

## CNT MASTERBATCH

### TECHNICAL DATA SHEET

#### Description:

Graphistrength® C E2-40 is a CNT masterbatch for nitrile rubber formulations that contains perfectly dispersed MWNT at a concentration of 40% by weight.

Graphistrength® C E2-40 is suited for the production of conductive or antistatic materials based on carboxylated, hydrogenated plastisized or nonplastisized rubbers.

#### Key features:

Graphistrength® C E2-40 is provided in pellet form with the following key characteristics.

Property	Method	Unit	Typical value <sup>(1)</sup>
MWNT content		wt%	40 <sup>(2)</sup>
Moisture content	Karl-Fisher	wt%	0.05 -0.10
Bulk density	ISO 8130-2	g/cm <sup>3</sup>	1,231
Apparent density	ASTM D1895	g/cm <sup>3</sup>	0,62
Mooney viscosity (ML1+4, 100°C)	ASTM D1646		170

<sup>(1)</sup> Data not intended for specification purposes

<sup>(2)</sup> Graphistrength® C E2-40 contains MWNT with purity > 90 %

#### Benefits and applications:

Graphistrength® C E2-40 is generally formulated with various resins contained nitrile functional groups. Typical final MWNT loadings in the final compounds are in the range 1,5 to 20 wt% depending on the host matrix characteristics, the targeted performances, processing methods and conditions.

The typical electrical resistivity that can be achieved is in the range  $10 - 10^8$  ohm·cm. The electric conductive properties obtained with Graphistrength® C E2-40 are outstandingly consistent and uniform.

Thanks to their low loading, and very small size, Graphistrength® MWNT offer several additional advantages: smooth surface aspect, high preservation of the neat matrix's ductility and considerable improvement of its mechanical properties.

Graphistrength® C E2-40 offers particular advantages for the formulation control due to high concentration of CNT in masterbatch; and for the process, it offers the possibility to introduce NTC using common mixing equipment without special safety precautions.

Graphistrength® C E2-40 is particularly useful in combination with convenient carbon black fillers in nitrile rubber formulations to get advantageous and cost effective solutions.

## Dilution and processing:

The use of Graphistrength<sup>®</sup> C E2-40 into final formulation will depend on the process technology.

**For molding applications** (rings, gloves, flexible parts etc) the masterbatch can be introduced in final formulation by cylinder, internal, conical, or other conventional mixing equipment.

- The nitrile basic resin used in the master-batch (60% in mass) should be absolutely taken into account for the vulcanization/accelerator part in the final formulation. This resin is of similar reactivity in vulcanization process as a major nitrile contained bases.
- The most efficient way to get the homogeneous rubber formulation is to mix firstly Graphistrength<sup>®</sup> C E2-40 with approximately half of basic rubber and all vulcanization additive (sulfur reactive composition for example). When the mixture looks homogeneous, the last part of the rubber can be introduced and the formulation finished to be ready for molding. This recommendation is important for efficient vulcanization of the rubber in vicinity to nanotubes surfaces resulting in enhanced electrical and mechanical properties.
- The molded article becomes conductive after the vulcanization. There is no relation found between the resistance level of the elastomer formulation and vulcanized article. The use of vulcanized articles is recommended to judge the electrical properties of the material.

**For extrusion application** (sheet extrusion, casting on textile and other substrates, etc.)

The presence of CNT may bring an increase in viscosity of the final rubber formulation. This increase should not impact extrusion/casting process conditions or the adhesion of the rubber to the substrate. If the viscosity factor happened to be critical, the use of lower viscosity basic resin is recommended.

## Safety and Handling:

Graphistrength<sup>®</sup> C E2-40 is provided in pellet or sheet form where MWNT are strongly embedded.

Graphistrength<sup>®</sup> C E2-40 doesn't present any specific health risk when using in rubber processing.

Graphistrength<sup>®</sup> C E2-40 is provided in 5 or 25 kg bags as pellets. The product is stable in its unopened original packaging when stored at normal temperatures.

Consult the product SDS for additional information on properties, hazards and handling.

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