

SOFT-SHIELD® 4000 Series

SOFT-SHIELD 4000 Series Foil/Fabric over Foam EMI Gaskets

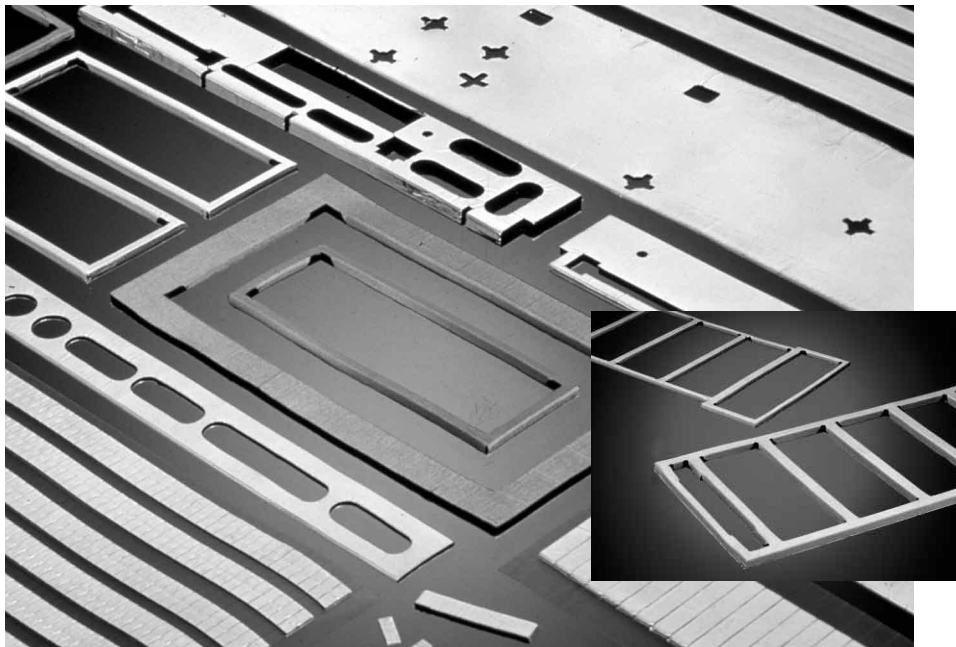
- No loose conductive fibers
- No sharp edges
- Electrically conductive attachment adhesive
- >90 dB attenuation from 10 MHz to 1 GHz
- No degradation in shielding performance after 10,000 deflection cycles
- <25% compression set at 50% deflection (22 hrs. at 70°C)
- Shielding performance of foil, with conformability and toughness of fabric
- Surface resistance <20 milliohms
- UL 94V-0 and UL 94HB* rated versions
- Thin cross sections suitable for back plane I/O and D-subminiature gaskets
- Custom, individually 360° wrapped gaskets available
- Available as "peel-and-stick" grounding contacts

High Performance for Die-Cut, Picture Frame and Backplane Applications

Chomerics' SOFT-SHIELD 4000 Series materials are low-cost, low closure force EMI gaskets that provide effective shielding and grounding of commercial electronic devices, indoor enclosures and industrial equipment. Their availability in thin cross sections makes them an ideal choice for access panel, back plane or I/O connector panel shielding.

Rectangular in cross section, the 4000 Series materials are constructed of a closed cell urethane foam that is machine wrapped with a fabric-reinforced aluminum foil. This combination provides the shielding performance of foil and the conformability and toughness of fabric. Each material includes conductive, pressure-sensitive adhesive on one side, which provides a means of gasket attachment without compromising shielding performance.

The fabric-reinforced foil covering has no loose conductive fibers or sharp edges. Low compression set, low surface resistivities, and durability make 4000 Series gasketing an excellent EMI shielding solution.



Choice of softness level and configuration

The group of five materials in the 4000 Series provides a choice of UL 94V-0 or UL 94HB rated compositions, and a choice of three grades of softness for the foam core.

Gaskets are produced as continuously wrapped solid strips in standard lengths, cut-to-length parts, die-cut parts, and individually 360° wrapped die-cut parts. For rapid peel and stick grounding applications, the materials are available as kiss-cut parts on polyester film release sheets. SOFT-SHIELD 4000 Series materials also can be fabricated as D-subminiature connector gaskets (9-50 pin).

When ordering die-cut gaskets, two wrapping techniques are available:

Standard die-cut parts are produced from any of the five 4000 Series materials. While they are produced from strips that have fully-wrapped outside edges, the parts will have exposed surfaces wherever they have been die-cut.

Custom, individually 360° wrapped gaskets are wrapped after die cutting, ensuring that every surface is covered in the fabric-reinforced foil jacket.

Applications for individually wrapped parts include ladder and back plane gaskets in computer storage cabinets. The ultra-soft core in SOFT-SHIELD 4002 and 4004 materials limits their use in

individually 360° wrapped gaskets. Contact Chomerics' Applications Engineering Department.

NOTE: For certain applications, Chomerics supplies alternate SOFT-SHIELD 4000 series materials in which a conductive metallized fabric jacket is substituted for the foil jacket. Inquiries are invited.

Compression-Deflection

The three grades of foam used for SOFT-SHIELD 4000 Series gaskets, and a choice of standard thicknesses, provide a range of compression-deflection performance levels to suit the closure force conditions of a given application. Compression-deflection characteristics vary both with the foam core selected and the volume of foil covering in relation to gasket thickness. Ranges are shown in Table 1. Actual compression-deflection values have been determined for each material in each standard profile, and are available on request.

Chomerics' Applications Engineering Department welcomes the opportunity to provide assistance with design and prototype fabrication of SOFT-SHIELD 4000 Series EMI Gaskets.

Table 1

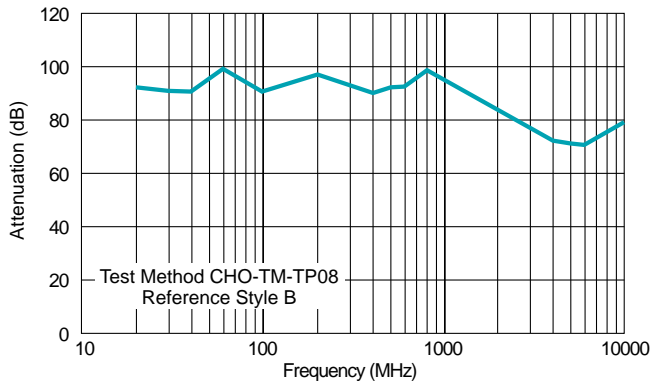
TYPICAL PROPERTIES FOR SOFT-SHIELD 4000 GASKETING						
Material	4000	4002	4004	4006	4008	Test Method
Core	PORON ¹ Urethane Foam					—
Jacket	Fabric-Reinforced Aluminum Foil					—
PSA Type	Chomerics Electrically Conductive Acrylic					—
Adhesion	See Table 2					ASTM D1000
Compression-Deflection ² , 25% deflection, psi	<7 to <12	<1 to <4	<1 to <5	<3 to <9	<3 to <8	ASTM D3574 Modified
Compression Set, % @ 25% Deflection	<20					ASTM D395 Method B
Compression Cycling, ohms, 10,000 cycles @ 50% Deflection	Initial 0.006, Final 0.032					—
Operating Temperature, max.	158°F (70°C)					—
Initial PSA Adhesion, lb/in	>2.5					ASTM D1000
EMI Shielding Effectiveness, dB (10 MHz to 1 GHz)	See Figure 1					CHO-TM-TP08 ³
Transfer Impedance	See Figure 2					SAE ARP 1705
Surface Resistivity after Heat Aging, ohms/sq. in. 168 Hours 185°F (85°C) 250°F (121°C) 95% RH/95°F (35°C) 2190 Hours 158°F (70°C)	Initial 0.009, Final 0.014 Initial 0.007, Final 0.017 Initial 0.007, Final 0.010 Initial 0.010, Final 0.010					CHO-TM-TP57 ³
Abrasion Resistance (Taber Abrader), ohms 500 cycles (500 g on CS wheel)	Initial 0.007, Final 0.010					ASTM D460
UL Flammability	94 HB	94 V-0	94 HB	94 HB	94 V-0	—

¹ Rogers Corporation

² Varies with thickness. Actual compression-deflection values are provided on specification sheet for each material profile..

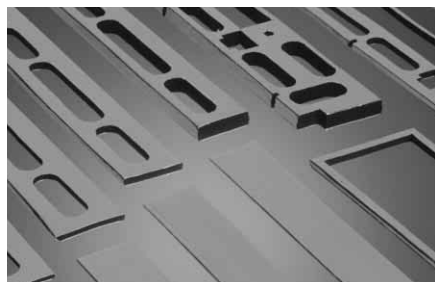
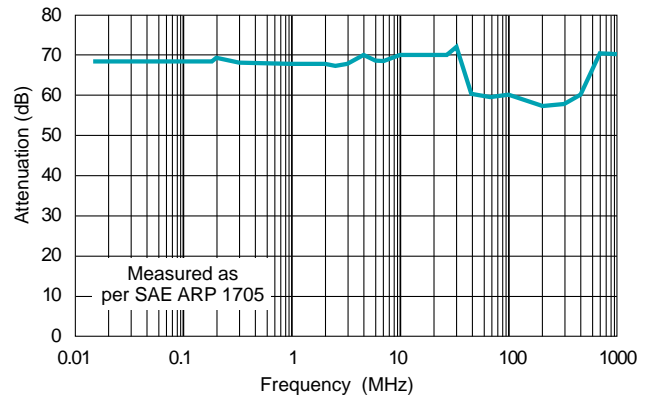
³ Copies of Chomerics Test Methods CHO-TM-TP08 and CHO-TM-TP57 are available on request.

Figure 1 Shielding Effectiveness



Note: To achieve the shielding effectiveness shown, gasket should be deflected a minimum of 10%.

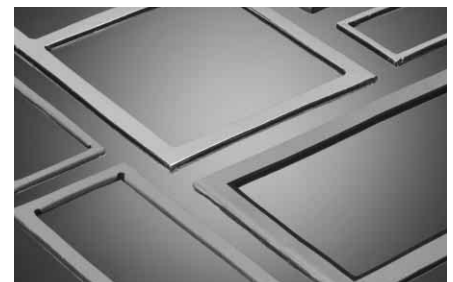
Figure 2 Transfer Impedance



Standard rectangular cross sections available as solid strips or die-cut parts.



Multiple kiss-cut parts on release backers for easy peel-and-stick in grounding applications.



Individually 360° wrapped picture-frame and ladder gaskets available in SOFT-SHIELD 4000, 4006 and 4008 materials.

continued

Table 2

ADHESION* (PEEL STRENGTH), lb/inch (N/m)		
Test Environment	To Aluminum	To Steel
Ambient Temperature	2.5 (438)	2.5 (438)
Baked 1 hr. @ 350°F (177°C)	4.0 (700)	3.9 (682.5)
Baked 1 hr. @ 400°F (204°C)	5.1 (892.5)	5.0 (875)
Baked 48 hrs. @ 350°F (177°C)	3.1 (542.5)	3.0 (525)
Baked 48 hrs. @ 165°F, 95% RH (74°C)	4.1 (717.5)	4.0 (700)

*Tested at ambient temperature per ASTM D1000.

Table 3

DIMENSIONAL TOLERANCES		
Strips	Width:	±1 mm (0.040 in.)
	Length:	±2 mm (0.080 in.)
Custom Die-Cut	Width:	±1 mm (0.040 in.)
	Length:	±0.38 mm (0.015 in.)
	Hole to Hole:	±0.25 mm (0.010 in.)
	Angular:	±0.5°
Datum from a die-cut feature.		
Thickness	±10%	

Table 4

GASKET SIZE RANGES		
Machine-Wrapped/ Cut-to-Length	Individually 360° Wrapped	
Width: 12.7 to 152 mm (0.5 to 6.0 in.)	610 x 610 mm (24.0 x 24.0 in.) maximum size	
Length: up to 1219 mm (up to 48.0 in.)		

D-CONNECTOR GASKETS

Use the following part number system to order D-Connector gaskets in SOFT-SHIELD 4002 material. Dimensions and tolerances are provided in Table 6.

4002 — **XXX** — **YYPIN-LLLLL**

Thickness

012	1.2 (0.048)	09PIN-L2780
017	1.7 (0.068)	15PIN-L2781
023	2.3 (0.091)	25PIN-L2782
		37PIN-L2783
		50PIN-L2784

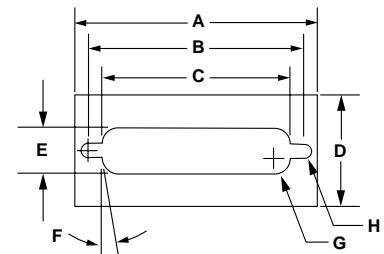


Table 6

D-CONNECTOR GASKETS <i>inch (mm)</i>					
Dimension Tolerances	9 PIN	15 PIN	25 PIN	37 PIN	50 PIN
“A” Overall Length ± 0.015 (0.38)	1.213 (30.81)	1.541 (39.14)	2.088 (53.04)	2.720 (69.09)	2.630 (66.80)
“B” Cutout Length at Slot Centerline ±0.010 (0.25)	0.984 (24.99)	1.312 (33.32)	1.852 (47.04)	2.500 (63.50)	2.406 (61.11)
“C” Cutout Length Excluding Slot ±0.010 (0.25)	0.746 (18.95)	1.074 (27.28)	1.614 (41.00)	2.266 (57.56)	2.158 (54.81)
“D” Overall Width ±0.040 (1.00)	0.700 (17.78)	0.700 (17.78)	0.700 (17.78)	0.700 (17.78)	0.825 (20.96)
“E” Cutout Width ±0.010 (0.25)	0.400 (10.16)	0.400 (10.16)	0.400 (10.16)	0.400 (10.16)	0.500 (12.70)
“F” Angle ±0.5°	2 x 10°	2 x 10°	2 x 10°	2 x 10°	2 x 10°
“G” Cutout Radius ±0.010 (0.25)	4 x 0.140 (3.56)	4 x 0.140 (3.56)	4 x 0.140 (3.56)	4 x 0.140 (3.56)	4 x 0.140 (3.56)
“H” Slot Radius ±0.010 (0.25)	2 x 0.062 (1.57)	2 x 0.062 (1.57)	2 x 0.062 (1.57)	2 x 0.062 (1.57)	2 x 0.062 (1.57)

ORDERING INFORMATION

Referring to Tables 3-5, use the part numbering scheme shown here to order SOFT-SHIELD 4000 Series gasketing in **standard sizes**:

WWWW-XXX-YYYY-ZZZZ

Table 5

WWWW = MATERIAL				
4000	4002	4004	4006	4008
XXX = STANDARD THICKNESSES <i>mm (inch)</i>				
4000 and 4006		4008		
012	1.2 (0.048)	016	1.6 (0.064)	
019	1.9 (0.075)	023	2.3 (0.091)	
027	2.7 (0.106)	031	3.1 (0.122)	
035	3.5 (0.138)	039	3.9 (0.154)	
067	6.7 (0.264)	017	7.1 (0.279)	
4002		4004		
012	1.2 (0.048)	009	0.9 (0.034)	
017	1.7 (0.068)	014	1.4 (0.054)	
023	2.3 (0.091)	020	2.0 (0.077)	
027	2.7 (0.106)	024	2.4 (0.094)	
037	3.7 (0.147)	034	3.4 (0.133)	
047	4.7 (0.187)	044	4.4 (0.173)	
057	5.7 (0.226)	054	5.4 (0.212)	
067	6.7 (0.264)	064	6.4 (0.250)	
YYYY = STANDARD WIDTH <i>mm (inch)</i>				
0127	12.7 (0.5)	0762	76.2 (3.0)	
0210	21.0 (0.825)	1016	101.6 (4.0)	
0254	25.4 (1.0)	1270	127.0 (5.0)	
0381	38.1 (1.5)	1524	152.4 (6.0)	
0508	50.8 (2.0)			
ZZZZ = STANDARD LENGTH <i>mm (inch)</i>				
2540	254 (10.0)	5080	508 (20.0)	

For custom die-cut parts, use the part number **WWWW-XXX-L0000**, for which Chomerics will assign the actual drawing number L0000. Note: Fully-wrapped (360°) custom gaskets are not available in SOFT-SHIELD 4002 or 4004 materials.