



GORE® EMI Shielding

MATERIALS

SMT Series

Excellent electrical performance with SMT convenience

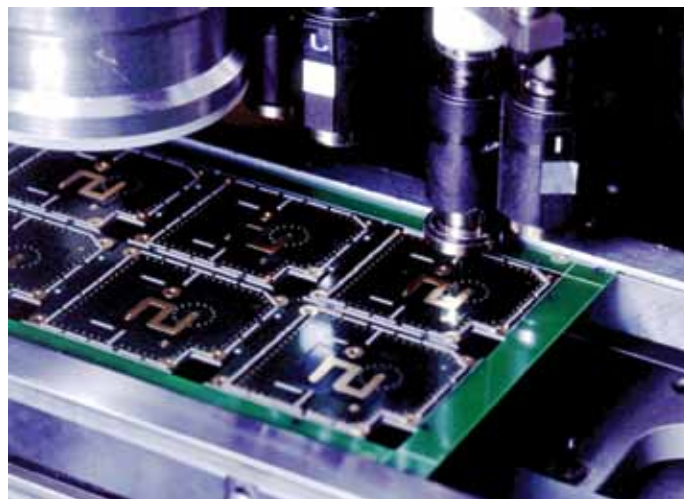
The Surface-Mount Technology (SMT) Series of GORE® EMI Shielding Materials combines unsurpassed conductivity with the convenience of SMT-compatible format. These conformable materials are engineered to maintain consistent contact and low DC resistance. Unlike the traditional designs of pogo pins and universal clips that can easily break, the robust design of the SMT Series increases durability with large contact surfaces rather than single-point contacts. The unique construction of the SMT Series ensures that the device maintains signal integrity and reliable electrical performance in harsh environments.

Because of their compatibility with SMT equipment for printed circuit board production, the SMT Series reduces total costs. Using these off-the-shelf materials eliminates the need for custom designs that can increase engineering costs. Also, no secondary processing is required, which reduces equipment and labor costs during production. Using precise SMT equipment to incorporate GORE® EMI Shielding Materials improves the consistency and repeatability of PCB assembly, thus decreasing waste.

The SMT Series of GORE® EMI Shielding Materials offers a full spectrum of working ranges, making them ideal for use as grounding pads, EMI gaskets, and antenna contacts. The highly compressible SMT Supersoft Series delivers consistent electrical performance with minimal force required for initial conductivity. The SMT GS5200 Series offers the most conductive materials under compression in Gore's complete product line of EMI shielding materials. In addition to these high-performance characteristics, the SMT Series has been tested against a variety of environmental standards (Table 1).

TYPICAL APPLICATIONS

- Portable electronic devices such as smartphones and tablets
- GPS and handheld scanners/readers
- Telematics
- Gaming devices
- Personal computers and laptops
- Telecommunication infrastructure



Benefits of GORE® EMI Shielding Materials — SMT Series

- Excellent shielding effectiveness and low DC resistance with conformable construction
- Reliable electrical performance achieved through consistent contact over time
- Reduced total costs versus custom options due to standard sizes and compatibility with SMT technology
- Increased design flexibility with easily integrated standard parts
- Consistent and repeatable assembly with parts that need no secondary processing
- Enhanced durability due to conformable material that maintains contact over time without compromising the integrity of the mating surface
- Faster production times because of standard solder process that requires no cure time

GORE® EMI Shielding Materials - SMT Series is covered by patent No. US 6,255,581 B1, US 6,210,789 B1. Corresponding foreign patents issued.

GORE® EMI Shielding Materials - SMT Supersoft Series is covered by patent No. US 6,255,581 B1, US 7,129,421 B2. Corresponding foreign patents issued.



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TABLE 1: ENVIRONMENTAL PROPERTIES

Property	Value
RoHS Status* (lead, cadmium, hexavalent chromium, mercury, bromine)	Pass
Flammability in accordance with UL horizontal burn method	Pass

*W. L. Gore & Associates declares that we do not intentionally add substances listed in EU Directive 2011/65/EU to the Surface-Mount Technology Series of GORE® EMI Shielding Materials. Independent lab tests have been performed and results are available upon request.

SELECTION GUIDELINES

The gaskets and grounding pads of the SMT Series are engineered to maintain conductivity in a wide range of service heights (gap distances). The closure force requirements and broad range of tolerance take-up in these materials results in multiple product options for some gap distances. Selecting the most suitable product for a given application depends on the following:

- Gap distance of interfacing surfaces
- Required compression force to achieve the specified gap distance
- Necessary DC resistance for grounding applications or shielding effectiveness for shielding applications at a specific gap distance

The recommended service height for the various products in the SMT Series differs because of their unique constructions (Figures 1 & 2).

FIGURE 1: RECOMMENDED SERVICE HEIGHTS FOR SMT SUPERSOFT SERIES

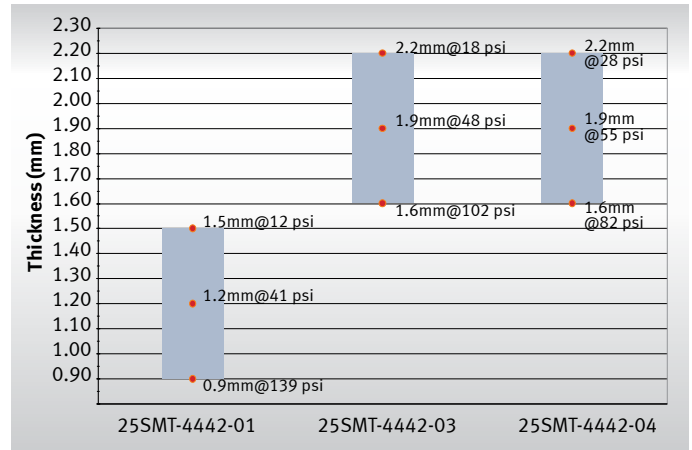
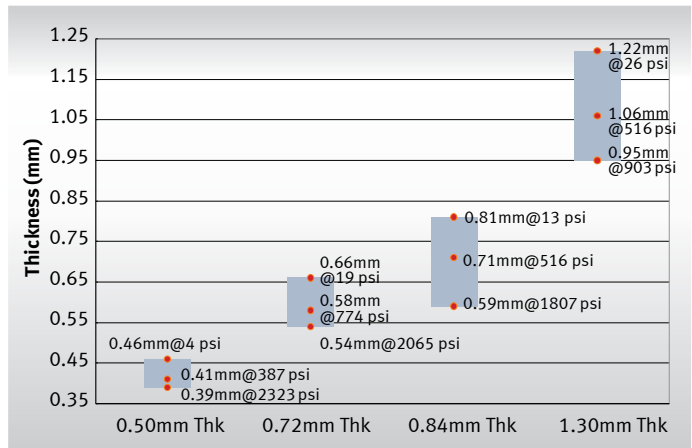


FIGURE 2: RECOMMENDED SERVICE HEIGHTS FOR SMT GS5200 SERIES



GORE® EMI Shielding Materials — SMT Supersoft Series

The SMT Supersoft Series is highly compressible to ensure consistent electrical performance. These materials are conductive on contact and resilient after compression (Table 2). This combination of highly compressible construction and minimal force requirements makes them an excellent choice for use with metallized plastic housings and a variety of components, including LCDs, flexible circuits, antennas, and cameras. In addition, the SMT Supersoft Series protects against harsh conditions like shock and vibration encountered in applications such as handheld scanners and telematics. The highly compressible construction also provides consistent contact in housings that have surface variations like those in magnesium as-cast enclosures.



TABLE 2: SMT SUPERSOFT SERIES SPECIFICATIONS¹

Gore Part Number	Thickness (mm)	Length (mm)	Width (mm)	Typical Weight (g)	Low Compression			Recommended Compression			High Compression		
					Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)
25SMT-4442-01	1.60	3.60	1.70	0.0219	1.50	0.125	12.0	1.20	0.018	40.9	0.90	0.014	138.9
25SMT-4442-03	2.40	3.60	2.50	0.0360	2.20	0.054	18.1	1.90	0.035	48.4	1.60	0.030	101.7
25SMT-4442-04	2.40	8.00	2.50	0.0803	2.20	0.130	27.6	1.90	0.010	54.7	1.60	0.008	82.0

¹Values are based on individual part geometries

ACCELERATED LIFE TESTING FOR SMT SUPERSOFT SERIES

A crucial factor in assessing the acceptability of gasket or grounding materials is their performance over time — performance that can be evaluated only through accelerated life testing. To evaluate durability of the SMT Supersoft Series, industry testing was performed at various conditions (Table 3) with parts soldered to a test board. Figures 3 & 4 show the changes in DC resistance following exposure to the outlined conditions. The minimal amount of change in DC resistance for the SMT Supersoft Series demonstrates consistent and reliable performance in demanding environments.

TABLE 3: IEC TEST STANDARDS FOR ACCELERATED LIFE TESTING (ALT) CONDITIONS

	International Electromechanical Commission (IEC) Test Standard	IEC Standard No.	Test Conditions
1	Cold	60068-2-1	-65°C, 96 hours
2	Dry Heat	60068-2-2	+85°C, 96 hours
3	Vibration	60068-2-6	Sinusoidal 5 Hz to 100 Hz, 5g max. acceleration, 90 min. on each of the 3 axes
4	Salt Mist	60068-2-11	+35°C, 5 parts by weight NaCl and 95 parts by weight H ₂ O, 24 hours
5	Change of Temperature	60068-2-14	-40°C to +125°C, 30 min. @ extremes, 15 min. @ 25°C, 90 min. per cycle, 25 cycles
6	Mixed Flowing Gas	60068-2-60	Hydrogen sulfide (H ₂ S) @ 100 PPB, sulfur dioxide (SO ₂) @ 500 PPB, 96 hours
7	Damp Heat	60068-2-78	+65°C, 100% humidity, 96 hours



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FIGURE 3: DC RESISTANCE THROUGH ALT FOR 25SMT-4442-01

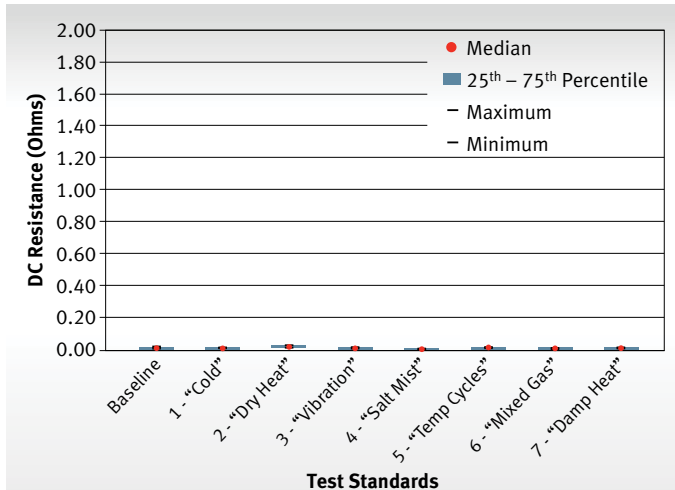
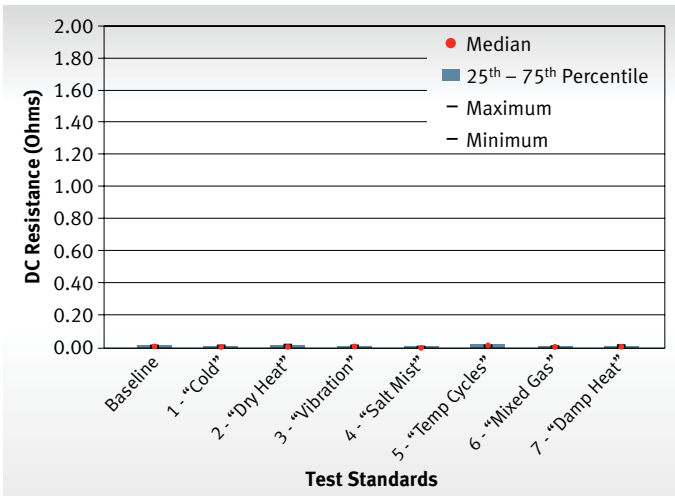


FIGURE 4: DC RESISTANCE THROUGH ALT FOR 25SMT-4442-03 & 25SMT-4442-04



FORCE DISPLACEMENT RESISTANCE OF SMT SUPERSOFT SERIES

The SMT Supersoft Series provides conductivity on contact; however, the amount of force and DC resistance differs for each variant as seen in Table 2 and Figures 5-7.

FIGURE 5: FORCE DISPLACEMENT RESISTANCE FOR 25SMT-4442-01

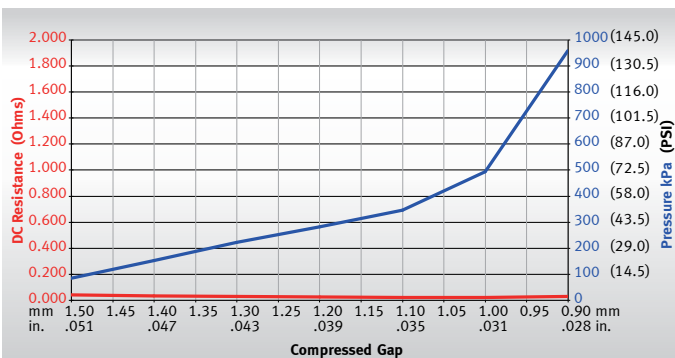


FIGURE 6: FORCE DISPLACEMENT RESISTANCE FOR 25SMT-4442-03

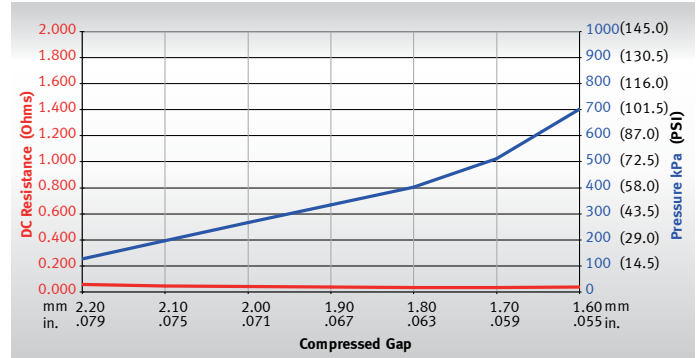
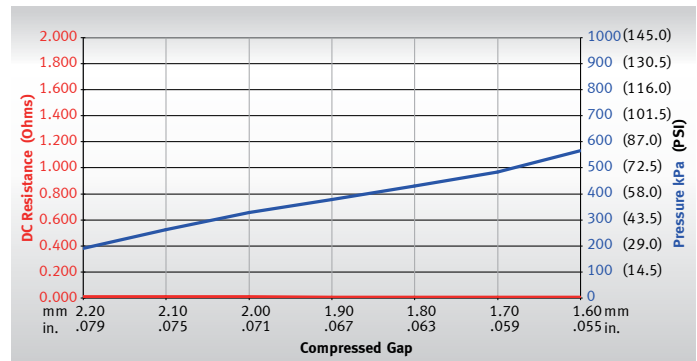


FIGURE 7: FORCE DISPLACEMENT RESISTANCE FOR 25SMT-4442-04



RECOVERABILITY

Recoverability is the inverse of compression set. If a device will be opened for modifications during initial production, hardware upgrades, or field repairs, the shielding materials must be able to rebound and create a consistent connection. Recoverability measures the gasket's ability to maintain some level of gap-filling following a release of a compression load. Using ASTM D395 B, Standard Test Methods for Rubber Property, Test Method B: Compression Set under Constant Deflection in Air, the SMT Supersoft Series has demonstrated recoverability between 96 and 97 percent (Table 4). This high level of recoverability ensures that the electrical path is maintained when compression is removed and then reestablished.

TABLE 4: RECOVERABILITY OF SMT SUPERSOFT SERIES

Gore Part Number	Recoverability After 22 Hours of Compression	Recoverability After 70 Hours of Compression
25SMT-4442-01	96.1%	96.0%
25SMT-4442-03	96.5%	97.0%
25SMT-4442-04	96.5%	96.9%

GORE® EMI Shielding Materials — SMT GS5200 Series

The SMT GS5200 Series offers the most conductive materials under compression in Gore's complete product line of EMI shielding materials (Table 5). The durability of these materials extends their service life in challenging environments such as ruggedized scanners/readers, gaming devices, and wireless infrastructure. These highly conductive materials recover easily after compression. Ideal for small footprint applications and for metal housings, the SMT GS5200 Series provides high performance and excellent reliability.

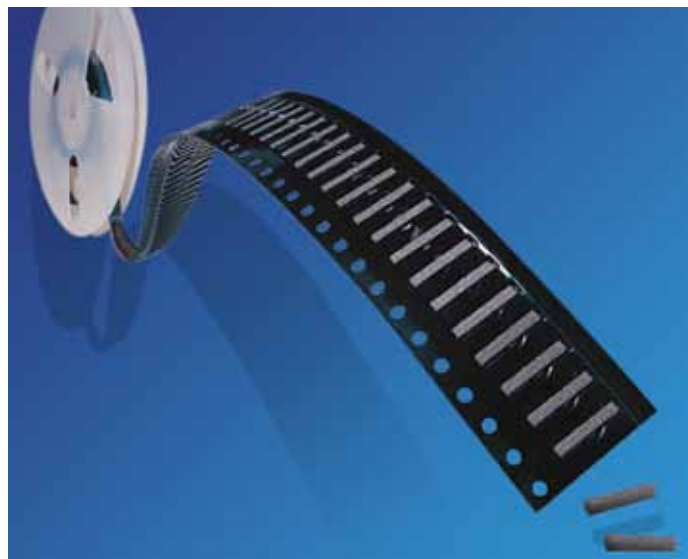


TABLE 5: SMT GS5200 SERIES SPECIFICATIONS

Gore Part Number	Thickness (mm)	Length (mm)	Width (mm)	Typical Weight (g)	Low Compression			Recommended Compression			High Compression		
					Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height (mm)	DC Resistance (ohms)	Pressure to Achieve Compression (psi)
25SMT-3645-13	0.50	5.50	1.25	0.0123	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-14	0.50	8.00	1.25	0.0176	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-21	0.50	5.50	1.10	0.0115	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-22	0.50	8.00	1.10	0.0160	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-31	0.50	3.20	1.10	0.0064	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-34	0.50	5.50	0.90	0.0088	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-35	0.50	8.00	0.90	0.0128	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-50	0.50	5.50	0.50	0.0066	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-51	0.50	5.50	0.70	0.0073	0.46	1.952	3.9	0.41	0.014	387.1	0.39	0.001	2,322.5
25SMT-3645-09	0.72	5.50	1.25	0.0158	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-10	0.72	8.00	1.25	0.0230	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-11	0.72	12.00	1.25	0.0339	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-17	0.72	5.50	1.10	0.0142	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-18	0.72	8.00	1.10	0.0200	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-25	0.72	12.00	2.00	0.0500	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-26	0.72	8.00	2.00	0.0400	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-27	0.72	5.50	2.00	0.0240	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-33	0.72	3.20	1.10	0.0078	0.66	0.492	19.3	0.58	0.003	774.2	0.54	0.001	2,064.5
25SMT-3645-40	0.84	5.50	1.25	0.0110	0.81	1.939	12.9	0.71	0.028	516.1	0.59	0.001	1,806.5
25SMT-3645-41	0.84	3.20	1.25	0.0100	0.81	1.939	12.9	0.71	0.028	516.1	0.59	0.001	1,806.5
25SMT-3645-43	1.30	3.20	3.20	0.0370	1.22	0.322	25.8	1.06	0.003	516.1	0.95	0.001	903.2
25SMT-3645-44	1.30	8.00	2.00	0.0580	1.22	0.322	25.8	1.06	0.003	516.1	0.95	0.001	903.2



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ACCELERATED LIFE TESTING FOR SMT GS5200 SERIES

A crucial factor in assessing the acceptability of gasket or grounding materials is their performance over time — performance that can be evaluated only through accelerated life testing. To evaluate durability of the SMT GS5200 Series, industry testing was performed at various conditions (Table 6) with parts soldered to a test board. Figures 8-11 show the changes in DC resistance following exposure to the outlined conditions. The minimal amount of change in DC resistance for the SMT GS5200 Series demonstrates consistent and reliable performance in demanding environments.

TABLE 6: IEC TEST STANDARDS FOR ACCELERATED LIFE TESTING (ALT) CONDITIONS

	International Electromechanical Commission (IEC) Test Standard	IEC Standard No.	Test Conditions
1	Cold	60068-2-1	-65°C, 96 hours
2	Dry Heat	60068-2-2	+85°C, 96 hours
3	Vibration	60068-2-6	Sinusoidal 5 Hz to 100 Hz, 5g max. acceleration, 90 min. on each of the 3 axes
4	Salt Mist	60068-2-11	+35°C, 5 parts by weight NaCl and 95 parts by weight H ₂ O, 24 hours
5	Change of Temperature	60068-2-14	-40°C to +125°C, 30 min. @ extremes, 15 min. @ 25°C, 90 min. per cycle, 25 cycles
6	Mixed Flowing Gas	60068-2-60	Hydrogen sulfide (H ₂ S) @ 100 PPB, sulfur dioxide (SO ₂) @ 500 PPB, 96 hours
7	Damp Heat	60068-2-78	+65°C, 100% humidity, 96 hours

FIGURE 8: DC RESISTANCE THROUGH ALT FOR 0.50 MM SMT GS5200 SERIES PARTS

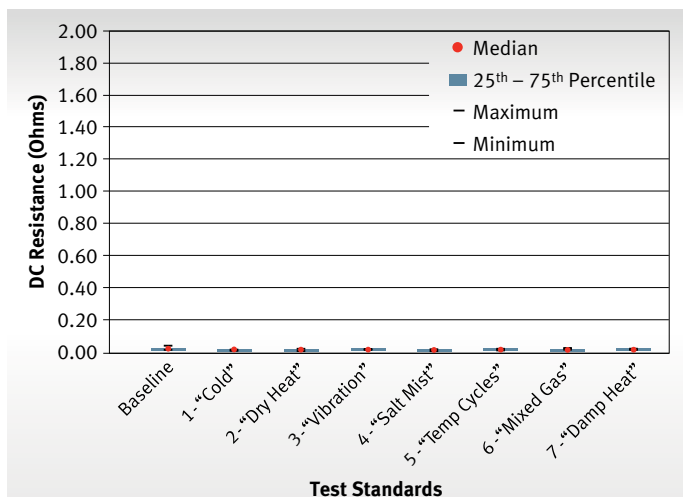


FIGURE 9: DC RESISTANCE THROUGH ALT FOR 0.72 MM SMT GS5200 SERIES PARTS

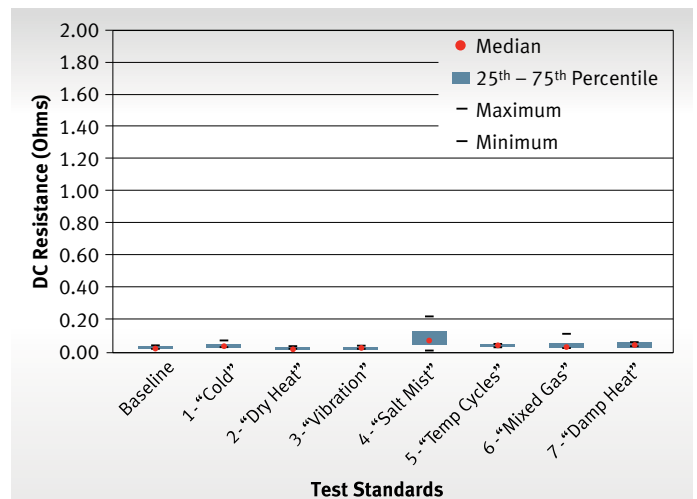


FIGURE 10: DC RESISTANCE THROUGH ALT FOR 0.84 MM SMT GS5200 SERIES PARTS

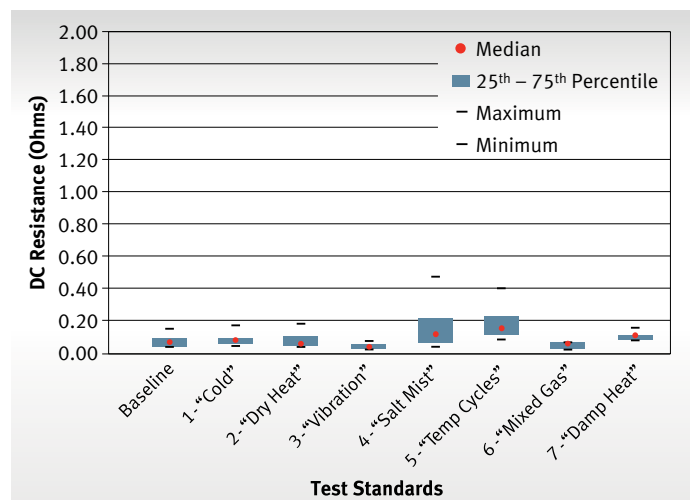
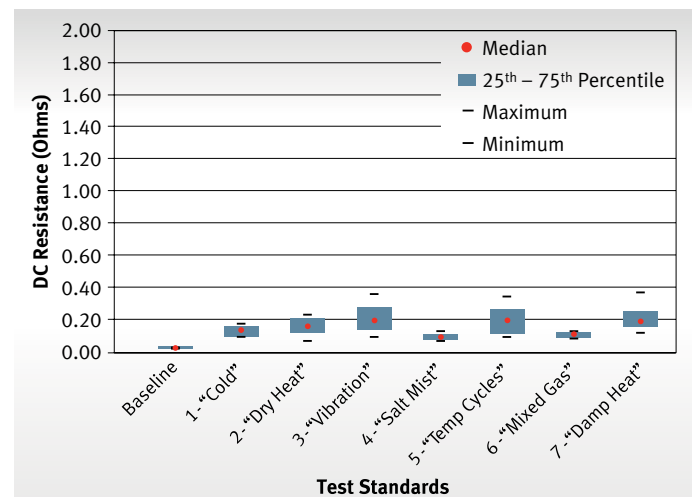


FIGURE 11: DC RESISTANCE THROUGH ALT FOR 1.30 MM SMT GS5200 SERIES PARTS



FORCE DISPLACEMENT RESISTANCE OF SMT GS5200 SERIES

The SMT GS5200 Series provides conductivity when compressed approximately ten percent of the initial height; however, the amount of force and DC resistance differs for each variant as seen in Table 5 and Figures 12-15.

FIGURE 12: FORCE DISPLACEMENT RESISTANCE FOR 0.50 MM SMT GS5200 SERIES PARTS

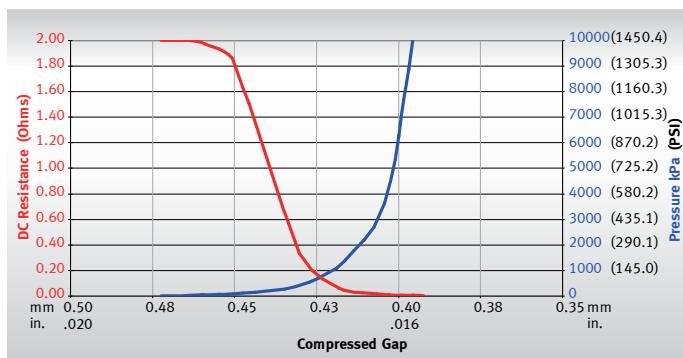


FIGURE 13: FORCE DISPLACEMENT RESISTANCE FOR 0.72 MM SMT GS5200 SERIES PARTS

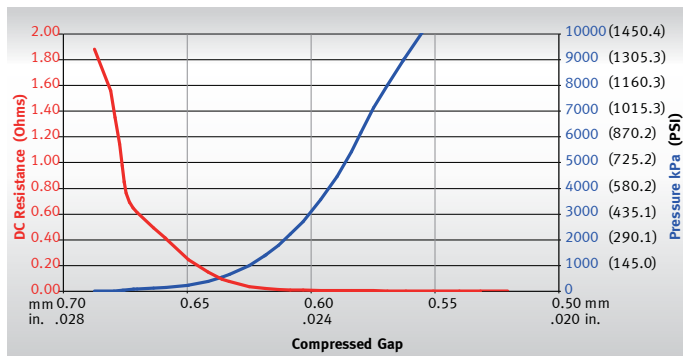


FIGURE 14: FORCE DISPLACEMENT RESISTANCE FOR 0.84 MM SMT GS5200 SERIES PARTS

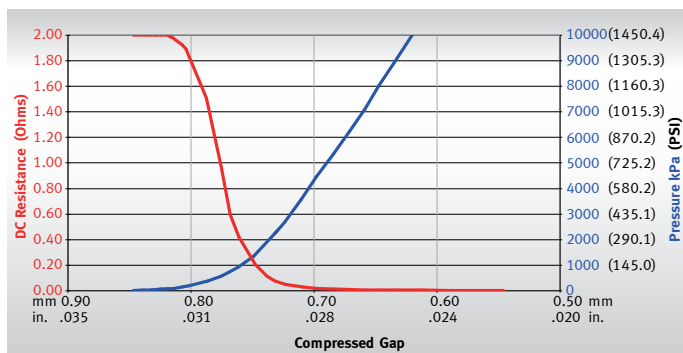
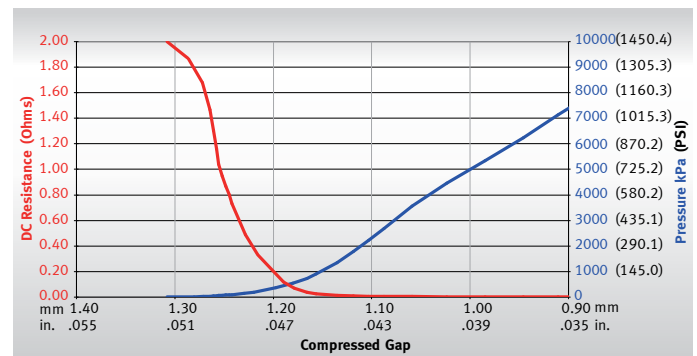


FIGURE 15: FORCE DISPLACEMENT RESISTANCE FOR 1.30 MM SMT GS5200 SERIES PARTS



RECOVERABILITY

Recoverability is the inverse of compression set. If a device will be opened for modifications during initial production, hardware upgrades, or field repairs, the shielding materials must be able to rebound and create a consistent connection. Recoverability measures the gasket's ability to maintain some level of gap-filling following a release of a compression load. Using ASTM D395 B, Standard Test Methods for Rubber Property, Test Method B: Compression Set under Constant Deflection in Air, the SMT GS5200 Series has demonstrated recoverability between 84 and 92 percent (Table 7). This high level of recoverability ensures that the electrical path is maintained when compression is removed and then reestablished.

TABLE 7: RECOVERABILITY OF SMT GS5200 SERIES

Gore Part Thickness (mm)	Recoverability After 22 Hours of Compression	Recoverability After 70 Hours of Compression
0.50	88.4%	88.5%
0.72	91.0%	92.2%
0.84	91.9%	87.8%
1.30	84.2%	86.0%



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ORDERING INFORMATION FOR GORE® EMI SHIELDING MATERIALS — SMT SERIES

Both the SMT Supersoft Series and the SMT GS5200 Series of GORE® EMI Shielding Materials are available in standard sizes of lengths, widths, and thickness. For assistance in selecting the right materials for your application, contact your Gore sales associate.

In addition, both the SMT Supersoft Series and the SMT GS5200 Series are readily available through several distributors. Visit gore.com/emidistributors for the list of GORE® EMI Shielding Materials distributors.

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GORE® EMI Shielding Materials - SMT Supersoft Series is covered by patent No. US 6,255,581 B1, US 7,129,421 B2. Corresponding foreign patents issued.

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Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

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