most extinguishing media such as water, carbon dioxide, chemical powders and halogenated compounds. Attempting to stop the flow of gas and allow the fire to burn itself out. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Ignites spontaneously in moist air. The heat of combustion from a diborane fire is greater than that from sililar hydrocarbon such as an ethane fire.		

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID Elevates temperatures. Diborane mixture storage time should minimized. Higher borane decomposition products (typically tetraborane) may be ore shock sensitive that diborane.
Unstable	X	
Stable		
INCOMPATIBILITY (Materials to avoid) None		
HAZARDOUS POLYMERIZATION		HAZARDOUS DECOMPOSITION PRODUCTS None
May Occur		
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact HSG for special advice.
WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container <u>properly labeled with any valve outlet plugs or caps secured and valve protection cap in place</u> to HSG. For emergency disposal assistance, contact HSG for specific advice.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation.	LOCAL EXHAUST To prevent accumulation above the TWA.	SPECIAL N/A
	MECHANICAL (Gen.) In accordance with electrical codes	OTHER N/A
PROTECTIVE GLOVES Plastic or rubber		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION DOT Shipping Name: Diborane Mixtures, compressed DOT Shipping Label: Flammable Gas		DOT Hazard Class: Division 2.2 I.D. No.: NA 1911
SPECIAL HANDLING RECOMMENDATIONS Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.		
SPECIAL STORAGE RECOMMENDATIONS Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.		
SPECIAL PACKAGING RECOMMENDATIONS Diborane is non-corrosive and most common structural materials (except aluminum) may be used. It is also compatible with ordinary glass, pyrex and quartz. Kel-F and Teflon are preferred gasketing materials.		
OTHER RECOMMENDATIONS OR PRECAUTIONS Earth-ground and bond all lines and equipment associated with the diborane system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Law.		

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