3M™ Electromagnetic Compatible Products

Selection Guide Revision E

Faster, smaller, lighter, easier – the skyrocketing development of today's electronics requires new solutions for significant new problems.

These solutions include an innovative line of **3M™ Electromagnetic Compatible Products** that can 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 can protect and enable electronic and electrical components in a wide variety of ways – from the manufacturing process to the final product. They can 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 can 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. And 3M can be trusted to supply these products on schedule around the world.

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

Static-free packaging and protecting for electronic components

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

Components for computers and peripherals

PCBs and components in mobile phones and wireless products

Advanced automotive electronics and electrical components

Cables and interconnects for computers and telecommunications equipment

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

Assemblies for cameras, appliances and other consumer products

For products that require EMC compliance certification

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

Products shown represent potential applications of 3M™ EMC Products and are not intended to suggest endorsement by any manufacturers for 3M or its products.

EMI Products*	Backing	Adhesive	Total thickness mils/mm
Aluminum Foil			
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
Aluminum Foil Laminated with Polyester Film			
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
Copper Foil			
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
Embossed Foil			
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 conductive	4.0/0,102
Metallized Cloth			
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 EMI 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	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 can provide 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 can provide 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.	1	35/3,8	

EMI Products*	Backing	Adhesive	Total thickness (mils/mm)
Mesh & Sleeving			
DS & FS Series	Braided glass fibers overwound with tin-plated copper foil	none	N/A
VA Series	Sleeves braided with polyester fibers and polyester fibers overwound with tin-plated copper foil	none	N/A
EMI Shielding Sheets & Films			
1380	High-metal magnetic sheet between polymer film layers	Rubber thermo-setting	11.8/0,300
AL-10S	Epoxy FR film + aluminum foil	none	7.8/0,198
AL-1010S	Double epoxy FR film + aluminum foil	none	13.8/0,351
CU-10S	Epoxy FR film + copper foil	none	6.7/0,170
CU-1010S	Copper foil + double epoxy film	none	11.8/0,300
Gaskets & Conductive Materials			
eCAP 7830N	X, Y, Z conductive acrylic/PET fabric	Acrylic nickel coated graphite	0,2; 0,3 mm
3245	Reverse-embossed copper foil	Acrylic conductive	5.9/0,150
Absorbing Materials			
AB-2000 Series	Silicone rubber with magnetic filler	Acrylic adhesive	10.6 - 62.2/0,27 - 1,58
AB-5000 Series	Polyurethane with metal flake filler	Acrylic non-conductive	0,1; 0,2; 0,3; 0,5; 1,0 mm
Anti-static Tapes	**Backing description**	**Adhesive**	**Breaking strength (oz/in) (N/cm)**
40	Polyester film	Antistatic polymer conductive	20/35
40PR	Polyester film	Antistatic polymer conductive	20/35
High-Temperature Masking Tapes	**Backing description**	**Breaking strength (lb/in)/(N/cm)**	**Elongation (% at break)**
92	Polyimide film	30/53	55
1093	Polyimide film	35/62	50
1205	Polyimide film	30/53	55
1206	Polyimide film	30/53	35
1218	Polyimide film	19/34	55

*Consult EMI 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 VO
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. Thin, flexible, and easily die cut. In 7 standard thicknesses.	N/A	35/3.8	
Polyurethane with metal flake. EMI absorbing can attenuate noise conducted or radiated in broadband frequency. Thin, flexible and easily rotary diecut.	N/A	25 - 35 oz.	
	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	
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.

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.

This product will be free from defects in material and manufacture at the 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.**

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