

## TNHDPE Carbon nanotubes-based masterbatch

The matrix resin is high density polyethylene (HDPE 5000s<sup>[1]</sup>, MI=1 g/10min) in this masterbatch

Features and Properties	Test Standard	Test Condition	Units	Typical Values <sup>[2]</sup>
The content of CNTs				25%
Melt Flow Rate	ISO 1133	190°C, 2.16Kg	g/10min	0
Resistivity of masterbatch <sup>[3]</sup>	Four probe method	23°C	Ω·cm	0.5-0.6
Surface resistivity when the content of CNTs is diluted to 3% <sup>[4]</sup>	ASTM D-257		Ω	10 <sup>8</sup> -10 <sup>10</sup>

[1] The code of matrix resin can be changed according to the customer's demand.

[2] Typical values refer to the average laboratory data, which is used only for reference when used, not as the standard of the product.

[3] The test sample was a round sheet, which was prepared by hot compression moulding with a thickness of 1.4mm.

[4] The content of CNTs in the masterbatch was diluted to 3% by matrix resin through twin screw extruder. Then the round sheet was prepared by hot compression moulding with a thickness of 1.4mm. And it is tested by a hand-held surface resistance meter.

### Announcements

- This masterbatches are stored in the same way as ordinary modified polyethylene without drying before used.
- If you produce some kind of special antistatic material by diluting this masterbatch, it is recommended to use double screw extruder, and choose screw combination with strong shear force as far as possible.
- CNTs have a significant viscosity-increasing effect on the polymer. The more CNTs are added, the more significant the effect is.
- Different polymers have different percolation threshold.
- When the type and content of CNTs are constant, for the same kind of polymer, the higher the melting index, the easier the CNTs are dispersed and the lower the electrical resistivity.
- Different molding methods have a very prominent impact on the electrical conductivity of the product. If the material remains unchanged, the product's resistivity is like this: injection molded > the extruded > the hot compression molded.
- The process conditions also have influence on the product's resistivity. For example, during injection molding, high mold temperature or high pressure and low speed can make the product's resistivity lower. The customer needs to obtain the best molding process through experiments.
- The resistivity measured by different test methods or standards is usually inconsistent and cannot be directly compared with each other.

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