CONDUCT-O-FIL®
Conductive Additives

Potters Industries Inc.
an affiliate of PQ Corporation

P.O. Box 840
Valley Forge, PA 19482-0840 USA
Telephone: (610) 651-4700 ■ Fax: (610) 408-9724
Web site: www.pottersbeads.com

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.

Conductivity and electromagnetic interference shielding protection are achieved as current passes along the surface 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).

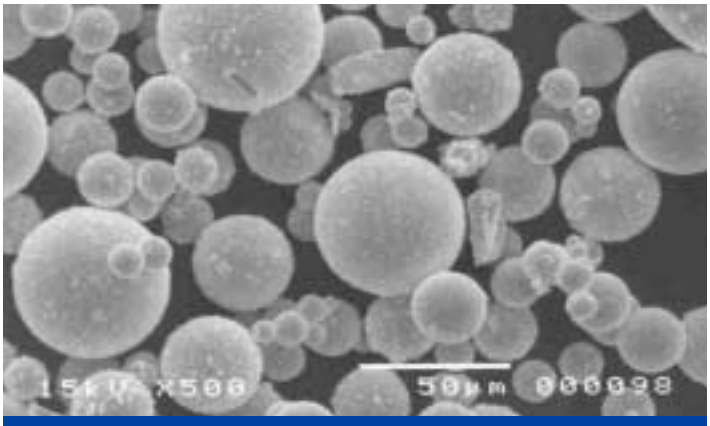
Features & Benefits of CONDUCT-O-FIL Silver-Coated Glass Spheres

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-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 peformance 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.