

PLASTICYL™

CNT thermoplastic concentrates

PLASTICYL™ TPU1001

Thermoplastic polyurethane – carbon nanotubes masterbatches

General Information

Description

PLASTICYL™ is a family of Multi-Wall Carbon Nanotubes (MWCNTs) thermoplastic concentrates for applications requiring superior electrical conductivity and electrostatic discharge (ESD) properties. PLASTICYL™ TPU1001 is a conductive masterbatch based on thermoplastic polyurethane resin loaded with 10% of Nanocyl's MWCNTs (NC7000™). Because of its high flow, PLASTICYL™ TPU1001 is ideal for injection molding and extrusion processes.

Key Applications

- Electrostatic Discharge (ESD) and electrically conductive parts
- Tubes, pipes and hoses extrusion
- Injection molding, extrusion
- Conveyor belts
- Extruded films

Benefits

- Excellent electrical conductivity at low loading
- Retention of key mechanical properties
- Ease of processing
- Better abrasion resistance
- High cleanliness

Technical Data

Main Characteristics

CARBON NANOTUBES LOADING (% _{WT})	REAL DENSITY (G/L) ISO 1183	MVR (cm ³ /10 MIN) NON-STANDARD TEST : 190°C; 15 kg; 4 mm	MELTING POINT (°C) ISO 11357-1,-3
10 ± 1,0	1219	25,6 ± 3	122

Typical Performance after Injection Molding

PROPERTIES	STANDARD	UNITS	NEAT TPU	DILUTION TO 1 % _{WT} OF CNT	DILUTION TO 3 % _{WT} OF CNT	DILUTION TO 5 % _{WT} OF CNT	DILUTION TO 6 % _{WT} OF CNT
Volume resistivity	ASTM D4496	Ohm.cm	> 1,00.10 ¹²	> 1,00.10 ¹²	4,19.10 ⁴	1,14.10 ³	3,61.10 ²
Surface resistivity	IEC 167	Ohm/sq	> 1,00.10 ¹²	> 1,00.10 ¹²	1,07.10 ⁵	9,50.10 ³	3,50.10 ³
Young's Modulus	ISO 527-1,2	MPa	29	33,4	50,7	77,9	93
Tensile strength at break	ISO 527-1,2	MPa	No Break	No Break	No Break	15,3	13,9
Strain at break	ISO 527-1,2	%	No Break	No Break	No Break	2,6	2,2
Hardness	-	Shore A / Shore D	-	88 / 32	91 / 38	92 / 42	93 / 43
Melt flow - MVR (190°C; 8,7 kg; 2 mm)	ISO 1133:1997	cm ³ /10 min	-	62	38	8	8
Color	-	-	White	Black	Black	Black	Black

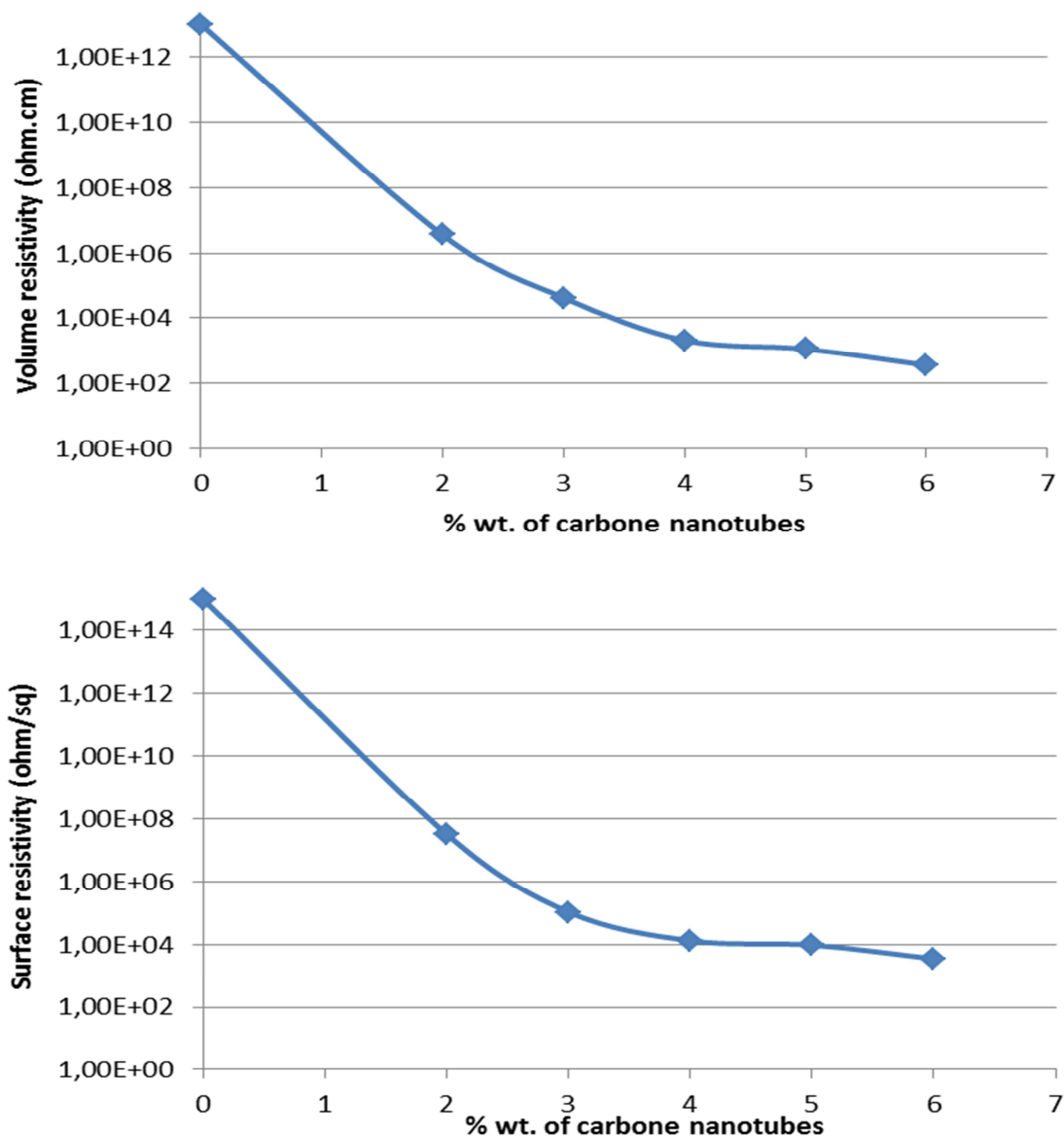
Compounds were processed using an L/D ratio and a 48 twin-screw extruder under proprietary conditions. Specimens were molded by injection, according to the processing parameters below.

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
cm ³ /s	°C	°C	m/s	bars	bars	s
1	20	210	0.1	15	750	25

Percolation Curve for Volume and Surface 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™ TPU1001 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™ TPU1001 is 20 kg.

Custom Grades

Besides the commercial grades, Nanocyl is able to toll-compound any type of TPU 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™ TPU1001. 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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