GRAPHISTRENGTH® C M4-30

POLYETHYLENE MASTERBATCH

TECHNICAL DATA SHEET

Description:

Graphistrength® C M4-30 is a Multi Wall Carbon Nanotubes (MWCNT) concentrate that is used as an additive for polyolefin based materials. It contains 30 wt% of MWCNT perfectly dispersed in low-density polyolefin matrix. Graphistrength® C M4-30 contains no processing aid or other additives.

Graphistrength® C M4-30 is well suited for the production of semi conducting and conducting polyolefin based compounds.

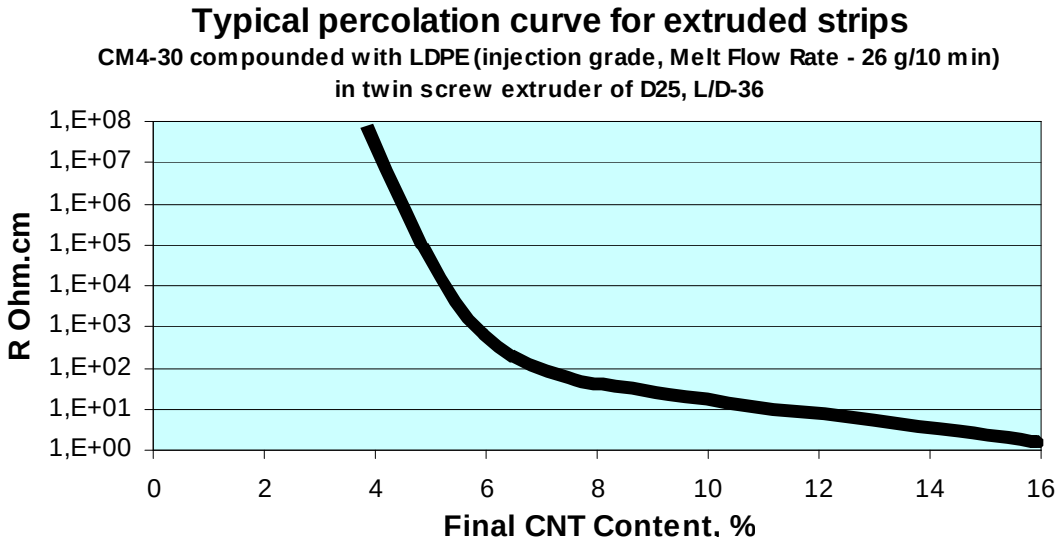
Graphistrength® C M4-30 is provided in pellet form with the following key characteristics:

Property	Method	Unit	Typical value (1)
MWCNT content	TGA	wt%	30.0(2)
Moisture content	Karl-Fisher	wt%	0.05-0.15

(1) Data not intended for specification purposes (2) Graphistrength® C M4-30 contains MWCNT with purity > 90 %

Benefits and applications:

Graphistrength® C M4-30 is generally diluted in low and high-density polyethylene and functional polyolefins. Typical final MWCNT loadings in the final compounds are in the range 1 to 15 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 1 – 10^8 ohm.cm as shown in the percolation plot below (Volume Resistivity vs MWCNT wt%). The ESD properties obtained with Graphistrength® C M4-30 are outstandingly consistent and uniform.



The resistivity is also depending on melt viscosity of the host matrix and process conditions. The percolation curve is normally shifted to lower CNT content for **foams**, **molded** articles, **compounds with mineral fillers**, articles obtained by **rotomolding** etc. Higher load of CNT for similar resistivity is needed for **films**, extruded layers as in **cables**, **pipes**, fluid lines, **textile yarns** etc.
Thanks to their low loading, and very small size, Graphistrength® MWCNT offer several additional advantages: smooth surface aspect, low increase in density and, high preservation of the neat matrix's ductility and mechanical properties, while enhancing thermo-mechanical properties. With low particulate generation, Graphistrength® MWCNT are also ideal additives for applications where cleanliness is key.

Dilution and processing guide

For optimal dispersion in **high flow rate polyolefins** (VLDPE, LDPE, HDPE, EVA, EDA, others), the use of a twin screw co-rotative extruder of L/D > 25 is recommended. The melting zone and the first mixing zone should be heated to temperature close to the melting point of the host matrix (120℃ for LDPE for exam ple). The last heating zones and the die should be regulated at the highest temperature level recommended in the process conditions of the host matrix (240℃ fo r LDPE).
In the case of **viscous extrusion grades** the use of single screw compounding lines is acceptable but not preferred. This type of equipment may also be used in two steps: 1) dilution by half in the host polyolefin to get 15 % of CNT and 2) futher dilution to desired CNT content. This method is recommended when no twin screw available. For low melt temperature functional polyolefins and thermoplastic elastomers internal mixers can also be used.

Packaging and Storage:

Graphistrength® C M4-30 is provided in lined bags of 5 kg or 25 kg net. The product is indefinitely stable in its unopened original packaging when stored at normal temperatures.
Graphistrength® C M4-30 may absorb water if exposed for long periods of time to the atmosphere. In this case, the pellets must be dried at 80 ℃ for 2 hour s before use.

Safety and Handling:

Graphistrength® C M4-30 is provided in pellet form where MWNT are strongly embedded.
Graphistrength® C M4-30 doesn't present any specific health risk when using in thermoplastic processing.
Consult the product MSDS for additional information on properties, hazards and handling.

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