

3M Advanced Materials Division

3M™ 11B Enriched Boron Trifluoride

Introduction

3M Technical Ceramics, Inc., supplies high-purity boron materials to the semiconductor market. The boron-11 isotope is used as an additive to semiconductor grade silicon as a “doping” agent, and in other semiconductor processes where ultra high purity boron is required.

3M™ 11B Enriched Boron Trifluoride is an isotopically enriched material used for doping. It is produced to >99.99% purity and >99.8% enrichment, with 25% more boron-11 than naturally occurring materials.

3M 11B enriched boron trifluoride is packaged in U.S. DOT certified cylinders. Customer cylinders may be filled upon request. Valves are CGA330 or DISS642. A minimum product order of 50 g applies.

Typical Physical Properties

Isotopic Enrichment*	High Purity Grade
¹¹ B (atomic %)	>99.8%
Chemical Purity**	
BF ₃	>99.99%
N ₂	<15 ppmv
O ₂ /Ar	<15 ppmv
CO ₂	<15 ppmv
SO ₂	<15 ppmv
HF	<15 ppmv
SiF ₄	<15 ppmv

* The boron-11 ratio is determined by inductively coupled plasma mass spectrometry (ICP-MS).

** Determined by GC-DID and FTIR.

Boron Enrichment Capabilities

3M Technical Ceramics is a leading global commercial processor of enriched boron, and is one of the largest boron isotope enrichment facilities in the world today. We focus on manufacturing optimized materials with an emphasis on stable boron isotopes. Our proprietary manufacturing processes allow ¹¹B enrichment from natural occurring ratios up to levels exceeding 99% isotopic purity. We offer secure supply, consistent product quality and the



ability to custom engineer products for your unique applications. Our specialists are experts at solving materials-related problems in the demanding nuclear and semiconductor industries. For more information, contact us at boron@mmm.com.

Analytical Services

As a manufacturer of specialty, high purity chemical and isotopic products, 3M Technical Ceramics maintains sophisticated analytical and testing capabilities at its manufacturing facility in Quapaw, OK. Our analytical laboratories support on-site production

Standard Cylinder Properties (Not for specification purposes)

Cylinder	O.D. Inch (mm)	Length Inch (mm)	Gross Weight Lbs. (kg)	Wall Inch (mm)	Volume Cubic Inch (Liters)	Service Pressure (psi)	Test Pressure (psi)	Fitting (NGT)	Maximum Fill ¹¹ BF ₃ (grams)
0.44L	1.94 (49.28)	11.88 (302)	2.3 (1.04)	0.095 (2.41)	25.5 (0.418)	1800	3000	3/4	100
8.4L	7.00 (178)	17.40 (442)	25.0 (11.3)	0.160 (4.06)	525 (8.60)	2015	3360	3/4	1600
49L	9.25 (235)	55 (1397)	139 (63)	0.224 (5.7)	2990 (49)	2400	4000	3/4	20,000

activities and provide our customers with data and evidence that the products they receive meet or exceed their requirements. Our laboratories are fully equipped with current-generation instruments to perform a full range of testing procedures, including: inductively coupled plasma mass spectrometry; atomic absorption spectroscopy; ion and gas chromatography; carbon/sulfur and oxygen/nitrogen analysis; particle size analysis and BET surface area measurement.

Product Storage, Handling and Safety

Storage: Keep container tightly closed to prevent contamination with water or air. If contamination is suspected, do not reseal container. Protect from sunlight. Store in a well-ventilated place. Store away from heat. See product Safety Data Sheet (SDS) for additional information.

Handling: Do not use in a confined area with minimal air exchange. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Wash contaminated clothing before reuse. See SDS for additional information.

Safety: Handling of this material may be hazardous. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.

Wear respiratory protection. Wear protective gloves, protective clothing, and eye/face protection. Wash thoroughly after handling. See SDS for additional information.

Regulatory Summary

See SDS for additional information.

Product is manufactured and sold by 3M Technical Ceramics.

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