

# Material Safety Data Sheet

according to 91/155/EEC for  
Carbon-Nanotubes  
Carbon-Nanofibers

## 1. Substance Identification, Preparation and Company Data

Product: Millennium-Tube  
Millennium-Fiber

Substance: Synthetic filamentous Graphite  
Chemical Formula: C  
CAS-Number: 7782-42-5 (Graphite)

Use of the substance/preparation: Synthetic Filler and/or Additive

Company/Undertaking Identification: YOUR-TOOL GmbH  
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## 2. Compositions/Information on Ingredients

Chemical Composition:

	<b>Graphite</b>	<b>Amorphous Carbon</b>	<b>Impurity: Ni/Fe</b>	<b>other</b>
<b>ingredients</b>				
Millennium-Tube	% by Wt.: $\geq 80$	% by Wt.: $< 20$	% by Wt.: $< 2$	none
Millennium-Fiber of S	% by Wt.: $\geq 80$	% by Wt.: $< 20$	% by Wt.: $< 2$	Traces

Hazard Symbol Xn harmful (Company recommendation)  
R-Phrases: 37, 68/20  
S-Phrases: 7, 16, 18, 22, 38, 47

## 3. Hazard Identification

Hazard designation: not regulated

According to article 14 of the Council Directive 67/548/EEC: Caution - Hazardous potential not completely determined. Irritating to respiratory system; harmful: possible risk of irreversible effects through inhalation

## 4. First Aid Measures

Eye Contact: Flush particles from the eye with clean water. If irritation persists, seek medical help.  
Skin Contact: Wash skin with mild soap and water to remove material. If a rash develops, seek medical attention.  
Inhalation: Remove from exposure. If respiratory irritation persists, seek medical help.  
Ingestion: If any symptoms caused by ingestion arise, seek medical help.

## 5. Fire Extinguishing Instructions

ABC fire extinguisher, large quantities of water may be used to extinguish incipient stage fires.

## 6. Accidental Release

Personal precautions:	Provide for sufficient ventilation/respiratory protection. See protective equipment listed in section 8. Remove sources of ignition. Ventilate area of leak or spill.
Environmental precautions:	Do not empty into drains. If the product contaminates lakes, rivers or sewages, inform appropriate authorities in accordance with local regulations.
Methods for Cleaning-Up/Collecting:	Absorb spillage with a wet cloth or flush away with water. Wipe up large amounts of spillage with a cloth and place in a plastic container for disposal. Flush area of spill with plenty of water.
Further handling of spillage:	See section 13.

## 7. Handling and Storage

Keep away from sources of ignition; store material in closed containments in dry room-temperature environment.

## 8. Exposure Controls and Personal Protection

Respiratory protection is necessary when exposure limits for airborne contaminants are exceeded during handling. Wear approved dust respirator (at least P100 or N95 respirator) in accordance with European, National and local laws and regulation. Work clothing should be confined to the workplace. Use safety goggles with side shields, gloves or protective barrier cream.

Recommend adequate ventilation to maintain exposure levels below the recommended exposure limit. For ventilation considerations, use guidelines recommended by the ACGIH.

Inhalation Standards: American Conference of Governmental Industrial Hygienists (ACGIH)  
Threshold Limit Value (TLV) - 3.5 mg/m<sup>3</sup>  
German Maximale Arbeitsplatzkonzentration (MAK) - 6 mg/m<sup>3</sup>  
British Occupational Exposure Limit (OEL) - 3.5 mg/m<sup>3</sup>  
Italian Exposure Limit - 3.5 mg/m<sup>3</sup> TWA; 7.0 mg/m<sup>3</sup> STEL

## 9. Physical and Chemical Properties

Appearance:	Black, fluffy solid	Odor:	Odorless	Boiling Point:	N/A
Vapor Pressure:	N/A	Vapor Density:	N/A	Flash Point:	N/A
Evaporation Rate:	N/A	Viscosity:	N/A	Bulk Density:	90-650 kg/m <sup>3</sup>
Solubility in Water:	Insoluble	Specific Gravity:	2	Percent Solid by Weight:	>99%
Particle Diameter:	microns	Average Single Fiber Diameter:	2 - 200nm		

## 10. Stability and Reactivity

The material as shipped is non-reactive (stable) under ambient conditions.

Thermal Decomposition:	N/A if Oxygen is excluded.
Thermal Combustion:	Incomplete combustion/combustion leads to formation of Carbon Dioxide and Carbon Monoxide.
Conditions to Avoid:	Avoid unwanted, uncontrolled reactions with strong oxidizers.

## 11. Toxicological Information

Practical Experiences with Humans: To our knowledge so far no hazardous effects occurred using this product.

As shipped, the material has no known toxicological properties other than causing allergic reactions in individuals sensitive to substances contained in the product. However, user generated dusts may on contact with the skin or eyes produce irritation. Chronic exposure could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of user generated dusts may pose a long-term health hazard.

The following information is directed to the ingredients of the material listed in Section 2.

Animal Toxicity Studies: Chronic inflammation, lung fibrosis and lung tumors have been observed in some rats experimentally exposed, for long periods of time, to very high concentrations of carbon black and several other insoluble fine dust particles. Tumors have not been observed in other animal species (i.e. mouse and hamster) under similar circumstances and study conditions. Researchers conducting the rat inhalation studies believe that these effects most likely result from the massive accumulation of small dust particles in the lung which overwhelm the natural lung clearance mechanisms, known as the "lung overload" phenomenon, rather than from a specific chemical effect of the dust particles in the lung.

Human studies: In Monograph 65, issued in April 1996, the International Agency for Research on Cancer (IARC) re-evaluated carbon black and concluded that, "Although one cohort study on the carbon black production industry showed slight excesses of cancer, the totality of the epidemiology studies, both in the carbon black production industry and in some user industries, suggested that there is inadequate evidence for the carcinogenicity in humans of carbon black".

Carcinogenicity: Based on an IARC conclusion that there is "sufficient evidence in experimental animals for the carcinogenicity of carbon black" and inadequate evidence of carcinogenicity in humans, IARC's overall evaluation is that "carbon black is possibly carcinogenic to humans" (Group 2B).

Carbon black has not been listed as a carcinogen by the National Toxicology Program (NTP) or the Occupational Safety and Health Administration (OSHA). The National Institute of Occupational Safety & Health (NIOSH) criteria document on carbon black recommends that only carbon blacks with PAH levels greater than 0.1 % be considered suspect carcinogens. The IARC conclude that nickel compounds were carcinogenic to humans and that metallic nickel is possibly carcinogenic to humans.

Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

The inhalation of nickel powder has not resulted in an increased incidence of malignant tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats, but did not produce an increased incidence in hamsters when administered at the maximum tolerated dose. However, single intratracheal instillations of nickel powder in hamsters at doses near the LD50 have produced and an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas. Inhalation of nickel powder at concentrations 15 times the PEL irritated the respiratory tract in rodents. Nickel is a known sensitizer and may produce allergic reactions.

## 12. Ecological Information

Do not discharge product unmonitored into the environment. As this product is a non active material, no evaporation or air pollution occurs under normal conditions.

## 13. Disposal Considerations

Recommendations for Product: The product may be disposed under controlled incineration and/or in agreement with local and national regulation.

Recommendations for Packaging: Empty used and/or contaminated packaging may be recycled after appropriate cleaning procedure. Packaging which can not be cleaned requires disposal as the product itself.

#### 14. Transportation Information

General information: This product is not considered hazardous for transportation.  
Road transport: ADR/RID/GGVS/GGVE: No hazardous goods.  
Marine transport: IMDG/GGVSee: No hazardous goods.  
Air transport: ICAO/IATA-DGR: No hazardous goods.

#### 15. Regulatory Information

Hazard Symbol "Xn" harmful (Company recommendation)  
Risk- and Safety-phrases according to directive 67/548/EEC

##### R-Phrase Labelling

R37 Irritating to respiratory system  
R68/20 Harmful: possible risk of irreversible effects through inhalation

##### S-Phrase Labelling

S7 Keep container tightly closed  
S16 Keep away from sources of ignition - No smoking  
S18 Handle and open container with care.  
S22 Do not breathe dust.  
S38 Wear suitable respiratory equipment  
S47 Keep at temperature not exceeding 250°C

Special training: No special training is anticipated, however, the worker should be well instructed for the execution of his task, have knowledge of this Safety Data Sheet and normal training in use of personal protective equipment.

#### 16. Other Information

Disclaimer: The data and information presented herein corresponds to the present state of our knowledge and experience and is intended to describe our product with respect to possible occupational safety and health concerns. The user of this product has sole responsibility to determine the suitability of the product for any use and manner of use in the relevant jurisdiction. This MSDS is updated on a periodic basis in accordance with applicable health and safety standards.