

# TECHNICAL DATA SHEET

## MASTERBATCH FOR RUBBER APPLICATIONS

### GENERAL INFORMATION

The performance of TUBALL™ graphene nanotubes (GNTs) in rubbers is based on creating an additional 3D network, embedded into the rubber matrix. Even low dosages have the effect of toughening the polymer, improving cohesion strength and fatigue properties, reducing hysteresis losses, and adding electrical conductivity.

TUBALL™ MATRIX 603 is a series of industrial modifiers based on TUBALL™ GNTs and oil plasticizers.

TUBALL™ MATRIX 603 for rubber products is a versatile masterbatch designed to enhance the physical and mechanical properties of rubbers and to contribute to the required electrical conductivity properties.

The versatility of the product lies in its potential to be utilized in blends of other rubber and filler products without having to adjust the formulation or technological process.

TUBALL™ MATRIX 603 for rubber products is an oil that contains up to 10 wt.% of TUBALL™ GNTs.

### BENEFITS

- TUBALL™ GNT, carried by TUBALL™ MATRIX, enable ultralow dosage starting at 0.05%
- Maintain or increase mechanical strength, stiffness and abrasion resistance
- Significantly increase abrasion resistance
- Reduce hysteresis losses and improve wet grip
- Increase electrical conductivity
- Without a significant increase in viscosity or density of the host material
- TUBALL™ expands the rubber compound performance space, giving freedom to access new high-performance options without being limited to the usual geometrical, construction or material parameters, and without performance drawbacks

## TYPICAL PROPERTIES

PROPERTY	TEST METHOD	VALUE
TUBALL™ dosage	Internal method	10 wt. %
Concentrate carrier	–	Low aromatic oil plasticizer (TDAE)
Color and appearance	–	Black paste
Density	–	1.00 g/cm <sup>3</sup>
Carbon content of aromatic rings (% C <sub>A</sub> )	ASTM D2140	25–30
Carbon content of naphthenic rings (% C <sub>N</sub> )	ASTM D2140	20–40
Carbon content of paraffinic chains (% C <sub>P</sub> )	ASTM D2140	40–55

## TYPICAL DOSAGE LEVEL

See dilution guidelines.

## METHOD OF ADDITION

See dilution guidelines.

## VULCANISATION

See dilution guidelines.

## PACKAGING

Plastic containers (0.1, 0.2, 0.5, 1, 5, 10, 20 kg).

## STORAGE AND TRANSPORTATION

The product is stable in its unopened original packaging when stored under normal temperature conditions. The recommended storage life is up to 12 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 is available.

## WARRANTIES AND DISCLAIMER

The Products correspond to the chemical composition indicated in the Technical Data Sheet and the 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.

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