

**SPECIALTY MATERIALS, INC.**  
**SAFETY DATA SHEET**  
**Continuous Boron Fiber**

**SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION**

Substance Identifier : Elemental boron fiber on tungsten

Form : Continuous monofilament

Product Names: 3-mil Boron Fiber, 4-mil Boron Fiber and 5.6-mil Boron Fiber

Product Uses: Reinforcing fiber for use in high strength, high temperature polymer composite applications.

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**HMIS LABEL**

<b>HEALTH</b>	<b>1</b>
<b>FIRE</b>	<b>0</b>
<b>REACTIVITY</b>	<b>0</b>
<b>PPE</b>	<b>B</b>

**SECTION 2 – HAZARDS IDENTIFICATION**

Classification: Not classified as hazardous in accordance with OSHA Hazard Communication Standard (29 CFR 1910.1200).

Overview: This is a non-combustible, non-reactive solid material in continuous monofilament form having a diameter greater than 3-mils (75 microns). Its primary acute hazard is puncture of the skin during handling. There are no known chronic hazards associated with boron in continuous fiber form. See Section 11.



**CAUTION:** Boron fiber poses a splinter hazard during handling, cutting and layup of the prepreg tape.

Potential Health Effects: Boron is an extremely hard substance that, when subjected to machining or grinding operations can result in the generation of hard dust particulates.



**WARNING:** Slight-to-moderate eye and skin irritation can occur as a result of machining or grinding operations. In addition, ingestion and inhalation of fine particle dust may result in gastrointestinal irritation and irritation to the respiratory tract (R36, R37 and R38).

**Manufacturing Process Note:**

Continuous boron fiber comes into contact with liquid mercury during production in the chemical vapor deposition (CVD) process. Mercury is non-wetting to boron fiber. Testing has not revealed the presence of mercury on 3-mil or 4-mil diameter fiber surfaces. Mercury at 3.8 ppm of mercury has been detected on 5.6-mil diameter boron. The detection limit of this test is 0.00008% (0.8 ppm).

HAZARDOUS COMPONENT(S)	CAS NUMBER	% MAXIMUM CONTENT
Mercury on 3-mil boron fiber	7439-97-6	< 0.8 ppm detection limit
Mercury on 4-mil boron fiber	7439-97-6	< 0.8 ppm detection limit
Mercury on 5.6-mil boron fiber	7439-97-6	3.8 ppm

**SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS #	EINECS #	Wt.%
Elemental boron fiber on tungsten substrate (meets Article definition of 40 CFR 704.3)	7440-42-8	7440-42-8	100%

**SECTION 4 – FIRST AID MEASURES**

**First Aid: Skin**

Remove splinters with clean tweezers and swab with medical-grade alcohol as soon as possible to avoid any infections. Removal of splinters in skin can be difficult. Medical assistance may be required in some instances.

If skin becomes irritated due to contact with boron particulates, remove contaminated clothing. Wash affected areas with soap and rinse with clean water. If irritation persists, seek medical attention.

First Aid: Eyes	Check for the presence of contact lenses and remove if possible. Flush eyes with plenty of water for at least 15 minutes, periodically lifting the upper and lower eyelids. Seek medical attention as soon as possible.
First Aid: Ingestion	Do not induce vomiting or administer anything by mouth. Seek medical attention as soon as possible.
First Aid: Inhalation	Remove from exposure area to fresh air immediately. If not breathing, administer artificial respiration – do not administer mouth-to-mouth resuscitation. If breathing with difficulty, administer oxygen. Seek medical attention as soon as possible.

### ***SECTION 5 – FIRE FIGHTING MEASURES***

Flammability of the substance:	Non-flammable. Use an extinguishing media suitable for the surrounding fire.  Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus appropriate to the surrounding fire conditions.
Explosion hazards:	Not expected to be an explosion hazard.
Hazardous Combustion Products:	None known.
NFPA Ratings:	<b>Health: 1; Fire: 0; Reactivity: 0; Other: 0</b>

### ***SECTION 6 – ACCIDENTAL RELEASE MEASURES***

Overview:	This is a non-combustible, non-reactive solid material in a continuous monofilament form having a diameter between 3 and 5.6-mils (75 and 142 microns).
Personal precautions:	Use gloves and eye protection (see Section 8) while collecting segments of fiber. To minimize splinters, avoid coiling tightly or doubling-over.  Minimize exposure to dust by following the recommendations in Section 8.
Environmental Precautions:	None if substance remains in continuous fiber form. Should the substance be reduced to fine particulate or dust form, treat as any inert particulate or dust by avoiding dispersal into waterways, drains and sewers.
Methods for containment/cleanup:	Place lengths of fiber into plastic bags and place bags into disposal containers. Vacuum or sweep up smaller lengths of fiber and place debris into plastic bags or containers. Follow personal protection precautions (Section 8).

## ***SECTION 7 – HANDLING AND STORAGE***

Precautions for safe handling:	Use appropriate personal protective equipment (Section 8). Eating, drinking and smoking should be prohibited in areas where this material is being handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Fiber should remain on provided spools until processing.
Conditions for safe storage:	Store in a dry area with the spool axis in the horizontal position. Avoid contact with strong oxidizing agents. Avoid airborne surface dust or oil accumulation.

## ***SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION***

Control parameters:	This is a non-combustible, non-reactive solid material in a continuous monofilament form having diameters ranging from 3 to 5.6-mils (75 to 142 microns). No special monitoring procedures or environmental controls are required.
Exposure limits:	
Boron continuous fiber:	ACGIH – none; NIOSH – none; OSHA PELs – none
Boron respirable:	<u>ACGIH</u> – 10 mg/m <sup>3</sup> (particulate matter containing no asbestos and <1% crystalline silica). <u>NIOSH</u> - 10 mg/m <sup>3</sup> TWA; respirable dust: 5 mg/m <sup>3</sup> TWA. <u>OSHA Final PELs</u> - 15 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable fraction)
Exposure controls:	No special ventilation requirements under normal and intended conditions of product use.
Personal protective equipment:	<u>Respiratory protection</u> : is not required unless the continuous fiber is reduced to particulate or dust form. <u>Hand protection</u> : is recommended to protect against fiber splinters. Nitrile gloves, or thin leather gloves if operations can be performed using them, are recommended. <u>Eye protection</u> : safety glasses with side shields are recommended when handling fiber and during processing. <u>Skin protection</u> : no special protective clothing is required while handling boron fiber, unless an airborne particulate or dust environment has been generated.
Hygiene measures:	Workers should wash hands and face before eating, drinking and smoking.

## ***SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES***

Boiling Point:	Not Applicable
Specific Gravity (H <sub>2</sub> O = 1):	2.4
Vapor Pressure (mm Hg):	Negligible
Solubility in Water:	Negligible
Reactivity in Water:	None
Melting Point:	Sublimes @ 2300°C
Appearance and Odor:	Odorless black cylindrical fiber, diameter ranging from 3 to 5.6-mils (75 to 142 μm).
Composition:	Boron on a tungsten substrate

## ***SECTION 10 – STABILITY AND REACTIVITY***

Stability:	Unstable ( ) Stable (X) Stable under recommended storage conditions. Does not degrade so shelf life not required. After five years of storage, visual inspection recommended before re-use. After ten years of storage, re-test of mechanical strength recommended before re-use.
Incompatibility (Materials to Avoid):	None known
Hazardous Decomposition Products:	None under normal conditions of storage and use.
Hazardous Polymerization:	May Occur ( ) Will Not Occur ( X )
Conditions to Avoid:	Avoid airborne dust accumulation

## ***SECTION 11 – TOXICOLOGICAL INFORMATION***

Acute toxicity:	May cause eye, skin and respiratory irritation when reduced to fine powder form.
Chronic health effects:	<u>Carcinogenicity:</u> National Toxicology Program: Yes ( ) No (X) I.A.R.C. Monographs: Yes ( ) No (X) OSHA: Yes ( ) No (X) <u>LD50/LC50:</u> Not available

## ***SECTION 12 – ECOLOGICAL INFORMATION***

Environmental effects:	No known significant effects or critical hazards.
Mobility:	Product is not hazardous to water; boron oxide is readily found in the environment.
Other adverse effects:	No known significant effects or critical hazards.
AOX:	The product does not contain organically bound halogens which could lead to an AOX value in waste water.

## ***SECTION 13 – DISPOSAL CONSIDERATIONS***

Methods of disposal:	Not a hazardous waste. However, disposal/maintenance personnel must be aware of the splinter hazard. Disposal of this product should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority regulations
Hazardous waste:	To the suppliers knowledge, this product is not regarded as hazardous waste, as defined by EU Directive 91/689/EEC.

## ***SECTION 14 – TRANSPORTATION INFORMATION***

International transport regulations:	ADR/RID/IMDG/IATA classes: Not regulated by any transport mode
US DOT information:	<u>Hazard class:</u> none <u>UN/NA #:</u> none <u>Required labels:</u> none
TDG information:	<u>Hazard class:</u> none <u>UN/NA #:</u> none <u>Required labels:</u> none

## ***SECTION 15 – REGULATORY INFORMATION***

US Federal regulations:	None of the product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).  The < 0.00008% (0.8 ppm) non-detect amount for the presence of mercury is well below regulatory minimums.
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## ***SECTION 16 – OTHER INFORMATION***

Notice:

THE INFORMATION PRESENTED HERE IN IS BASED UPON DATA CONSIDERED TO BE ACCURATE AS OF THE DATE OF MANUFACTURE OF THIS MATERIAL DATA SAFETY DATA SHEET. HOWEVER, NO WARRANTY OR REPRESENTATION, EXPRESSED OR OTHERWISE, IS MADE AS TO THE ACCURACY OR COMPLETENESS OF THE FOREGOING DATA AND SAFETY INFORMATION, NOR IS ANY AUTHORIZATION GIVEN OR IMPLIED TO PRACTICE ANY PATENTED INVENTION WITHOUT A LICENSE. IN ADDITION, THE VENDOR CAN ASSUME NO RESPONSIBILITY FOR ANY DAMAGE OR INJURY RESULTING FROM ABNORMAL USE, FROM ANY FAILURE TO ADHERE TO RECOMMENDED PRACTICES, OR FROM ANY HAZARDS INHERENT IN THE NATURE OF THE PRODUCT.

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