

ELECTRONIC GAS

DIBORANE B₂H₆ MIXTURES

Diborane is a colorless, unstable, highly toxic flammable gas with a sickly-sweet odor. In pure form, it must be cooled to below 0°C for shipment. When diluted, however, stability is improved and it is therefore shipped as a mixture under high pressure in steel cylinders. Diborane can be diluted with argon, helium, hydrogen or nitrogen in order to provide concentrations less than 100%. Using diborane in this form can add an additional degree of control to the process, particularly when relatively small amounts of boron are to be deposited. Boron atom is a p-type dopant for epitaxial silicon. Boron is introduced to silicon wafer by diffusion implantation techniques. Mixtures are analyzed prior to shipment to ensure that the concentration is in the range requested. Diborane mixtures are prepared as ordered. Concentrations other than those listed below are available upon request.

Container Information

BALANCE GAS OPTIONS: ARGON, HELIUM, HYDROGEN, NITROGEN

CYLINDER SIZE	CONTENTS		Pressure @ 21.1°C Valve Outlet	1800 psig CGA-350 / DISS-632
	Ft ³	M ³		
049	193	5.5	DOT Shipping Description:	see next page
044	169	4.8	DOT Shipping Labels	Poison Gas Flammable Gas
016	63	1.8	CAS Registry No.	19287-45-7

Borosilicate Glass - Diborane In Silane

DIBORANE CONCENTRATION	CYLINDER SIZE	PRESSURE psig	CONTENT	
			Ft ³	M ³
1 - 10%	049	875	148	4.2
	044	875	133	3.8
	016	875	50	1.4

Specifications (pure Diborane)

COMPONENT DIBORANE	ELECTRONIC 99.95% min
Tetraborane	< 300 ppm
Pentaborane	< 150 ppm
Carbon Dioxide	< 5 ppm
Hydrogen	< 500 ppm
Nitrogen	< 10 ppm
Oxygen	< 1 ppm
THC (as Methane)	< 5 ppm

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Physical Properties (Pure Diborane)

Molecular Weight	27.67
Flammability Limits in air	0.8 - 98%
Specific Gravity, Gas @ 70°F(21.1°C), 1 atm(Air=1)	0.965
Density, Gas @ 70°F(21.1°C), 1 atm	0.0712lbs/ft ³ (1.141g/l)
Specific Volume, Gas @ 70°F(21.1°C), 1 atm	1.404ft ³ /lb (0.854l/g)
Boiling Point @ 1 atm	-135.1°F (-92.8°C)
Melting Point @ 1 atm	-267.8°F (-164.9°C)
Critical Temperature	62.1°F (16.7°C)
Critical Pressure	580.8 psia (40.04 bar)
Toxicity	
PEL	0.5 ppm
TC _{Lo} (Inhalation Human, 15 min.)	159 ppm
LC ₅₀	293 ppm
IDLH	30 ppm

DOT Shipping Information

HYDROGEN BALANCE

Conc	Shipping Name	Shipping Papers	Shipping Labels
>40%	__% Diborane/Hydrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Hydrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone A	Poison Gas Flammable Gas
40% - 8%	__% Diborane/Hydrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Hydrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone B	Poison Gas Flammable Gas
8% - 2.67%	__% Diborane/Hydrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Hydrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone C	Poison Gas Flammable Gas
2.67% - 1.6%	__% Diborane/Hydrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Hydrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone D	Poison Gas Flammable Gas
<1.6%	__ppm Diborane/Hydrogen Mixture	Compressed Gases, flammable, nos (__ppm Diborane/Hydrogen Mixture) 2.1 UN 1954	Flammable Gas

NITROGEN BALANCE

Conc	Shipping Name	Shipping Papers	Shipping Labels
>40%	__% Diborane/Nitrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Nitrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone A	Poison Gas Flammable Gas
40% - 8%	__% Diborane/Nitrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Nitrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone B	Poison Gas Flammable Gas
8% - 2.67%	__% Diborane/Nitrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Nitrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone C	Poison Gas Flammable Gas
2.67% - 1.6%	__% Diborane/Nitrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Nitrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone D	Poison Gas Flammable Gas
1.6% - 1.0%	__% Diborane/Nitrogen Mixture Inhalation Hazard	Compressed Gases, toxic, flammable, nos (__% Diborane/Nitrogen Mixture) 2.3 UN 1953 Poison Inhalation Hazard, Hazard Zone D	Flammable Gas
<1.0%	__ppm Diborane/Nitrogen Mixture	Compressed Gases, nos (__ppm Diborane/Nitrogen Mixture) 2.2 UN 1956	Non-flammable Gas