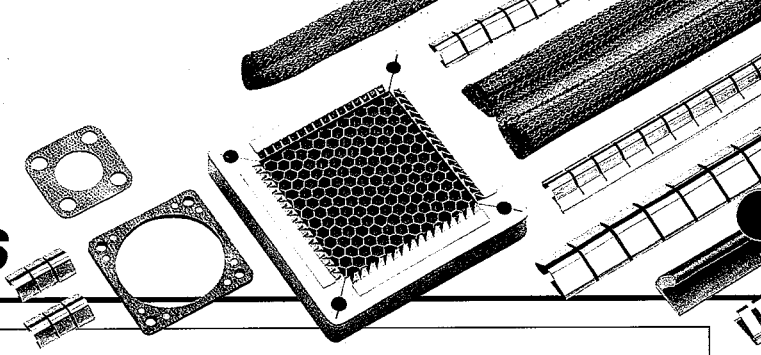
EMI/RFI Shielding Products



Tech-Etch is a global supplier of EMI/RFI shielding products for the commercial and military markets. A leader in the shielding field for over 40 years, Tech-Etch designs and manufactures both standard catalog and customized shielding products. Our complete line of shielding includes all sizes, shapes, compositions, mounting options and seal types. Products include BeCu shielding strips, conductive elastomers, wire mesh, filters, honeycomb vents, board level, and metalized fabric shielding.

Tech-Etch is dedicated to continued improvement and committed to remaining a leader in the shielding industry. Tech-Etch has continually introduced new products to maintain our leadership role. Product innovations have included No-snag fingers, Hook-on fingers, Snap-on fingers and more recently DiamondBack shielding. Tech-Etch operates a Quality System that has been registered to **ISO 9001:2000**.

Tech-Etch performs a wide variety of services, and this single-source capability enables us to assume total responsibility for the quality and delivery of our precision products. In-plant services include photoetching, stamping from coil stock and forming from etched blanks, tool and die making, production heat treating, flexible circuit design and production, welding and soldering, metal finishing, plating, and laser cutting. Secondary operations such as soldering joints to seal seams, spot welding, and the application of pressure sensitive tapes and insulation materials are also available.

Tech-Etch supplies many custom designed shielding components for special applications from high volume requirements using progressive dies, to prototype and small quantities utilizing photoetch fabrication. Photoetching economically manufactures custom board level shielding.

Shielding Compatibility

Electromagnetic Compatibility

EMI/RFI Shielding Products are designed to either keep out or keep in electromagnetic interference. Shielding reflects and absorbs incident radiation. The higher the attenuation of the shielding, the more effective it is at keeping in or out the undesired electromagnetic interference.

Electrochemical Compatibility

To avoid galvanic action between contacting metals refer to this chart. Materials in adjacent groups may be safely used together. Choosing materials from within a single group in the table will provide the least corrosion due to galvanic action when the materials are in contact for an extended period of time with appropriate protective finish.

Grouping of Metals by Decreasing Galvanic Activity

Group 1	Group 2	Group 3	Group 4
Magnesium	Aluminum	Cadmium Plating	Brass
Magnesium Alloys	Aluminum Alloys	Carbon Steel	Stainless Steel
Aluminum	Zinc & Zinc Plating	Iron	Beryllium Copper
Aluminum Alloys	Chromium Plating	Nickel & Nickel Plating	Copper
Zinc & Zinc Plating	Cadmium Plating	Tin & Tin Plating	Copper Alloys
Chromium Plating	Carbon Steel	Tin/Lead Solder	Nickel/Copper Alloys
	Iron	Brass	Monel
	Nickel & Nickel Plating	Stainless Steel	Silver
	Tin & Tin Plating	Beryllium Copper	
	Tin/Lead Solder	Copper & Copper Alloys	
		Nickel/Copper Alloys	
		Monel	

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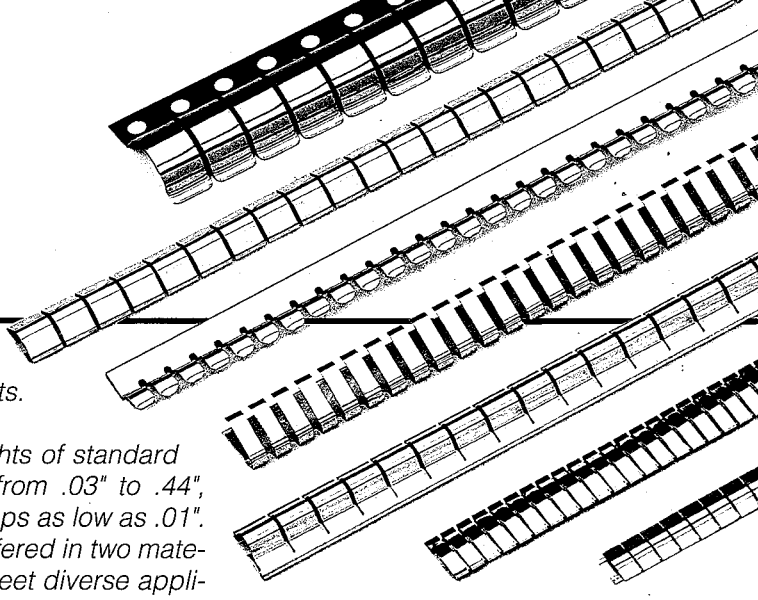
Shielding Strips



Tech-Etch offers the most complete line of standard BeCu shielding strips in the industry. Shielding strips are designed for a wide variety of application requirements. They are available in strips ranging from 16 to 24 inches in length, in continuous coils up to 35 feet long, as single fingers, or cut to requested full-finger lengths. Consult our engineering department for special modifications to suit your requirements.

Uncompressed heights of standard finger stock range from .03" to .44", which will occupy gaps as low as .01". Many gaskets are offered in two material thicknesses to meet diverse application compression requirements: "Standard" and "TF", which requires less force to compress the gasket to its operating range.

Beryllium Copper

Beryllium Copper (BeCu) is a high performance metal which can be fabricated into a wide variety of components. Its mechanical and electrical properties make it the ideal material for EMI/RFI shielding products.

Beryllium copper's electrical properties provide shielding effectiveness over an extremely broad frequency range. At the same time, its mechanical properties yield a high deflection range, in addition to a long life without compression set. BeCu finger stock provides maximum spring properties for strength and fatigue resistance, plus excellent conductivity. Available in many plating options, BeCu has a high cycle time and conforms to large gap variations making it the best material for attenuation.

DiamondBack

DiamondBack shielding with a textured contact surface increases attenuation at 2.5 GHz and above. Nonabrasive DiamondBack texturing can be applied to most of the standard profiles to achieve up to a 20 dB attenuation improvement at high frequencies without raising the compression force. It has hundreds of raised dimples providing a smooth texture that enhances the conductivity between the gasket and mating surface. DiamondBack is available on numerous mounting and finish options, and offers superior longevity over plated fabrics.

Stainless Steel

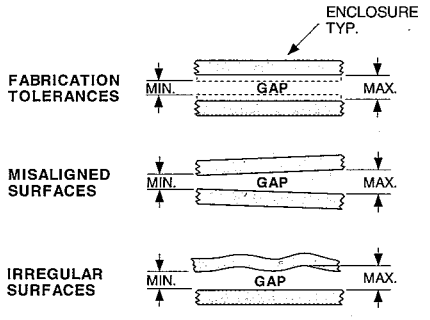
Stainless steel is an economical alternative to beryllium copper for shielding applications where high attenuation is not required. It does not have the electrical conductivity of BeCu and is stiffer. Mechanical considerations generally limit the use of stainless steel to low profile strips and twisted contacts. Items are identified by (SS) in the notes.

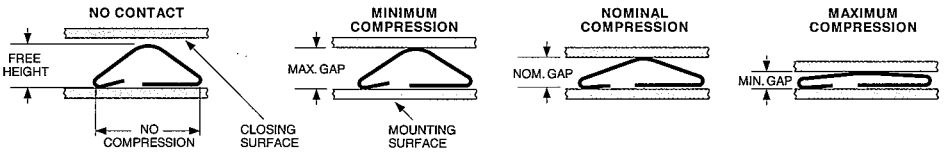
Attenuation

For maximum attenuation of a gasketed gap, the contact resistance of the mounting joint and closing joint must be very low and remain so throughout the life of the product. While a gasket may have the potential for very high attenuation under ideal conditions, over time oxidation, corrosion and dirt at the mounting and closing joints may reduce effectiveness. Factors influencing contact resistance over the life of the product are pressure (closing force), plating, and wiping action. Our engineers can help you determine the optimal specifications to ensure sustained attenuation.

Compression

The purpose of shielding is to occupy and thereby shield the gap that exists between two adjoining surfaces. In order to be effective, shielding gaskets must be able to occupy both the maximum and minimum gaps, which exist due to fabrication tolerances, misalignment of surfaces, or irregular surfaces. Proper compression management is essential to ensure effective EMI shielding. Tech-Etch will be pleased to assist you in specifying the most effective gasket for your requirements.





Materials

Beryllium Copper (BeCu) ASTM B194 Material Specifications

Chemical Composition

Beryllium	1.80-2.00%
Cobalt plus nickel	0.20% Min.
Cobalt + nickel + iron	0.6% Max.
Copper	Balance

Physical Properties (heat treated)

Electrical conductivity (% IACS)	22-25
Modulus of elasticity (psi)	18.5×10^6

Mechanical Properties (heat treated)

Temper (1,000 psi)	¼ HT	½ HT
Tensile strength	175 Min.	185 Min.
Yield strength .2% offset	150 Min.	160 Min.

Stainless Steel Material Specifications

Type 301 Stainless steel possesses good heat and corrosion resistance.

AISI 301 Analysis

C: .15 Max.
Mn: 2.00 Max.
Si: .750 Max.
P: .040 Max.
S: .030 Max.
Cr: 16.00/18.00
Ni: 6.00/8.00

Shielding Strips Installation Options

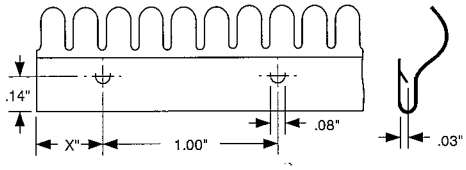
Shielding strips are designed for a wide variety of application requirements, and can be supplied cut to length or full size in any of the following mounting configurations. Consult our engineering department for special modifications to suit your requirements.

If you know the Shielding Strip Part Number you are looking for, see the directory on page 7.

● Clip-on Mounting

Clip-on Mounting provides a reliable mechanical installation when there is an accessible mounting flange. Various flange thicknesses can be accommodated, and lances can be added to enhance the holding force to the flange.

D LANCE



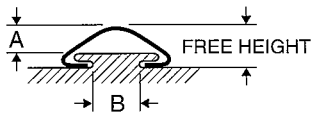
X CENTERED EQUIDISTANT FROM BOTH ENDS
X = LESS THAN .50" FOR MAXIMUM NUMBER OF LANCES
.10" ≤ X < .60"

Certain Clip-on strips have lance locations other than shown above. These dimensions are specified on the product drawings in the Clip-on section.

● Extrusion Mounting

Tech-Etch "S" Series symmetrical shielding strips can be installed on extrusions specially designed to provide a useful free height. A durable shielding solution for applications requiring bi-directional motion. The drawing below illustrates guidelines for designing the extrusion.

Dimension "A" less allowance for initial contact is the compression range. Dimension "B" should be approximately .020" less than the open dimension of the shielding strip.

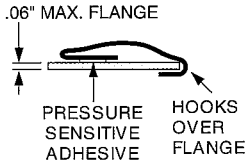


● Stick-on Mounting

Pressure Sensitive Mounting provides double-sided pressure sensitive transfer tape for a fast, reliable installation. 3M F9469PC transfer tape or equivalent may be used at ambient temperatures from -67°F to 300°F. Apply only on a clean, oil-free surface, and allow a 24-hour cure time. Consult the factory for other adhesives and extended liner options.

STICK-ON GASKET

HOOK & STICK-ON GASKET



Hook and stick fingers are ideal for flange mounting applications requiring low compression forces and small gap shielding.

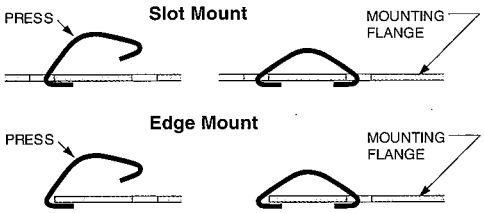
Non-conductive .010" thick adhesive may be specified for improved adhesion on rough surfaces. Conductive adhesives and extended liners are also available. Consult the factory for these options.

● Special Mounting

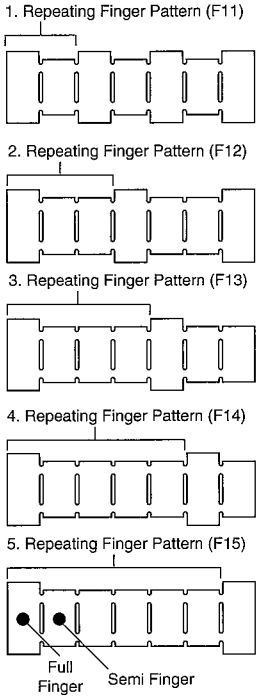
Special Mounting shielding strips can be installed by spot welding or soldering. Rivets can be used for the 375A and 500A profiles and conductive pressure sensitive adhesives are available. Consult the factory.

● Snap-on Mounting

Slot and Edge Mount Symmetrical fingers using single or double fingers are very economical for applications such as sliding drawers, doors, rack-mounted assemblies and covers. They perform well in bi-directional applications and the snap-on capability makes them easy to install.



When continuous shielding is required the V Series or VE Series utilizing the same snap on mounting feature can be used. The figure below illustrates available repeating finger patterns for the V and VE Series.



Consult factory for the availability of other patterns.

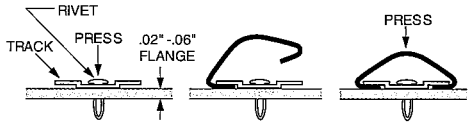
Track Installation Options & Accessories

● Track / Extrusion Mounting

Track or extrusion mounted symmetrical fingers provide a durable shielding solution for applications requiring bi-directional motion, such as drawers and plug-in modules.

TR Series Track is typically installed with plastic rivets, but is also available with pressure sensitive tape for adhesive mounting. The track can be installed prior to the assembly of the finger strips to avoid damaging the fingers. See below. Photos at right illustrate several methods of retention, including "T" Retaining Caps. Retention stops can also be incorporated in the sheet metal.

EASY 1-2-3 TRACK MOUNTING



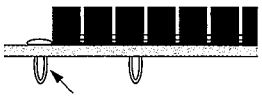
STEP 1 PRESS PLASTIC RIVET INTO FLANGE.

STEP 2 HOOK ONE LEG OF FINGER STOCK UNDER TRACK.

STEP 3 PRESS FINGER STOCK DOWN TO "SNAP-ON" TO TRACK.

Plastic Rivets

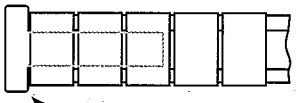
Plastic rivets can be used to install Track and as rivet stops to retain shielding on a track as shown below and in the photo on the right. When used on a flange, the hole diameter for the rivet should be .125". Two rivets are available: PR45 and PR60 (See Track Accessories below.).



PLASTIC RIVET RETAINER POSITIONS SHIELDING ON TRACK

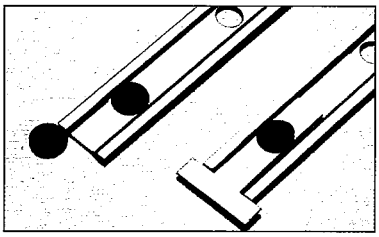
"T" Retaining Caps

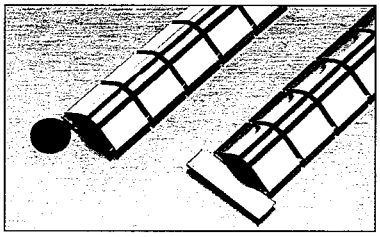
"T" Retaining Caps (See Track Accessories below) can also be used to hold shielding on the Track as illustrated here.



"T" RETAINING CAP POSITIONS SHIELDING ON TRACK

Track the in top photo shows two shielding retainer options: Plastic Rivet Stop on the left and "T" Retainer on the right. Bottom photo shows the same track with shielding snapped into place.





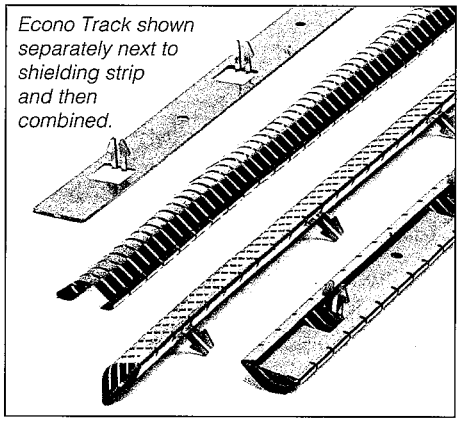
Omni Track

Omni Track is designed to provide a track type mounting for single finger applications. It is typically supplied with pressure sensitive tape for adhesive mounting. Holes are available for rivet mounting.

PRESSURE SENSITIVE ADHESIVE OR RIVET MOUNT

Econo Track

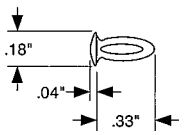
Econo Track has self-fastening clips and optional retention to provide the most economical method of mounting Symmetrical Fingers. Installation requires the fingers to be slid on from either end. Track and strip are then pressed into .12" diameter flange mounting holes. Flange thickness varies from .02" to .07".



Track Accessories

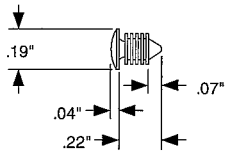
PR45 PLASTIC RIVET

Used on Snap-on Track and OMNI Mounting Pads.
Panel Hole Dia. .123" - .127"
Panel Thickness .02" - .06"
Order PR45 Rivets, if required for your application.



PR60 PLASTIC RIVET

Used on Snap-on Track and OMNI Mounting Pads.
Panel Hole Dia. .118" - .125"
Panel Thickness .045" - .075"
Order PR60 Rivets, if required for your application.



TCXX "T" RETAINING CAPS

"T" Retaining Caps are used at the ends of Mounting Track to hold finger stock in place.
Material: Brass.
Finish: Bright.

"T" CAP	"A"	"B"
TC37	.45"	.16"
TC60	.70"	.26"
TC80	1.00"	.35"