MATERIAL SAFETY DATA SHEET

GrafTech International Holdings Inc.
11709 Madison Avenue
Lakewood, OH 44107

Trade Name: **GRAFGUARD® Expanding Flake All Grades**

MSDS No.: **0067**
Issue Date: October, 1994
Revision Date: December, 2007

GRAFTECH INTERNATIONAL HOLDINGS INC. REQUESTS THE USERS OF THIS PRODUCT TO STUDY THIS MATERIAL SAFETY DATA SHEET (MSDS) AND BECOME AWARE OF PRODUCT HAZARDS AND SAFETY INFORMATION. TO PROMOTE SAFE USE OF THIS PRODUCT, USERS SHOULD NOTIFY THEIR EMPLOYEES, AGENTS AND CONTRACTORS OF THE INFORMATION ON THIS MSDS AND ANY PRODUCT HAZARDS AND SAFETY INFORMATION.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: GRAFGUARD® Expanding Graphite Flake

Chemical Name: Graphite/Acid-Washed Graphite Flake

Synonyms: Acid-Treated Graphite Flake

Manufacturer:
GrafTech International Holdings Inc.
11709 Madison Avenue
Lakewood, OH 44107

Emergency Telephone Numbers:
1-800-424-9300 or
1-703-527-3887
24 Hours

2. COMPOSITION / INFORMATION ON INGREDIENTS

	Material	CAS Registry No.	Weight Percent	ACGIH (TLV)	OHSA (PEL)
1.	Graphite	7782-42-5	>70	2.0 mg/m^3 Respirable	2.5 mg/m^3 Respirable
2.	Sulfuric Acid 3 mg/m^3 STEL has been established for Sulfuric Acid	7664-93-9	0-25	1.0 mg/m^3	1.0 mg/m^3
3.	Nitric Acid 4 ppm STEL has been established for Nitric Acid	7697-37-2	0-15	2 ppm	5.0 mg/m^3
4.	Crystalline Silica (See Section 16, Item 3.)	14808-60-7	<0.3	0.025 mg/m^3 Respirable	$\frac{10\ mg/m^3}{\%\ SiO_2 + 2}$ Respirable
5.	Trade Secret Ingredient	No CAS No. Assigned	1-3	Not Established	Not Established

3. HAZARDS IDENTIFICATION

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☆ **PRODUCT IS STABLE AT ROOM TEMPERATURE. PRODUCT MAY RELEASE ACID FUMES IF** ☆
☆ **HEATED ABOVE 100°F. PRODUCT MAY UNDERGO RAPID EXPANSION ABOVE 300°F.** ☆
☆ **PRODUCT DOES NOT RELEASE HAZARDOUS MATERIALS IN NORMAL USE. FABRICATION** ☆
☆ **MAY RELEASE GRAPHITE AND SILICA DUSTS, WHICH MAY BE HARMFUL IF INHALED OR IF** ☆
☆ **CONTACT IS MADE WITH SKIN OR EYES. SEE BELOW AND SECTION 16, ITEM 3.** ☆
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Primary Route of Exposure: Inhalation of dusts and/or acid fumes generated during processing and handling, and dermal and ocular contact with dusts.

Effects of Overexposure:

Acute: High concentration of graphite dusts and/or acid fumes may be irritating to the eyes, skin, mucous membranes and respiratory tract.

Nitric and sulfuric acids are corrosive. High concentrations of vapors or mists are highly irritating to the eyes, skin, mucous membranes and respiratory tract. Direct skin contact may cause chemical burns. Direct eye contact may cause corneal damage which can result in blindness. Ingestion may cause severe pain and chemical burns of the mouth, esophagus and stomach.

Chronic: Inhalation of high concentrations of graphite dusts over prolonged periods of time may cause pneumoconiosis. Symptoms can include cough, shortness of breath and decrease in pulmonary function.

Pre-existing pulmonary disorders, such as emphysema, may possibly be aggravated by prolonged exposure to high concentrations of graphite dusts, nitric and/or sulfuric acid vapors and mists.

Exposure to high concentrations of nitric and/or sulfur acid vapors and mists over prolonged periods of time may increase the risk of developing emphysema and chronic bronchitis. Prolonged exposure to high concentrations of nitric and/or sulfur acid vapors and mists over prolonged periods of time may cause discoloration and erosion of teeth. Exposure to high concentrations nitric and/or sulfuric acid vapors and mists over prolonged periods of time may also cause chronic conjunctivitis (eye irritation).

NOTE: The acid components of this product are encapsulated within the graphite matrix. They do not pose a hazard during normal use or handling.

Inhalation of high concentrations of crystalline silica dusts over prolonged periods of time may cause silicosis, a progressively debilitating lung disease. The symptoms are similar to those cited above for pneumoconiosis. (See Section 16, Item 3.) Inhalation of high concentrations of crystalline silica over prolonged periods of time has also been linked to an increased incidence of lung cancer. (See Section 11.)

Physical Hazards:

Graphite dusts are electrically conductive. Accumulations of dusts may cause shorting of electrical circuits. Care should be taken to seal electrical circuits and switches that may be affected. Dusts should not be emitted to the atmosphere where they may settle on and cause shorting of electrical equipment.

4. FIRST AID MEASURES

Inhalation: For overexposure to fumes, vapors or particulate matter, remove the exposed person to fresh air. If breathing is difficult, oxygen may be administered. Seek medical attention. If breathing has stopped, artificial respiration should be started immediately. Seek medical attention.

Eye Contact: If material enters the eye, flush with water for at least 15 minutes. Seek medical attention if irritation develops or persists.

Skin Contact: If material gets on the skin, wash thoroughly with mild soap and water. Seek medical attention if irritation develops or persists. Dermatitis should be treated symptomatically by a physician.

Ingestion: Ingestion is not expected to be an important route into the body.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: Not Applicable

Flammable Limits: LEL: Not Applicable UEL: Not Applicable

Autoignition Temperature: Not Applicable

Extinguishing Media: Bulk material is non-combustible, but subject to thermal decomposition at high temperatures. Use water, carbon dioxide, dry chemical or foam as extinguishing media.

Special Firefighting Procedures: Material in or near fires should be cooled with a water spray to prevent liberation of acid fumes or expansion.

Unusual Fire and Explosion Hazards: Thermal decomposition may produce smoke, oxides of carbon and low molecular weight organic compounds whose composition has not been characterized. Material volume will increase up to 200 times when exposed to intense heat.

6. ACCIDENTAL RELEASE MEASURES

Spilled or released material should be picked up with a suitable implement and returned to the original container if reusable. If not reusable, the material should be placed in DOT-approved containers for disposal. Personnel involved in the cleanup should be wearing appropriate personal protective equipment. See Section 8. Unauthorized personnel should be kept clear of the area of spills or releases. Do not allow material to enter storm or sanitary sewers, groundwater or soil. Releases may be reportable to local, state or federal authorities. Consult federal, state or local regulatory requirements for more information.

7. HANDLING AND STORAGE

Material is stable at room temperature. Store at temperatures below 100°F. The nitric and/or sulfuric acid components are encapsulated within the graphite matrix but may exhibit a strong odor. They do not pose a hazard during normal use or handling.

Store in labeled, closed containers away from heat, spark, open flames and other sources of ignition. Do not store with or near incompatible chemicals cited in Section 10. Do not let dust from material accumulate in the workplace. Promptly clean up any spills that may occur. Any dusts generated during handling or processing should be cleaned up by wet mopping or vacuuming. Dry sweeping can resuspend particulate matter in the atmosphere.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Ventilation

If dusts are generated during processing or use, local exhaust ventilation should be provided to maintain exposures below the limits cited in Section 2.

Personal Protection:

Respiratory: If exposures exceed the limits cited in Section 2 by less than a factor of 10, use a respirator with acid-gas cartridges and dust pre-filter.

Eye Protection: Protective chemical safety glasses with sideshields should be worn to prevent eye contact with particulate matter.

Protective Gloves: Protective neoprene or nitrile gloves are recommended to prevent cuts, abrasions and irritation during handling and processing.

Other: Neoprene or nitrile rubber coveralls or slicker are recommended.

All chemicals should be handled so as to prevent eye contact and excessive or repeated skin contact. Appropriate eye and skin protection should be employed. Inhalation of dusts and vapors should be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Black Particles	Bulk Density:	0.6-1.0 g/cc
Odor:	Slight to None	Boiling Point:	Not Applicable
Melt Point:	>5000°F (Sublimes)	Vapor Density:	Not Applicable
Specific Gravity:	2 g/cc	% Solubility (H_2O):	Insoluble
Vapor Density (Air=1):	Not Applicable	Evaporation Rate (BUOAC=1):	Not Applicable
% Volatile by Volume:	Organic Volatiles: None Inorganic Volatiles: 25%	Other:	Not Applicable

10. STABILITY AND REACTIVITY

Conditions Causing Instability:	None that are known. Material is stable in ambient conditions. Material will expand when exposed to temperatures above 300°F. Hazardous polymerization will not occur. Temperatures above 100°F **may liberate acid fumes.**
Incompatibility (Materials to Avoid):	Avoid contact with strong oxidizing agents.
Hazardous Decomposition Products:	See Section 5 for possible combustion and/or thermal decomposition products. These would be expected during expansion of the material at temperatures exceeding 300°F.
Special Sensitivity:	None that are known.

11. TOXICOLOGICAL INFORMATION

Graphite	Oral LD_{50} Rat	>5 g/kg
Nitric Acid	Oral LD_{LO} Human	430 mg/kg
Sulfuric Acid	Oral LD_{50} Rat	2140 mg/kg

The International Agency for Research on Cancer (IARC) has concluded that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to man causing cancer of the larynx and lung.

The crystalline silica component of this formulation is listed as an animal carcinogen and a known human carcinogen by the International Agency for Research on Cancer (IARC).

12. ECOLOGICAL INFORMATION

The sulfuric acid component is toxic to aquatic life at low concentrations.

13. DISPOSAL CONSIDERATIONS

Material should be disposed of in accordance with all applicable federal, state and local regulations. Contact your local or state environmental agency for specific requirements.

14. TRANSPORT INFORMATION

D.O.T. Shipping Name:	Not Regulated
Technical Shipping Name:	Not Applicable
D.O.T. Hazard Class:	Not Applicable
U.N./N.A. Number:	Not Applicable
Product RQ. (lbs.):	Not Applicable
D.O.T. Label:	Not Applicable
D.O.T. Placard:	Not Applicable
Freight Class Bulk:	Not Applicable
Freight Class Package:	Not Applicable
Product Label:	Not Applicable

15. REGULATORY INFORMATION

All components are listed on:

U.S.: TSCA

EC: EINECS

Canada: DSL

CERCLA REPORTABLE QUANTITY:

1000 lbs Nitric and Sulfuric Acids

RCRA STATUS:

Not Applicable

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES:

Nitric and Sulfuric Acids TPQ 1000

SECTION 311/312 HAZARD CATEGORIES:

Nitric and Sulfuric Acids

SECTION 313 TOXIC CHEMICALS:

Nitric Acid and Sulfuric Acid Aerosol

TSCA STATUS:

On TSCA Inventory

STATE REGULATORY INFORMATION:

1. WARNING: The crystalline silica component of this formulation has been identified as a "chemical known to cause cancer" by the State of California.

COMPONENT NAME	CAS REGISTRY NO.	CONCENTRATION
Crystalline Silica	14808-60-7	<0.3%

16. OTHER INFORMATION

NOTICE FROM GRAFTECH INTERNATIONAL HOLDINGS INC. – The data in this Material Safety Data Sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process. The information contained herein is based on available scientific literature obtained by GrafTech International Holdings Inc. and is current as of the date of issue of this Material Data Safety Sheet. GrafTech International Holdings Inc. makes no representation as to the accuracy of the scientific literature on which it has relied in the preparation of this Material Data Safety Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of GrafTech International Holdings Inc., it is the user's obligation to determine the conditions of safe use of this product.

1. Products — Grades

   Grades — Applicable to all grades of Expandable Graphite Flake

   * And various other new sales grades or trial grades not specifically listed, but manufactured with the materials noted in this MSDS.

2. This product is WHMIS Controlled D2A, E.

3. Personnel samples taken during cut-part fabrication showed non-detectable levels of crystalline silica.

4. The "Trade Secret Ingredient" contained in this product is less toxic than sulfuric acid, nitric acid and silica components and no more toxic than the graphite components.

   In case of medical emergency, the identity of the "Trade Secret Ingredient" will be divulged to medical personnel.

   In non-emergency situations, the identity of the "Trade Secret Ingredient" will be divulged after a Confidentiality Agreement is completed. Call 1-800-253-8003.

Prepared By: M. H. Burns/J. D. Banzer