
SAFETY DATA SHEET

Version 9

Revision Date 08/19/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product Identifiers**

Product Name: Pyrograf III[®] Carbon Nanofiber, LHT Grade
Product Number: N/A
Brand: Pyrograf Products, Inc.

1.2 Relevant Identified Uses of the Substance of Mixture and Uses Advised Against

Identified uses: Laboratory chemicals, synthesis of substances

1.3 Details of the Supplier of the Safety Data Sheet

Company: Pyrograf Products, Inc.
154 West Xenia Ave., PO Box 579
Cedarville, OH 45314-0579
USA

Telephone: (937)-766-2020
Fax: (937)-766-4878

1.4 Emergency Telephone Number

Emergency Phone Number: 1-800-222-1222 (National Poison Control Hotline)

2. HAZARDS IDENTIFICATION**2.1 Classification of the Substance or Mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Eye irritation (Category 2A), H319

Specific target organ toxicity – single exposure (Category 3), Respiratory system, H335

For full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label Elements, Including Precautionary Statements

Pictogram



Signal Word: WARNING

Hazard Statements

H319 Causes serious eye irritation

H335

May cause respiratory irritation

Precautionary Statement

Avoid inhalation of dusts/fumes/gases/mists/vapors/spray. Use in well-ventilated areas only. Thoroughly wash skin after handling. Wear eye and face protection.

IF INHALED: Remove person from contaminated area to fresh air for breathing and keep comfortable. Call the EMERGENCY TELEPHONE NUMBER (Poison Control, section 1.4) if are experiencing discomfort.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, seek medical attention. Store in a well-ventilated place. Keep container tightly closed and locked up. Dispose of contents to an approved waste disposal plant.

IF SWALLOWED: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult physician.

2.3 Hazards Not Otherwise Classified (HNOC) or Covered by GHS

None.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Chemical Name: Carbon Nanofiber
Synonyms: PR-19/24/25-XT-LHT-(AM)
Formula: C
Molecular Weight: 12.01 g/mol

Hazardous Components

| Component | Concentration |
|-----------------|--------------------------------|
| Carbon Fiber | > 98 wt % |
| Iron | < 1.4 wt % |
| Sulfur | < 0.8 wt % |
| Mineral content | < 1 wt % from H ₂ O |

4. FIRST-AID MEASURES

4.1 Description of First-Aid Measures

General

Exit contaminated area. Consult a physician. Show this safety data sheet (SDS) to your health care personnel.

If Inhaled

Move person into fresh air. If not breathing, give artificial respiration. Consult a physician or nearest health care personnel.

Skin Exposure

Rinse thoroughly with plenty of soap and water. Consult a physician or nearest health care personnel.

Eye Contact

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Consult a physician or nearest health care personnel.

If Swallowed

Never give anything to an unconscious person. Rinse mouth with water. Consult a physician or nearest health care personnel.

4.2 Most Important Symptoms and/or Effects: Both Acute and Delayed

The most important known symptoms and effects are described in the labelling (see section 2.2 and/or section 11).

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

No data available.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the Substance or Mixture

No data available.

5.3 Recommendations for Firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist, dust, or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, see section 8.

6.2 Environmental Precautions

Do not allow product to enter drainage systems.

6.3 Methods and Materials Used for Containment

Carefully pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to Other Sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventative fire protection. For precautions see section 2.2.

7.2 Conditions for Safe Storage, Including Any Incompatibilities

Keep container tightly closed in a dry and well-ventilated area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters

Components with Workplace Control Parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure Controls

Appropriate Engineering Controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of the work day.

Personal Protective Equipment

Eye/Face Protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin Protection

Handle with gloves. Gloves should be inspected prior to use. Use proper glove removal technique by not touching the glove's outer surface to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands thoroughly.

Full Contact

Material: Nitrile Rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 minutes

Molded Nitrile gloves impervious to nanomaterials (tested and passed with ASTM standard F739).

Splash Contact

Material: Nitrile Rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 minutes

If used in solution, or mixed with other substances, and other conditions, contact the supplier of the gloves. This recommendation is advisory only and must be determined by an industrial hygienist and/or safety officer familiar with the

specific situation of anticipated use by our customers. It should not be constructed as offering an approval for any specific use scenario.

Body

Clothing impervious to nanomaterials, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace (passed ASTM standard F739)

Respiratory

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). The EPA mandates the use of full face respirators with minimum N100 grade cartridges if there is any risk of exposure to carbon nanomaterial dust.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

| | |
|--|--|
| a. Appearance | Black powder/agglomerates, nanoparticles |
| b. Odor | No data available |
| c. Odor Threshold | No data available |
| d. pH | No data available |
| e. Melting point | 3,652 – 3,697 °C (6,606 – 6,687 °F) |
| f. Freezing point | No data available |
| g. Initial boiling point/range | No data available |
| h. Flash point | No data available |
| i. Flammability | No data available |
| j. Evaporation Rate | No data available |
| k. Upper/lower flammability or explosive limit | No data available |
| l. Vapor pressure | No data available |
| m. Vapor density | No data available |
| n. Relative density | 2 - 20 lbs/ft ³ |
| o. Nanofiber density | 1.55 – 1.70 g/cc |
| p. Water solubility | No data available |
| q. Partition coefficient: n-octal/water | No data available |
| r. Auto-ignition temperature | No data available |
| s. Decomposition temperature | No data available |
| t. Viscosity | No data available |
| u. Explosive properties | No data available |
| v. Oxidizing properties | No data available |

9.2 Other Information

Particle diameter: 0.2 micron

The nanofiber density includes with volumes of the hollow core of the nanofiber. The density of the nanofiber wall is 2.0 - 2.1 g/cc.

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical Stability

Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

No data available

10.5 Incompatible Materials

Strong oxidizing agents.

10.6 Hazardous Decomposition Products

Hazardous decomposition formed under fire conditions. The exact nature of decomposition is unknown.

Other decomposition products: No data available

In the event of a fire, see section 5.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

No data available

Inhalation: No data available

Dermal: No data available

Skin Corrosion/Irritation

No data available

Serious Eye Damage/Eye Irritation

No data available

Respiratory or Skin Sensitization

No data available

Germ Cell Mutagenicity

No data available

Carcinogenicity

| | |
|------|---|
| IRAC | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IRAC. |
| NTP | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by NTP. |
| OSHA | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by OSHA. |

Reproductive Toxicity

No data available

Specific Target Organ Toxicity

May cause respiratory irritation via inhalation.

Specific Target Organ Toxicity – Repeated Exposure

No data available

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company according to applicable federal, state and local environmental regulations. May be placed in an industrial hazardous waste incineration process.

Contaminated Packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

| | |
|---------------------------|---------------------|
| Land transport (DOT) | Not dangerous goods |
| Sea Transport (IMDG) | Not dangerous goods |
| Air Transport (ICAO/IATA) | Not dangerous goods |

15. REGULATORY INFORMATION

US Toxic Substances Control Act

Product is listed on the TSCA chemical inventory.

The TSCA Section 5(e) Consent Order issued for this product has set provisions for the end user when this product is used in a commercial application. It is important that Pyrograf Products, Inc. be notified prior to placing this product into a commercial

application, as information may be needed to determine the extent of regulatory oversight. This product is subject to an Order issued under Section 5(e) of TSCA, to the TSCA Section 12(b) export notice requirement, and to the TSCA Section 8(b) chemical inventory.

16. OTHER INFORMATION

H-Statements

| | |
|-------------|--|
| Eye. Irrit. | Eye irritation |
| H319 | Causes serious eye irritation. |
| H335 | May cause respiratory irritation. |
| STOT SE | Specific target organ toxicity – single exposure |

HMIS Rating

| | |
|------------------------|---|
| Health Hazard: | 2 |
| Chronic Health Hazard: | 0 |
| Flammability: | 0 |
| Physical Hazard: | 0 |

NFPA Rating

| | |
|------------------------|---|
| Health Hazard: | 2 |
| Chronic Health Hazard: | 0 |
| Flammability: | 0 |
| Physical Hazard: | 0 |

Further Information

All carbon nanofibers are solid particles. Carbon nanofibers and their associated dust/shards may cause temporary irritation of the skin, eye, nasal passages, throat, upper respiratory tract, or gastrointestinal tract.

All forms of Pyrograf-III carbon nanofiber meet the definition of a respirable fiber (i.e. containing a length greater than 5 microns, a largest cross-sectional width less than 3 microns, and a length to cross-sectional width ratio greater than 3:1). Respirable fibers, dusts and shards may cause lung damage or disease.

During operations involving moving or mechanically working with this product, airborne fibers, shards, and dust may be generated. Any recipients of this product should assess their workplaces, processes, and material/products to determine if handling, processing, and/or incorporating Pyrograf-III carbon nanofibers in anyway allows for these fibers to become airborne in an open atmosphere. If so, recipients should take necessary precautions to protect people who may be exposed to Pyrograf-III carbon nanofibers.

This SDS is based upon data, information and other resources available at the time of the revision date listed. The information contained within this SDS is considered accurate, to the extent known by Pyrograf Products, Inc. Pyrograf Products, Inc. assumes no legal responsibility for reliance or use of the information in this SDS.