

# SPECIALTY MATERIALS, INC.

Manufacturer of Boron and Silicon Carbide Fiber and Boron Nanopowder

## SPECIALTY MATERIALS, INC.

### SAFETY DATA SHEET

## Boron Fiber Prepreg Tape with Hexply® 996 Cyanate Ester Resin Film

#### SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Product Name: Boron/996 Cyanate Ester Prepreg Tape

Product Use Description: Unidirectional Boron monofilament reinforcement in a cyanate ester resin system for use in aerospace composite applications

Manufacturer's Name: Specialty Materials, Inc.  
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(800 – 1645 ET)

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Other Information : 978-322-1900

Date Prepared: October 31, 2013

#### HMIS LABEL

HEALTH	2
FIRE	1
REACTIVITY	1
PPE	X

#### SECTION 2 – HAZARDS IDENTIFICATION

##### Emergency Overview:

This product consists of unidirectional boron fiber encapsulated in catalyzed cyanate ester resin film, in prepreg tape form. The resin portion of the tape is an amber-brown colored tacky resin film having no distinctive odor. The encapsulated boron reinforcement fiber is gray-to-black in appearance and is stiff and very hard. The fiber diameter is 0.004-to-0.0056 inch. The fiber component poses a splinter hazard during handling, cutting and layup of the prepreg tape.

Masses of resin greater than 50 grams heated above 160°F may polymerize in an exothermic reaction. Product should be placed in sealed, moisture-proof bags and stored in a freezer for safety and material integrity.

Hazardous resin decomposition products may include oxides of carbon and nitrogen, phenol and other unknown hydrocarbons.



##### **WARNING: Health Hazard**

Exposure of unpolymerized resin components to temperatures above 160°C may result in thermal decomposition, resulting in formation of

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irritating and/or toxic vapor (R37 & R38). Avoid conditions where inhalation of vapor might occur.

**CAUTION: Safety Description**

Excessive cyanate ester resin skin contact may cause irritation (S23 & S24). Excessive cyanate ester resin eye contact may cause irritation(R36 & S25).

**CAUTION: Safety Description**

Boron fiber poses a splinter hazard during handling, cutting and layup of the prepreg tape (S37 & S39).

**Acute:** Uncatalyzed epoxy resin can cause skin and eye irritation, and may produce an allergic reaction in some individuals. Use of protective gloves, eyewear and a long-sleeved garment is recommended. Prolonged exposure to resin irritation is not recommended for individuals suffering from dermatitis.

**Chronic:** Dust or particulate from machining, grinding or sawing the cured product may cause irritation, allergic skin reaction and possible sensitization known as Allergic Contact Dermatitis (ACD).



**WARNING:**

**Health Hazard:** May cause long term allergic skin reaction (R38 & R43).

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

**Resin components contained in this product are classified as Hazardous Chemicals as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200**

Amounts specified are typical and do not represent a specification

<b><u>Prepreg Resin Component(s)</u></b>	<b>OSHA PEL</b>	<b>ACGIH TLV</b>	<b>OTHER EXPOSURE LIMITS</b>	<b>% MAXIMUM CONTENT (Wt.)</b>	<b>CAS No.</b>
Proprietary Cyanate ester resin	Not Determined	Not Determined	Not Determined	80% - 90%	Proprietary mixture
Proprietary Siloxane Modifier	Not Determined	Not Determined	Not Determined	5% - 10%	Proprietary
Proprietary Polycarbonate Toughener	Not Determined	Not Determined	Not Determined	0% - 5%	Proprietary
Tetrahydrofuran	200 PPM (TWA) 750 PPM (STEL)	50 PPM (TWA) 100 PPM (STEL)	Not Determined	0% - 1%	109-99-9
<b><u>Prepreg Fiber Component(s)</u></b>					
Boron Filament 4-mil (excluding Tungsten core)	Not Determined	Not Determined	Not Determined	45% - 60%	7440-42-8

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The fiber component contained in this product is not classified as Hazardous Chemicals as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200

Where specific exposure limits for component dusts are not established, the levels provided for (Total/Inhalable) dust and respirable fraction reflect the classification of particulates not otherwise regulated (PNOR) by OSHA or specified (PNOR) by ACGIH®.

Exposure limits for cured product dust as [Particulate not otherwise regulated (PNOR) by Osha or specified (PNOR) by ACGIH®]:	OSHA (PEL) 15 mg/m <sup>3</sup> (Total) 5 mg/m <sup>3</sup> (Respirable)	ACGIH® (TLV®) 10 mg/m <sup>3</sup> (Inhalable) 3 mg/m <sup>3</sup> (Respirable)
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## -----SECTION 4 – FIRST AID MEASURES-----

1. **Acute:** Fiber splinters, skin irritation and eye irritation. Resin is a skin sensitizer. Acute overexposure may result in irritation, sensitization and dermatitis.
2. **Chronic:** Possible allergic reaction, dermatitis
- Signs and Symptoms of Exposure: Irritation of skin or eyes from boron splinters or resin dust or particulate
- Medical Conditions Generally Aggravated by Exposure: Dermatitis
- Emergency and First Aid Procedures: Excessive cyanate ester resin skin contact may cause irritation, and boron fiber breakage may result in splinters. Remove splinters as soon as possible to guard against any infection. Wash affected skin areas with soap and water

### ROUTES OF ENTRY:

1. Inhalation: **Possible** - Adverse effects are not anticipated by breathing small amounts of resin vapor. If released from resin encapsulation, fiber particles may be an irritant to mouth, throat and nasal passages. If components of the prepreg tape have been pulverized or otherwise finely divided and inhaled, remove patient to fresh air. If breathing is difficult, give oxygen and call a physician.
2. Eyes: **Possible** - Should transfer of resin from hands or gloves occur, hold eye open and flush gently with water for at least 15 minutes and call a physician. In the case of a boron fiber splinter, call for immediate medical assistance.
3. Skin: **Most likely** - Should exposure occur due to compromised gloves or clothing coverage, remove contaminated articles and wash affected area(s) with soap and water. In the case of a boron fiber splinter, remove as soon as possible using fine-tipped tweezers and clean the affected area with soap and water and apply a local bandage.

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4. Ingestion:

**Unlikely** – mechanical irritation may occur seek Medical Attention. Do not induce vomiting. Do not give anything by mouth to an unconscious or convulsing person.

## ----- SECTION 5 - FIRE & EXPLOSION DATA -----

Flash Point:	Not determined
Stability:	Unstable ( ) Stable (X)
Conditions to Avoid:	Extended Storage above 80 °F or Exposure to Direct Sunlight. Avoid conditions over 300 °F
Incompatibility (Materials to Avoid):	Strong Oxidizers, Acids, Bases, Anhydrides, Polysulfides and amines
Hazardous Decomposition Products:	CO, CO <sub>2</sub> , oxides of nitrogen, phenol and other organic species.
Hazardous Polymerization:	May Occur ( X ) Will Not Occur ( )
Auto-Ignition Temperature:	Decomposition temperature >500 °F
Extinguisher Media:	Carbon dioxide, foam, dry chemical, water spray, submerge in water or cover with inert material

## ----- SECTION 6 – ACCIDENTAL RELEASE MEASURES -----

Steps to be Taken In Case Material Is Released or Spilled:	Clean material can be returned to storage. Contaminated material should be cured to prevent exotherm of resin. Clean up carefully to avoid fiber splinters. Sweep up or vacuum with care to prevent fiber particles and dust from becoming airborne. Follow personal protection recommendations in Section 8.
Waste Disposal Method (Consult Federal, State, and Local Regulations):	All disposal practices must be in accordance with Federal, State and local regulations. Cured material may not be considered a Hazardous Waste.

## ----- SECTION 7 – HANDLING & STORAGE -----

Precautions to be taken in Handling and Storage:	Masses of resin greater than 50 grams heated above 160 °F may polymerize in an uncontrolled exothermic reaction. Storage in a freezer (protected from moisture) is recommended for safety and preservation of material integrity. Handle prepreg tape carefully to avoid any penetration of skin or eyes by fibers. Avoid handling fiber that has been released from catalyzed resin and reduced to a fine particle size. Some
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individuals can develop rashes from resins. Store in closed containers and use gloves or barrier creams if rash occurs.

Other Precautions: None

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

Respiratory Protection: If sufficient vapor or fumes are being generated during use, and /or heating or curing of the product, use NIOSH approved organic vapor respirator. If sufficient dust or particulate are being generated during use, machining, grinding or sawing the cured resin, use a NIOSH approved respirator, as appropriate.

Ventilation: Use of local exhaust to control vapor, fumes, dust or particulate. If exhaust ventilation is not available or is inadequate, use NIOSH approved respirator, as appropriate.

Protective Gloves: Recommended (29 CFR 1910.132)

Eye Protection: Avoid eye and skin contact. Wear safety glasses with side shields. Wear safety glasses and face shield when machining, grinding or sawing the cured resin.

Other Protective Clothing or Equipment: Additional Protective Clothing to include Long-Sleeved Garments and Face Shield for High Sensitivity Individuals

Work/Hygienic Practices: Wash hands thoroughly before Eating or Smoking.

## -----SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES -----

Boiling Point: Not Applicable

Resin Specific Gravity (H<sub>2</sub>O = 1): 1.2

Vapor Pressure (mm Hg): Negligible

Vapor Density (Air = 1): Not Applicable

Solubility in Water: Not determined

Reactivity in Water: None

Melting Point: Not Applicable

Appearance and Odor: Amber brown-colored tacky resin film on black unidirectional fibers; no distinctive odor.

## -----SECTION 10 – STABILITY & REACTIVITY DATA -----

Flash Point: Not determined

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Flammable Limits in Air % by Volume:	Not Determined
LEL Lower:	Not Established
UEL Upper:	Not Established
Auto-Ignition Temperature:	Decomposition temperature >300°C
Incompatible Materials:	Avoid strong oxidizers, acids, bases and amines.
Extinguisher Media:	Carbon dioxide, foam, dry chemical, water spray, submerge in water or cover with inert material
Special Fire Fighting Procedures:	Use of Self-Contained Breathing Apparatus may be warranted to prevent exposure to fumes generated by the resin component of this product, or by surrounding chemicals and materials. Cool fire-exposed containers with water. Use Foam, CO <sub>2</sub> Dry Chemical and/or cover with Sand.
Unusual Fire and Explosion Hazards:	Decomposition and combustion products may be toxic. Component information indicates that burning may produce CO, CO <sub>2</sub> , oxides of nitrogen, hydrocyanic acid, oxides of silicon, hydrocarbons, phenols and other unidentified gases and vapors.
Hazardous Polymerization:	Should not occur under proper conditions of use. If heated improperly, heated rapidly, heated to an excessive temperature or heated in large quantity or mass, an uncontrolled exothermic reaction may occur that will char and decompose the resin system, generating unidentified gases and vapors that may be toxic. Avoid inhalation.

## ----- SECTION 11 – TOXICOLOGICAL INFORMATION -----

Component Toxicity Data (resin system):

Median Lethal Dose (species):

Oral (LD<sub>50</sub>)...Proprietary Cyanate Resin...>5.05 g/kg (Rat)  
...Proprietary Siloxane Modifier...500 – 5,000 mg/kg (Rat)  
...Tetrahydrofuran...1650 mg/kg (Rat)

Dural (LD<sub>50</sub>)... Proprietary Cyanate Resin...>2.02 g/kg (Rabbit)  
...Proprietary Siloxane Modifier...1,000 – 2,000 mg/kg (Rabbit)

Inhalation (LD<sub>50</sub>) ...Proprietary Siloxane Modifier...2 – 20 mg/L (Rat)  
...Tetrahydrofuran...21,000 PPM/3 hour (Rat)

Irritation Index, estimation of irritation (species):

Skin... Proprietary Cyanate Resin... mild irritation (Rabbit)  
...Tetrahydrofuran...hazardous, irritant (Human)

Eye... Proprietary Cyanate Resin... mild irritation (Rabbit)  
...Tetrahydrofuran...corrosive, irritant (Human)

Inhalation... Tetrahydrofuran...lung, irritant (Human)



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Sensitization...Not Determined

Other:

Mutagenic...Not Determined

Acute Health Hazard:

Uncatalyzed cyanate ester resin can cause skin and eye irritation, and may produce an allergic reaction in some individuals. Use of protective gloves, eyewear and a long-sleeved garment is recommended. Prolonged exposure to resin irritation is not recommended for individuals suffering from dermatitis.

Chronic Health Hazard:

ACGIH<sup>®</sup> listed, Class A3, and a confirmed animal carcinogen with unknown relevance to humans.

## CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN:

National Toxicology Program:

Yes ( ) No (X)

I.A.R.C. Monographs:

Yes ( ) No (X)

OSHA:

Yes ( ) No (X)

ACGIH:

Yes ( ) No (X)\* see Chronic Health Hazard.

## ----- SECTION 12 – ECOLOGICAL INFORMATION -----

Total Product Data:

No ecological data has been determined on the total product.

Resin Mixture Data:

No ecological data has been determined on the resin mixture itself.

## ----- SECTION 13 – DISPOSAL CONSIDERATIONS -----

Material condition:

Un-polymerized resin should be treated as hazardous waste. Large resin quantities should be packaged in smaller, sealed quantities to avoid the possibility of uncontrolled exothermic reaction.

Waste Disposal Method  
(Consult Federal, State,  
and Local Regulations):

All disposal practices must be in accordance with Federal, State and local regulations. Cured material may not be considered a Hazardous Waste.

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## -----SECTION 14 – TRANSPORT INFORMATION-----

**D.O.T Hazard Classification:** Not Determined  
**Proper Shipping Name:** Not Determined  
  
**Identification Number:** Not Determined  
  
**Packing Group:** Not Determined  
  
**Packing Method:** Not Determined  
  
**Label Required:** None

## -----SECTION 15 – REGULATORY INFORMATION-----

**U. S. Federal Regulations:** This Safety Data Sheet (SDS) has been prepared in compliance with the federal OSHA Hazard Communication Standard 29CFR 1910.1200.

EPA and TSCA Information: All components of this product are either listed or are not required to be listed in the TSCA Inventory.

Ozone depletion Information: This product does not contain or is not manufactured with ozone depleting substances as identified in Title VI, Clean Air Act “Stratospheric ozone Protection” regulations set forth in 40 CFR, Part 82.

**SARA Title III:** Section 302/304 Extremely Hazardous Substance:  
None  
Section 311 Hazardous Categorization:  
Class 1 (Acute)  
Section 313 Toxic Chemicals:  
None

**CERCLA:** Section 102(a) Hazardous Substance:  
**None**

**RCRA Information:** Currently, the product is not listed in federal hazardous waste regulations 40 CFR, Part 261.33, paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. It does not exhibit any of the hazardous characteristics listed in 40 CFR, Part 261, and Subpart C. State or local hazardous waste regulations may apply if they are different from the federal regulation. It is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification and to assure proper disposal.

**WHMIS (Canada):** Classification: D2B – this product has been classified in accordance with hazard criteria of the “Controlled Products Regulations” and this SDS contains all information required by the “Controlled Products Regulations”.

Ingredient Disclosure List:  
Tetrahydrofuran (CAS #109-99-9)



