

# TUBALL™ MATRIX 203

## Concentrate for epoxy and polyurethane resins

TUBALL™ MATRIX 203 is a concentrate based on TUBALL™ single wall carbon nanotubes specifically designed to provide superior electrical conductivity to solvent-based epoxy and solvent-based polyurethane systems, while retaining mechanical properties and minimally impacting the host matrix. TUBALL™ MATRIX 203 is available in flakes with a pasty texture form.

TUBALL™ is a unique single wall carbon nanotube additive from OCSiAl that provides electrical conductivity at ultralow dosage with minimal impact on the rheological and mechanical properties of the host matrix.

TUBALL™ MATRIX 203 is designed for the most demanding applications in the automotive, petrochemical, oil and gas, healthcare, pharmaceutical and electronics industries.

### Benefits

- TUBALL™ single wall carbon nanotubes, carried by TUBALL™ MATRIX, enable ultralow dosage starting at 0.01%;
- Production of conductive parts that retain colours;
- Maintain and even increase mechanical strength. Increase in fracture toughness of up to 25%;
- Ensure permanent and uniform electrical conductivity without “hot spots”;
- Without significant increase of viscosity or density of the host material.

### Typical Properties

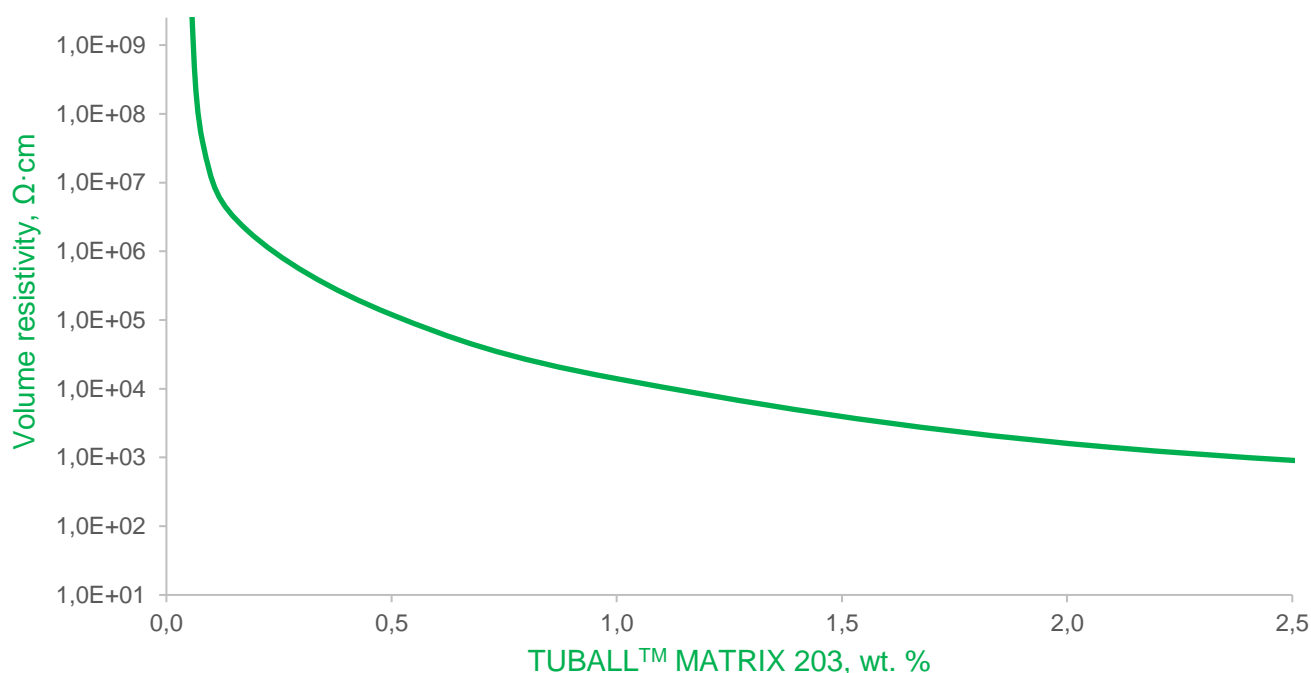
| Concentrate carrier       | The blend of fatty acid glycedyl ester and ammonium salt of polyolefins based derivatives |              |
|---------------------------|---|--------------|
| Property                  | Test method   | Value        |
| Epoxide equivalent weight | ASTM D1652  | 120–140 g/eq |
| Flash point               | ASTM D3278  | 126 °C       |
| Density @ 25 °C           | ASTM D4052  | 0.95 g/ml    |
| Fineness of grind         | ISO 1524  | < 15 µm      |

TUBALL™ MATRIX 203 may contain particles up to 500 µm in size; mass concentration of such inclusions does not exceed 0.04%.

## Typical addition rate

Depending on the characteristics of the dilution polymer and the processing conditions, the loading range of TUBALL™ MATRIX 203 for anti-static or dissipative applications can be as low as 0.1–4.0 wt.%. The exact loading level depends on the required performance, resin characteristics, processing conditions and presence of other ingredients.

An example of a percolation curve, obtained by compounding TUBALL™ MATRIX 203 in D.E.R. 351 epoxy resin, is shown in the figure below. The dilution of the concentrate in neat D.E.R. 351 was performed using a mechanical overhead stirrer.



## Dilution

In order to obtain a high-quality TUBALL™ MATRIX dispersion, OCSiAl recommends that close attention be paid to the dilution procedure. Refer to the Dilution Guidelines for detailed information.

## Packaging

OCSiAl provides free TUBALL™ MATRIX 203 samples in tin containers (50 g concentrate). Industrial volumes are available in different packaging up to 50 kg.

## Storage and transportation

The product is stable in unopened original packaging when stored at temperatures between 5 °C and 60 °C. The recommended storage life is up to 24 months when stored as directed.

## Safety

To ensure safe handling, the appropriate safety regulations should be observed. OCSiAl recommends that every user should be able to apply the safe handling procedures necessary for the user's applications before any handling or manufacturing takes place. A Safety Data Sheet outlining the hazards and handling methods for TUBALL™ MATRIX 203 is available.

## Warranties and disclaimer

The Products correspond to the chemical composition indicated in the Technical Data Sheet and the Material Safety Data Sheet supplied with the Product. The information contained in this document (Information) is based on trials carried out by OCSiAl and may contain inaccuracies or errors that could cause injury, loss or damage.

OCSiAl gives no further warranty and makes no further representation regarding the Products and/or the accuracy of Information and/or suggestions for any particular use of the Products or Information, or that suggested use will not infringe any patent. The Products and Information are supplied on an "as is" basis. These express provisions are in place for all warranties, representations, conditions, terms, undertakings and obligations implied by statute, common law, custom, trade usage, course of dealing or otherwise (including implied undertakings of satisfactory quality, conformity with description, fitness for purpose and reasonable skill and care), all of which are hereby excluded to the maximum extent permitted by applicable law.

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