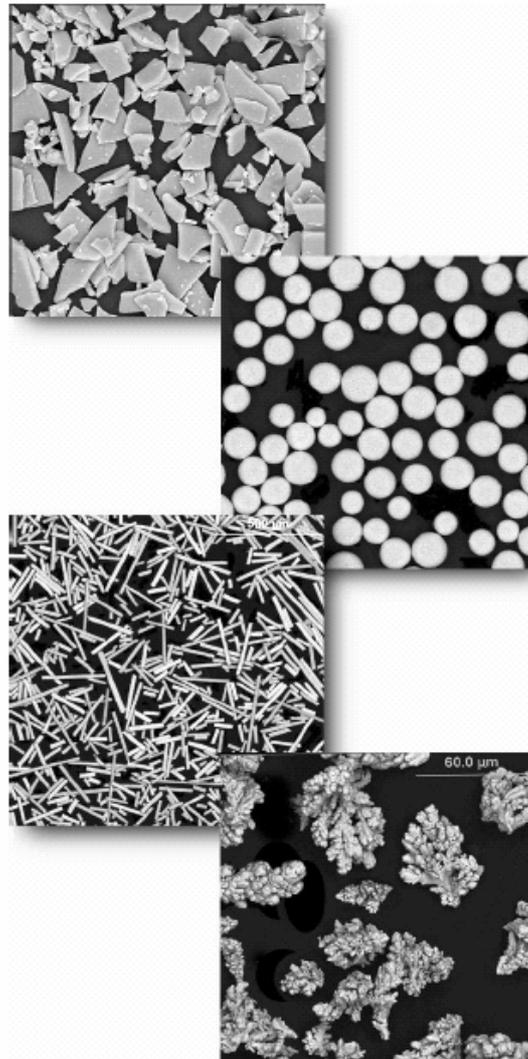


CONDUCT-O-FIL[®]

Conductive Additives

Product Overview

- Silver-coated glass spheres
- Silver-coated glass fibers
- Silver-coated glass flakes
- Silver-coated glass granules
- Silver-coated aluminum particles
- Silver-coated nickel particles
- Silver-coated copper spheres
- Silver-coated copper granules
- Silver-coated copper flakes
- Silver-coated copper dendrites
- Silver-coated hollow glass spheres
- Silver-coated hollow ceramic spheres
- Silver-coated magnetic spheres
- Silver-coated sub-10 micron particles
- Aluminum-compatible particles
- In addition, any of the silver-coated products are also available with a gold coating.



CONDUCT - O - FIL Products are a registered trademark of Potters Industries LLC



CONDUCT-O-FIL® Silver Coated Glass Spheres

CONDUCT-O-FIL® silver coated solid glass spheres offer the conductive and shielding properties of pure silver and silver coated metallic particles at a fraction of their cost and density. Potters' proprietary solid glass spheres are classified into a controlled particle size distribution engineered for intimate particle contact and predictable packing characteristics. The particle distribution can be adjusted for different end user processing procedures. The glass core is virtually chemically inert, offering tremendous aging stability, even in high temperature environments.

face layer of silver. Typical powder resistivity is less than 3 mohm-cm. End product resistivities are in the 10⁻²/10⁻⁴ ohm-cm range. CONDUCT-O-FIL silver coated glass spheres are available in standard and customized size ranges and silver coating thicknesses.

CONDUCT-O-FIL silver coated solid glass spheres are approved for military gasketing applications as described in Mil-G-83528 (the Military Specification on EMI conductive elastomers).

Conductivity and electromagnetic interference shielding protection are achieved as current passes along the sur-

Features & Benefits of Conduct-O-Fil® Silver Coated Glass Spheres

Pure silver coating

- End product resistivity values in the 10⁻²/10⁻³ ohm-cm range
- Provides the shielding properties of pure silver particles

Glass substrate

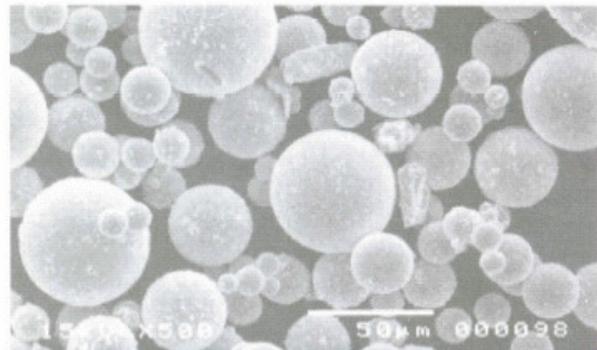
- Virtually chemically inert
- Stable in high temperature environments
- Will not oxidize and cause loss of electrical conductivity of the silvered particle over time and temperature
- Low density - reduced weight

Proprietary silvering process

- Provides excellent adhesion of silver to surface of glass
- Passes Mil Spec vibration and electromagnetic pulse requirements

Consistent quality assured

- Closely controlled particle size distributions
- Ensures engineered, consistent product performance
- Optimizes conductive network based on manufacturing process used
- Allows for wide application flexibility
- Provides reproducible loading characteristics



Scanning Electron Micrograph, S-3000-S3M



CONDUCT-O-FIL® Silver Coated Glass Spheres

Typical Properties

Product #	Powder Resistivity mohms-cm	% Ag Metal	D10 Particle Size (microns)	D90 Particle Size (microns)	Mean Partical Size (microns)	True Density (g/cc)	Scott Apparent Density (g/in3)
S-2429-S	3.8	4	52	139	89	2.6	24
S-3000-S	4.0	4	17	68	41	2.5	22
S-3000-S2E	3.9	8	15	51	32	2.6	21
S-3000S2M	1.9	8	23	61	41	2.6	22
S-3000-S3E	1.6	12	18	49	32	2.7	22
S-3000-S3M	1.2	12	23	62	41	2.7	21
S-3000-S3N	1.4	12	24	46	34	2.7	24
S-3000-S4M	1.0	16	25	62	41	2.8	21
S-4000-S3	1.9	12	13	35	23	2.8	18
S-5000-S2	9.5	8	4	19	10	2.6	13
S-5000-S3	2.6	12	8	20	14	2.7	16

Quality Control

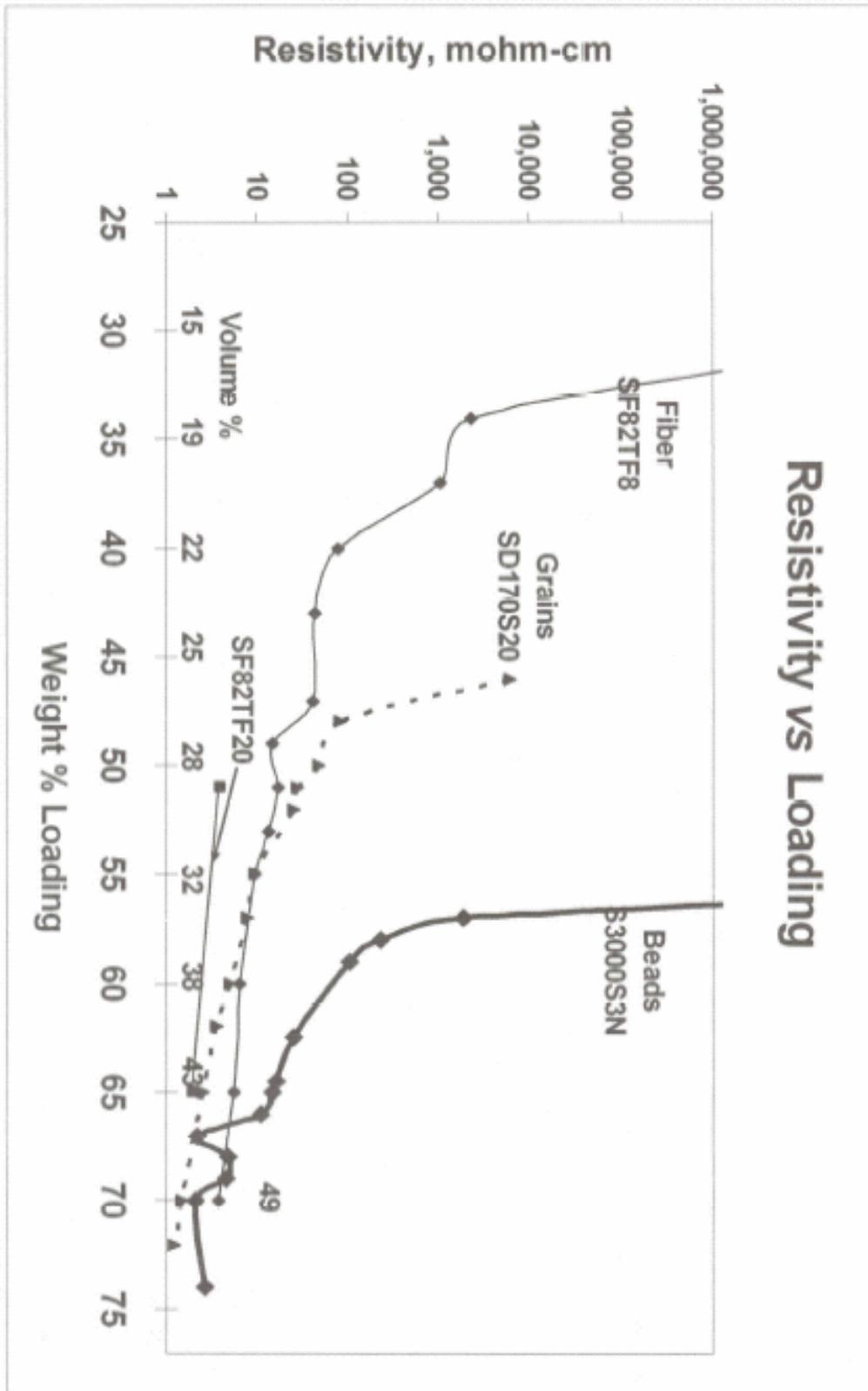
Each Conduct-O-Fil product is subjected to a battery of QC analyses to ensure that every lot meets established specifications before it is released for shipment. Specification parameters typically include:

- Percent silver
- Powder resistivity
- Color L* value
- Apparent density
- Silver adhesion
- Coating defect incidence
- Particle size distribution

Specifications are established in relationship to actual performance of the conductive filler in silicone EMI shielding gaskets and other filled systems such as adhesives and lacquers. Testing

begins in our research laboratories where we produce ASTM silicone test slabs or other filled systems, and measure their performance characteristics using standardized industry-accepted procedures. Measurements include volume resistivity and durometer, both as initially prepared and after accelerated heat aging and ambient shelf aging. Where appropriate, we measure EMI shielding effectiveness and conduct other critical tests such as stability under vibration and electromagnetic pulse at outside DoD-approved testing laboratories. Testing then often moves to partnership programs with customers for further development and qualification for setting final specifications.

Quality assurance testing and R&D are conducted in modern laboratories located in Potters' 65,000 sq. ft. manufacturing and warehousing facility in Carlstadt, NJ.





CONDUCTIVITY / RESISTIVITY

10^{-6} OHM-CM 10^{-4} 10^{-3} 10^{+8} 10^{+9} 10^{+11} $>10^{+12}$

←----->

<p>MOST CONDUCTIVE LEAST RESISTANCE</p> <p>PURE SILVER OR GOLD</p>	<p>Conduct-O-Fil</p> <p>SILVER ALUMINUM, SILVER GLASS BEADS</p> <p>AREA OF POTTERS CONDUCTIVE PRODUCTS</p>	<p>LEAST CONDUCTIVE MOST RESISTANCE</p> <p>SEMI-CONDUCTIVE OXIDES OF TIN, INDIUM OR COPPER</p> <p>AREA OF ELECTROSTATIC DISSIPATION</p>	<p>HYDROPHILIC ORGANICS (ANTISTATS)</p> <p>AREA OF ANTISTATIC BEHAVIOR</p>	<p>NONE CONDUCTIVE</p> <p>PLASTIC GLASS</p>
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6 TIMES 10^{-6} IS 0.000006 OHM-CENTIMETERS