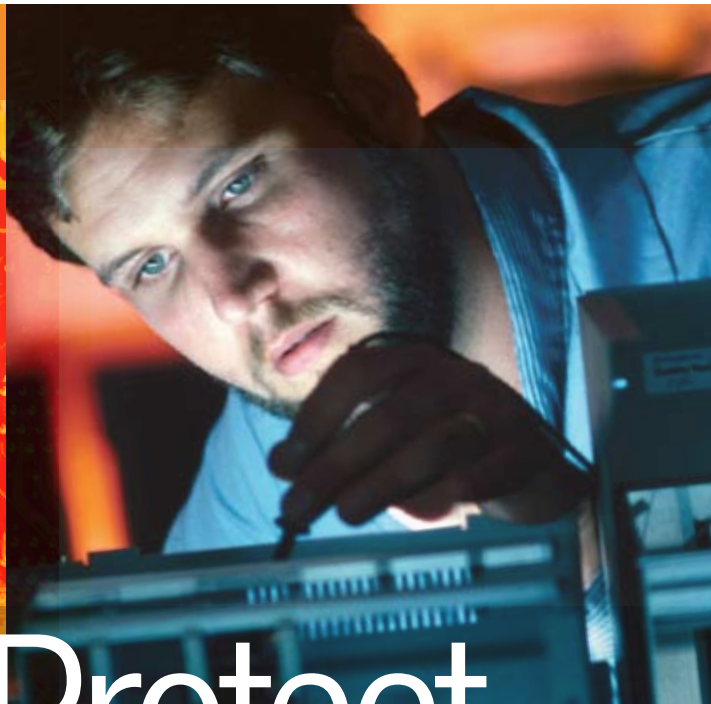


Electromagnetic Compatible Products  
Product Selection Guide




# Control & Protect Against EMC Threats



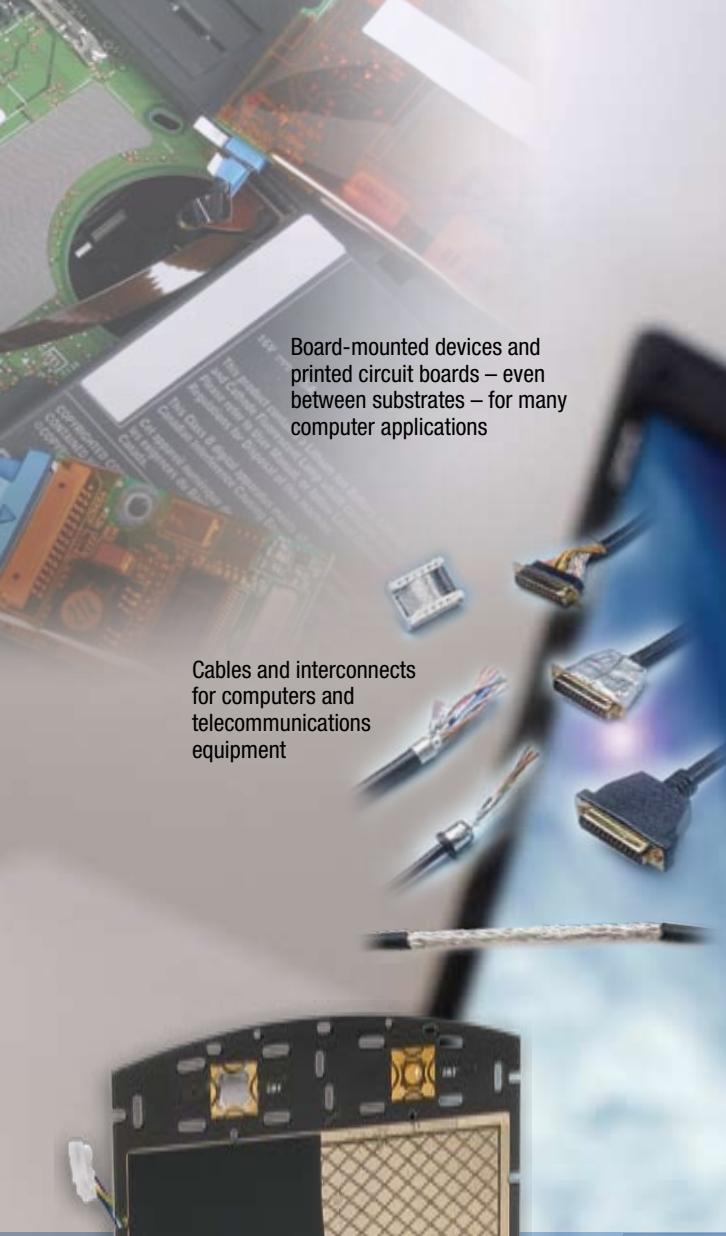
A close-up photograph of a woman with short blonde hair, smiling and talking on a black mobile phone. The phone is held to her ear. The background is a soft, out-of-focus grey.

Faster, smaller,  
lighter, easier —

the skyrocketing development of today's electronics  
requires new solutions for significant new problems.

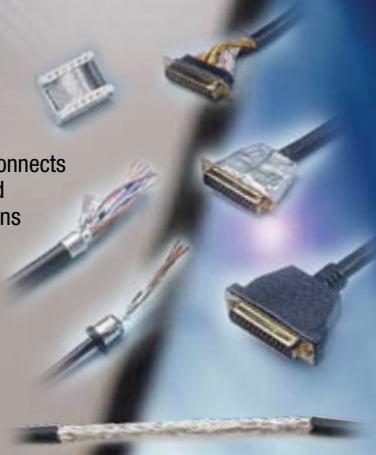
A small, square inset image in the bottom right corner showing a close-up of a green printed circuit board (PCB) with several gold-colored components, likely a microchip or connector.





Board-mounted devices and printed circuit boards – even between substrates – for many computer applications

Cables and interconnects for computers and telecommunications equipment



Components for computers and peripherals



PCBs and components in mobile phones and wireless products

These solutions include an innovative line of 3M™ Electromagnetic Compatible Products (EMC) that are designed to control electromagnetic interference from internal sources, limit EMI susceptibility from external sources and help manufacturers meet high certification standards around the world.

3M EMC products help protect and provide for electronic and electrical components in a wide variety of ways – from the manufacturing process to the final product. They are designed to provide electromagnetic compatibility, shield or absorb electromagnetic and radio frequency interference, ground sensitive electronic components and boards, cushion components, protect cables, provide conductive properties, and add value in other ways. These products also mask and protect PCBs and other devices during manufacturing while minimizing risk from such factors as static charge.

3M offers a wide range of EMI/RFI shielding tapes and absorbing materials, mesh and sleeving products, gaskets and conductive materials, and antistatic and high temperature tapes.

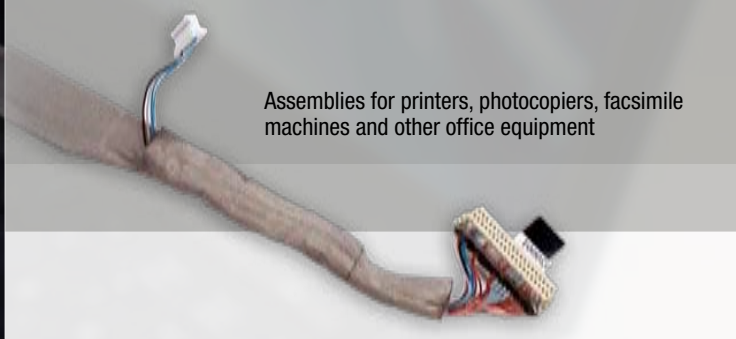
These innovative products are based on advanced research conducted at 3M laboratories around the world, building on EMI shielding technology that 3M introduced more than 40 years ago.

3M EMC Products are designed to provide EMI/RFI shielding and absorbing, static charge grounding, anti-static masking, cushioning, mechanical protection, and conductive properties for a wide variety of applications.



Wireless communication devices, mobile-computing devices and sound equipment may need not just EMI shielding but absorbing.

For products that require EMC compliance certification



Assemblies for printers, photocopiers, facsimile machines and other office equipment

3M™ Product	Backing	Adhesive	Total Thickness mils/mm
<b>Aluminum Foil</b>			
1120	2-mil aluminum foil	Acrylic conductive	4.0/0,102
1170	2-mil aluminum foil	Acrylic conductive	3.2/0,081
AL-25BT	1-mil aluminum foil	Acrylic conductive	2.4/0,061
AL-25DC	1-mil aluminum foil	Acrylic conductive coated on both sides	3.3/0,084
AL-50BT	2-mil aluminum foil	Acrylic conductive	3.1/0,079
1115	5-mil aluminum foil	Acrylic conductive	7.0/0,177
<b>Aluminum Foil Laminated with Polyester Film</b>			
AL-36FR	1-mil aluminum foil + polyester film	Acrylic conductive	2.4/0,061
AL-36NC	1-mil aluminum foil + polyester film	Acrylic nonconductive	2.2/0,055
AL-37BLK	1-mil aluminum foil + black matte polyester film	Acrylic conductive	2.8/0,071
AL-40BLK	1-mil aluminum foil + black glossy polyester film	Acrylic conductive	2.8/0,071
<b>Copper Foil</b>			
1125	1.4-mil copper foil	Acrylic nonconductive	3.5/0,089
1126	1.4-mil copper foil	Acrylic conductive	3.5/0,089
1181	1.4-mil copper foil	Acrylic conductive	2.6/0,066
1182	1.4-mil copper foil	Acrylic conductive coated on both sides	3.5/0,089
1183	1.4-mil tin-plated copper foil	Acrylic conductive	2.6/0,066
1194	1.4-mil copper foil	Acrylic nonconductive	2.6/0,066
CU-35C	1.4-mil copper foil	Acrylic conductive	2.8/0,071
<b>Embossed Foil</b>			
1245	Embossed copper foil	Acrylic nonconductive	4.0/0,102
1267	Embossed aluminum foil	Acrylic nonconductive	5.0/0,127
1345	Embossed tin-plated copper foil	Acrylic nonconductive	4.0/0,102
2245	Embossed copper foil	Acrylic nonconductive	4.0/0,102
<b>Metallized Cloth</b>			
2191FR	Nickel on copper-plated polyester ripstop fabric	Acrylic conductive	5.5/0,140
AG-2300	Silver-coated polyester fabric	Acrylic conductive	4.3/0,110
AU-2190	Gold-coated polyester fabric	Acrylic conductive	4.3/0,110
X-7001	Copper-plated polyester ripstop fabric	Acrylic conductive coated on both sides	4.3/0,110
CN 3190	Nickel on copper-plated polyester ripstop fabric	Acrylic conductive	4.3/0,110

\*Consult product data sheets for attenuation information.

Features	Electrical Resistance (m ohms)	Adhesion to Steel (oz/in)(N/cm)	Product Certification
For EMI shielding, static charge draining, grounding. Good for cable wrap. Easily die cut.	9	36/3,9	UL 510
For EMI shielding, static charge draining, grounding. Easily die cut.	10	35/3,8	UL 510
For EMI shielding, static charge draining, grounding. Easily die cut.	10	31/3,4	UL 510
For EMI shielding, static charge draining, grounding. Easily die cut.	35	31/3,4	
For EMI shielding, static charge draining, grounding. Easily die cut.	10	31/3,4	UL 510
For EMI shielding, static charge draining, grounding. Easily die cut.	5	52/5,6	
Foil backing laminated with polyester film. Good resistance to oxidation, solvents and oils. Easily die cut.	20	22/2,4	UL 510
Foil backing laminated with polyester film. Good resistance to oxidation, solvents and oils. Easily die cut.	N/A	20/2,2	
Foil backing laminated with polyester film. Matte surface finish. Good electrical insulation, resistance to oxidation, solvents and oils. Easily die cut.	50	31/3,4	UL 510
Foil backing laminated with polyester film. Glossy surface finish. Good electrical insulation, resistance to oxidation, solvents and oils. Easily die cut.	50	31/3,4	UL 510
For EMI shielding on a wide range of electronic applications. Easily die cut.	N/A	40/4,4	UL 510
For EMI shielding, static charge draining when grounded. Easily die cut.	3	36/3,9	UL 510, MIL-T-47012
For EMI shielding, static charge draining, grounding. Easily die cut.	5	35/3,8	UL 510
Typically used to bond two surfaces, both physically and electrically. Also provides EMI shielding, static charge draining, grounding. Easily die cut.	10	35/3,8	UL 510
Oxidation resistant for long-term EMI shielding, static charge draining, grounding. Solderable and easily die cut.	5	35/3,8	UL 510
For EMI shielding, static charge draining, grounding. Easily die cut.	N/A	40/4,4	UL 510
For grounding and EMI shielding. Solderable and easily die cut.	5	35/3,8	UL 510
For EMI shielding, static charge draining, grounding. Solderable and easily die cut.	1	35/3,8	UL 510
For EMI shielding, static charge draining, grounding. Solderable and easily die cut.	5	35/3,8	UL 510
Oxidation resistant for long-term EMI shielding, static charge draining, grounding. Solderable, easily die cut.	1	45/4,9	UL 510
For grounding and EMI shielding. Solderable and easily die cut.	1	31/3,4	UL 510
Lightweight, conformable oxidation resistant and high strength for EMI shielding & grounding. Easily die cut.	3	19/2,1	UL 510
Lightweight, conformable oxidation resistant and high strength for EMI shielding & grounding. Easily die cut.	5	31/3,4	
Lightweight, conformable oxidation resistant and high strength for EMI shielding and grounding. Easily die cut.	5	31/3,4	
Typically used to bond two surfaces, both physically and electrically. Also provides EMI shielding, static charge draining, grounding. Lightweight, conformable and easily die cut.	15	59/6,4	
Lightweight, conformable, oxidation-resistant and high strength for EMI shielding & grounding.	10	35/3,8	

3M™ Product	Backing	Adhesive	Total Thickness mils/mm
<b>Mesh &amp; Sleeving</b>			
<b>DS &amp; FS Series</b>	Braided with glass fibers overwound with tin-plated copper foil	none	N/A
<b>VA Series</b>	Polyester fibers braided with tin-plated copper foil	none	N/A
<b>EMI Shielding Sheets &amp; Films</b>			
<b>1380</b>	High-metal magnetic sheet between polymer film layers	Rubber thermosetting	11.8/0,300
<b>AL-10S</b>	Epoxy FR film + aluminum foil	none	7.8/0,198
<b>AL-1010S</b>	Double epoxy FR film + aluminum foil	none	13.8/0,351
<b>CU-10S</b>	Epoxy FR film + copper foil	none	6.7/0,170
<b>CU-1010S</b>	Double epoxy FR film + copper foil	none	11.8/0,300
<b>Gaskets &amp; Conductive Materials</b>			
<b>Electrically Conductive Acrylic Pad (eCAP) 7830N</b>	X, Y, Z conductive acrylic/PET fabric	Acrylic with nickel-filler coated graphite	0,2; 0,3; 0,4; 0,5 mm
<b>3245</b>	Reverse-embossed copper foil	Acrylic conductive	5.9/0,150
<b>Absorbing Materials</b>			
<b>AB-2000 Series</b>	Silicone rubber w/ magnetic filler	Acrylic nonconductive	0,27 - 1,58
<b>AB-5000 Series</b>	Polyurethane w/ metal flake filler	Acrylic nonconductive	0,1; 0,2; 0,3; 0,5; 1,0 mm
<b>AB-5000S Series</b>	Polymer resin w/ metal flake filler	Acrylic nonconductive	0,1; 0,2; 0,3; 0,5; 1,0 mm
<b>Anti-static Tapes</b>	<b>Backing description</b>	<b>Adhesive</b>	<b>Breaking strength (oz/in) (N/cm)</b>
<b>40</b>	Polyester film	Antistatic polymer conductive	20/35
<b>40PR</b>	Polyester film	Antistatic polymer conductive	20/35
<b>High-Temperature Masking Tapes</b>	<b>Backing description</b>	<b>Breaking strength (lb/in)/(N/cm)</b>	<b>Elongation (% at break)</b>
<b>92</b>	Polyimide film	30/53	55
<b>1093</b>	Polyimide film	35/62	50
<b>1205</b>	Polyimide film	30/53	55
<b>1206</b>	Polyimide film	30/53	35
<b>1218</b>	Polyimide film	19/34	55

\*Consult product data sheets for attenuation information.

Features	Electrical Resistance (m ohms)	Adhesion to Steel (oz/in)(N/cm)	Product Certification
EMI mesh sleeves for cables and harnesses. Excellent strain relief and heat stability, flexible, oxidation resistant. Solderable.	N/A	N/A	UL VW-1 (UL FR-1)
EMI mesh sleeves for cables and harnesses. Excellent strain relief and heat stability, flexible, and oxidation resistant. Solderable, light weight.	N/A	N/A	
Excellent high-magnetic shielding at low frequency. Soft magnetic sheet sandwiched between layers of film. Thin, flexible, lightweight and easily die cut.	N/A	N/A	
Softened aluminum foil with flame-retardant film on one side. Excellent EMI shielding for PCBs and assemblies. Lightweight, flexible and easily die cut.	N/A	N/A	UL 510
Softened aluminum foil with flame-retardant film on both sides. Excellent EMI shielding for PCBs and assemblies. Lightweight, flexible and easily die cut.	N/A	N/A	UL 510
Softened copper foil with flame-retardant film on one side. Excellent EMI shielding for PCBs and assemblies. Lightweight, flexible and easily die cut.	N/A	none	UL 94 V0
Softened copper foil with flame-retardant film on both sides. Excellent EMI shielding for PCBs and assemblies. Lightweight, flexible and easily die cut.	N/A	none	
X, Y, Z, axis electrically conductive acrylic pad gasket provides shielding and grounding in electronic devices. Self sticking.	.5 Ω	25 - 35 oz.	
For EMI shielding, static charge draining, grounding. Solderable, easily die cut.	1	46/5.0	UL 510
Silicone rubber with magnetic filler. EMI absorbing can suppress radiated noise in broadband frequency. Flexible, and easily die cut. In 7 standard thicknesses.	N/A	N/A	
Polyurethane with metal flake. EMI absorbing can attenuate noise conducted or radiated in broadband frequency. Flexible and easily rotary diecut.	N/A	N/A	
Polymer resin with metal flake. Provides attenuation for conducted or radiated noise at frequencies down to 200 MHz. Excellent for RFD applications. Flexible and easily rotary die cut.	N/A	N/A	
	Remove from roll (volts)	Adhesion to steel (oz/in)(N/cm)	Remove from stainless Steel (volts)
General use utility tape for electronic components and assemblies. Antistatic conductive polymer adhesive. Clear.	5	15/1,7	5
General use utility tape for electronic components and assemblies. Antistatic conductive polymer adhesive. Clear, printed with antistatic symbol.	5	15/1,7	5
	Total tape thickness (mils)/(mm)	Adhesion to steel (oz/in)(N/cm)	Product Certification
Tough, thin, puncture-resistant film designed for high-temperature applications. For insulating and motor applications.	3.0/0.076	25/2,8	UL 510
Tough, thin, puncture-resistant film designed for high-temperature applications. For insulating and motor applications.	2.5/0.063	20/2,2	UL 510
Solvent-resistant, tough, thin, puncture-resistant film designed for high-temperature applications. Good cover layer for flexible circuits and for insulating applications.	3.0/0.076	35/3,8	UL 510
Solvent-resistant, tough, thin, puncture-resistant film designed for high-temperature applications. Good cover layer for flexible circuits and for insulating applications.	2.2/0.055	35/3,8	UL 510
Solvent-resistant, tough, thin, puncture-resistant film designed for high-temperature applications. Good cover layer for flexible circuits and for insulating applications.	3.0/0.076	19/2,0	UL 510



3M™ EMC Products are available from 3M and through select 3M EMC Product distributors.  
Contact your 3M OEM sales representative for details.



3M is a trademark of 3M Company.

### **Important Notice**

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. 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. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

### **Warranty; Limited Remedy; Limited Liability.**

This product will be free from defects in material and manufacture at time of purchase. **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.



### **Electrical Markets Division**

6801 River Place Blvd.  
Austin, TX 78726-9000  
800 245 3573  
FAX 800 245 0329  
[www.3M.com/electrical](http://www.3M.com/electrical)

Please Recycle.  
© 3M 2007. All rights reserved.  
80-6016-0112-5F