MESH STRIP®
Metal Mesh EMI Gasketing

Customer Value Proposition:
MESH STRIP gaskets are cost effective, resilient, highly conductive, knitted wire mesh strips used to provide electromagnetic interference (EMI) shielding, electromagnetic pulse (EMP) shielding and electrical grounding at the joints and seams of a variety of enclosure applications.

To reduce application design time, tooling charges and lead times, MESH STRIP gaskets are produced in a variety of standard cross sectional geometries and wire mesh alloys to meet a wide array of performance criteria. For unique application requirements, custom materials and profile geometries are available upon request.

To ensure quick and easy integration into any manufacturing environment, without the need for additional capital expenditures, material can be provided in spooled, cut-to-length, or spliced gasket forms and affixed utilizing welding, adhesive spot-bonding, soldering or riveting.

Features:
- Monel, Ferrex* and aluminum are standard alloy choices, with custom wire material available upon request
- Rectangular, round, round with fin and double round are standard cross sectional geometries, with custom geometries available upon request
- High metal content
- Knit construction
- Multiple gasket form-factors and installation options
- Foreign object debris (FOD) free version available upon request

Benefits:
- Various metal alloy offerings allow for optimized performance variables such as galvanic corrosion, EMI / EMP attenuation, electrical conductivity and temperature range
- Numerous standard geometric offerings ensure easy gasket integration into existing applications, thereby eliminating the need for redesign
- High metal content gaskets are highly durable and silicone-free, making them an excellent choice for applications with either silicone outgassing sensitivity or temperature requirements which exceeds that of typical silicone-based EMI / EMP seals
- Knitted wire construction results in a light-weight product offering for applications with weight restriction requirements
- Multiple gasket form factors and attachment methods allow for easy incorporation into existing manufacturing installation environments without the need for capital expenditures
- Encapsulated ends ensure the elimination of foreign object debris and associated rework costs.

* Ferrex is Parker Chomerics tradename or 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 it replaces.

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Application Design Information:

Parker Chomerics MESH STRIP gaskets are used to provide EMI/EMP shielding and lightning grounding performance for a variety of applications. Various design variables should be considered when making a product selection to ensure optimal performance. These variables are expanded upon in the following text to assist in the design process.

Material Type

MESH STRIP gasketing is offered in monel, Ferrex and aluminum alloys as standard offerings, with custom materials being available upon request. When making a material selection, a number of variables should be taken into consideration depending on the specific application. These criteria include; electrical performance for EMI/EMP shielding or current carrying requirements, galvanic compatibility between the gasket and mating surfaces, overall material durability and temperature thresholds. Electrical and galvanic performance are the predominant driving forces behind the material selection process and will therefore be focused on in the following text.

MESH STRIP gasketing can provide greater than 60 dB of shielding across a broad range of frequencies, though specific alloys perform better at specific frequencies. Depending on deflection percent, electrical resistance of less than .5 milliohms is also attainable for lightning grounding applications. For applications where electrical performance is the primary concern, it is recommended to evaluate materials in the following order; monel, Ferrex and aluminum.

To avoid long-term corrosion rework costs, the galvanic compatibility between the mating surfaces of the application with the gasket material of choice should be evaluated. For applications where corrosion mitigation against an aluminum substrate is the primary concern, it is recommended that aluminum MESH STRIP be utilized, though electrical performance and physical durability will be sacrificed.

In summary, monel is the material of choice for applications with moderate shielding and galvanic concerns. Ferrex, though good at low-frequency shielding, should be avoided in applications where galvanic corrosion is a concern mated to aluminum. Lastly, aluminum MESH STRIP gives great galvanic compatibility against aluminum housings, but has moderate shielding capabilities and material durability limitations.

Mounting

There are two main gasket attachment methods to be considered during the design process. Either open area mounting or incorporating the gasket within a groove are options. Groove incorporation is considered a more conservative selection due to gasket retention the ability to obtain more exact gasket compression and better shielding due to metal to metal contact between the cover and the flange. For open area mounting, it is recommended to RTV spot bond, weld, solder or rivet the material to hold it in place. Pressure sensitive adhesive is not available with knit mesh products.

Rectangular and round profiles are typically recommended for groove applications. Grooves are recommended to be rectangular with the height being the primary concern. It is recommended to target gasket compression of 30 +/- 10% when taking into consideration maximum material condition (MMC) and least material condition (LMC) of both the gasket and the groove. As a general rule, the nominal width of the groove should have a target value that results in the groove being 80 - 90% filled when the gasket is deflected to the aforementioned amount.

Round with fin and double round profiles are typically recommended for open area mounting applications. The flat area associated with both of these profile types allow for easy attachment to a substrate. Gasket compression should be targeted in a similar manner to that of a grooved design. Open area mounting, however, relies more heavily on the compressive forces generated by the fasteners incorporated into the design versus the compression tendencies of the specific gasket profile selected.

Geometric Profile

For MESH STRIP products, round, rectangular, double round and round with fin are standard profiles. After the aforementioned mounting criteria are evaluated, the final decision regarding the geometric gasket profile to be incorporated into the design is related to size.

Gasket size selection is a balance between available space in the application, the force available for gasket deflection and the tolerances associated with the application.

The larger the gasket, the less effect tolerance variations have on gasket deflection percentage. This will mitigate gasket under or over-deflection. Under-deflection will result is decreased electrical performance. Over-deflection will result in permanent gasket deformation and compromised gasket integrity.

Recognizing that larger gaskets incur higher price points, both for material and the associated machining necessary in the application, smaller profiles are typically more appealing to customers. Due to this, it is recommended to carefully consider tolerance swings and the affects they will have on the overall performance of the assembly.

See Table 3 for Chomerics standard tolerances.

Substrate Surface Preparation

Acknowledging that most applications have a substrate surface treatment interfacing with MESH STRIP gasketing, there are a few variables to evaluate.

First, the surface finish must allow for electrical contact between the gasket and the substrate. If electric contact is not ensured, gasket performance will be substantially reduced. Therefore, non-conductive surface treatments are not recommended unless masking of the gasket flange area is possible.

Though non-conductive, chemical conversion coatings are commonly used in conjunction with MESH STRIP gaskets. Whenever possible, MIL-DTL-5541 Class 3 is recommended.

This thinner surface treatment ensures gasket "bite-through" to the electrically conductive substrate beneath the finish. Class 1A is thicker and therefore harder to obtain the same level of electrical continuity to that of Class 3.

Any form of electrically conductive plating can be utilized.

Fastener Spacing

Fastener spacing recommendations are a highly variable situation with many things to be taken into consideration. As a general rule, spacing should range between 2.5 and 3.5 inches. In applications where either extreme forces or thin flange thickness may be present, flange deformation can occur. This deformation limits gasket compression at the mid-point between fasteners. As such, fasterner spacing should be reduced to 1.5 to 2.5 inches.

Foreign Object Debris (FOD)

Because of the knit wire composition of MESH STRIP gasketing and the cutting operation associated with this material, FOD is a potential concern. To mitigate this risk, Chomerics gives the option of terminated ends. In post-cutting operations, a silicone encapsulant is applied to the gasket ends. This silicone binds any loose debris. Other encapsulant materials are available to meet your specific application needs such as temperature and fluid resistance.

Weather Sealing

MESH STRIP does not provide a water seal. These gaskets are specifically designed for electrical properties only. For applications requiring wire mesh weather sealing performance, please refer to the Chomerics COMBO GASKET data sheet.

Metal EMI MESH STRIP® - Product Information

Table 1 - Material Specifications

	Aluminum	Ferrex	Monel
Specifications	Alloy 5056 AMS-4182*	**	QQ-N-281 AMS-4730
Nominal Wire Diameter	.005 in (0.127mm)	.0045 in (0.114mm)	.0045 in (0.114mm)

* Max tensile strength is 75,000 PSI

**Ferrex is 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.

Table 2 - Typical Shielding Effectiveness

Materials	H-FIELD 100 kHz	E-FIELD 10 MHz	PLANE WAVE	
			1 GHz	10GHz
	dB	dB	dB	dB
Aluminum	60	130	90	80
Ferrex	80+	130+	105	95
Monel	60+	130	90	80

Note: Please contact the Parker Chomerics Applications Engineering Department at 781-935-4850 with additional design questions.

Please contact the Parker Chomerics Test Services Department at 781-935-4850 in instances where application specific performance data is necessary.

Table 3 MESH STRIP - Cross Section Tolerances

Rectangular Strips inches (mm)	Round Strips inches (mm)
0.062 to 0.188; +0.015, -0.000 (1.57 to 4.78: +0.38, -0.000)	0.062 to 0.125; +0.015, -0.000 (1.57 to 3.18: +0.38, -0.000)
Over 0.188 to 0.375; +0.032, -0.000 (4.78 to 9.53: +0.81, -0.000)	Over 0.125 to 0.188; +0.032, -0.000 (3.18 to 4.78: +0.81, -0.000)
Over 0.375 to 0.500; +0.047, -0.000 (9.53 to 12.70: +1.19, -0.000)	Over 0.188 to 0.375; +0.047, -0.000 (4.78 to 9.53: +1.19, -0.000)
Over 0.500 to 1.000; +0.062, -0.000 (12.70 to 25.40: +1.57, -0.000)	Over 0.375 to 0.750; +0.062, -0.000 (9.53 to 19.05: +1.57, -0.000)
Single or Double Round with Fin (Overall Width) inches (mm)	**Fabricated MESH STRIP Gaskets inches (mm)**
Under and including 1.00; ± 0.06 (under 25.40 ±1.52)	0 to 4.9; ± 0.03 (0 to125 ±.76)
	5.0 to10.0; ± 0.06 (127 to 254 ±1.52)
Over 1.00; ± 0.12 (over 25.40 ±3.04)	Over 10.00; ± 0.06 (over 254 ±1.52)

ORDERING PROCEDURE

Continuous Length Gaskets – Order by part numbers listed in Tables 4 through 7 by replacing **'X'** with **1** for monel, **2** for aluminum or **4** for Ferrex and then specify total length required per part.

Custom Fabricated Gaskets – Specify the standard material to be used to manufacture the part by referencing the part numbers listed in Tables 4 through 7. Submit a fully dimensioned drawing of the required gasket, referencing any splice locations or terminated ends (when applicable). For design assistance please contact Parker Chomerics Applications Engineering Department.

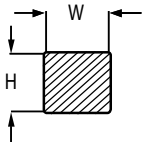

Table 4

RECTANGULAR CROSS SECTIONS inches (mm)		
Height	**Width**	**Part Number**
0.062 (1.57)	0.062 (1.57)	01-010X-0408
0.062 (1.57)	0.125 (3.18)	01-010X-0218
0.062 (1.57)	0.187 (4.75)	01-010X-0213
0.062 (1.57)	0.250 (6.35)	01-010X-0144
0.062 (1.57)	0.312 (7.92)	01-010X-0777
0.062 (1.57)	0.375 (9.53)	01-010X-0149
0.062 (1.57)	0.500 (12.70)	01-010X-0780
0.062 (1.57)	0.625 (15.88)	01-010X-0812
0.062 (1.57)	0.750 (19.05)	01-010X-0258
0.062 (1.57)	1.000 (25.40)	01-010X-1539
0.093 (2.36)	0.093 (2.36)	01-010X-0424
0.093 (2.36)	0.125 (3.18)	01-010X-0377
0.093 (2.36)	0.187 (4.75)	01-010X-0203
0.093 (2.36)	0.250 (6.35)	01-010X-0167
0.093 (2.36)	0.312 (7.92)	01-010X-0332
0.093 (2.36)	0.375 (9.53)	01-010X-0197
0.093 (2.36)	0.500 (12.70)	01-010X-0285
0.093 (2.36)	0.625 (15.88)	01-010X-0238
0.125 (3.18)	0.125 (3.18)	01-010X-0199
0.125 (3.18)	0.187 (4.75)	01-010X-0177
0.125 (3.18)	0.250 (6.35)	01-010X-0153
0.125 (3.18)	0.312 (7.92)	01-010X-0336
0.125 (3.18)	0.375 (9.53)	01-010X-0192
0.125 (3.18)	0.500 (12.70)	01-010X-0286
0.125 (3.18)	0.625 (15.88)	01-010X-1607
0.125 (3.18)	0.750 (19.05)	01-010X-0251
0.125 (3.18)	1.000 (25.40)	01-010X-1092
0.156 (3.96)	0.125 (3.18)	01-010X-0194
0.187 (4.75)	0.187 (4.75)	01-010X-0168
0.187 (4.75)	0.250 (6.35)	01-010X-0958
0.187 (4.75)	0.312 (7.92)	01-010X-0516
0.187 (4.75)	0.375 (9.53)	01-010X-0217
0.187 (4.75)	0.500 (12.70)	01-010X-1639
0.187 (4.75)	0.625 (15.88)	01-010X-1815
0.187 (4.75)	0.750 (19.05)	01-010X-0547
0.187 (4.75)	1.000 (25.40)	01-010X-1817

Table 4 continued

RECTANGULAR CROSS SECTIONS inches (mm)		
Height	**Width**	**Part Number**
0.250 (6.35)	0.250 (6.35)	01-010X-0169
0.250 (6.35)	0.312 (7.92)	01-010X-0581
0.250 (6.35)	0.375 (9.53)	01-010X-0310
0.250 (6.35)	0.500 (12.70)	01-010X-1523
0.250 (6.35)	0.625 (15.88)	01-010X-0818
0.250 (6.35)	0.750 (19.05)	01-010X-1530
0.250 (6.35)	1.000 (25.40)	01-010X-1598
0.312 (7.92)	0.312 (7.92)	01-010X-0390
0.375 (9.53)	0.375 (9.53)	01-010X-0265
0.375 (9.53)	0.625 (15.88)	01-010X-1816

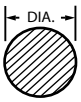

Table 5

ROUND CROSS SECTIONS inches (mm)	
Diameter*	**Part Number**
0.062 (1.57)	01-010X-0064
0.093 (2.36)	01-010X-0056
0.125 (3.18)	01-010X-0006
0.156 (3.96)	01-010X-0311
0.187 (4.75)	01-010X-0020
0.250 (6.35)	01-010X-0250
0.312 (7.92)	01-010X-0439
0.375 (9.53)	01-010X-0017
0.437 (11.10)	01-010X-0088
0.500 (12.70)	01-010X-0110

Metal EMI MESH STRIP® - Available Profiles

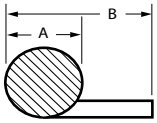

Table 6

ROUND with FIN inches (mm)		
A Diameter*	B Overall Dimension	Part Number
0.062 (1.57)	0.375 (9.53)	01-010X-0983
0.062 (1.57)	0.500 (12.70)	01-010X-0756
0.062 (1.57)	0.625 (15.88)	01-010X-0091
0.062 (1.57)	0.750 (19.05)	01-010X-1160
0.093 (2.36)	0.375 (9.53)	01-010X-0826
0.093 (2.36)	0.500 (12.70)	01-010X-0977
0.093 (2.36)	0.750 (19.05)	01-010X-0998
0.125 (3.18)	0.375 (12.70)	01-010X-0008
0.125 (3.18)	0.437 (11.10)	01-010X-0076
0.125 (3.18)	0.500 (12.70)	01-010X-0060
0.125 (3.18)	0.562 (14.27)	01-010X-1161
0.125 (3.18)	0.625 (15.88)	01-010X-0061
0.125 (3.18)	0.750 (19.05)	01-010X-0079
0.156 (3.96)	0.500 (12.70)	01-010X-1162
0.156 (3.96)	0.750 (19.05)	01-010X-1163
0.187 (4.75)	0.437 (11.10)	01-010X-0075
0.187 (4.75)	0.500 (12.70)	01-010X-0092
0.187 (4.75)	0.625 (15.88)	01-010X-0058
0.187 (4.75)	0.750 (19.05)	01-010X-0051
0.187 (4.75)	0.875 (22.23)	01-010X-1164
0.250 (6.35)	0.500 (12.70)	01-010X-1331
0.250 (6.35)	0.625 (15.88)	01-010X-0109
0.250 (6.35)	0.750 (19.05)	01-010X-0106
0.250 (6.35)	0.875 (22.23)	01-010X-0534
0.250 (6.35)	1.000 (25.40)	01-010X-1330
0.312 (7.92)	0.625 (15.88)	01-010X-0530
0.312 (7.92)	0.750 (19.05)	01-010X-0362
0.312 (7.92)	0.875 (22.23)	01-010X-0592
0.375 (9.53)	0.625 (15.88)	01-010X-0568
0.375 (9.53)	0.750 (19.05)	01-010X-1191
0.375 (9.53)	0.875 (22.23)	01-010X-0009
0.375 (9.53)	1.000 (25.40)	01-010X-0270
0.437 (11.10)	0.750 (19.05)	01-010X-1192
0.437 (11.10)	0.875 (22.23)	01-010X-0098
0.437 (11.10)	1.000 (25.40)	01-010X-0274
0.500 (12.70)	0.750 (19.05)	01-010X-0789
0.500 (12.70)	0.875 (22.23)	01-010X-1193
0.500 (12.70)	1.000 (25.40)	01-010X-1040

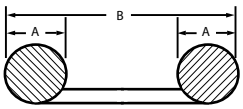

Table 7

DOUBLE ROUND with FIN inches (mm)		
A Diameter*	B Overall Dimension	Part Number
0.062 (1.57)	0.375 (9.53)	01-010X-6164
0.062 (1.57)	0.500 (12.70)	01-010X-0922
0.062 (1.57)	0.625 (15.88)	01-010X-0041
0.062 (1.57)	0.750 (19.05)	01-010X-1261
0.062 (1.57)	0.875 (22.23)	01-010X-1262
0.093 (2.36)	0.500 (12.70)	01-010X-6165
0.125 (3.18)	0.500 (12.70)	01-010X-0449
0.125 (3.18)	0.625 (15.88)	01-010X-0012
0.125 (3.18)	0.750 (19.05)	01-010X-0085
0.125 (3.18)	0.875 (22.23)	01-010X-0515
0.125 (3.18)	1.000 (25.40)	01-010X-0625
0.187 (4.75)	0.625 (15.88)	01-010X-0019
0.187 (4.75)	0.750 (19.05)	01-010X-0049
0.187 (4.75)	0.875 (22.23)	01-010X-0735
0.187 (4.75)	1.000 (25.40)	01-010X-0344
0.250 (6.35)	0.750 (19.05)	01-010X-0949
0.250 (6.35)	0.875 (22.23)	01-010X-1276
0.250 (6.35)	1.000 (25.40)	01-010X-0452
0.375 (9.53)	1.000 (25.40)	01-010X-1277
0.375 (9.53)	1.250 (31.75)	01-010X-1278

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