



Unlocking the promise of Carbon Nanotubes
(CNT) usage, economically!

Technical Data Sheet

ANTIS™ - SIL102
CONDUCTIVE CNT - SILICONE MASTERBATCH

DESCRIPTION

A multi-walled carbon nanotube (MWCNT) - silicone system specifically designed as an additive for silicone based static dissipative and electrically conductive applications.

PRODUCT OVERVIEW

Delivery form : Viscous paste

Volume Resistivity : $\sim 1\Omega\text{cm}$

Silicone Carrier : Vinyl group-terminated polysiloxanes

MWCNT concentration : 2 wt.%

Cure system : Consult the resin manufacturer for recommended curing agents and conditions

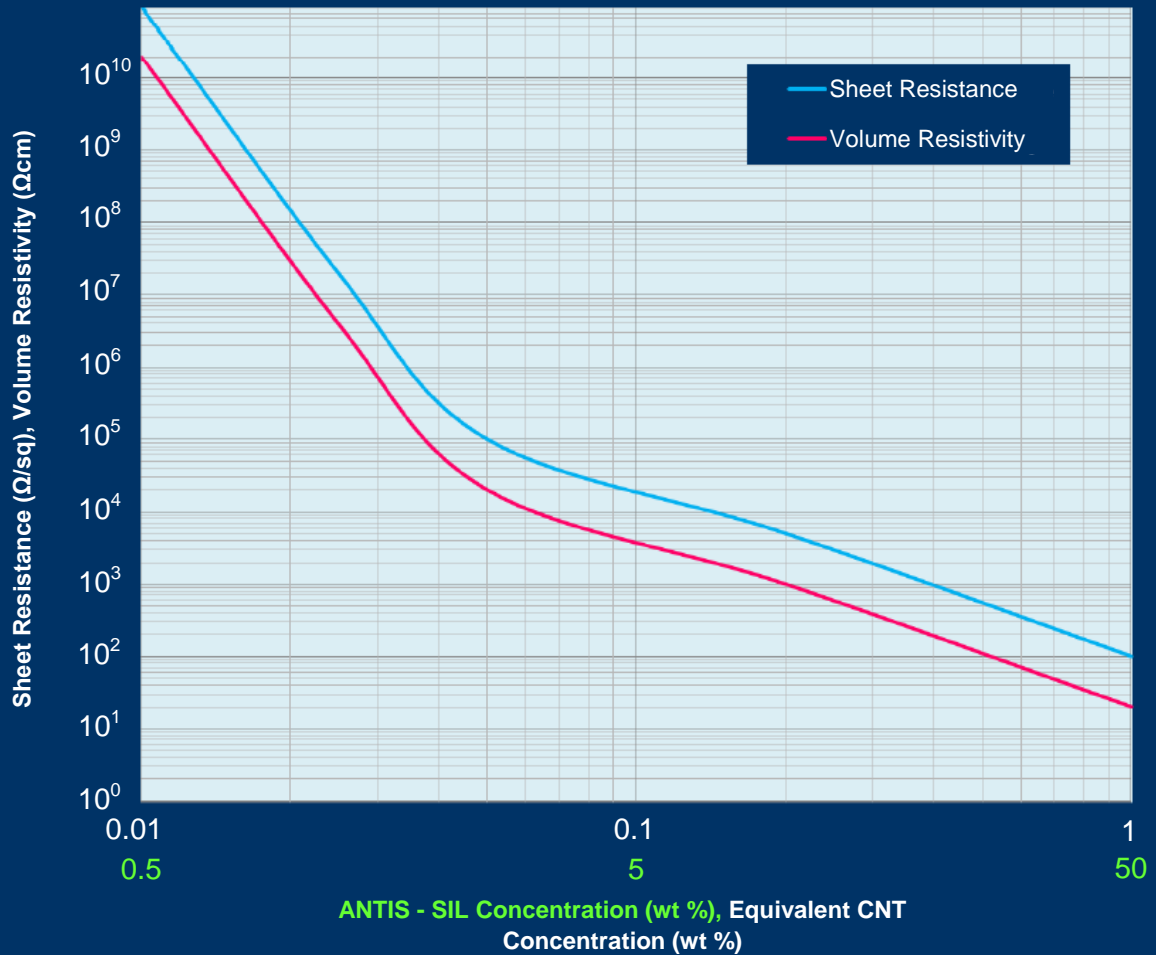
Specific Gravity : ~ 0.99

Color : black

Carrier solvents/Diluents : none

When formulating to the Mohm/sq. regime ($\geq 10^6 \Omega$ approx.), the carbon content is extremely low, Therefore, it is generally acceptable to treat ANTIS™ - SIL as vinyl dimethylpolysiloxanes for stoichiometry calculations.

SHEET RESISTANCE / VOLUME RESISTIVITY



Surface resistivity measurements were conducted using a 1mm film prepared with ANTIS™-SIL, BLUESIL® 621V1500, and curing agent, without pigment. Surface and volume resistivity may vary for different formulations, curing agents, film thicknesses and measurement conditions.

The weight percentage of ANTIS™ - SIL is in the final compound, including Part B.

EXAMPLE:

5 wt.% of ANTIS™ - SIL sample can be made using 5g of ANTIS™ - SIL and 95g of Silicone part A (e.g., BLUESIL® 621V1500) and B (curing agent). The ratio of Silicone part A and B must be selected according to the supplier recommendation.

APPLICATIONS

ESD/anti-static protection	Conductive inks
Coatings and paints	Adhesives
EMI/RFI protection	

DILUTION GUIDELINES

1. Low viscosity systems

Dilute ANTIS™- SIL masterbatch in a clean, compatible container. The container volume should not be more than 3 to 4 times the total volume of mixed material. Accurate weighing of all material components using an appropriate scale is recommended for optimal product performance.

Use a mechanical mixer equipped with an appropriate mixing element (e.g., high shear dispersion blades) and blend until the mixture is homogeneous. The blade speed, temperature, and mixing time may need to be adjusted to obtain a consistent mixture. Check the mixing impeller blade and container walls and bottom for any ANTIS™- SIL masses that remains undispersed in the host material (darker and more viscous masses than the mixture). Remove any undispersed masses from the container and mixing impeller surfaces and continue stirring until dispersion is complete. ***For optimum dispersion, Nanorial would recommend to use high shear mixing blades and mixing speeds around 1500rpm.***

If needed, a multi-stage dilution is recommended for concentrations less than 5 wt.% of ANTIS™- SIL, to achieve the most favourable results in the final compound. In this case, first, dilute 1 - 5 wt.% of ANTIS™- SIL in a sufficient amount of host resin and then top up and mix with the rest of the host resin. If needed, dispersing agents, which are recommended for carbon black, can be used to achieve optimum dispersion. Add other secondary additives, such as color pigments, as needed. After mixing is complete, a deaerating step is recommended to remove the air bubbles. Mix the solution at 100-200 rpm for up to 5 - 10 min. Add curing agent and mix the system until it is homogeneous and then vacuum the container, if possible.

Shelf life of the final mixture following dilution is viscosity dependent and should be determined by experimentally. For best results, dilute the masterbatch when ready to use and cure it immediately, if possible

2. High viscosity systems

Dilute ANTIS™-SIL masterbatch in a final formulation by conventional mixing equipments like cylinder (e.g., two roll mill), internal (e.g., Brabender, extruder), and/or other. ANTIS™-SIL masterbatch must homogeneously be mixed (*mixing time must experimentally be determined*) in respective silicone resin, rubber, and/or formulation which can include silicone part B or curing agents. Nanorial recommends 5 to 10 wt.% of ANTIS™-SIL additive in the high viscosity formulations to achieve the surface resistivity levels of 10^7 - $10^5\Omega/\text{sq}$.

MEASURING THE RESISTANCE

Measuring sheet resistance of static dissipative coatings ($> 10^6$ ohm) usually involves very low currents. It is important to use highly sensitive measuring equipment, such as a Megohm meter with 5-lb resistance probes in compliance with ASTM F150, or a DC four-point probe analyzer with silver-painted electrodes in accordance with ANSI/ASTM D257. In both cases, the electrodes have much lower resistance than the sample and should not contaminate the sample (in the case of the silver-painted electrodes).

STANDARD PACKAGING

1kg, 20 kg quantities, Non-permeable, plastic-lined container
Larger quantities available

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