



# EMI Shielding Tapes

## A wide variety of tapes for EMI shielding and grounding

- Copper, aluminum, and tin-plated copper foil backings
- Conformable copper-plated fabric backing
- Smooth and embossed foil surfaces
- Conductive and nonconductive acrylic adhesives
- Liners on all tapes for diecutting and handling ease

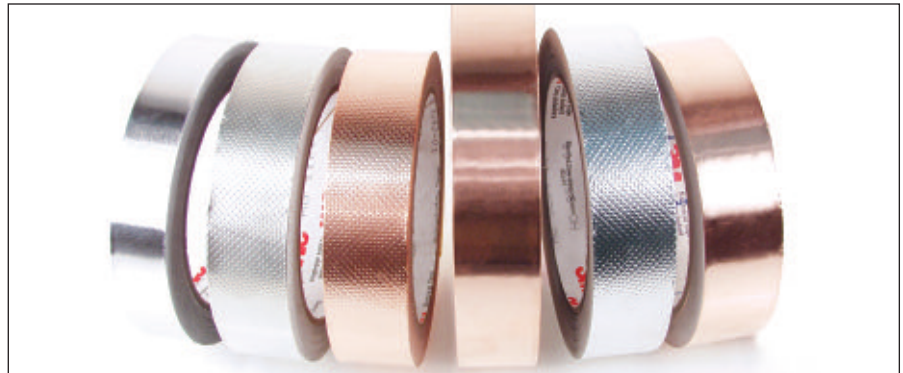
## Long-term proven durability and reliability

3M has been providing adhesive-backed foil tapes for EMI (electromagnetic interference) shielding and grounding applications for over forty years. Test results and actual in-use experience have proven the stability and effectiveness of the backings and adhesives over long periods of time.

3M was the first to introduce shielding tape with conductive adhesive, first with embossed foil backing for "through the adhesive" conductivity, and first with tin-plated copper backing for improved shielding, solderability, and corrosion resistance.

## Excellent shielding effectiveness

Consistent manufacturing processes ensure that all of the 3M<sup>®</sup> EMI Shielding Tapes exhibit the low contact resistance necessary to achieve the level of shielding effectiveness shown on the graph below.



## Customer Service

In addition to the high standard of quality that goes into each roll of shielding tape, 3M customers receive other important value-added benefits. Customer Service, Technical Service, and Manufacturing resources are dedicated to maintaining the highest level of service, quality, and delivery. 3M also offers the unique advantage of global product support and availability through a worldwide network of subsidiaries and distributors.

In addition to handling your order entry needs, our Customer Service Department can put you in contact with your local 3M sales representative, identify the distributor offices in your area, or connect you with our Technical Service personnel.

3M sales representatives are always ready to assist your engineering, product development, and purchasing personnel with answers to technical questions and guidance in the selection of the ideal shielding tape for each application.

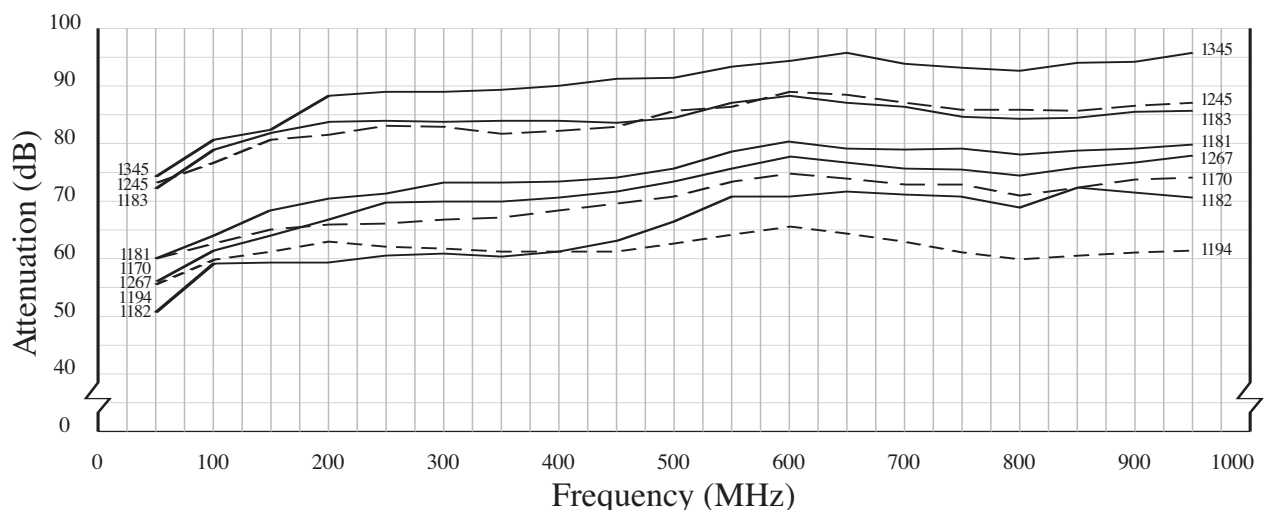
Our sales force is supported by an extensive nationwide network of distributors who can provide prompt and efficient service and delivery in response to all of your shielding tape requirements. Many of our distributors also offer diecutting and fabricating services.

## Your "How To" Resource

The advantage you get with 3M shielding tapes is not only superior product, but also a reliable source of technical solutions. Whether you need assistance to select a shielding tape to meet a specific production requirement or to increase productivity or product performance, our technical expertise is always available.

For any inquiries or requests regarding 3M EMI Shielding Tapes, please contact **Customer Service** by phone at **800-328-1368** or by FAX at **800-828-9329**. (From the Maquiladoras, call 512 -984-2666.)

## Shielding Effectiveness (Far Field) - Typical Values (ASTM-D-4935)



## Tape Construction

### Smooth foil backings with conductive adhesive

3M™ EMI Shielding Tapes **1170** (aluminum), **1181** (copper) and **1183** (tin-plated copper) are smooth-backed foil tapes that establish secure electrical contact with the application surface by means of a unique adhesive. Well distributed conductive particles in the adhesive provide a multitude of low-resistance paths between the backing and the substrate. (Figure 1)

### Embossed foil backings

The backings of Shielding Tapes **1245** (copper), **1267** (aluminum) and **1345** (tin-plated copper) are impressed with an embossed pattern (Figure 2) that protrudes through the acrylic adhesive to make direct electrical contact with the application surface. This reliable “through-the-adhesive” conductivity system provides stable contact resistance and a high level of shielding effectiveness.

### Tin-plated foil backings

The copper used in 3M EMI Shielding Tapes **1183** (smooth backing) and **1345** (embossed backing) is plated on both sides with tin to provide exceptional solderability and resistance to corrosion and oxidation. In addition, the tapes remain conductive after oxidation.

### Conductive adhesive on both sides

3M Shielding Tape **1182** is a copper foil tape coated on both sides with conductive acrylic adhesive. This unique construction offers an excellent method of grounding and bonding conductive surfaces. It also exhibits low thermal resistance. Tape 1182 is supplied with a removable liner on each side for ease of handling.

Figure 1:

### Smooth Backing with Conductive Adhesive

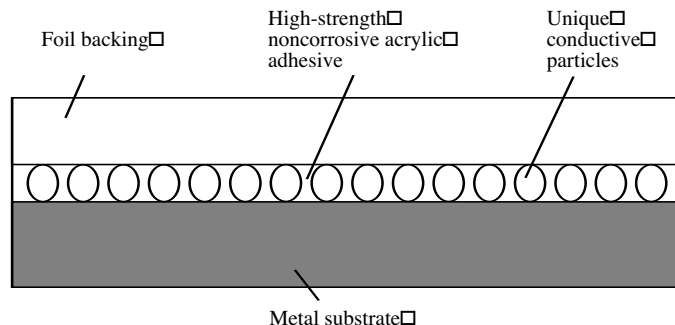
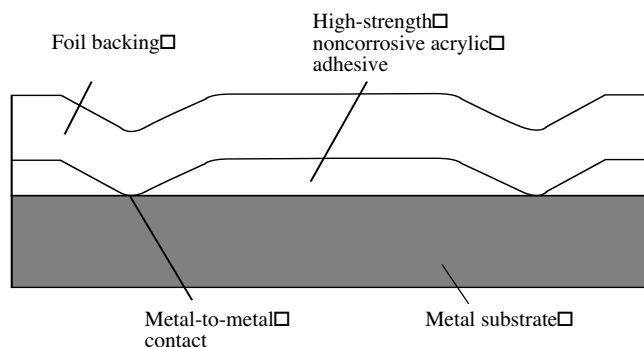


Figure 2:

### Embossed Backing with “Through-the-Adhesive” Contact



### Smooth foil backing with nonconductive adhesive

3M Shielding Tape **1194** is a smooth-backed copper tape that features the same high quality solvent-resistant, acrylic adhesive as other 3M foil tapes. Good solderability makes it an economical choice for applications like connector and cable shielding, grounding, electrostatic shielding between transformer windings, outer wrap for

coils, and attachment of connector tabs on rolled film-and-foil capacitors.

### Adhesive

Both the conductive and nonconductive versions use the same acid-free, corrosion-resistant acrylic resin.

**Ask your 3M Sales Representative about 3M Electromagnetic Compatible Products.**

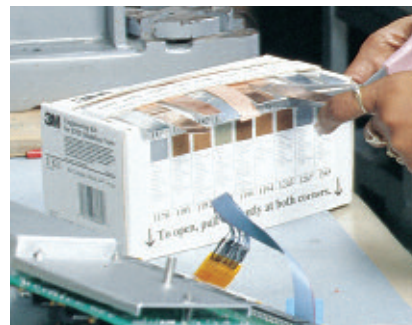
## Engineering Kit for EMI Shielding Tapes

3M EMI Shielding Tapes have a multitude of uses in electronic design and test laboratories.

The 3M Engineering Kit offers ready access to the full line of 3M shielding tapes. Priced to enable companies to provide a kit for each of their engineers, the kit makes specifying, prototyping, troubleshooting, testing and repairing faster and easier. The compact

dispenser box (4 in. x 4 in. x 8.3 in.) serves as a desktop reference for the tapes. The box panels provide basic technical information about each tape, including product number, backing and adhesive type and thickness, adhesion, resistance, and shielding effectiveness.









The kit is available through 3M Electrical Markets Division foil tape distributors, or it can be ordered in any quantity directly from 3M by calling Customer Service (see page 1).





## Technical Information

Note: Values shown are typical and are not recommended for specification purposes. Product specifications will be provided upon request.







### Smooth Backing, Conductive Adhesive

Tape		Product Description	Roll Length <sup>3</sup>	Backing Thickness	Total Thickness	Breaking Strength <sup>4</sup>	Adhesion to Steel <sup>4</sup>	Flame Retardant <sup>5</sup>	Electrical Resistance <sup>6</sup>
1170		Aluminum foil, conductive adhesive <sup>1</sup>	18 yds	2.0 mil (0,05mm)	3.2 mil (0,08mm)	20 lb/in (35 N/10mm)	35 oz/in (3,8 N/10mm)		0.010 ohm
1181		Copper foil, conductive adhesive <sup>1</sup>	18 yds	1.4 mil (0,04mm)	2.6 mil (0,07mm)	25 lb/in (44 N/10mm)	35 oz/in (3,8 N/10mm)		0.005 ohm
1182		Copper foil, conductive adhesive <sup>1</sup> on both sides	18 yds	1.4 mil (0,04mm)	3.5 mil (0,09mm)	25 lb/in (44 N/10mm)	35 oz/in (3,8 N/10mm)		0.010 ohm
1183		Tin-plated copper foil, conductive adhesive <sup>1</sup>	18 yds	1.4 mil (0,04mm)	2.6 mil (0,07mm)	25 lb/in (44 N/10mm)	35 oz/in (3,8 N/10mm)		0.005 ohm

### Smooth Backing, Nonconductive Adhesive

1194		Copper foil, nonconductive adhesive	36 yds	1.4 mil (0,04mm)	3.0 mil (0,08mm)	25 lb/in (44 N/10mm)	40 oz/in (4,4 N/10mm)		N/A
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### Embossed Backing, Conductive-through-Adhesive

1245		Embossed copper foil, conductive-through-adhesive <sup>2</sup>	18 yds	1.4 mil (0,04mm)	4.0 mil (0,10mm)	25 lb/in (44 N/10mm)	35 oz/in (3,8 N/10mm)		0.001 ohm
1267		Embossed aluminum foil, conductive-through-adhesive <sup>2</sup>	18 yds	2.0 mil (0,05mm)	5.0 mil (0,13mm)	20 lb/in (35 N/10mm)	35 oz/in (3,8 N/10mm)		0.005 ohm
1345		Embossed tin-plated copper foil, conductive-through-adhesive <sup>2</sup>	18 yds	1.4 mil (0,04mm)	4.0 mil (0,10mm)	25 lb/in (44 N/10mm)	35 oz/in (3,8 N/10mm)		0.001 ohm


<sup>1</sup> Conductive particles in the adhesive provide the electrically conductive path between the substrate and the backing. (Figure 1, page 2)

<sup>2</sup> The embossed pattern provides the electrically conductive path through the adhesive. (Figure 2, page 2)

<sup>3</sup> Multiple-length rolls and custom slit widths up to 23" (58.4cm) are available by special order.

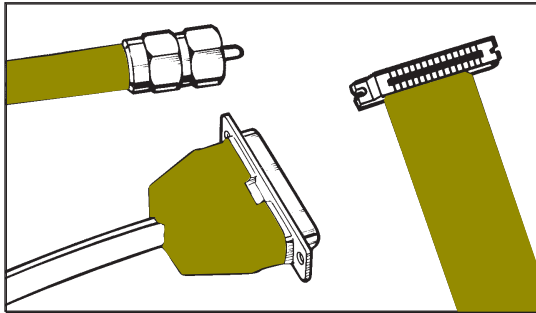
#### Test methods:

<sup>4</sup> ASTM D 1000

<sup>5</sup> All 3M foil shielding tapes are UL Recognized () for flame retardancy per UL 510, Product Category OANZ 2, File E17385.

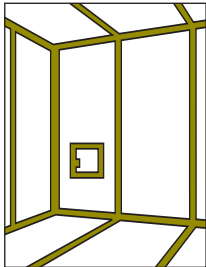
<sup>6</sup> Resistance measured through the adhesive. MIL-STD-202 Method 307 maintained at 5 PSI (3,4 N/sq cm) measured over 1 sq in. surface area.

## Typical Shielding Tape Applications



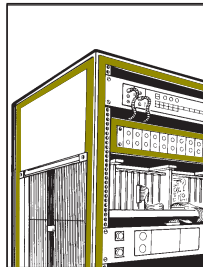
3M™ Shielding Tapes are used as ground planes or shields for electronic cables and connectors. The tape is bonded to the cable's conductive sheath and to the metallic lip of the connector to provide a complete shield from end to end.

3



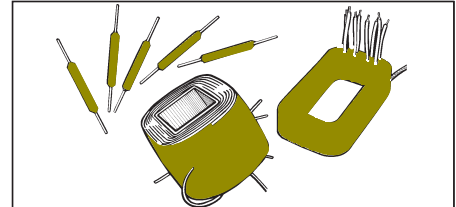
Shielding tapes provide effective, economical shielding of seams and apertures in shielded rooms.

4



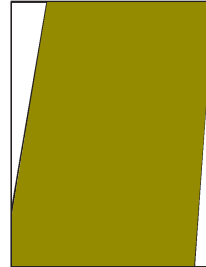
3M shielding tapes provide a reliable, durable contact surface for conductive gaskets for EMI shielding of the doors and panels of electronic cabinets and enclosures.

5



3M Shielding Tapes are commonly used between transformer coil windings to reduce electrostatic coupling and around the outside of coils, relays, and other components to prevent broadband EMI emissions.

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All 3M shielding tapes are supplied on liners for easy handling and die-cutting. Many 3M authorized distributors and converters provide fabrication service.

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3M™ EMI Shielding Tapes are well suited for applications requiring reliable point-to-point electrical contact, particularly EMI shielding, grounding and static charge draining.

### Economical EMI shielding

Shielding tapes are able to contain signals emitted from your components, thus preventing interference with other circuits. They can also be used to seal out random signals in the environment to protect sensitive equipment. Typical applications include shielding around electronic cabinet doors and panels, individual electronic components and cables. The ease of installation offered by the pressure-sensitive adhesive saves labor and provides cost-effective, long-term shielding.

### EMI troubleshooting and prototyping

3M shielding tapes also simplify the trial-and-error aspect of EMI troubleshooting. When a source of EMI leakage is located, shielding tape easily and effectively solves

the problem.

The tapes have a multitude of uses in electronic design and in test and QC laboratories for prototyping and troubleshooting. An excellent tool for such applications is the **3M Engineering Kit for EMI Shielding Tapes** (Page 2).

### Static charge drainage

These tapes also offer an easy way to eliminate potentially dangerous static build-up on solid state devices, CRTs and computer peripherals. The secure bond and excellent "through-the-adhesive" conductivity provide dependable grounding.

### Fast and easy application

For best results, the application surface must be clean and dry. To maximize electrical and physical contact to the substrate, it is important that you use the correct application pressure (generally 5 to 10 PSI [3,5 to 7,0 N/cm<sup>2</sup>]) and position the tape correctly the first time.

The complete line of standard dispensers available includes three machines well suited for application of shielding tapes. Available with liner take-up attachments or liner removal capability, these dispensers are designed to deliver either random or definite lengths without curling the tape:

- M712 (includes liner removal/wind-up mechanism)

In addition, Electrical Markets Division Technical Service can be consulted for design of custom application equipment for automatic or semiautomatic production.

### Product packaging

3M EMI Shielding Tapes are supplied on easily removable liners and in widths to meet customer needs. Multiple-length rolls are also available.

3M is a trademark of 3M Company.

### Important Notice

Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use.

### Warranty; Limited Remedy; Limited Liability.

3M's product warranty is stated in its Product Literature available upon request. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is

defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**



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