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This document is a guide to safe handling of GRAPHISTRENGTH™ carbon nanotube powders and is provided as a supplement to the Material Safety Data Sheets (MSDS).

### GRAPHISTRENGTH™ Carbon Nanotube Products

GRAPHISTRENGTH™ products comprise multi-walled carbon nanotubes. Typical GRAPHISTRENGTH™ carbon nanotube diameter is 10 to 15 nanometers; typical length is approximately a few microns, roughly between 1 to 10 μm. Due to their process of production, GRAPHISTRENGTH™ multi walled carbon nanotubes exist in agglomerated bundles with average dimensions of about 400 microns with range of approximately 50 to 900 microns. Using GRAPHISTRENGTH™ powders likely poses a potential risk of exposure. This guide identifies good practices for handling GRAPHISTRENGTH™ powders to minimize human and environmental exposure.

### Safe Handling

**BEFORE HANDLING THE MATERIAL, READ AND UNDERSTAND THE MSDS (MATERIAL SAFETY DATA SHEET) FOR ADDITIONAL INFORMATION ON PERSONAL PROTECTIVE EQUIPMENT AND FOR SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION.**

GRAPHISTRENGTH™ multi walled carbon nanotubes are chemically consistent with graphite, however, due to dimension, shape and physical characteristic differences, toxicological properties of GRAPHISTRENGTH™ powders are not completely understood and are the subject of ongoing studies. The goal in safely handling GRAPHISTRENGTH™ powders is to eliminate, to the extent possible, contact with people and the environment via any exposure route.

Access to work areas where GRAPHISTRENGTH™ powders are present should be restricted to reduce worker exposure. The best way to avoid worker exposure is to use GRAPHISTRENGTH™ powders in closed, negative pressure processes equipped with high efficient particulate air filtration (>99.9% efficiency at sub-micron particle size).

In cases where the use cannot be conducted in a closed process, appropriate local exhaust systems and personal protective equipment (PPE) must be used. Local exhaust must be equipped with high efficiency filtration as defined above.

Recommended PPE for these applications is as follows:

- High efficiency dust mask or half face respirator, with an appropriate fit test. The most efficient dust masks available on the market must be used. For instance, FFP3 rating in Europe, or N100 rating in North America.
- Suitable impervious gloves;
- Laminated coverall and foot coverings (equivalent to TYCHEM<sup>®</sup> non-porous protective clothing products).

When managing spills or releases, a hood-type powered air-purifying respirator (PAPR) equipped with a high efficiency filter must be used with the other specified PPE. Work areas must be cleaned with a high efficiency filtration vacuum cleaner (>99.9% efficiency at sub micron particle size) and wet wiping methods.

In addition, after handling carbon nanotube powders, all the used materials must be discarded according to state and local regulations.

Periodic personnel exposure monitoring should be performed to assure particle concentrations do not exceed established background levels.

### First Aid

- If in eyes, immediately flush with water. Obtain medical attention for persistent irritation.
- If on skin, immediately wash with soap and water. Remove contaminated articles. Obtain medical attention for any symptom.
- If swallowed, do not induce vomiting. Administer water. Obtain medical attention.
- If inhaled, remove to fresh air. If not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain medical attention.

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