

## Carbon NanoFibers

### Conductive Masterbatches & Compounds

FERRO-PLAST introduces on the Italian market the Carbon Nanofibers conductive masterbatches & compounds produced by Electrovac (Austria)

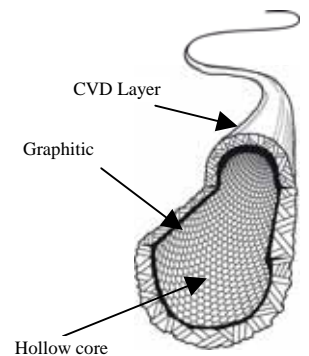
How can our Nanofibers improve your product?

Offering an excellent electrical and thermal conductivity the fiber enables antistatic and mechanically reinforced properties without reducing the mechanical behavior of your conductive material.

Electrovac (Austria) is one of the biggest producers of Carbon Nanofibers with a current capacity of several tons per year.

The novel graphitic nanofibers are available either as powder or already dispersed in a polymer matrix. From the family of Vapor Crown Carbon Fibers (VCGF) CNF offers a wide range of solutions for the aerospace, industrial and automotive industry in the field of mechanical reinforcing, thermal management and electrostatic dissipation.

Carbon nanofibers with an average diameter of 80 – 150 nm and a specific surface area in a range of 20 – 100 m<sup>2</sup>/g show an effective fire retardant barrier by forming a char layer over combustible composites.

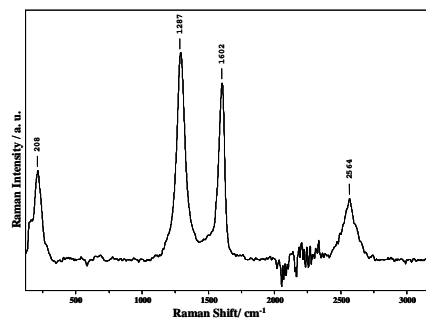


Struttura delle Nanofibre

#### Outstanding Properties

Nanofibers offer significant advantages over many existing materials due to their exceptional mechanical, electrical and chemical properties such as:

- Specific Electrical Resistivity: 10<sup>-3</sup> -10<sup>-4</sup> W/cm
- Max. Current Density: up to 1013 A/cm<sup>2</sup>
- Thermal Conductivity: up to 2000 W/mK
- Young's Modulus: ~ 500 Gpa
- Tensile Strength: ~ 7 GPa.
- Temperature Stability - Air: 550 - 750°C
- Specific Weight: 1.8 – 2.1 g/cm<sup>3</sup>
- High Chemical Inertness



Raman spectrum of carbon nanofibers exhibiting dual structure; the peak at 208 wave number refers to the radial breathing mode, a structural feature observed and characteristic for SWCNT

Such materials are designed for a wide range of applications starting from simple products up to high-tech carbon-carbon composites. Electrovac offers ready to use products such as conductive polymers and eNano®-thermal grease.

#### Carbon Nanofiber filled Masterbatches & Compounds

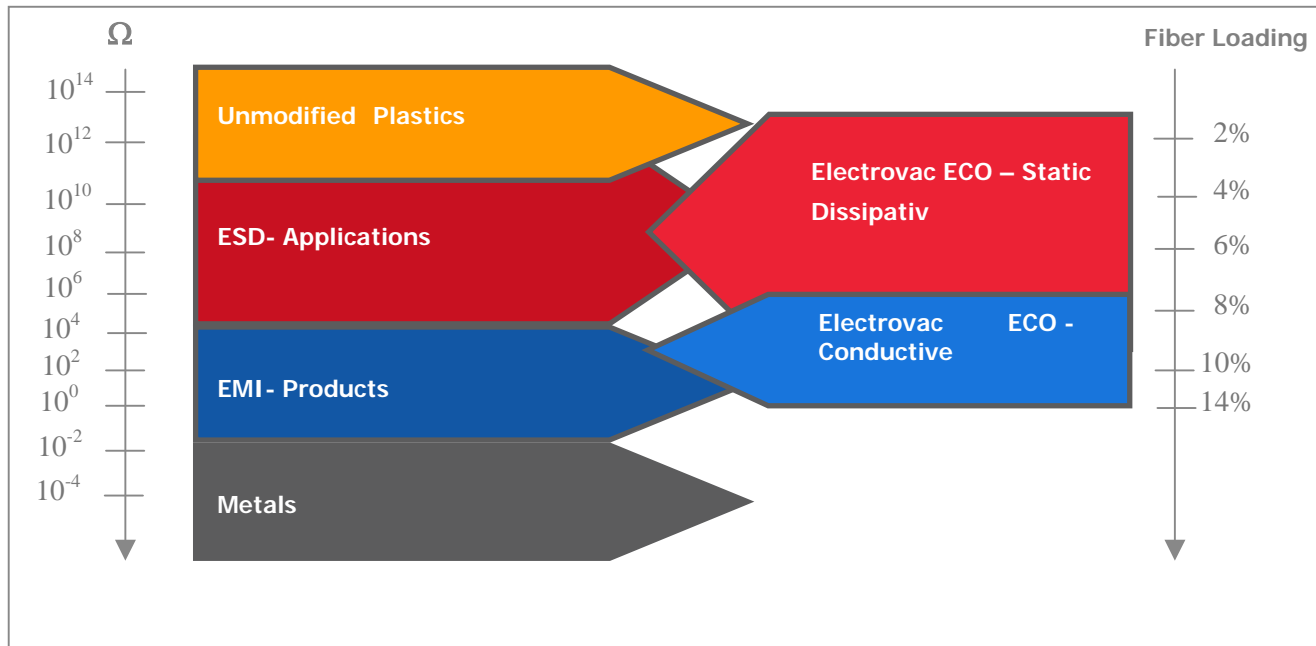
Electrovac offers a wide range of polymer-based, dust-free nanofiber masterbatches and compounds, based on carrier materials developed and optimized for high tech plastics. Because of the very good price-performance ratio this material is suitable for applications in standard thermoplast as well.

In case of the newly designed Electrovac products the conductivity carriers are carbon nanofibers (CNF's), which are a thousand fold smaller than regular carbon fibers. This material owes its excellent properties to its longitudinal geometrical appearance and above-average ratio of length and diameter (L/D-ratio). For these reasons and its chemical properties, this nano-filler material does not detach from the basic material and retains desired properties for years.

## Your dosing – Your conductive Range

A minimal amount of CNF is utilized in thermoplastic applications, which maintains or significantly improves the basic characteristics of polymers. Depending on the type of application, the necessary surface conductivity, and mechanical properties of the final product, 4% to 8% by weight of CNF is recommended. CNF's provide the polymers with higher temperature stability, optimised properties, and outstanding surface quality. The masterbatches and compounds offer a uniform and precisely adjustable surface conductivity within the conductivity range – from antistatic ( $10^{11}$  Ohm/sq) to high conductivity of  $10^3$  Ohm/sq.

### Surface conductivity ranges in ECO products



## Applications and benefits

### Applications:

- ESD
- EMI- Shielding
- Permanent Antistatic
- ESD protected containers
- E-Painting
- Wafer Handling system
- Clean-room application

### Characteristics/Advantages:

- Low loading of conductive filaments
- Maintain the mechanical properties
- Excellent surface quality
- Almost zero contamination of filaments
- Very good flow properties

### Industries:

- Automotive industry
- Electronics industry
- Medical

### Packaging:

We ship in different packaging units:

- Sample bag: 2 kg
- Plastic bag: 25 kg
- Big-Bag: 1000 kg

For further information please visit our website or contact our technical – commercial team.