

Enriched Boron Trifluoride SDS[®]2 Safe Delivery Source

Features and Benefits

- Enriched $\geq 99.7\%$ Boron Trifluoride Content
- Higher beam current for increased throughput
- Dopant pressure maintained below one atmosphere minimizing the chance of accidental release
- Extend equipment lifetimes
- Unique cylinder outlet connections prevent inadvertent substitution of a pressurized gas cylinder
- Shelf life of two years

Overview

Ion implantation places dopant atoms at the precise location and at the proper depth within the silicon to achieve the optimal electrical performance of the device. In the case of boron, the dopant atoms are traditionally supplied from high pressure boron trifluoride. Due to the highly corrosive nature of this process gas, even the smallest breach in the integrity of the gas delivery system can reduce implanter availability.

The revolutionary SDS[®]2 Boron Trifluoride Safe Delivery Source addresses the concerns of a high pressure system by delivering $>99.9\%$ pure boron trifluoride gas at a pressure below one atmosphere. The potential for an accidental release of Boron Trifluoride is minimized improving plant safety and extending equipment lifetime. In addition, the concentration of the enriched Boron Trifluoride dopant is 25% higher than that of naturally occurring sources. This positively impacts the overall cost of ownership by increasing wafer throughput.

Description

The SDS[®] Safe Delivery Source technology, introduced by Matheson Tri-Gas and ATMI, Inc. in 1994, uses an adsorbent material to store enriched boron trifluoride at sub-atmospheric pressure levels. The gas is extracted by the pressure differential between the cylinder and the ion implant chamber, thus eliminating the risk of an uncontrolled release.

The SDS[®]2 Boron Trifluoride Safe Delivery Source is available in three standard cylinder sizes which deliver a quantity of gas comparable to conventional high pressure cylinders.

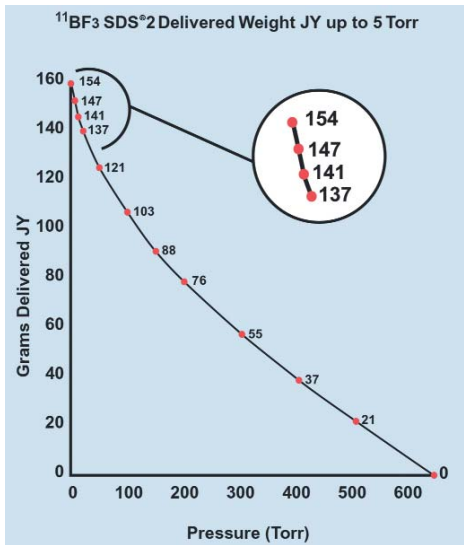
Most existing implant equipment can be easily adapted to use SDS[®] Brand products. In addition, ion implant manufacturers are now offering SDS[®] compatible equipment configurations as options on all new implanters.



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Enriched Boron Trifluoride SDS®2 Safe Delivery Source (¹¹BF₃)



Gas Purity (ppmv)	
Boron Trifluoride	≥ 99.9%
¹¹ BF ₃	≥ 99.7%
Argon	< 25
Carbon Dioxide	< 25
Hydrogen Fluoride	< 25
Nitrogen	< 25
Oxygen	< 25
Sulfur Dioxide	< 25
Shelf life: 2 years	
Purity Specification based on source gas	

Cylinder Size	Grams Deliverable to 20 Torr	Liters Deliverable to 20 Torr
UY (6.6L)	390	139.4
JY (2.2L)	130	46.5
WY (0.44L)	26	9.3

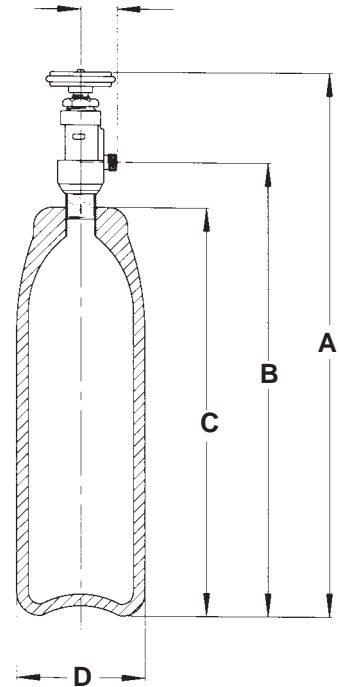
Note: Delivery capacity (grams) at 20 torr.
Actual capacity is a function of final cylinder pressure.

Cylinder Specifications

- D.O.T. (3AA2015) approved
- Carbon steel cylinder
- 1/4" VCR® type cylinder connection
- Stainless steel diaphragm valve
- Cylinders filled to 650 torr at 70° F (21°C) and not to exceed 700 torr at 70° F (21°C).
- Adsorbant material in SDS®2 is Carbon

Cylinder Dimensions

Size	A	B	C	D
UY (in)	22.60	19.66	18.20	6.20
(mm)	574.04	499.36	462.28	157.48
JY (in)	17.55	14.62	13.16	4.15
(mm)	445.78	371.35	334.26	105.41
WY (in)	15.75	13.50	11.75	2.00
(mm)	400.10	342.90	298.50	50.50



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