

# GRAPHISTRENGTH® C W1-20

## WATER-SOLUBLE MASTERBATCH

### TECHNICAL DATA SHEET

#### Description:

Graphistrength® C W1-20 is a Multi Wall carbon Nanotubes (MWNT) masterbatch that contains perfectly dispersed MWNT at a concentration of 20% by weight.

Graphistrength® C W1-20 is suited for the production of electrically conductive water-based formulations. It is based on a non-ionic water-soluble polymer that makes it compatible with most pH sensitive formulations. This masterbatch is intended for use in electrostatic discharge (ESD) protection or mechanical reinforcement of composite structures.

#### Key features:

Graphistrength® C W1-20 is provided in pellet form with the following key characteristics:

Property	Method	Unit	Typical value <sup>(1)</sup>
MWNT content	TGA	wt%	20 <sup>(2)</sup>
Moisture content	Karl-Fisher	wt%	< 0.50

(1) Data not intended for specification purposes

(2) Graphistrength® CW1-20 contains Graphistrength® MWNT with purity > 90 %

#### Benefits and applications:

Graphistrength® C W1-20 is generally diluted in various liquid bases of water-based formulations. Typical final MWNT loadings in the final formulations are in the range of 0.1 to 2 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 of  $10^2 - 10^3$  ohm.cm, depending on MWNT loading and formulation. The ESD properties obtained with Graphistrength® C W1-20 are outstandingly consistent and uniform.

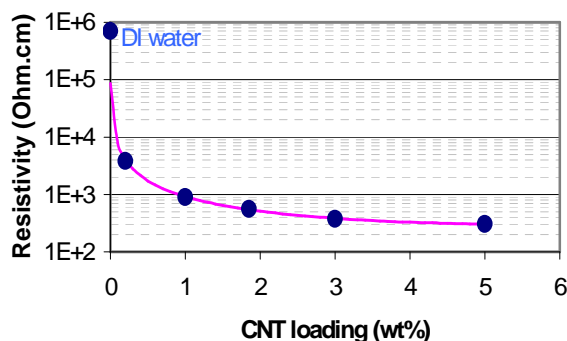
Graphistrength® C W1-20 offers particular advantages for the formulation control due to high concentration of MWNT. It also offers a process advantage, with the possibility to efficiently introduce MWNT using conventional mixing equipment, such as impeller or high-shear mixer.

Graphistrength® C W1-20 is particularly suited for water-based paints, coatings and composites applications.

#### Example of electrical properties:

Percolation curve obtained by dilution of CW1-20 in deionized water.\*

\*Dilution performed according to dilution and processing guide below. Mixing was done on a Silverson LR4T high shear mixer for 30 min at 5,000 rpm.



## Dilution and processing:

The dilution of Graphistrength® C W1-20 into final formulation can be achieved with standard mixers.

Process recommendations:

- The masterbatch should be impregnated or swelled in water or compatible solvent used in final formulation overnight or at least for a few hours before incorporation in formulation. The water or solvent can be preheated to 70°C if possible to improve the impregnation. The liquid should cover completely the masterbatch pellets. The weight of the liquid components used for the impregnation should be taken into account in final formulation.
- External heating of the mixer can be used up to 70°C.
- The rotation speed is to be set at high level for most conventional mixers.
- Impregnated masterbatch and other additives, e.g. mineral or organic fillers can be introduced in base resin at the same time.
- MWNT even in small quantities may lead to increased viscosity of the formulation. Viscosity regulating additives may be needed.
- The presence of MWNT in formulation may lead to variations in drying times. Adjustment of reactive components may be needed.

## Safety and Handling:

Graphistrength® C W1-20 is provided in pellet form where MWNT are strongly embedded.

Graphistrength® C W1-20 does not present any specific health risk when used in liquid-based processing.

Graphistrength® C W1-20 is provided in metal vessels of 2.5 kg and 25 kg net. The preliminary impregnation of the masterbatch with base solvent can be done in original packaging.

Graphistrength® C W1-20 should be stored in dry place, preferably in its sealed original container, at temperatures between 0 and 40°C. In these storage conditions, shelf life is more than one year.

Consult the product's safety data sheet for additional information on properties, hazards and handling.

## Contacts:

- [www.graphistrength.com](http://www.graphistrength.com)

- **Europe**

Arkema France –

Tel.: + 33 (0)5 59 92 67 81

- **Japan**

Arkema K.K. –

Tel.: + 81 (0)75 326 7515

- **North America**

Arkema Inc. –

Tel.: + 1 610 878 6992

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Arkema – 420, rue d'Estienne d'Orves – 92705 COLOMBES Cedex – France

Tel.: + 33 1 49 00 80 80 - Fax: 33 1 49 00 83 96

[www.arkema.com](http://www.arkema.com)

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