

Germanium Tetrafluoride SDS[®]2 Safe Delivery Source

Features and Benefits

- The dopant pressure is kept below one atmosphere minimizing the chance of accidental release
- Higher beam current for increased throughput
- Extend equipment lifetimes
- Unique cylinder outlet connections prevent inadvertent substitution of a pressurized gas cylinder
- Shelf life of two years

Overview

Ion implantation of Germanium at high doses is used primarily for the intentional formation of amorphous silicon layers. Co-implantation of electrically inactive species, such as germanium, is an effective method for creation of shallow p-type junctions. In this method, the non-dopant implant is performed before the boron implant, forming a fully amorphous layer that eliminates the channeling effect by removing the crystal order.

Elemental Germanium has been historically provided by high pressure liquefied gas. This method has the same drawbacks as the high pressure Boron Trifluoride delivery systems which have the potential for catastrophic leaks which causes damage or loss to gas box hardware and result in costly downtime. There is also a potential for personal exposure due to leaks.

The revolutionary SDS[®]2 Germanium Tetrafluoride Safe Delivery Source addresses the concerns of a high pressure delivery system by delivering pure germanium tetrafluoride gas at a pressure below one atmosphere. The potential for an accidental release of Germanium Tetrafluoride is virtually eliminated reducing risk of exposure and caustic leaks.

Description

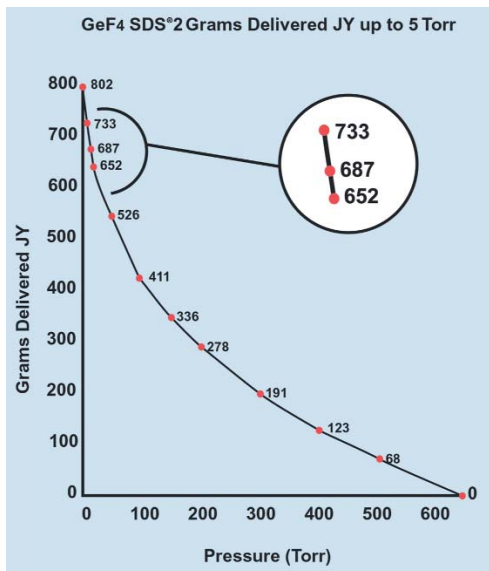
The SDS[®] Safe Delivery Source technology introduced by Matheson Tri-Gas and ATMI, Inc. in 1994, uses an adsorbent material to store pure Germanium Tetrafluoride at sub-atmospheric pressure levels. The gas is extracted by the pressure differential between the cylinder and the ion implanter, thus eliminating the risk of an uncontrolled release. 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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Germanium Tetrafluoride SDS®2 Safe Delivery Source (GeF₄)



Gas Purity (ppmv)	
Germanium Tetrafluoride	≥ 99.9%
Argon	< 25
Carbon Dioxide	< 25
Hydrogen Fluoride	< 25
Nitrogen	< 25
Oxygen	< 25
Sulfur Dioxide	< 25
Shelf life: 2 years	
Purity specifications based on source gas	

Cylinder Size	Grams Deliverable to 20 Torr	Liters Deliverable to 20 Torr
JY (2.2L)	620	101.0
WY (0.44L)	120	19.5

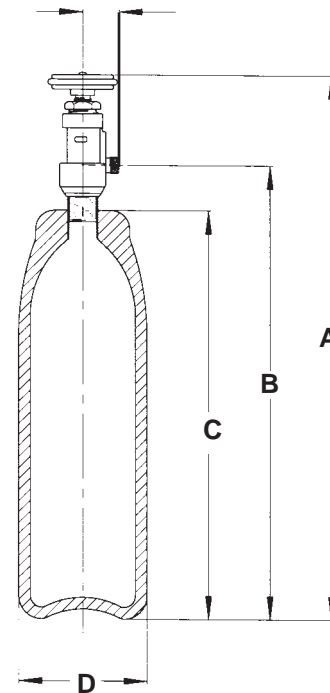
Note: Delivery capacity (grams) at 20 torr.
Actual capacity is a function of final cylinder pressure.

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
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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