

PLASTICYL™

CNT thermoplastic concentrates

PLASTICYL™ HDPE1501

High Density Polyethylene – carbon nanotubes masterbatches

General Information

Description

PLASTICYL™ is a family of multiwall carbon nanotubes (MWCNTs) thermoplastic concentrates for applications requiring superior electrical conductivity and electrostatic discharge (ESD) properties.

PLASTICYL™ HDPE1501 is a conductive masterbatch based on high-density polyethylene loaded with 15% of Nanocyl's MWCNTs (NC7000™). Because of its high flow, PLASTICYL™ HDPE1501 is ideal for injection molding and extrusion processes.

Key Applications

- Electrostatic Discharge (ESD) and electrically conductive parts
- Electrical and Electronics (E&E), automotive and industrial
- Injection molding, extrusion, blow molding
- Conductive containers

Benefits

- Excellent electrical conductivity at low loading
- Retention of key mechanical properties
- Ease of processing

Technical Data

Main Characteristics

CARBON NANOTUBES LOADING (% _{WT})	PARTICLE SIZE (Units/g) ISO 1183	MVR (cm ³ /10 MIN) NON-STANDARD TEST : 190°C; 21,6 kg; 4 mm	MELTING POINT (°C) ISO 11357-1-3	RESISTIVITY (kΩ)
15 ± 1,0	105 ± 15	25,0 ± 3,0	135	Max. 1,0

Typical Performance after Injection Molding

PROPERTIES	STANDARD	UNITS	NEAT HDPE	DILUTION TO 2% _{WT} OF CNT	DILUTION TO 4 % _{WT} OF CNT	DILUTION TO 6 % _{WT} OF CNT
<i>Volume resistivity</i>	ASTM D4496	Ohm.cm	> 1,00.10 ¹²	> 1,00.10 ¹²	1,15.10 ³	78,8
<i>Surface resistivity</i>	IEC 167	Ohm/sq	> 1,00.10 ¹²	> 1,00.10 ¹²	9,15.10 ³	4,36.10 ²
<i>Young's Modulus</i>	ISO 527-1,2	MPa	1053	1120	1312	1333
<i>Tensile strength at break</i>	ISO 527-1,2	MPa	8,6	25	28	29
<i>Strain at break</i>	ISO 527-1,2	%	-	99	35	26
<i>Charpy notched impact strength</i>	Internal method	kJ/m ²	4	6	7	7
<i>Melt flow - MVR</i> (190°C; 3,8 kg; 2mm)	ISO 1133:1997	cm ³ /10 min	-	13	5	1
<i>Color</i>	-	-	White	Black	Black	Black

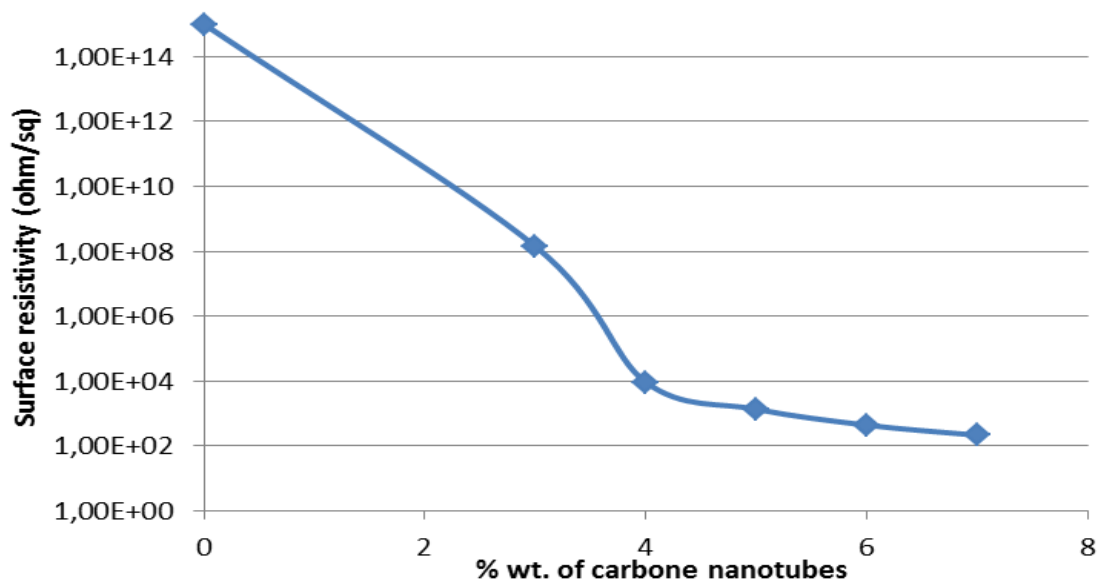
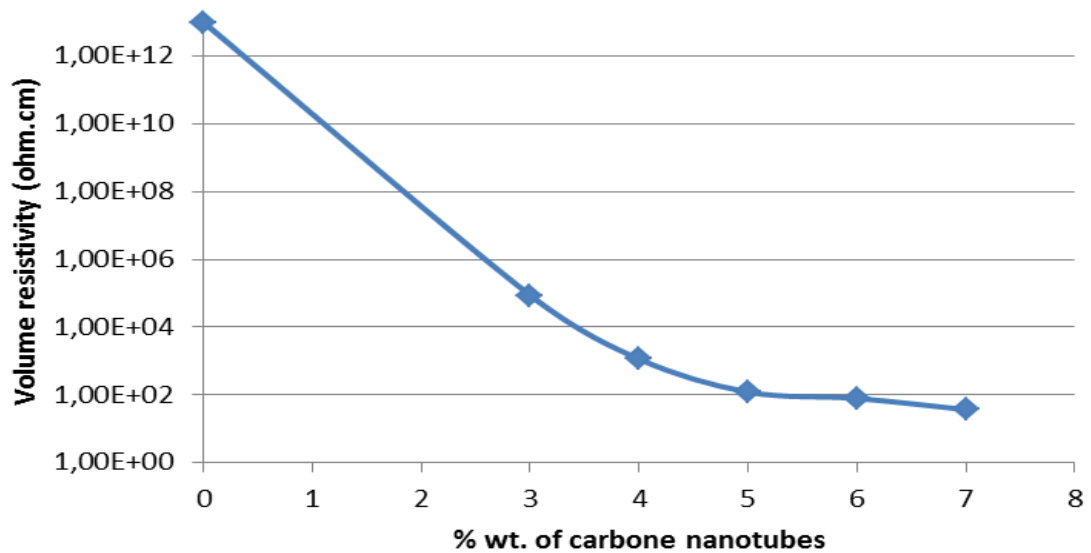
Compounds were processed using an L/D ratio and a 48 twin-screw extruder under proprietary conditions. Specimens were molded by injection, according to the processing parameters below.

In order to get well-dispersed CNT aggregates, Nanocyl recommends the use of polymers with a high Melt Flow Index (MFI). Surface Resistivity results can be significantly influenced by molding/extrusion conditions.

General Processing Guidelines for Injection Molding

INJECTION SPEED	MOLD TEMPERATURE	MATERIAL TEMPERATURE	PLASTICIZING SPEED	BACK PRESSURE	HOLDING PRESSURE	HOLDING TIME
<i>cm³/s</i>	<i>°C</i>	<i>°C</i>	<i>m/s</i>	<i>bars</i>	<i>bars</i>	<i>s</i>
10	20	285	0,5	10	750	40

Percolation Curves for Volume and Resistivity



Electrical resistivity measurement in accordance with Nanocyl standard method based on standard injection molded IZOD specimens, processed according to parameters provided before (General Processing Guide for Injection Molding).

Commercial/Safety Information

Packaging

PLASTICYL™ HDPE1501 masterbatches (pellets) are available in different packaging:

- 20 kg sealed white plastic bags,
- 600 kg cardboard octabins.

Minimum Order Quantity

Nanocyl's minimum order quantity for PLASTICYL™ HDPE1501 is 20 kg.

Custom Grades

Besides the commercial grades, Nanocyl is able to toll-compound any type of HDPE masterbatches to meet its clients' needs.

Health and Safety

A Material Safety Data Sheets (MSDS) is available to provide both workers and emergency personnel with the proper procedures for handling or working with the PLASTICYL™ HDPE1501. This MSDS includes information such as physical data (form and color, melting point, etc.), handling and storage recommendations, first aid measures and ecological information. The Safety Data Sheet is provided with any order and should be observed.

Disclaimer

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