

ESD Protective Material Specifications



Containers manufactured in Electrostatic Discharge (ESD) protective materials protect contents from static electricity and electrostatic damage. These materials are designed to absorb the charge and pass it to the ground, bypassing the contents of the containers, saving you thousands of dollars by reducing or eliminating product damage. ORBIS offers containers made with some of the most advanced ESD protective materials available, including conduc-

tive, static dissipative and anti-static materials. To maintain our leadership status in this industry, we continually research new ESD protective materials.

Conductive Material - XL Material is a thermoplastic polypropylene material based upon carbon black that has a surface resistance of less than 1.0×10^4 ohms or surface resistivity of less than 1.0×10^9 ohms/square. This material has a static decay rate from 5000 Volts to 0 of less than 2 seconds. It has a useful temperature range of 40° to 225° F with intermittent use recommended at the higher end of the temperature range. The electrical properties of this material are permanent and unaffected by washing.

Static Dissipative Material - LS is a polypropylene material that is on the upper end of the dissipative range. The material has a surface resistance greater than or equal to 1.0×10^8 ohms but less than 1.0×10^{11} ohms or surface resistivity greater than or equal to 1.0×10^9 ohms/square but less than 1.0×10^{12} ohms/square. The static decay rate from 5000 Volts to 0 is less than 2 seconds, and it has a useful temperature range of 40° to 225° F, with intermittent use recommended at the higher end of the temperature range. Electrical properties are affected by humidity, and material has a shelf life of five years.

ORBIS ESD materials conform to ANSI/ESD S20.20*1999 requirement for ESD packaging. This standard requires conductive materials surface resistance to be $<1.0 \times 10^4$ ohms and dissipative materials to be $>1.0 \times 10^4$ ohms to $<1.0 \times 10^{11}$ ohms when tested per EOS/ESD S11.11. The materials also conform to the static decay requirement of FTM-101B, Method 4046.1 dissipating a 5000 Volt charge to 0 when grounded in less than 2 seconds.

Additional ESD materials, including static intercept and dissipative materials, are available upon request for some products. Call today about our colorable, permanently static dissipative material.



ORBIS products that can be manufactured with ESD materials include:

- StakPak Containers
- Electronics Distribution Containers
- Automated System Totes
- Stack-N-Nest® Containers
- EIPak™ Containers
- FlipPak™ Containers
- Nest Only Containers
- Food Handling Products
- LEWISBins+™ Products

Specific ESD materials not mentioned below are available upon request. Products that can be made in ESD materials have an icon indicator near the specifications. Please refer to the Product Index for product ESD compatibility or call your ORBIS representative. Note that not all products are available in all materials.

Permanent Static Dissipative Material is a polypropylene material that is on the upper end of the dissipative range. It has a surface resistance greater than or equal to 1.0×10^8 ohms but less than 1.0×10^{10} ohms or surface resistivity greater than or equal to 1.0×10^9 ohms/square but less than 1.0×10^{10} ohms/square. The static decay rate from 5000 Volts to 0 is less than 2 seconds, and it has a useful temperature range of 40° - 225° F, with intermittent use recommended at the higher end of the temperature range. Electrical properties are affected by humidity.

Typical Product Data

Physical Property	Test Methods	XL Material 	LS Material 
Surface Resistivity	XL and LS Material: ASTM D257-78	$<10^5$ ohms/square	$\geq 1.0 \times 10^8, < 1.0 \times 10^{12}$
Surface Resistance	EOS/ESD S11.11 (ohms)	$< 1.0 \times 10^4$ ohms	$\geq 1.0 \times 10^8, < 1.0 \times 10^{11}$
Specific Gravity	ASTM D792	1.01	0.09
Temperature Range		40 to 225°F	40 to 225°F
Tensile Strength	ASTM D638	3,200 psi	3,000 psi
Elongation	ASTM D638	16 psi %	20 psi %
Flexural Strength at 73° F	ASTM D790	4,500 psi	3,900 psi
Flexural Modulus	ASTM D790	$1.6 \text{ psi} \times 10^5$	$1.5 \text{ psi} \times 10^5$
Izod Impact Strength 1/8" Notched	ASTM D256	8.5 ft. - lb./in.	8.0 ft. - lb./in.
Unnotched	ASTM D256	No break	No break
Volume Resistivity	XL and LS Material: ASTM D991-83, EIA-541	1.4×10^2 ohm-cm	1.0×10^{11} ohm-cm
Static Decay Rate +5000V to 50V -5000 to 50V	FTM-101B, Method 4046 MIL-B81705C	<2 seconds	<2 seconds

* Data was obtained from sample specimens molded under carefully controlled conditions. Properties may be materially affected by the molding techniques applied and by the size and shape of the item molded. No assurances can be implied that all molded articles will have the same properties as those listed.

ESD Material Comparison (Surface Resistivity)

Conductive Range	Static Dissipative Range	Anti-Static Range	PE & PP
10^5 10^6 10^7 10^8 10^9	10^{10} 10^{11} 10^{12}	10^{10} 10^{11} 10^{12}	$>10^{12}$
XL Totes	SD Totes	LS Totes	All Other ORBIS Totes
<ul style="list-style-type: none"> - Conductive - Permanent - Contains up to 15% Carbon Black - Not for cleanroom use - No outgassing - $<10^4$ ohms/square 	<ul style="list-style-type: none"> - Static Dissipative - Permanent - Can be made-to-order for cleanroom use - No chlorides, amides, or silicon - 10^8 - 10^9 ohms/square - Low outgassing 	<ul style="list-style-type: none"> - Anti-Static - Temporary - No Carbon Black - No outgassing - 10^9 - 10^{12} ohms/square 	