

	Fabric-Over-Foam and Conductive Foam	Wire Mesh	Tape
Applications	<ul style="list-style-type: none"> Shielding or grounding of computer and telecommunication equipment seams and apertures 	<ul style="list-style-type: none"> Covers opened infrequently for servicing (6-12 times per year) Long lasting resiliency is ideal for highly sensitive components in permanent or semi-permanent enclosures Consistent point-to-point contact for high shielding effectiveness over the life of the gasket 	<ul style="list-style-type: none"> Design flexibility provides grounding and shielding solutions for I/O shielding panels, disk drive insulators, ground planes or circuit boards, electromedical devices, keyboard devices Mask-and-peel tape for painted electronic enclosures Cable and wire harness wrapping
Features and Benefits Product Highlights	<ul style="list-style-type: none"> UL 94VO and HB flame retardant Ideal for applications requiring low pressure force Self-terminating cut-to lengths High conductivity and shielding attenuation Galvanically-compatible with most mating surfaces High abrasion and shear resistance 	<ul style="list-style-type: none"> Most economical gasket for low-cycling applications High shielding effectiveness over broad frequency range Available in wide variety of sizes and shapes Knit construction for long lasting resiliency Versatile mounting options Available with elastomer gasket for moisture and dust sealing 	<ul style="list-style-type: none"> Simple installation Ideally suited for thin or low-profile applications Conductive foil tape with release mask for painted enclosures Tin copper cloth and nickel copper cloth versions provide easy-to-handle alternatives to foils
Electrical Shielding Effectiveness Transfer Impedance (500 MHz)	>85 dB	90 - 105 dB	—
H-field (200 MHz) Modified Mil 285	30 - 45 dB	55 - 65 dB	—
Plane Wave (2 GHz) Modified Mil 285	90 - 100 dB	80 - 115 dB	85 - 95 dB
Surface Resistivity	<0.07 ohms/square	N/A	Low surface resistivity based on material selection
Volume Resistivity	N/A	0.0004 - 0.114 ohm-cm	N/A
Mechanical Available Size Range	Height: 0.015 - 0.945 (0,038 - 24,0)	Height: 0.062 - 0.500 (1,57 - 12,7)	Width: 0.025 - 2.00 (6,4 - 50,8) Thickness: 0.003 - 0.007 (0,08 - 0,18)
Deflection Operating Range	20 - 75% deflection	20 - 70% deflection	N/A
Compression Force (based on shape selection)	3 - 10 lbs/in. ft. (4,5 - 15,0 Kg/m) @ 20% deflection (dependent on foam selection and shape)	From 6 - 50 lbs/in. ft. (8,8 - 74 Kg/m) round	N/A
Compression Set	<4 - 20% @ 50% deflection	10% @ 20% compression	N/A
Joint Unevenness Accommodation	0.020 - 0.050 (0,51 - 1,27)	0.010 - 0.300 (0,25 - 7,6)	N/A
Compound/Material Availability	Cover: Flame retardant metallized Ni/Cu, Tin/Cu and silver woven or non-woven textile. Core: Flame retardant urethane, TPE	BeCu, Monel, aluminum, tin-plated steel, tin-plated brass, Enviroseal version with neoprene or silicone	Tin-plated copper, copper foil, nickel copper cloth tape
Temperature Range	-40 - 158°F (-40 - 70°C)	Enviroseal -103 - 500°F (-75 - 260°C)	50 - 500°F (10 - 260°C) based on material selection
Available Profiles	Round, rectangular, square "D", "C", "J", "P", "U", clip-on, knife edge	Round, rectangular, square, single-round with fin, double-round with fin	Rolls
Mounting Methods	Groove, PSA, clip-on, dart	Groove, pressure-sensitive adhesive, mechanical fasteners, channel mount	Pressure-sensitive adhesive, conductive or non-conductive
Custom Shapes Available	Cut-to lengths, mitered and spliced corners, kiss-cut, other profiles	Cut-to lengths, mitered corners, flat tape, and EMI washers	Die-cut shapes
Environmental Fluid Seal	N/A	Enviroseal product only: moisture, rain	N/A
Air/Dust	Provides barrier against dust	Enviroseal product only	N/A
Galvanic Compatibility	Compatible with a wide variety of mating surfaces—zinc, aluminum, stainless steel, etc.	Variety of platings to ensure galvanic compatibility with mating surface	Wide variety of materials available to meet galvanic compatibility requirements

FABRIC-OVER FOAM

METALLIZED SHIELDING GASKETS

Laird is a fully integrated manufacturer of profile and Input/Output (I/O) EMI shielding gaskets. The metallized Fabric-Over-Foam product line has been expanded greatly due to our committed efforts in new product development and meeting or surpassing regulatory requirements.

This catalog is designed to provide helpful information to engineers on our expanded product line. In this section, you will find benefits for Fabric-Over-Foam gaskets, material options and an extensive list of profile and I/O sizes and configurations.

Laird specializes in quick turnaround of custom shapes and sizes of EMI shielding gaskets. If you don't find exactly what you need, our engineers will help you design the right solution to your shielding problem.

A sampling for standard profiles are shown; custom configurations and sizes can be designed to meet your specific requirements. Profiles are shown in ascending order by height (starting on page 58).

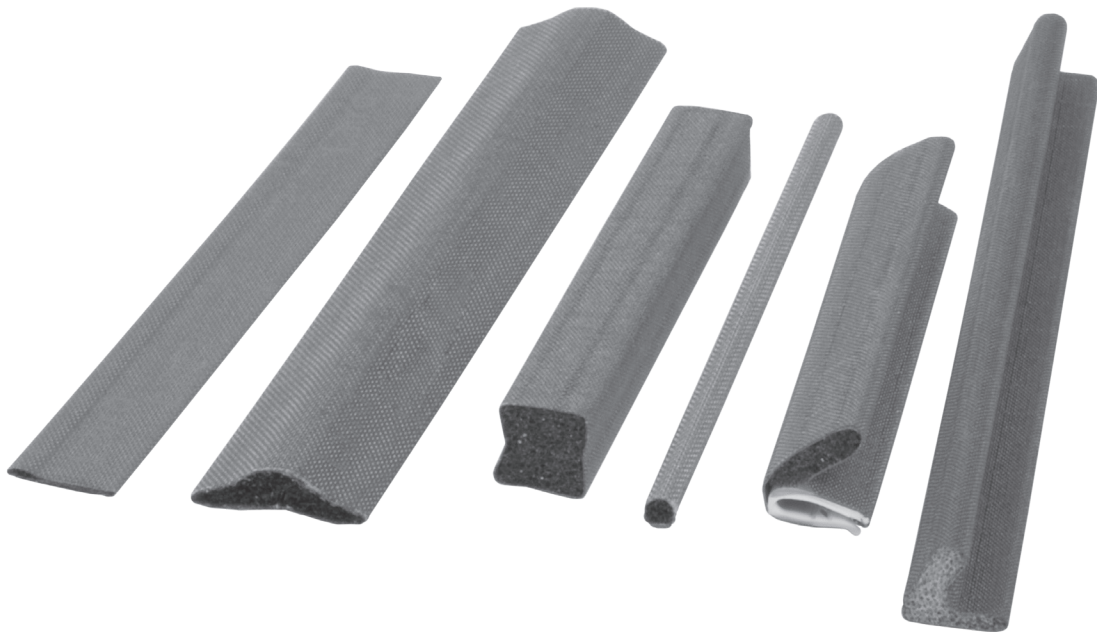
The recommended operating compression for Fabric-Over-Foam EMI Gaskets will vary depending on the shape and size of the particular gasket.

Typically, D-Shaped, Rectangular Shaped, and Square Shaped Fabric-Over-Foam EMI Gaskets should be compressed between 30% and 50% of the foam height.

Similarly, C-Shaped Fabric-Over-Foam EMI Gaskets should typically be compressed between 50% and 75% of the gasket height.

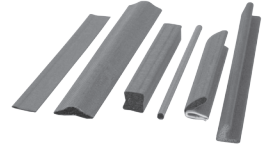
Force Displacement Resistance (FDR) graphs are available upon request. Please contact engineering department at Laird when unsure.

Certain combinations of materials may not be available for all Profiles or I/Os. Please consult the Engineering Department at Laird when unsure.



FABRIC-OVER FOAM

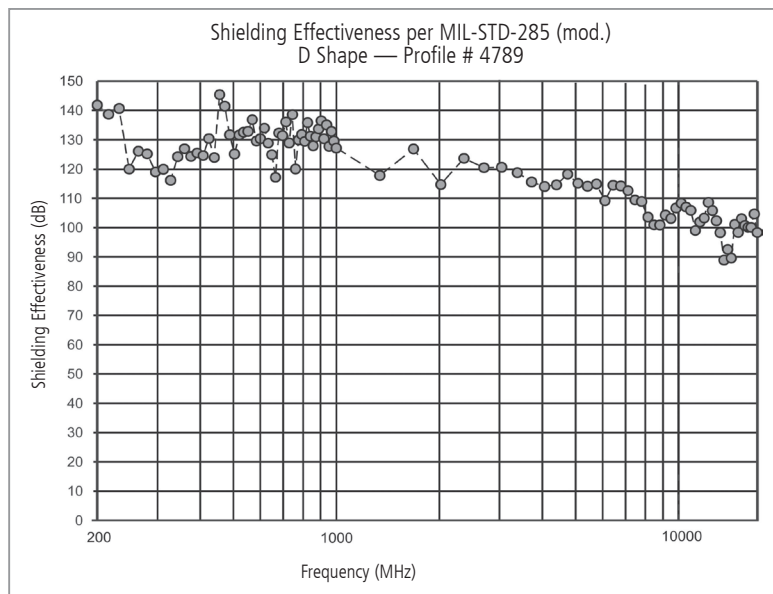
METALLIZED SHIELDING GASKETS

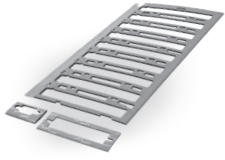


BENEFITS OF FABRIC-OVER-FOAM GASKETS

- Shielding effectiveness of >100 dB across a wide spectrum of frequencies (see figure 2).
- Extremely low compression forces allow for use of lighter materials (see figure 1).
- Low Surface Resistivity as low as 0.07 ohms/square dependent on the fabric. Fabric-Over-Foam gaskets provide improved conductivity (ASTM F390).
- A wide range of flame retardant gaskets are available (UL recognized per UL94 V0 or UL94 HB). More information is available at ul.com.
- Abrasion resistant metallized fabrics show virtually no degradation in shielding performance.
- Urethane core provide low compression set ensuring long-term reliability of gasket performance. Contact Engineering for profile specific data.
- Service temperatures from -40°F to 158°F (-40°C to 85°C).
- Available in Nickel/Copper (Ni/Cu) and Tin/Copper (Sn/Cu) to ensure galvanic compatibility with a wide variety of host materials. Both versions display no significant performance degradation after environmental exposure per the Accelerated Aging Test (ASTM B845-93 Method H).
- Prototype samples can be provided quickly utilizing laser technology, CAD/CAM equipment, and customer supplied drawings in DWG®, DXF®, IGS, PRT®, DRW®, STP®, and CT® file formats.
- Profile and I/O gaskets are available with a variety of pressure sensitive adhesive (PSA) tapes, including Easy Peel® with extra wide release liner to facilitate quick assembly.
- Profile gaskets can be cut to specified lengths, kiss-cut on release liner, or mitered to form frame configurations.
- UL94 V0 and Halogen-free gaskets to meet stringent environmental / safety requirements

FIGURE 2





ECOGREEN™

ENVIRONMENTALLY FRIENDLY FABRIC-OVER-FOAM SHIELDING GASKETS

Laird is pleased to introduce the next generation in RoHS-compliant EMI shielding technology.

While Laird Fabric-Over-Foam EMI gaskets are RoHS compliant, we are proactively strengthening our compliancy by engineering halogen-free EcoGreen™ shields.

Not only are the patented EcoGreen™ shields environmentally friendly, they offer high EMI shielding effectiveness, extremely low compression forces, abrasion-resistant metallized fabrics, large service temperature ranges, and multiple profile/gasket options.

Laird shields are flame retardant and pass the stringent UL94-V0 burn test and the whole gasket is Halogen-free.

ENVIRONMENT & SAFETY

- Halogen-free and RoHS compliant; per the IEC 61249-2-21 standard
- UL94 V0

PERFORMANCE AND BENEFITS

- Profiles and I/O gaskets are available with a pressure sensitive adhesive (PSA) tape
- Profiles can be cut to specified lengths, kiss-cut release liner or mitered to form frame configurations

HIGH SHIELDING EFFECTIVENESS

- Shielding effectiveness of > 100 dB
- Extremely low compression forces allow lighter weight materials, with less fastening and hinge hardware.
- Low surface resistivity as low as <0.07 ohms/square provides improved conductivity (ASTM F390)
- Service temperature range from - 40°F to 158°F (- 40°C to 70°C)

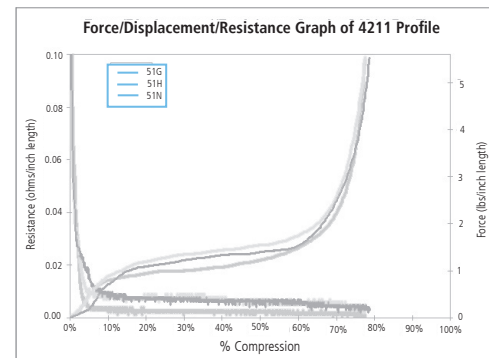
APPLICATIONS

- Computer servers
- Desktop computers
- Digital cameras
- Internal/external hard drives
- Liquid Crystal Displays (LCDs)
- Medical equipment
- Notebook computers
- Plasma Display Panels (PDPs)
- Printers
- Set-top boxes
- Telecommunications enclosure cabinets

AGENCY APPROVALS

- UL designation V0 041
- UL file #OCDT2.E170327
- More information is available at ul.com

FIGURE 1



Fabric

Fabric Type	Metal Coating	Conductivity	Application	Benefits
Ripstop	Ni/Cu	<0.07 ohms/square	I/O or Profile Gaskets	Flame retardant, high abrasion resistance
Taffeta	Ni/Cu	<0.07 ohms/square	I/O or Profile Gaskets	Flame retardant, abrasion resistant
Knit Mesh	Ni/Cu	<0.10 ohms/square	I/O or Profile Gaskets	Low cost, flame retardant
Black Taffeta	Ni/Cu	<0.07 ohms/square	I/O or Profile Gaskets	Black UL94V0, similar properties to Taffeta fabric
High Performance Taffeta	Ni/Cu	<0.05 ohms/square	I/O or Profile Gaskets	EMI tape, highest shielding effectiveness

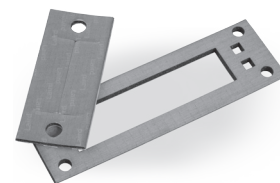
Foam

Foam Type	Compression Set (ASTM D 3574)	Color	Application	Benefits
Urethane (Polyester)	5-10%	Charcoal	I/O or Profile Gaskets	Simple, moderate shapes, low compression force/compression set, flame retardant

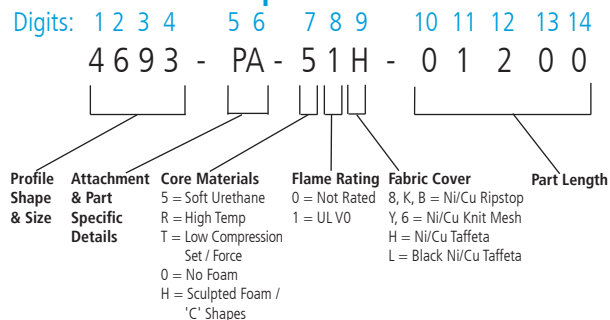
Pressure Sensitive Adhesive

Pressure Sensitive Adhesive	Thickness	Benefits
Acrylic Non-conductive	0.005"	High Peel Strength, Temperature Resistant
Acrylic Conductive	0.004"	Electrically Conductive in Z-Axis Direction

FABRIC-OVER-FOAM I/O GASKET SELECTION GUIDE



Part Number Example:



* Certain combinations of materials may not be available for all Profiles or I/Os.
Please consult the Engineering Department at Laird when unsure.

See back cover for contact information.

DIGITS 1 THROUGH 4

Designate profile number. Select profile or I/O and sizes from pages 58-61 (Profile) or 62-64 (I/O).

DIGITS 5 THROUGH 6

Designate part-specific attributes of the product including cutouts, notches, tape and a variety of other customized details. PA STD PSA / PB STD PSA W/ ERL / PC STD CPSA

DIGITS 7 THROUGH 9

Designate the core materials, flame rating and fabric cover combinations. Select these options from the recommended list in the table below.

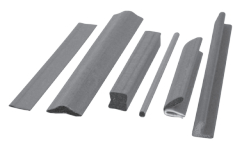
DIGITS 10 THROUGH 14

Designate the part length in inches to two decimal places. For the example shown above, the "01200" denotes a 12.00 inch (304,8 mm) long gasket.

Fabric	Non-Rated RoHS Compliant	UL94-V0 Rated RoHS Compliant	UL94-V0 Rated RoHS Compliant Halogen-Free EcoGreen™	Typical Apps	Shielding
Ni/Cu Mesh	506		51N	Compos Only	Medium
Ni/Cu Taffeta	501		51H	Comp/Shear	High
Ni/Cu NRS	50B		51G	Comp/Shear	High
Ni/Cu NRS		H1K		C-Fold Only	High
Sn/Cu NRS			51S	Comp/Shear Harsh Environment	High
Ni/Cu NRS			T1G	Low Compression Set / Force	High
Ni/Cu NRS			R1G	85°C Applications	High
Ni/Cu Black Taffeta			51L	Visible Applications	High

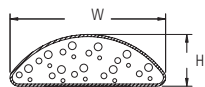


All parts listed in this catalog are lead free and RoHS compliant.



FABRIC-OVER-FOAM PROFILE SELECTION GUIDE

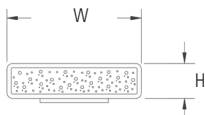
D-SHAPED



Profile Number	inches (mm) H	inches (mm) W
4584	0.040 (1,0)	0.150 (3,8)
4320	0.050 (1,3)	0.140 (3,6)
4541	0.050 (1,3)	0.250 (6,4)
4358	0.060 (1,5)	0.098 (2,5)
4184	0.060 (1,5)	0.150 (3,8)
4548	0.060 (1,5)	0.250 (6,4)
4356	0.070 (1,8)	0.180 (4,6)
4052	0.080 (2,0)	0.080 (2,0)
4283	0.080 (2,0)	0.157 (4,0)
4181	0.080 (2,0)	0.394 (10,0)
4053	0.090 (2,3)	0.090 (2,3)
4912	0.090 (2,3)	0.150 (3,8)
4375	0.094 (2,4)	0.200 (5,1)
4240	0.100 (2,5)	0.300 (7,6)
4742	0.120 (3,0)	0.150 (3,8)
4202	0.120 (3,0)	0.250 (6,4)
4078	0.120 (3,0)	0.360 (9,1)
4090	0.125 (3,2)	0.090 (2,3)

Profile Number	H inches (mm) H	W inches (mm) W
4906	0.130 (3,3)	0.188 (4,8)
4692	0.140 (3,6)	0.250 (6,4)
4228	0.150 (3,8)	0.150 (3,8)
4123	0.150 (3,8)	0.354 (9,0)
4112	0.158 (4,0)	0.433 (11,0)
4120	0.160 (4,1)	0.240 (6,1)
4295	0.170 (4,3)	0.250 (6,4)
4609	0.180 (4,6)	0.400 (10,2)
4787	0.200 (5,1)	0.250 (6,4)
4134	0.197 (5,0)	0.394 (10,0)
4607	0.200 (5,1)	0.480 (12,2)
4242	0.250 (6,4)	0.250 (6,4)
4542	0.248 (6,3)	0.291 (7,4)
4789	0.250 (6,4)	0.375 (9,5)
4368	0.299 (7,6)	0.272 (6,9)
4105	0.375 (9,5)	0.500 (12,7)
4060	0.500 (12,7)	0.500 (12,7)

RECTANGLE SHAPED



Profile Number	inches (mm) H	inches (mm) W
*4570	0.015 (0,4)	0.200 (5,1)
*4577	0.015 (0,4)	0.276 (7,0)
*4572	0.015 (0,4)	0.394 (10,0)
*4300	0.017 (0,4)	0.826 (21,0)
*4058	0.020 (0,5)	0.157 (4,0)
*4569	0.020 (0,5)	0.196 (5,0)
*4500	0.020 (0,5)	1.217 (30,9)
*4501	0.020 (0,5)	1.970 (50,0)
*4850	0.030 (0,8)	0.900 (22,9)
4245	0.040 (1,0)	0.120 (3,0)
4223	0.040 (1,0)	0.157 (4,0)
4220	0.040 (1,0)	0.200 (5,1)
4404	0.040 (1,0)	0.236 (6,0)
4215	0.040 (1,0)	0.275 (7,0)
4208	0.040 (1,0)	0.395 (10,0)
4219	0.040 (1,0)	0.510 (13,0)
4259	0.040 (1,0)	0.600 (15,2)
4677	0.040 (1,0)	0.709 (18,0)
4532	0.040 (1,0)	0.750 (19,1)
4597	0.040 (1,0)	0.900 (22,9)
4297	0.040 (1,0)	1.000 (25,4)
4363	0.040 (1,0)	1.126 (28,6)
4179	0.040 (1,0)	1.431 (36,3)
4512	0.040 (1,0)	1.640 (41,7)
4270	0.040 (1,0)	1.770 (45,0)
4573	0.040 (1,0)	1.840 (46,7)
4394	0.040 (1,0)	3.300 (83,8)
4246	0.050 (1,3)	0.090 (2,3)
4088	0.050 (1,3)	0.220 (5,6)
4086	0.060 (1,5)	0.850 (21,6)
4273	0.060 (1,5)	0.125 (3,2)
4056	0.060 (1,5)	0.200 (5,1)
4157	0.060 (1,5)	0.280 (7,1)
4629	0.060 (1,5)	0.394 (10,0)
4051	0.060 (1,5)	0.500 (12,7)
4455	0.060 (1,5)	0.551 (14,0)
4430	0.060 (1,5)	0.591 (15,0)
4626	0.060 (1,5)	0.608 (15,4)
4606	0.060 (1,5)	0.620 (15,7)
4579	0.060 (1,5)	0.650 (16,5)
4164	0.060 (1,5)	0.750 (19,1)

Profile Number	inches (mm) H	inches (mm) W
4170	0.060 (1,5)	0.866 (22,0)
4225	0.060 (1,5)	0.900 (22,9)
4080	0.060 (1,5)	1.000 (25,4)
4599	0.060 (1,5)	1.063 (27,0)
4518	0.060 (1,5)	1.235 (31,4)
4079	0.060 (1,5)	1.330 (33,8)
4161	0.060 (1,5)	1.370 (34,8)
4163	0.060 (1,5)	1.400 (35,6)
4591	0.060 (1,5)	1.455 (37,0)
4091	0.060 (1,5)	1.525 (38,7)
4628	0.060 (1,5)	1.575 (40,0)
4231	0.060 (1,5)	1.615 (41,0)
4679	0.060 (1,5)	1.693 (43,0)
4408	0.060 (1,5)	1.740 (44,2)
4148	0.060 (1,5)	1.878 (47,7)
4169	0.060 (1,5)	1.900 (48,3)
4160	0.060 (1,5)	2.305 (58,5)
4235	0.060 (1,5)	2.52 (64,0)
4596	0.060 (1,5)	3.091 (78,5)
4907	0.060 (1,5)	3.780 (96,0)
4071	0.062 (1,6)	0.300 (7,6)
4171	0.062 (1,6)	0.870 (22,1)
4143	0.062 (1,6)	2.000 (50,8)
4268	0.070 (1,8)	0.160 (4,1)
4302	0.070 (1,8)	0.551 (14,0)
4199	0.070 (1,8)	0.650 (16,5)
4410	0.070 (1,8)	1.063 (27,0)
4688	0.079 (2,0)	0.118 (3,0)
4392	0.079 (2,0)	0.354 (9,0)
4094	0.080 (2,0)	0.160 (4,1)
4186	0.080 (2,0)	0.200 (5,1)
4602	0.080 (2,0)	0.236 (6,0)
4096	0.080 (2,0)	0.275 (7,0)
4650	0.080 (2,0)	0.295 (7,5)
4601	0.080 (2,0)	0.315 (8,0)
4357	0.080 (2,0)	0.394 (10,0)
4182	0.080 (2,0)	0.400 (10,2)
4675	0.080 (2,0)	0.535 (13,6)
4359	0.080 (2,0)	0.710 (18,0)
4571	0.080 (2,0)	0.787 (20,0)
4200	0.080 (2,0)	0.827 (21,0)

All dimensions shown are in inches (millimeters) unless otherwise specified.

* Gaskets less than 0.040" thick are constructed without foam.