Wire & Expanded Metal Gasket Technology

Parker Chomerics offers one of the broadest selections of metal-based gaskets solutions available anywhere for EMI and EMP shielding as well as lightning strike protection.

These products include three distinct families; knitted wire, oriented wire in silicone and expanded metal.

Cost-effective, metal-based shielding products have been used for decades in countless military and commercial market applications. Because of their high metal content, these gaskets typically provide 60 to 100 dB of attenuation in the 20 MHz to 20 GHz range.

In addition to hundreds of standard parts, Parker Chomerics routinely supports unique applications with custom gasket configurations and materials. With a focus on application-based engineering, we can direct designers to the most cost-effective, specification matched metal gasket solution.

Please reference the technical data associated with each of the following products for more in-depth information regarding performance, standard materials and sizes and typical applications.

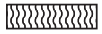
STANDARD MATERIAL SPECIFICATIONS

Gasketing Types	ELASTOMERS				METALS			
	Silicone*		Neoprene*		Aluminum	Ferrex	Monel	Tin-Plated Steel
	Solid	Closed Cell Sponge	Solid	Closed Cell Sponge				
MESH STRIP® (all metal)	-	-	-	-	Alloy 5056 AMS-4182	**	QQ-N-281 AMS-4730	-
MESH STRIP® (elastomer core)	A-A-59588 Class 2B Grade 40	AMS-3195	MIL-R-6855 Class II, Grade 40	MIL-R-6130 Type II, Grade A, Condition Medium	Alloy 5056 AMS-4182	**	QQ-N-281 AMS-4730	-
COMBO STRIP®/COMBO® Gaskets (mesh/elastomer)	A-A-59588 Class 2B Grade 40	AMS-3195	MIL-R-6855 Class II, Grade 40	MIL-R-6130 Type II, Grade A, Condition Medium	Alloy 5056 AMS-4182	**	QQ-N-281 AMS-4730	-
POLASHEET®/POLASTRIP® (oriented wire in elastomer)	A-A-59588 Class 3A Grade 30	AMS-3195	-	-	Alloy 5056 AMS-4182	-	QQ-N-281 AMS-4730	-
PORCUPINE METALASTIC® (expanded monel in elastomer)	A-A-59588 Class 2B Grade 50	-	-	-	QQ-A-250/2 3003 AL	-	QQ-N-281 (expanded)	-
METALASTIC® (woven aluminum in elastomer)	AMS 3302D	-	AMS-3222	-	Alloy 5056 AMS-4182	-	-	-
SHIELDMESH® (compressed mesh)	-	-	-	-	Alloy 5056 AMS-4182	**	QQ-N-281 AMS-4730	-
SPRINGMESH™	-	-	-	-	-	-	-	ASTM A 228-02 SAE J178

* Temperature Ranges:
Silicone-solid, MESH STRIP w/Core & COMBO STRIP: A-A-59588, Class 2B, Grade 40. –70° to +500°F (–57° to 260°C).
Silicone-solid, POLASHEET and POLASTRIP: A-A-59588, Class 3A, Grade 30. –70° to +500°F (–57° to 260°C).
Silicone-sponge, POLASHEET and POLASTRIP: AMS-3195, –80° to +400°F (–62° to +204°C).
Silicone-solid, PORCUPINE & METALASTIC gasketing: A-A-59588 Class 2B Grade 50), –65° to +500°F (–54° to +260°C).
Neoprene-solid, MESH STRIP w/Core & COMBO STRIP: MIL-R-6855, Class II, Grade 40, –45° to +220°F (–43° to +104°C).
Neoprene-solid, METALASTIC gasketing: AMS-3222, –65° to +500°F (–54° to +260°C).
Neoprene-sponge, MESH STRIP w/Core & COMBO STRIP: MIL-R-6130, Type II, Grade A, –30° to +150°F (–34° to +65°C), meets UL 94HF-1 rating.

** Ferrex is Parker Chomerics tradename for tin-plated, copper-clad steel wire per ASTM B-520, ASTM (QQ-W-343) tin-plated, 2-3% by weight; ASTM B-227 copper-cladding 30-40% by weight; SAE 1010 steel wire, balance by weight and is the same as Tecknit Su/Cu/Fe which Ferrex replaces.

Wire Mesh EMI Gasket Selection Guide

Product Trade Name			MESH STRIP® (all metal)	SHIELDMESH® Compressed Mesh Gaskets	MESH STRIP® (Elastomer Core)		COMBO® STRIP Gasketing	COMBO® Gaskets	PORCUPINE[4] METALASTIC® Gasketing	METALASTIC® [4] Gasketing	SOLID POLA® Gasketing	SPONGE POLA® Gasketing
Schematic Cross Section												
Construction			Knitted Wire Mesh	Formed or Compressed Knitted Wire Mesh	Knitted Wire Mesh over Elastomer Strips		Formed Knitted Wire Strips in Parallel w/ Elastomer Strips; or Die-Cut Gaskets		Expanded Metal in Elastomer	Woven Wire in Elastomer	Oriented Wire in Matrix of Silicone Elastomer (available with pressure sensitive adhesive)	Oriented Wire in Matrix of Silicone Elastomer (available with pressure sensitive adhesive)
Available Forms			Strips, Gasket made by Joining Strips	Jointless Rings or Rectangular Gaskets	Strips, Gasket made by Joining Strips		Strips, Gasket made by Joining Strips	Die-Cut Elastomer with Joined EMI Strips	Sheets, Die-Cut Gaskets	Sheets, Die-Cut Gaskets	Sheets, Die-Cut, Strips, Gasket made by Joining Strips	Sheets, Die-Cut, Strips, Gasket made by Joining Strips
EMI Rating[5]	14 kHz (H)		>20- >30 dB	>25- >30 dB	>25- >30 dB		>20- >30 dB		>35 dB	>35 dB	>35 dB	>35 dB
	18 MHz (E)		>102 dB	>102 dB	>102 dB		>102 dB		>102 dB	>102 dB	>102 dB	>102 dB
	1.0 GHz (P)		>83- >93 dB	>93 dB	>93 dB		>83- >93 dB		>85 dB	>40 dB	>93 dB	>93 dB
Maximum Joint Unevenness, % of Gasket Height	Class A -Permanently Closed		30-40%	30%	30-50%		30%		15%	10%	20%	20%
	Class B -Open-Close in same position		25-30%	25%	25-40%		30%		10%	7%	17%	17%
	Class C -Completely Interchangable		20-25%	20%	20-30%		25%		10%	7%	17%	17%
Minimum/Maximum Height (inches (mm)			0.062/0.500 (1.57/12.70)	0.040/0.375 (1.02/9.53)	0.125/0.750 (3.18/19.05)		0.062/0.375 (1.57/9.53)		0.020/0.030 (0.51/0.76)	0.016/0.020 (0.41/0.51)	0.062/0.312 (1.57/7.92)	0.030/0.250 (0.76/6.35)
Min. Width (Greater of Actual Dim. or Portion of Height inches (mm)			0.062/1/2 H (1.57/1/2 H)	0.062/1/2 H (1.57/1/2 H)	0.062/1/2 H (1.57/1/2 H)		0.125/1/2 H (3.18/1/2 H)		0.140 (3.56)	0.125 (3.18)	0.093/1/2 H (2.36/1/2 H)	0.125 (3.18)
Recommended Compression Pressure psi(kg/cm)			5-100 (0.35-7.03)	5-100 (0.35-7.03)	5-100 (0.35-7.03)		20-100 (1.47-7.03)		20-100 (1.47-7.03)	20-100 (1.47-7.03)	20-100 (1.47-7.03)	10-40 (0.70-2.81)
Attachment or Positioning	In Slot		Excellent	Excellent	Excellent		Excellent		No	No	Good	Good
	Pressure Sensitive Adhesive		N/A	N/A	N/A		Excellent		N/A	N/A	Excellent	Excellent
	Bond Non-EMI Gasket Portion[3]		Excellent[2]	N/A	Excellent[2]		Excellent		N/A	N/A	Excellent[7]	N/A
	Conductive Adhesive		Poor	Poor	Poor		N/A		Poor	Poor	Poor	Poor
	Bolt thru Bolt Holes		Excellent[2]	N/A	Excellent[2]		Excellent		Excellent	Excellent	Excellent	Excellent
Elastomer Temperature Range					Solid	Sponge	Solid	Sponge				
	Neoprene Version		N/A	N/A	-65°F to 212°F -54°C to 100°C	-24°F to 212°F -31°C to 100°C	-65°F to 212°F -54°C to 100°C	-24°F to 212°F -31°C to 100°C	N/A	-40°F to 212°F -40°C to 100°C	N/A	N/A
	Silicone Version		N/A	N/A	-75°F to 500°F -60°C to 260°C	-103°F to 401°F -75°C to 205°C	-75°F to 500°F -60°C to 260°C	-103°F to 401°F -75°C to 205°C	-75°F to 500°F -60°C to 260°C	-75°F to 500°F -60°C to 260°C	-85°F to 392°F -65°C to 200°C	-85°F to 392°F -65°C to 200°C
	Fluorosilicone Version		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Standard Metals Available in EMI Portion (others also available)			Aluminum, Ferrex[1], Monel	Aluminum, Ferrex[1], Monel	Aluminum, Ferrex[1], Monel		Aluminum, Ferrex[1], Monel		Aluminum, Monel	Aluminum Only	Aluminum, Monel, Phosphor Bronze	Aluminum, Monel, Phosphor Bronze

(1) Ferrex® is Parker Chomerics tradename for tin-plated, copper-clad steel EMI gasketing.
(2) Two versions have fins especially designed for easy attachment.
(3) Most products for which this method is suitable are available with "dry back" (solvent-activated) adhesives already applied.
(4) Available without elastomer in metal form only.
(5) These EMI ratings are based on MIL-STD-285 test methods and are useful for making meaningful qualitative comparisons between products in this table since all tests were conducted under similar conditions. They cannot be used to compare to other EMI gasket data unless those data were obtained by the same methods.
(6) Non-conductive RTV yields excellent results, but use sparingly. If more adhesive surface is needed, use conductive adhesive.
(7) Available with COMBO POLA only

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Compression-Deflection

The deflection of knitted wire mesh strips under various compressive loads is a function of size, shape, and wire material. **Figures 1-7** provide typical compression-deflection data for common sizes and shapes in both Monel and Ferrex materials.

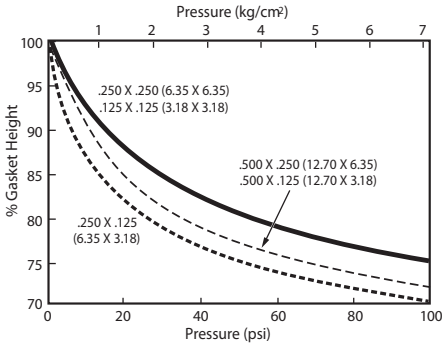

Figure 1 Compression vs. Pressure for MESH STRIP Gasketing

Dimensions are W x H in inches and (mm).

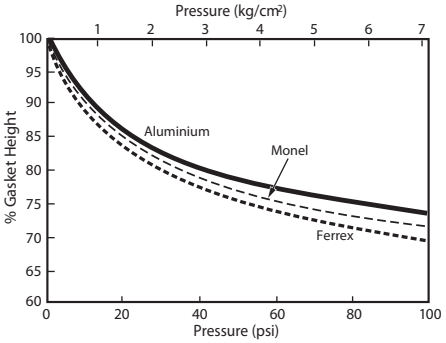

Figure 2 Compression vs. Pressure for MESH STRIP Gasketing with Cross Section of 0.250 in. (6.35 mm) x 0.125 in. (3.18 mm)

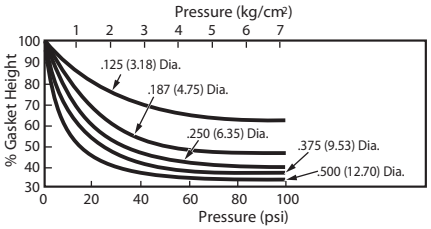

Figure 3 Compression vs. Pressure for Monel Round MESH STRIP Gasketing

Dimensions are inches and (mm).

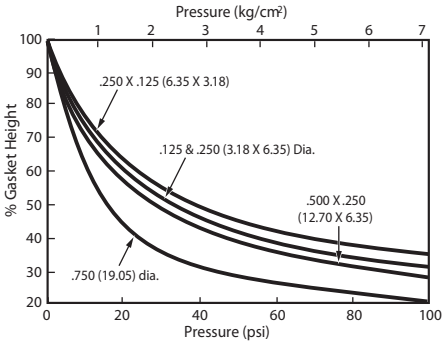

Figure 4 Compression vs. Pressure for MESH STRIP Gasketing with Neoprene Sponge Core and Two Layers of Monel Mesh

Dimensions are Dia. or W x H in inches and (mm).

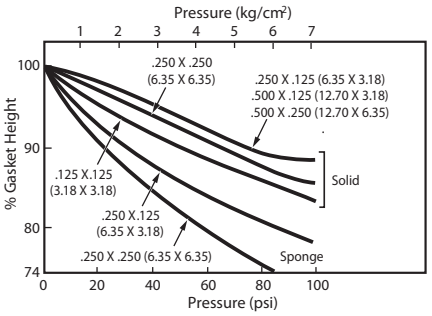

Figure 5 Compression vs. Pressure for POLASTRIP Gasketing

Dimensions are W x H in inches and (mm).

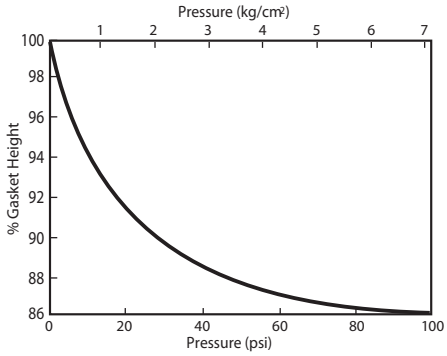

Figure 6 Compression vs. Pressure for METALASTIC Gasketing

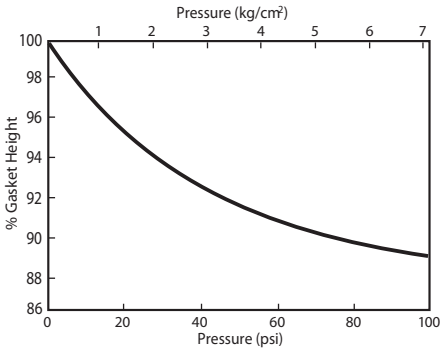

Figure 7 Compression vs. Pressure for PORCUPINE METALASTIC Gasketing

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Shielding Effectiveness

Figures 8-11 show the shielding effectiveness of mesh, METALASTIC and POLA gasket materials, measured via a radiated test method, with a 12 x12 inch (305 x 305 mm) aperture in a rigid enclosure wall. Shielding effectiveness is expressed as the difference between an open-field reference measurement and a measurement with antennas placed on each side of the covered gasketed aperture.

EMP Survivability

In order for an enclosure to continue providing EMI isolation during and after an EMP environment, the conductive gaskets at joints and seams must be capable of carrying EMP-induced current pulses. **Figure 13** shows the EMP current response of various metal mesh gasket materials.

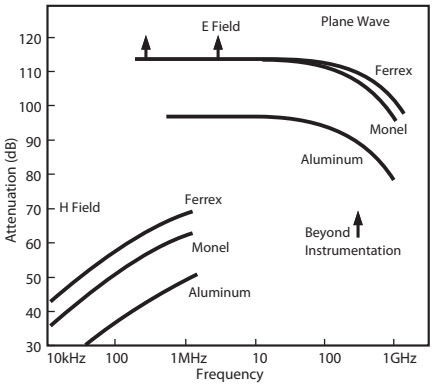

Figure 8 Shielding Effectiveness of MESH STRIP Gaskets

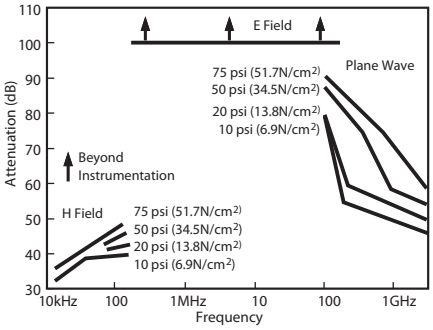

Figure 10 Shielding Effectiveness of METALASTIC Gaskets

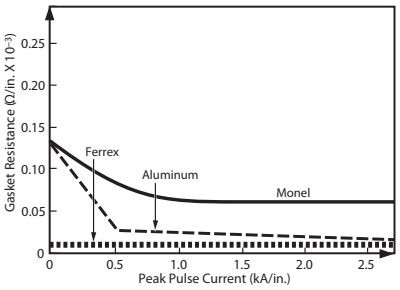

Figure 13 EMP Current Response of Mesh-Based Gaskets

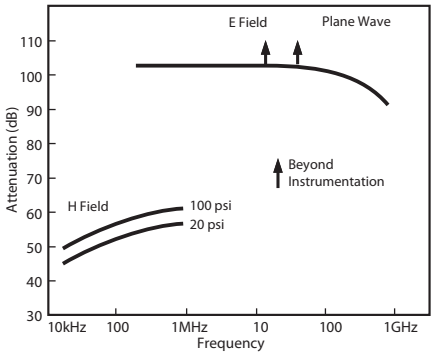

Figure 9 Shielding Effectiveness of SOLID POLA Gaskets

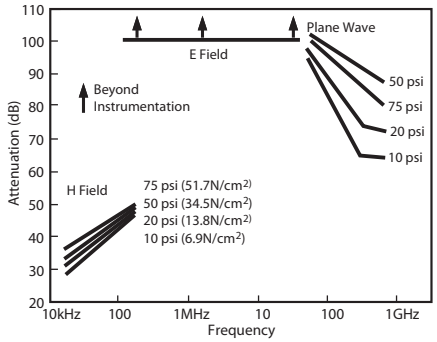

Figure 11 Shielding Effectiveness of PORCUPINE METALASTIC Gaskets

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