GORE® EMI Gaskets and Grounding Pads

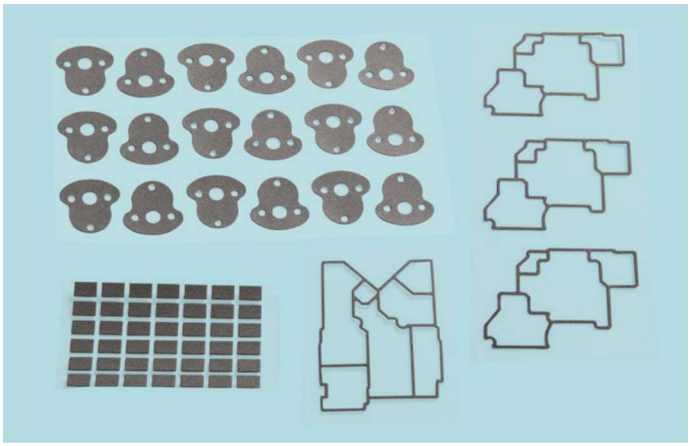
Reliable RF grounding and EMI shielding performance

Gore offers a variety of EMI gaskets and grounding pads with low DC resistance and up to 90 dB of shielding effectiveness. These materials are suitable for the most demanding applications including wireless infrastructure, ruggedized scanners/readers, test equipment, and defense and aerospace communications.

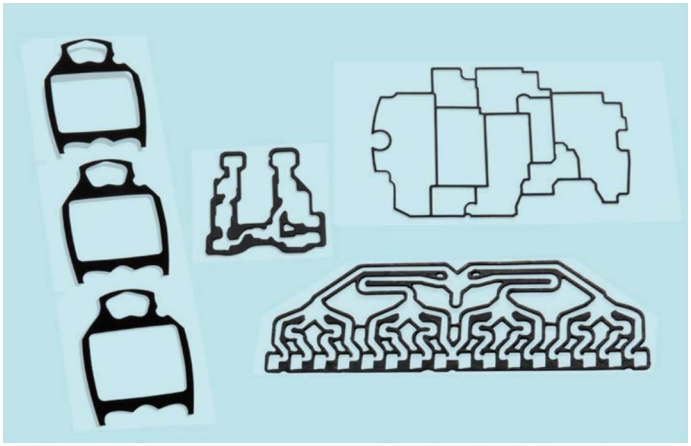
GORE® EMI Gaskets and Grounding Pads are available in two different materials, the GS5200 Series offers excellent EMI shielding effectiveness from low frequency to 40 GHz. The GS2100 Series, approved for military aerospace and spaceflight applications, combines good shielding effectiveness with light weight and low outgassing. GORE® EMI Gaskets and Grounding Pads offer unique features and reliable performance with a variety of highly customized precision die-cut solutions, and peel and stick strip gaskets solutions.

Die-Cut Gaskets provide a dimensionally consistent, conformal interface and are particularly well suited for cavity-to-cavity shielding. These die-cuts are ideal for high volume applications and can be installed rapidly and accurately to an enclosure or board without curing.

Peel and Stick Strip Gaskets enable you to design and prototype EMI gaskets easily and inexpensively. They are also an excellent alternative to dispensed FIP gaskets and large die-cut gaskets; ideal for retrofitting applications and field repairing damaged gaskets.



GS5200 Series



GS2100 Series

GORE® EMI Gaskets and Grounding Pads

GS5200 Series

Best shielding performance and conductivity for complex design packages

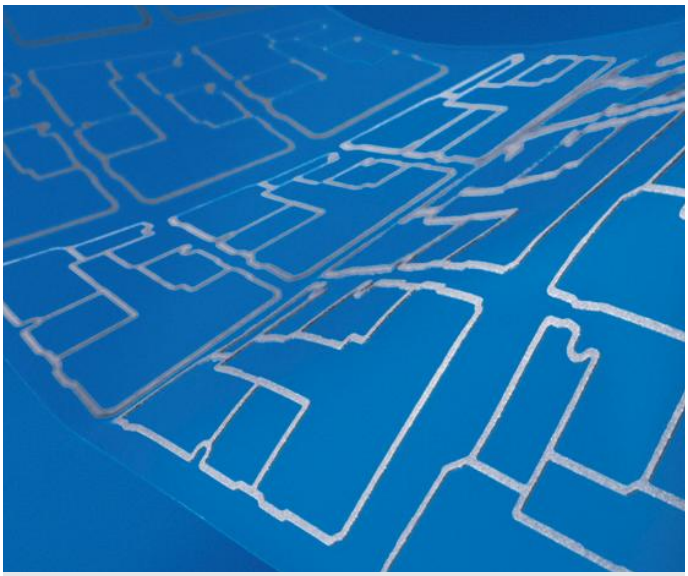
The GS5200 Series of GORE® EMI Gaskets and Grounding Pads offers the most conductive materials under compression in Gore's line of EMI shielding materials. The durability of these materials extends service life in challenging environments such as ruggedized scanners/readers, test equipment, and wireless infrastructure ; as well as communications and positioning modules in defense and aerospace. In addition, the GS5200 Series meets DEF-STAN and MIL-SPEC requirements, enabling them to be used in military devices.

These highly conductive materials recover easily after compression. Ideal for small footprint applications and for metal housings, the GS5200 Series of GORE® EMI Gaskets and Grounding Pads provides high performance and excellent reliability in harsh environments.

With trace widths as narrow as one millimeter, the GS5200 Series improves flexibility in complex packaging designs.

Typical Applications

- Land-based military communications
- Military radios
- High-frequency test equipment
- Wireless infrastructure
- GPS and scanner/reader equipment
- Power amplifiers



Benefits of GORE® EMI Gaskets and Grounding Pads — GS5200 Series

- Excellent shielding effectiveness and low DC resistance
- Reliable electrical performance from conformable material that maintains consistent contact over time
- Easier installation with simple peel-and-stick adhesives that do not require curing or post processing
- Increased design flexibility that allows small trace widths and complex geometries
- Simplified device maintenance with materials that recover and do not adhere to mating surfaces
- Durable materials that provide a barrier against dust and water to enable IP65 device compliance

GORE® EMI Gaskets and Grounding Pads

GS5200 Series

Table 1: Environmental and Mechanical Properties of GS5200 Series

Properties	Standard	Value
Operating temperature range (°C) with adhesive without adhesive		 -55 to 125 -200 to 200
RoHS status[a] (lead, cadmium, hexavalent chromium, mercury, bromine)		Pass
Flammability	Tested in accordance with UL methods; V0 vertical burn	Pass
Mold growth	BS 2011 – Part 2-1J	None
Hardness		(Shore A) 60
Density (gm/cc)	ASTM D1622-88	1.95
Recoverability	ASTM D395 B	› 50%
EMI seal reusability	MIL-G-83528	Pass (› 80 dB after 10 closings)
Vibration resistance	DESC 92017 and MIL-G-83528	Pass
Bulk Material Volume resistivity	DESC 92017 and MIL-G-83528	0.04 ohm-cm @ 500 psi, Au electrodes
Contaminant resistance	DESC 92017, MIL-G-83528, BS 3G 100-Part 2, and DEF-STAN 59-103-Part 3/1	Pass
Shielding effectiveness	DESC 92017 and MIL-G-83528	"E" field – 100 dB 200 MHz to 18 GHz
Shielding effectiveness, with adhesive	ARP-1705 modified test method[b]	› 90 dB @ 1 GHz
Corrosion resistance	DEF-STAN 59-103	Pass
Electromagnetic pulse (EMP) survivability	DEF-STAN 59-103	Pass
Water seal	DEF-STAN 59-103/Part 3 and IP65	Pass
Accelerated life (heat aging)	DEF-STAN 59-103, Part 3/1 and MIL-G-83528	Pass
Outgassing, with adhesive	ASTM E595 and ESA PSS-01-702	Pass with ‹ 1% mass loss
Electromagnetic discharge: Charge ‹ 150 volts, @ 25°C, 45% RH, loss less than 100 volts within 0.5 seconds		Pass

[a] W. L. Gore & Associates declares that we do not intentionally add substances listed in RoHS regulations to the GS5200 Series of GORE® EMI Gaskets and Grounding Pads. Independent lab tests have been performed, and results are available upon request.

[b] All measurements made using ARP-1705 modified test method through 3 GHz on 2 mm trace width

[c] Gore's EMI Gasket materials have been tested under the listed conditions and shown the provided performance. However, these tests may not be indicative of performance in a particular end use, and no material is suitable for all end uses. Companies will need to evaluate the Gore materials for suitability in their end use, and assumes sole responsibility for determining whether Gore's EMI Gaskets and Grounding Pads are fit for the intended use, and suitability of qualification and acceptance criteria.

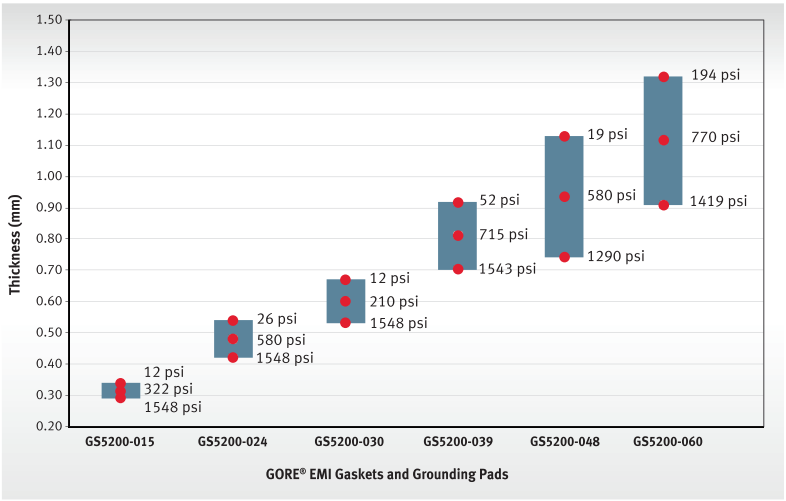
Extended Service Heights

The GS5200 Series of GORE® EMI Gaskets and Grounding Pads performs well in both grounding and EMI shielding applications. Gore recommends using each variant within a range of service heights (gap distances). The range of tolerance take-up results in multiple product choices for some gap distances (Table 2). Selecting the most suitable variant for a given application depends on the following:

- Gap distance of the housing that needs to be filled
- Compression force required to achieve the specified gap distance
- Required DC resistance for grounding applications (or required shielding effectiveness for shielding applications) at a specified gap distance

Figure 1 shows recommended service heights (gap distances) for each variant.

Figure 1: Recommended Service Heights of GS5200 Series



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GORE® EMI Gaskets and Grounding Pads

GS5200 Series

Table 2: Service Height Specifications of GS5200 Series[D]

Gore Part Number	Weight (g)	Low Compression			Recommended Compression			High Compression		
		Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)
GS5200-015	0.026	0.29 (0.011)	0.001	1548	0.31 (0.012)	0.022	322	0.33 (0.013)	0.421	12
GS5200-024	0.032	0.42 (0.017)	0.002	1548	0.48 (0.019)	0.007	580	0.54 (0.021)	0.392	26
GS5200-030	0.039	0.59 (0.023)	0.001	1548	0.67 (0.026)	0.011	210	0.74 (0.029)	0.435	12
GS5200-039	0.048	0.70 (0.028)	0.001	1543	0.81 (0.032)	0.005	715	0.92 (0.036)	0.450	52
GS5200-048	0.056	0.74 (0.029)	0.001	1290	0.94 (0.037)	0.004	580	1.13 (0.044)	0.487	19
GS5200-060	0.067	0.91 (0.036)	0.003	1419	1.12 (0.044)	0.008	770	1.32 (0.052)	0.306	194

[d] Based on 5 x 5 mm grounding pad

Gore's EMI Gasket materials have been tested under the listed conditions and shown the provided performance. However, these tests may not be indicative of performance in a particular end use, and no material is suitable for all end uses. Companies will need to evaluate the Gore materials for suitability in their end use, and assumes sole responsibility for determining whether Gore's EMI Gaskets and Grounding Pads are fit for the intended use, and suitability of qualification and acceptance criteria.

Ordering Information

The GS5200 Series of GORE® EMI Gaskets and Grounding Pads is available as custom die-cut gaskets, strip gaskets, and sheets (Table 3, 4). To order or specify GS5200 Series grounding pads and custom die-cut gaskets, contact Gore for assistance.

Standard strip gaskets in a variety of widths are available in 15-meter rolls through approved distributors.

Larger widths (e.g., 6.35 mm and 3.18 mm) are manufactured with one lane of strips per roll, whereas smaller widths (e.g., 2.03 mm and 1.02 mm) are manufactured with five lanes of strips per roll. For other strip gasket configurations, contact Gore for assistance.

Table 3: Strip Gasket Ordering Information of GS5200 Series

Gore Part Number	Thickness mm (in)	Width mm (in)
EDR-52-015-0250-SC	0.38 (0.015)	6.35 (0.250)
EDR-52-015-0125-SC	0.38 (0.015)	3.18 (0.125)
EDR-52-015-0080-SC	0.38 (0.015)	2.03 (0.080)
EDR-52-015-0040-SC	0.38 (0.015)	1.02 (0.040)
EDR-52-024-0250-SC	0.61 (0.024)	6.35 (0.250)
EDR-52-024-0125-SC	0.61 (0.024)	3.18 (0.125)
EDR-52-024-0080-SC	0.61 (0.024)	2.03 (0.080)
EDR-52-024-0040-SC	0.61 (0.024)	1.02 (0.040)
EDR-52-030-0250-SC	0.76 (0.030)	6.35 (0.250)
EDR-52-030-0125-SC	0.76 (0.030)	3.18 (0.125)
EDR-52-030-0080-SC	0.76 (0.030)	2.03 (0.080)

Table 4: Sheets Ordering Information of GS5200 Series

Variant	Thickness mm (in)	Part Number	Material
GS5200-015	0.38 (0.015)	20GS-6015-01	GS5200 without adhesive 8" x 8" sheet
GS5200-024	0.61 (0.024)	20GS-6015-02	
GS5200-030	0.76 (0.030)	20GS-6015-03	
GS5200-039	0.99 (0.039)	20GS-6015-04	
GS5200-048	1.22 (0.048)	20GS-6015-05	
GS5200-060	1.52 (0.060)	20GS-6015-06	
GS5200-015	0.38 (0.015)	20GS-6015-07	GS5200 with adhesive 8" x 8" sheet
GS5200-024	0.61 (0.024)	20GS-6015-08	
GS5200-030	0.76 (0.030)	20GS-6015-09	
GS5200-039	0.99 (0.039)	20GS-6015-10	
GS5200-048	1.22 (0.048)	20GS-6015-11	
GS5200-060	1.52 (0.060)	20GS-6015-12	

GORE® EMI Gaskets and Grounding Pads

GS2100 Series

Best shielding effectiveness in lightweight materials approved for military and spaceflight applications

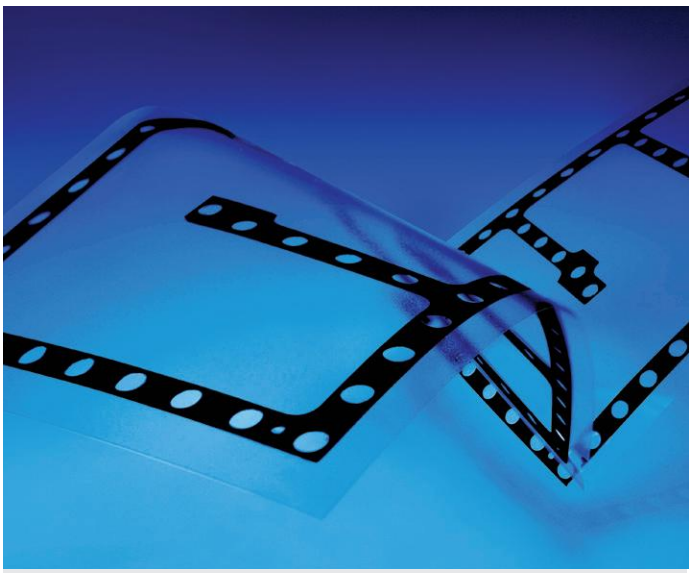
In addition to commercial applications such as connector gaskets and test equipment, the GS2100 series of Gore EMI Shielding Materials are well suited for military and aerospace applications. The lightweight GS2100 Series of GORE® EMI Gaskets and Grounding Pads reduces overall product size while providing excellent shielding performance. The low outgassing materials used in the GS2100 Series result in conductive solutions approved for DEF-STAN, MIL-SPEC, NASA, and ESA applications.

The GS2100 Series of GORE® EMI Gaskets and Grounding Pads is engineered with a conductive EMI gasketing material that is moderately soft, providing excellent shielding effectiveness in housings with surface variations like those in magnesium as-cast enclosures.

With trace widths as narrow as one millimeter, the GS2100 Series improves flexibility in complex packaging designs. Their peel-and-stick adhesive backing makes installation quick and easy, whether used in a new design or a retrofit. These gaskets can be supplied in die-cut forms or in slit-width rolls and sheets.

Typical Applications

- Aerospace communications
- Fixed and portable military communications
- Test equipment
- Connector gaskets



Benefits of GORE® EMI Gaskets and Grounding Pads — GS2100 Series

- Enhanced reliability from low outgassing materials approved for DEF-STAN, MIL-SPEC, NASA, and ESA applications
- Reliable electrical performance over a wide range of temperatures
- Easier installation with simple peel-and-stick adhesives
- Increased design flexibility that allows small trace widths and complex geometries
- Simplified device maintenance with materials that recover and do not adhere to mating surfaces
- Durable materials that provide a barrier against dust and water to enable IP65 device compliance

GORE® EMI Gaskets and Grounding Pads

GS2100 Series

Table 5: Environmental and Mechanical Properties of GS2100 Series

Properties	Standard	Value
Operating temperature range (°C) with adhesive without adhesive		 -55 to 125 -200 to 200
RoHS status[a] (lead, cadmium, hexavalent chromium, mercury, bromine)		Pass
Flammability	Tested in accordance with UL methods; V0 vertical burn	Pass
Mold growth	BS 2011 – Part 2-1J	None
Hardness		(Shore A) 45
Density (gm/cc)	ASTM D1622-88	0.34
Recoverability	ASTM D395 B	› 50%
EMI seal reusability	MIL-G-83528	Pass (› 80 dB after 10 closings)
Vibration resistance	DESC 92017 and MIL-G-83528	Pass
Volume resistivity	DESC 92017 and MIL-G-83528	1.5 ohm-cm @ 500 psi, Au electrodes
Contaminant resistance	DESC 92017, MIL-G-83528, BS 3G 100-Part 2, and DEF-STAN 59-103-Part 3/1	Pass
Shielding effectiveness	DESC 92017 and MIL-G-83528	"E" field – 100 dB 200 MHz to 18 GHz
Shielding effectiveness, with adhesive	ARP-1705 modified test method[b]	› 45 dB @ 1 GHz
Corrosion resistance	DEF-STAN 59-103	Pass
Electromagnetic pulse (EMP) survivability	DEF-STAN 59-103	Pass
Water seal	DEF-STAN 59-103/Part 3 and IP65	Pass
Accelerated life (heat aging)	DEF-STAN 59-103, Part 3/1 and MIL-G-83528	Pass
Outgassing, with adhesive	ASTM E595 and ESA PSS-01-702	Pass with ‹ 1% mass loss
Electromagnetic discharge: Charge ‹ 150 volts, @ 25°C, 45% RH, loss less than 100 volts within 0.5 seconds		Pass

[a] W. L. Gore & Associates declares that we do not intentionally add substances listed in RoHS regulations to the GS2100 Series of GORE® EMI Gaskets and Grounding Pads. Independent lab tests have been performed, and results are available upon request.

[b] All measurements made using ARP-1705 modified test method through 3 GHz on 2 mm trace width

[c] Gore's EMI Gasket materials have been tested under the listed conditions and shown the provided performance. However, these tests may not be indicative of performance in a particular end use, and no material is suitable for all end uses. Companies will need to evaluate the Gore materials for suitability in their end use, and assumes sole responsibility for determining whether Gore's EMI Gaskets and Grounding Pads are fit for the intended use, and suitability of qualification and acceptance criteria.

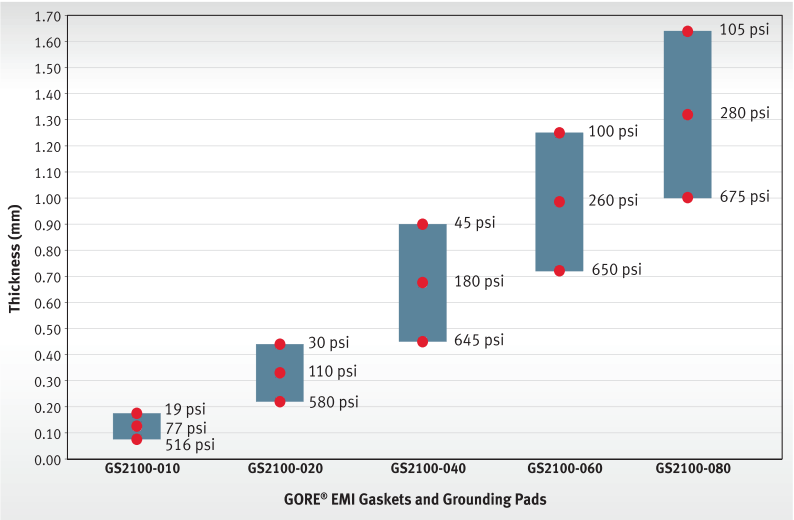
Extended Service Heights

For the GS2100 Series of GORE® EMI Gaskets and Grounding Pads, Gore recommends using each variant within a range of service heights (gap distances). The broad range of tolerance take-up results in multiple product choices for some gap distances (Table 6). Selecting the most suitable variant for a given application depends on the following:

- Gap distance of the housing that needs to be filled
- Compression force required to achieve the specified gap distance
- Required DC resistance for grounding applications (or required shielding effectiveness for shielding applications) at a specified gap distance

Figure 2 shows recommended service heights (gap distances) for each variant.

Figure 2: Recommended Service Heights of GS2100 Series



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GORE® EMI Gaskets and Grounding Pads

GS2100 Series

Table 6: Service Height Specifications of GS2100 Series[d]

Gore Part Number	Weight (g)	Low Compression			Recommended Compression			High Compression		
		Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)	Stop Height mm (in)	Initial DC Resistance (ohms)	Pressure to Achieve Compression (psi)
GS2100-010	0.003	0.07 (0.003)	3.8	516	0.13 (0.005)	7.0	77	0.18 (0.007)	20	19
GS2100-020	0.005	0.22 (0.009)	3.3	580	0.33 (0.013)	5.6	110	0.44 (0.017)	9.0	30
GS2100-040	0.010	0.45 (0.018)	1.6	645	0.68 (0.027)	3.5	180	0.90 (0.035)	5.5	45
GS2100-060	0.014	0.72 (0.028)	1.3	650	0.99 (0.039)	5.0	260	1.25 (0.049)	12.0	100
GS2100-080	0.019	1.00 (0.039)	1.1	675	1.32 (0.052)	5.5	280	1.64 (0.065)	12.0	105

[d] Based on 5 x 5 mm grounding pad

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Ordering Information

The GS2100 Series of GORE® EMI Gaskets and Grounding Pads is available as custom die-cut gaskets, strip gaskets, and sheets (Table 7, 8). To order or specify GS2100 Series grounding pads and custom die-cut gaskets, contact Gore for assistance.

Standard strip gaskets in a variety of widths are available in 15-meter rolls through approved distributors.

Larger widths (e.g., 6.35 mm and 3.18 mm) are manufactured with one lane of strips per roll, whereas smaller widths (e.g., 2.03 mm and 1.02 mm) are manufactured with five lanes of strips per roll. For other strip gasket configurations, contact Gore for assistance.

Table 7: Strip Gasket Ordering Information of GS2100 Series

Gore Part Number	Thickness mm (in)	Width mm (in)
EDR-21-010-0250-SC	0.25 (0.010)	6.35 (0.250)
EDR-21-010-0125-SC	0.25 (0.010)	3.18 (0.125)
EDR-21-010-0080-SC	0.25 (0.010)	2.03 (0.080)
EDR-21-010-0040-SC	0.25 (0.010)	1.02 (0.040)
EDR-21-020-0250-SC	0.51 (0.020)	6.35 (0.250)
EDR-21-020-0125-SC	0.51 (0.020)	3.18 (0.125)
EDR-21-020-0080-SC	0.51 (0.020)	2.03 (0.080)
EDR-21-020-0040-SC	0.51 (0.020)	1.02 (0.040)
EDR-21-040-0250-SC	1.02 (0.040)	6.35 (0.250)
EDR-21-040-0125-SC	1.02 (0.040)	3.18 (0.125)
EDR-21-040-0080-SC	1.02 (0.040)	2.03 (0.080)
EDR-21-040-0040-SC	1.02 (0.040)	1.02 (0.040)
EDR-21-060-0250-SC	1.52 (0.060)	6.35 (0.250)
EDR-21-060-0125-SC	1.52 (0.060)	3.18 (0.125)
EDR-21-060-0080-SC	1.52 (0.060)	2.03 (0.080)
EDR-21-060-0040-SC	1.52 (0.060)	1.02 (0.040)
EDR-21-080-0250-SC	2.03 (0.080)	6.35 (0.250)
EDR-21-080-0125-SC	2.03 (0.080)	3.18 (0.125)
EDR-21-080-0080-SC	2.03 (0.080)	2.03 (0.080)

Table 8: Sheets Ordering Information of GS2100 Series

Variant	Thickness mm (in)	Part Number	Material
GS2100-010	0.25 (0.010)	20GS-6089-01	GS2100 without adhesive 5" x 8" sheet
GS2100-020	0.51 (0.020)	20GS-6089-02	GS2100 without adhesive 8" x 8" sheet
GS2100-040	1.02 (0.040)	20GS-6089-03	
GS2100-060	1.52 (0.060)	20GS-6089-04	
GS2100-080	2.03 (0.080)	20GS-6089-05	
GS2100-010	0.25 (0.010)	20GS-6089-06	GS2100 with adhesive 5" x 8" sheet
GS2100-020	0.51 (0.020)	20GS-6089-07	GS2100 with adhesive 8" x 8" sheet
GS2100-040	1.02 (0.040)	20GS-6089-08	
GS2100-060	1.52 (0.060)	20GS-6089-09	
GS2100-080	2.03 (0.080)	20GS-6089-10	

GORE® EMI Gaskets and Grounding Pads

NOTICE — USE RESTRICTIONS APPLY
Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

W. L. Gore & Associates, Inc.

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