

MATERIAL SAFETY DATA SHEET

Grafil, Inc.

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Pyrofil™ Carbon Fiber

Product Codes: X330/TR330

Manufacturer's/Distributor's Name: Grafil, Inc.

Manufacturer's/Distributor's Address: 5900 88th Street
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[9:00 am - 5:00 pm, M - F, PST]

Date Prepared: August 02, 2007

SECTION 2 COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS Registry No.	Weight %	Exposure Limits
Carbon fiber	7440-44-0	≥ 99%	See Note 1 below
Epoxy resin	K/n	≤ 3.0%	NE

Notes on Composition and Information on Ingredients

NE = Not established

¹ OSHA and ACGIH have not established air contaminant limits for carbon fibers. Under certain conditions, this substance may be a nuisance dust. OSHA has an established standard for particulates not otherwise regulated (nuisance dust) set at 5 mg/m³ (respirable fraction) and 15 mg/m³ (total dust). ACGIH has established an exposure value of 3 mg/m³ (respirable fraction) and 10 mg/m³ (inhalable fraction) for particulates not otherwise classified.

SECTION 3
HAZARDS IDENTIFICATION

*****Emergency Overview*****

Black continuous carbon fiber. Not expected to present an immediate concern for emergency response personnel. Not expected to present an immediate acute health, reactivity, or flammability hazard. Not expected to present an environmental hazard.

Processing of any fiber may lead to fly (dust) formation. Some individuals with asthma or bronchitis or similar reparatory sensitivity may in intolerant to high concentrations of fiber in the air. Carbon fibers are electrically conductive and may cause a short circuit in electrical equipment.

POTENTIAL HEALTH EFFECTS

SKIN: May cause skin irritation. Mechanical irritation may occur from carbon fiber abrading or becoming imbedded in the skin. Chemical irritation may occur from exposure to sizing present on the carbon fiber.

EYES: Fragments of this product may cause mechanical eye irritation. Chemical irritation may occur from exposure to sizing present on the carbon fiber.

INHALATION: Inhalation exposure to respirable fibers of this product is not expected to occur under normal industrial conditions. Under very limited circumstances, however, exposure to respirable fibers of this product can occur and may result in respiratory tract irritation.

INGESTION: Not expected to occur during industrial activities since ingestion is not a relevant route of exposure, however, if ingested exposure may cause mild gastro-intestinal irritation.

CHRONIC EFFECTS/CARCINOGENICITY: Not regulated as a carcinogen. There are no chronic effects/carcinogenicity data are available on this product. Under very limited circumstances, exposure to respirable fibers of this product can occur and may result in respiratory tract irritation; prolonged exposure may result in more adverse effects. See Section 11 – *Toxicological Information* for information on subchronic toxicity.

NTP: *Not listed*
IARC: *Not listed*
OSHA: *Not listed*

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

INCOMPATIBILITY: Not known.

SIGNS AND SYMPTOMS OF EXPOSURE: May result in slight skin and eye irritation.

**SECTION 4
FIRST AID MEASURES**

FIRST AID MEASURES

SKIN: Wash fibers off of skin with water and soap. If fibers are imbedded in the skin, remove with tweezers. Discard clothing that may contain imbedded fibers. Get medical attention if exposure results in adverse effects.

EYES: Immediately flush with a continuous water stream for at least 20 minutes. Washing immediately after exposure is expected to be effective in preventing damage to the eyes. Get medical attention.

INHALATION: If there is inhalation exposure to the fibers of this product, remove source of exposure and move victim to fresh air. If irritation is experienced, mouth and throat may be rinsed with water. Particles adhering to the nasal cavity may be rinsed/diluted with saline/plain water. If irritation or asthma-like symptoms persist, seek medical attention. If not breathing give artificial respiration. If there is breathing difficulty, give oxygen. Get immediate medical attention for any respiratory problems.

INGESTION/SWALLOWED: Not expected to occur since ingestion is not a likely route of exposure for this product. If ingestion does occur, do not induce vomiting. Drink water to assist with dilution. Nothing by mouth if unconscious. Act immediately in order to prevent further irritation of mouth, Throat, and stomach mucosa. If symptoms persist, if persistent vomiting occurs or if blood tinged vomitus is present, seek medical attention.

**SECTION 5
FIRE FIGHTING MEASURES**

FLASH POINT: Not applicable

EXPLOSION/FLAMMABLE LIMITS: Not applicable

AUTOIGNITION TEMPERATURE: Not applicable

EXTINGUISHING MEDIA:

SUITABLE: Carbon Dioxide, Dry Chemicals, Foam, Water Fog.

UNSUITABLE: Direct Water Spray

SPECIAL FIRE FIGHTING PROCEDURES: As in any fire, wear a self-contained breathing apparatus pressure demand (MSHA/NIOSH approved or equivalent) and full protective gear. Fight fires from a safe distance or protected areas. Fire hoses with fog nozzles may be used for controlling fires but care must be exercised not to spread flaming. Water may not always be effective for large fires.

SPECIAL EXPOSURE HAZARDS: Not explosive. Not auto-flammable. This product itself will not burn. If anything, packaging may be involved in a fire. Fiber or dust may glow in an oxygen-containing atmosphere above 350°C. When glowing, and during combustion CO/CO₂ is generated as well as the potential release of degradation products such as NH₃, HCN and monomeric acrylonitrile.

OTHER INFORMATION: Do not incinerate carbon fibers since airborne fibers may cause electrical malfunctions. See Section 13 – *Disposal Considerations* for additional information.

**SECTION 6
ACCIDENTAL RELEASE MEASURES**

SPILL/RELEASE AND CLEANUP PROCEDURES: Methods of cleaning up spill, scoop up dust/fibers mechanically (*e.g.*, sweep up, vacuum, etc.) and either reuse or dispose of properly. Chopped or milled carbon fibers may be slippery if spilled posing an accident risk.

PERSONAL PRECAUTIONS: Wear personal protective equipment as described in Section 8 during cleanup activities.

ENVIRONMENTAL PRECAUTIONS: Avoid dust/ fiber spillage into drains, sewers or surface water.

**SECTION 7
HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: The product can be supplied in cartons or pallet packs. Cartons and pallet packs should be handled with suitable mechanical devices I.e. forklift truck. Cartons and pallet packs should be opened with care as the straps are under tension and will spring open when cut. Personnel should wear suitable protective clothing, including eye protection (goggles or face shield) and industrial gloves. Wash hands with soap and water after handling. Avoid contact with skin and eyes. Arrange for suitable eye wash facilities. Ensure good ventilation.

STORAGE: Store in a cool, dry place. Ideally cartons and pallet packs should be stored on a designated racking system. Badly stacked cartons/pallet packs may fall and cause serious injury.

**SECTION 8
EXPOSURE CONTROLS AND PERSONAL PROTECTION**

RESPIRATORY PROTECTION: Normal use and processing of this product are not expected to generate carbon fiber dust. Respirable fibers of this product under certain very limited circumstances can be generated. In such circumstances, HEPA respiratory protection should be used to prevent exposure.

SKIN PROTECTION: Wear protective clothing to minimize the potential for skin contact. An emergency shower should be readily accessible. Discard any clothing that has become contaminated. Latex (plastic, impervious) gloves should be worn when handling this product. Rinse and remove gloves after use, and wash hand thoroughly with soap and water. Gloves should be removed and replaced if there are any signs of degradation or breakthrough.

EYE PROTECTION: Wear safety goggles or glasses when handling or processing this product in any form.

RECOMMENDED ENGINEERING CONTROLS: Use adequate ventilation to maintain air contaminants below exposure limits.

ENVIRONMENTAL EXPOSURE CONTROLS: Prevent from entering into public sewers or the immediate environment.

EXPOSURE GUIDELINES: OSHA and ACGIH have not established air contaminant limits for carbon fibers. Under certain conditions, this substance may be a nuisance dust. OSHA has an established standard for particulates not otherwise regulated (nuisance dust) set at 5 mg/m³ (respirable fraction) and 15 mg/m³ (total dust). ACGIH has established an exposure value of 3 mg/m³ (respirable fraction) and 10 mg/m³ (inhalable fraction) for particulates not otherwise classified.

**SECTION 9
PHYSICAL AND CHEMICAL PROPERTIES**

Appearance:	Black continuous fiber
Odor:	None
Color:	Black
Specific Gravity:	1.75 - 1.85
Vapor Pressure:	None
Melting Point:	Not applicable
Solubility:	Size component is miscible in water
Other:	Carbon Fibers are electrically conductive

**SECTION 10
STABILITY AND REACTIVITY**

STABILITY: Stable.

CONDITIONS TO AVOID: None.

INCOMPATIBILITY/MATERIALS TO AVOID: Do not expose to strong oxidizing agents such as fluorine. Carbon fiber can react violently with such compounds.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Not expected under normal conditions of processing and use. Thermal decomposition of sizing may begin to occur at high temperatures (> 120 °C) resulting in the release of small amounts of nitrogen oxides, carbon monoxide, organic compounds, and other potentially hazardous substances.

HAZARDOUS POLYMERIZATION: Will not occur.

**SECTION 11
TOXICOLOGICAL INFORMATION**

ACUTE TOXICOLOGICAL DATA: There are no acute toxicological data available on this product. The oral, dermal, and inhalation acute toxicity are expected to be very low. The chemicals applied to its surface to aid downstream processing govern the toxicological properties of the fiber finishes and antistats.

EYE IRRITATION DATA: No data are available.

SKIN IRRITATION DATA: No data are available.

SKIN SENSITIZATION DATA: No data are available.

SUBCHRONIC TOXICITY: Two subchronic inhalation tests in rats exposed to carbon fibers have been conducted. In one test, rats were exposed to fibers for 16 weeks. Pulmonary function tests performed on the test animals before necropsy did not show any significant or consistent changes. The only pulmonary finding related to exposure was the occurrence of phagocytosis by alveolar macrophages. No inflammation or fibrosis was observed. In the second study, rats were also exposed to carbon fibers for 16 weeks. Based on clinical signs, no effects due to exposure were observed. Histopathological evaluation revealed non-fibrous particles in the pulmonary lymphoid clearance system and in alveolar macrophages. There were no signs of fibrosis.

REPRODUCTIVE TOXICITY: No data are available.

TERATOGENICITY (birth defects): No data are available.

MUTAGENICITY: Several *in vitro* mutagenicity tests have been performed on carbon fibers. Carbon fibers have been found to be negative in the gene mutation assay in bacteria (Ames test), did not cause sister chromatid exchanges in Chinese hamster ovary (CHO) cells, and did not cause unscheduled DNA synthesis in rat liver cells or forward mutations in studies with CHO cells.

CHRONIC EFFECTS/CARCINOGENICITY: No data are available.

SECTION 12 ECOLOGICAL INFORMATION
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ECOTOXICOLOGICAL DATA: No data are available.

ENVIRONMENTAL FATE DATA: No data are available.

PHYSICAL/CHEMICAL PROPERTIES: No data are available.

Remarks: The product is not considered harmful to aquatic organisms nor to cause long term adverse effects to the environment. The evaluation of environmental hazards is based on the concentration limits as set out in Directive 1999/45/EC

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA CLASSIFICATION: If discarded in its manufactured form, this product is not expected to be a characteristic or specifically listed hazardous waste under RCRA. However, it is the responsibility of the user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste.

SPECIAL INSTRUCTIONS: Do not incinerate carbon fibers since airborne fibers may cause electrical malfunctions. Any disposal practices must be in compliance with federal, state, and local requirements.

SECTION 14
TRANSPORT INFORMATION

U.S./INTERNATIONAL SHIPPING INFORMATION UNDER DOT/IMO/IATA REGULATIONS: This product is not regulated as dangerous or hazardous goods under DOT, IMO, ICAO, IATA, or UN shipping regulations.

SECTION 15
REGULATORY INFORMATION

REGULATORY STATUS: This product, as well as its impurities, may trigger specific reporting, recordkeeping, and testing requirements under TSCA, EPCRA/SARA III, RCRA, CERCLA, CAA, SDWA, and CWA.

CALIFORNIA PROPOSITION 65: This product contains the impurity epichlorohydrin, a substance known to the State of California to cause cancer and reproductive toxicity. This product also contains the impurity phenyl glycidyl ether, a substance known to the State of California to cause cancer. This information is provided to assist users of this product that conduct business in California in discharging any warning obligations that that person may have under California Proposition 65.

OTHER STATE CHEMICAL LISTS: This product contains the impurities epichlorohydrin and phenyl glycidyl ether. These chemicals are identified on several state chemical lists.

EPCRA/SARA TITLE III SECTION 313: This compound contains no toxic chemicals at or above the de-minimus threshold subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

SECTION 16
OTHER INFORMATION

DISCLAIMER: This information is furnished without warranty, expressed or implied, except that it is believed to be accurate to the best knowledge of Grafil, Inc. The information presented in this MSDS is related only to the specific material designated herein. Grafil, Inc. assumes no legal responsibility for the use or reliance upon these data. The user should review any recommendation in the specific context of the intended use to determine whether appropriate.