SPECIALTY MATERIALS, INC.
SAFETY DATA SHEET
Boron Prepreg 5505

---------- *SECTION 1 – IDENTIFICATION*----------

Product Name:	Boron Prepreg 5505 (a.k.a. Rigidite 5505/4 and Rigidite 5505/5.6)
Product Use Description:	Unidirectional Boron monofilament reinforcement in a 350°F cure epoxy resin system for use in high strength, high temperature composite applications
Manufacturer's Name:	Specialty Materials, Inc.
Address:	1449 Middlesex Street
City, State, and ZIP:	Lowell, MA 01851
Emergency Telephone No.:	978-322-1927
Other Information :	978-322-1900
Date Prepared:	February 13, 2013

HMIS LABEL

HEALTH	2
FIRE	1
REACTIVITY	1
PPE	E

---------- *SECTION 2 – HAZARD(S) IDENTIFICATION* ----------

2.1 Overview of material:

Boron Prepreg 5505 tape consists of a unidirectional array of continuous boron fiber encapsulated in a thin layer of catalyzed and partially reacted epoxy resins. The fiber/resin tape layer is supported on a release paper or polyester carrier. At room temperature the resin layer is a tacky, amber-colored semi-solid. Storage and shipment of tape rolls is typically accomplished at, or below 0°F. In this state the resin layer is hard and non-reactive. Boron filament is high strength and modulus, and is relatively large in diameter when compared to individual fiberglass and carbon filaments.

2.2 Physical Hazards:

WARNING! Handling, cutting and layup of prepreg tape may result in fiber splinters.

Boron fiber poses a splinter hazard during handling, cutting and layup of the prepreg tape. Protective gloves and eyewear are recommended. (R36/R38)

WARNING! To avoid the possibility of uncontrolled (exothermic) polymerization, large concentrated quantities of uncured prepreg tape should not be exposed to temperature above 150°F for a prolonged period of time.

It is highly unlikely that sufficient quantity and concentration of resin in tape form will occur under recommended storage or manufacturing operations. (S3/S15)

2.3 Health Hazards:

WARNING! Direct skin contact with room temperature uncured resin layer may cause an allergic reaction. Eye irritation may also result from exposure to the resin.

Uncured catalyzed 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. (H315, H317, R43)

Acute Health Hazard

Skin:	Epoxy constituents used in this product have resulted in positive patch test results for Allergic Contact Dermatitis (ACD)
Chronic Health Hazard	This epoxy resin formulation does not contain any chemicals listed as known human carcinogens according to IARC, NTP and/or OSHA at concentrations of 0.1 percent or greater.

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

Amounts specified are typical and do not represent a specification

Fiber Component	OSHA PEL	ACGIH TLV	OTHER EXPOSURE LIMITS	% MAXIMUM CONTENT	CAS No.	ECN (equivalent where available)
Boron fiber on tungsten substrate (meets Article definition of 40 CFR 704.3)	Not Established	Not Established	Not Established	100%	7440-42-8	7440-42-8
Mercury (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 of 4-mil boron fiber has not revealed the presence of mercury. Testing of 5.6-mil boron fiber has detected 3.8ppm).	0.1mg/m3	0.025mg/m3	Not Established	Not Detected on 4-mil boron fiber surface. Detected @ 3.8ppm on 5.6-mil boron fiber surface. (detection limit = 0.8ppm)	7439-97-6	7439-97-6

Resin Film Component(s) (meets Article definition of 40 CFR 704.3)	OSHA PEL	ACGIH TLV	OTHER EXPOSURE LIMITS	% MAXIMUM CONTENT	CAS No.	ECN (equivalent where available)
* Epoxy Cresol Novolac resin; formaldehyde, polymer with (chloromethyl) oxirane and 2-methylphenol.	Not Established	Not Established	Not Established	52%	29690-82-2	249-204-3
* Triglycidyl Ether of p-Aminophenol (TGPAP)	Not Established	Not Established	Not Established	34%	5026-74-4	225-716-2
Epoxy curing agent mixture: Cyanoguanidine (99%) and Silica (1%)	Not Established	Not Established	Not Established	6%	461-58-5 7631-86-9	207-312-8 262-373-8
* Diglycidyl ether of bisphenol A (DGEBPA)	Not Established	Not Established	Not Established	< 5%	1675-54-3	216-823-5
HYCAR CTBN polymer	Not Established	Not Established	Not Established	2%	68891-46-3	Not available
Silica, amorphous, fumed, crystalline-free	Not Established	Not Established	Not Established	0.1%	112945-52-5	Not available
Fibrous Glass (Micro Glass)	Nus. Dust 15mg/m^3 Resp. Dust 5mg/m^3 TWA 20 mppcf	Fibrous Glass Dust 10mg/m^3	Not Established	2%	12001-26-2;	238-878-4

On an individual basis, * = OSHA hazardous chemicals as defined by 29CFR 1910.1200; together, 5505 resin formulation meets the 40 CFR 704.3 definition of an article, and is not identified as a hazardous substance.

---------- *SECTION 4 – FIRST-AID MEASURES* ----------

1. **Eyes:** 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.

2. **Skin:** 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.

3. **Inhalation:** 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.

4. **Ingestion:**	Treat for ingestion by removing patient to fresh air. Do not induce vomiting. Call a Poison Control Center or Physician immediately for treatment advice. Do not give anything by mouth to an unconscious or convulsing person.

---------- *SECTION 5 - FIRE FIGHTING MEASURES* ----------

Extinguisher Media:	Submerge in water or cover with inert material
Special Fire Fighting Procedures:	Wear Self-Contained Breathing Apparatus to prevent exposure to fumes. Use Foam, CO_2 Dry Chemical and/or cover with Sand.
Unusual Fire and Explosion Hazards:	None known

---------- *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. Prevent particulates from becoming airborne during sweep-up or vacuum. Good practice dictates that released material should be prevented from entering the soil, sewers, waterways and/or groundwater.
Waste Disposal Method (Consult Federal, State, and Local Regulations):	All disposal practices must be in accordance with Federal, State and local regulations. Cured material is not considered a Hazardous Waste.

---------- *SECTION 7 – HANDLING AND STORAGE* ----------

Precautions to be taken in Handling and Storage:	Careful handling to avoid any penetration of skin or eyes by fibers. Fiber size is too large and dense for inhalation and is encased in catalyzed epoxy resin. Observe personal protection (HMIS) recommendation. Some individuals can develop rashes from epoxy resins. Store in closed containers and use gloves or barrier creams if rash occurs.
Other Precautions:	None known. This resin system should be considered more reactive than most epoxy resin systems.

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

Respiratory Protection:	Dust mask for cutting of prepreg or grinding of cured resin; Nuisance Dust (29 CFR 1910.134)
Ventilation:	Recommended
Local Exhaust:	Not required unless working in a confined space
Mechanical (General):	As per ACGIH Industrial Vet. Guidelines
Protective Gloves:	Recommended (29 CFR 1910.132)
Eye Protection:	Recommended (29 CFR 1910.133)
Other Protective Clothing or Equipment:	Additional protective clothing may include long-sleeved garments for High Sensitivity Individuals
Work/Hygienic Practices:	Wash hands thoroughly with soap and water before eating or smoking.

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

Physical State:	Tacky resin film on fiber, interleaved with release paper or poly film; slight odor at room or slightly elevated temperature.
Flash Point:	>200ºF
Method Used:	Open Cup
Flammable Limits in Air % by Volume:	
LEL Lower:	Not established
UEL Upper:	Not established
Auto-Ignition Temperature:	Unknown
Solubility in water:	Insoluble
Reactivity in water:	None
Melting point:	Not applicable

---------- *SECTION 10 – STABILITY AND REACTIVITY* ----------

Stability:	Unstable ( ) Stable (**X**)

Conditions to Avoid:	Extended Storage above 100 ^{o}F or Exposure to Direct Sunlight
Incompatibility (Materials to Avoid):	Strong oxidizers, acids, bases, anhydrides, polysulfides
Hazardous Decomposition Products:	CO, CO_2, HCN, nitrogen oxides and other organic species
Hazardous Polymerization:	May occur at temperatures above 200^{o}F

---------- *SECTION 11 – TOXICOLOGICAL INFORMATION* ----------

Overview

The product consists of a layer of continuous boron filament encapsulated in a thin layer of epoxy resin formulated from numerous resin components. The following resin components are Hazardous Chemicals as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200:

CAS# 29690-82-2 – Formaldehyde, polymer with (chloromethyl) oxirane and 2-methylphenol

CAS# 5026-74-4 – Triglycidyl ether of p-aminophenol

CAS# 1675-54-3 – Bisphenol A Diglycidyl ether

In prepreg form, these listed components have already been partially reacted to form an article.

The boron (CAS# 7440-42-8) fiber component of this product is not a toxic substance; however, boron fiber comes into contact with liquid mercury during production in the chemical vapor deposition (CVD) process. Although mercury is non-wetting to boron fiber, up to 3.8ppm of mercury has been detected on the surface of 5.6-mil diameter boron fiber. See Section 3.

Acute Health Hazards

Eyes:

No data on the product itself. The boron fiber component is brittle and airborne shards can become an eye splinter hazard. Boron is not a toxic substance. The resin formulation contains two epoxy components that may pose irritation risk to eyes in the raw material state. Transfer of resin from hands or gloves to close proximity of the eyes would enhance the possibility of eye irritation.

Skin:

No data on the product itself. The boron fiber component is brittle and shards can become a splinter hazard during prepreg handling and cutting. Boron is not a toxic substance. Splinters are a skin irritant and may also produce mild infection at the site of the puncture. Three

epoxy components contained in this resin formulation report eye and skin irritation risks in the raw material state. For some individuals, prolonged exposure to epoxy resins in general, and to direct skin contact to the semi-solid resin formulation in this product, may result in Allergic Contact Dermatitis (ACD).

Inhalation: No data on the product itself. Inhalation of this prepreg tape in the uncured (tacky) state is highly unlikely. Should fully-cured prepreg, in tape or laminate form, be chopped or ground to a fine particle size, the resulting dust would pose an airborne dust hazard. Boron is not a toxic substance.

Ingestion: No data on the product itself. Ingestion of this prepreg tape in the uncured (tacky) state is highly unlikely. Should fully-cured prepreg, in tape or laminate form, be chopped or ground to a fine particle size, the resulting particles would pose a physical hazard to the digestive tract.

Chronic Toxicity Hazards

Listings: National Toxicology Program – Not reviewed or Not Listed as a human carcinogen

I.A.R.C. Monographs - Not reviewed or Not Classified as a human carcinogen

OSHA - Not reviewed or Not Listed as a human carcinogen

---------- *SECTION 12 – ECOLOGICAL INFORMATION* ----------

Not Established for the Product. One epoxy formulation ingredient, CAS# 5026-74-4 – Triglycidyl ether of p-aminophenol, reports fish toxicity (carp) at 96 h, LC50: 4.2 mg/l.

---------- *SECTION 13 – DISPOSAL CONSIDERATIONS* ----------

Waste Disposal Method	All disposal practices must be in accordance with Federal, State and local regulations.
(Consult Federal, State, and Local Regulations):	Cured material is not considered a Hazardous Waste.

---------- *SECTION 14 – TRANSPORT INFORMATION* ----------

DOT: Not Regulated
IMDG: Not Regulated
IATA: Not Regulated
TDG: Not Regulated

---------- *SECTION 15 – REGULATORY INFORMATION* ----------

U. S. Federal Regulations:

Occupational Safety and Health Act (OSHA) – This Safety Data Sheet (SDS) has been prepared in compliance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

This Product contains resin components that are Hazardous Chemicals as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200. The Product itself has not been reviewed.

All components of this Product are on the Toxic Substance Control Act Inventory, or are exempt from TCSA Inventory requirements under 40 CFR 720.30.

SARA Title III: Section 313 Toxic Chemical List - To the best of our knowledge, this Product does not contain any chemicals for routine annual toxic chemical release reporting under Section 313 (40 CFR 372).

Resource Conservation and Recovery Act (RCRA) – To the best of our knowledge, this Product is not a Hazardous Waste under RCRA (40 CFR 261).

State Regulations:

California Proposition 65: To the best of our knowledge, this Product does not contain any chemicals currently on the California list of Known Carcinogens and Reproductive Toxins.

Pennsylvania (Right to Know) Special Hazardous Substances List (2010): To the best of our knowledge, this Product does not contain any chemicals at levels which require reporting under this statute.

---------- *SECTION 16 – OTHER INFORMATION* ----------

NOTICE:

The information presented herein is based upon data considered to be accurate as of the date of manufacture of this 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.

SDS history:
Date of Issue: 13 February 2013
Revision: New