
# Helping enable the next generation of electronics.

3M™ EMI/RFI Management Solutions

# Don’t let unwanted frequencies interfere with electronics components performance.

### Why is minimizing EMI/RFI important?

When the amount of noise (EMI) rises higher than the signal’s strength, resulting in a low signal-to-noise ratio (SNR), it can degrade electronic performance. This can result in errors, data loss, delayed or incorrect readings, or even temporary shutdowns. Which is why it is critical to help prevent EMI as much as possible.

### 3M™ EMI/RFI Management Solutions will help you:

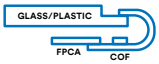
- Minimize EMI noise and crosstalk
- Improve signal integrity
- Enable high performing and reliable materials
- Be more cost-effective
- Achieve quick and easy application with peel and stick solutions

Generated by electronic devices, communications signals, electromagnetic frequencies and static electricity, Electromagnetic Interference (EMI) – also known as Radio Frequency Interference (RFI) – is an electronic emission that interferes with the performance of electronic components, RF systems and other critical equipment.

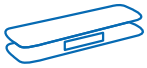
## Help manage EMI with 3M™ EMI/RFI Solutions

Help protect your systems and achieve efficient and reliable operations with solutions from 3M. We bring decades of expertise in EMI/RFI management and materials science to help you solve complex and dynamic design challenges. Our EMI/RFI management solutions are known for helping boost signal-to-noise ratios in industrial electronics, improving antenna signal integrity, and even grounding displays for connected and smart products.

### EMI Shielding and Grounding Applications

| | | | | |
|---|---|---|---|---|
|  Flex circuit to flex circuit interconnection |  Camera module grounding |  Electrostatic discharge (ESD) |  Shield can lid |  PCB/flex/chassis grounding |
|  Medium pitch flexible circuits and PCBs |  PIM management |  Sensor grounding |  EMI shield and gasket attachment |  Bond line gap shielding |
|  FPC grounding |  Shielding display wrap |   Display chip on flex | | |

### EMI Absorbing Applications

| | | |
|---|---|---|
|  Cable wrapping/ attachment |  Attached to noise (traces, IC’s, reflective enclosure surface) |  Attached to metal surface (reduce emitting EMI noise) |
|  Near field communication |  Attached to semicon chip/ micro-processors |  Insert between module (compartment) |

# 3M™ Electrically Conductive Tapes Selection Criteria

Selecting a 3M™ Electrically Conductive Tape for grounding, shielding, and attachment includes identifying several application requirements. For instance, the selection process could consider the following items, among others:

1 - Contact R target
2 - Contact surface type
3 - Adhesion level desired
4 - Bond line thickness
5 - XYZ or Z conductivity path
6 - Operating temperature range and environmental conditions
7 - EMI shielding in bond line "gap/slit" for higher frequencies
8 - Surface contact area for adhesion
9 - Assembly pressure, temperature and time

### Meet your "go-to" materials

3M created the EMI/RFI Management Solutions Go-To Material List (GTML) to provide fast and reliable service on our go-to materials. The GTML includes materials that cover most applications and provide differentiated solutions for various EMI design challenges.

Make these materials the first, go-to options for EMI challenges, supplemented by a broader line of 3M EMI/RFI materials for niche applications.

★ = Indicates which select thicknesses are part of the GTML.

The "□**Good**-□**Better**-■**Best**" rankings are based on the 3M Test Method and tape performance in a nominal application.

**This information is based on tests performed at 3M laboratory facilities. While we believe that these test results are reliable, your results may vary due to differences in test conditions, your facility/lab environment, or the other conditions within your control. This information is intended for industrial/occupational use by persons with the knowledge and technical skills to analyze, handle and use such information. It is supplemental only and is not intended to replace the detailed information found in written 3M product literature. For additional information, including important safety and warranty information, regarding 3M EMSD products, please refer to the data sheets, instruction and/or installation manuals.*

| Product | Typical contact resistance (R ohms Ω) | EMI shielding in bond line gap/slit | Flex to PCB contact resistance (R ohms Ω) | Peel strength (24 hr/RT) | Workability | Thermal conductivity/resistance (W/mK or C/W) |
|---|---|---|---|---|---|---|
| **3M™ Electrically Conductive Double-Sided Tapes** | | | | | | |
| **3M™ Electrically Conductive Adhesive Transfer Tapes** | | | | | | |
| ★ **3M tape 9703** | Good | N/A | Better | Good | Good | Good |
| **3M tape 9709SL** | Better | Better | Best | Good | Better | Best |
| **3M tape 9712** | Good | Good | Good | Better | Good | Good |
| **3M tape 9713** | Better | Good | Good | Better | Good | Good |
| **3M™ Electrically Conductive Double-Coated Tapes** | | | | | | |
| ★ **3M tape 5113DFT** | Best | Best | Best | Better | Best | Better |
| **3M tape 9772** | Best | Best | Good | Good | Best | Best |
| **3M tape 9711S** | Best | Better | Best | Best | Best | Better |
| **3M tape 9750** | Better | Better | Better | Best | Better | Good |
| **3M™ Electrically Conductive Single-Sided Tapes** | | | | | | |
| ★ **3M tape 5113SFT** | Better | Good | Better | Good | Better | Good |
| **3M tape 3304BC-S** | Best | Best | Best | Better | Better | Good |
| **3M tape 1020BC** | Best | Better | Best | Good | Best | Better |
| ★ **3M tape 1050TC** | Best | Better | Best | Good | Better | Best |
| **3M tape CEF-3BV** | Good | Good | Good | Better | Better | Good |

» **Typical contact resistance** - Gold flex bonded to stainless steel (SS). "Best" results relate to a lower contact R potential on SS Contact R can vary with SS type tested. Lower contact resistance can allow for improved EMI shielding of a design.

» **EMI Shielding in Bond Line "Gap/Slit"** - Best = High dB EMI Shielding. Inherent EMI shielding at the bond line provides significantly reduced crosstalk, stray EMI, noise in circuit, antennae effects, FPC susceptibility and spurious emissions.

» **Flex to PCB Contact Resistance** - Potential to improve contact R grounding locations via improved surface conformability and XYZ conductive potential with a 3M electrically conductive tape or film vs. a generic Z-axis only conductive PSA.

» **Peel Strength** - Adhesion to SS type substrate/3M Test Method/24 hour room temp dwell.

» **Workability** - Ease of Rework based on a standard set of high surface energy substrates. The tape design can affect rework based on adhesive type and conductive filler type.

» **Thermal Conductivity/Thermal Resistance** - Effective Thermal Resistance and Thermal Conductivity vs. a generic PSA without conductive fillers. Important for thermal connection performance between substrates.

# 3M™ Electrically Conductive Single-Sided Tapes

3M™ Electrically Conductive Single-Sided Tapes offer XYZ-axis conductivity in a variety of conductive adhesives, carriers, and fillers to provide enhanced EMI performance where you need it (flexibility, conformability, adhesion, temperature range, etc.). These tapes are available in multiple thicknesses and provide EMI/RFI shielding and/or grounding across multiple frequencies.

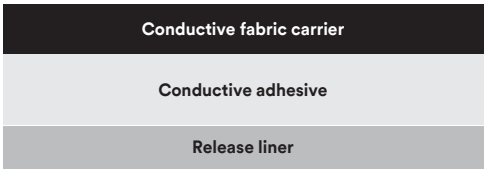
### Features and benefits

- XYZ-axis conductivity
- Conformability and edge conformance
- Excellent EMI/ESD and electrical performance over time
- Overlap resistance and electrical contact on small areas and bond lines
- High adhesion for reliable contact to various substrates
- Great handling & workability
- Thin product constructions for applications with less Z-space

## Product construction

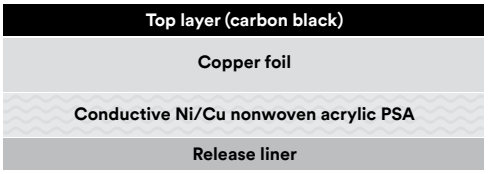
### 3M Fabric Tapes

5113SFT Series, CEF-3BV



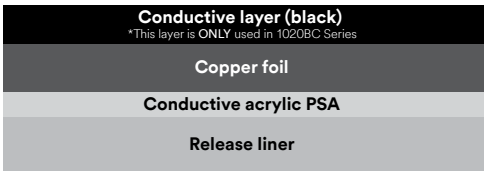

### 3M Foil Tapes, PSA with conductive nonwoven

3304BC-S

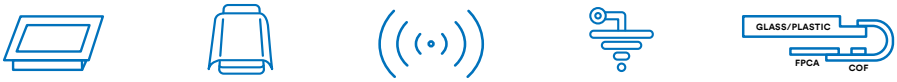



### 3M Foil Tapes, PSA with conductive fillers

1050TC Series, 1020BC Series*




## Applications



Shield can lid | Shielding display wrap | PIM management | Sensor grounding | Display chip on flex

| 3M product number | Thickness mil (mm) | Conductive filler type and tape format | Adhesive type | Liner type | Electrical resistance through Z-axis Ω (3M ETM-12) | Electrical resistance through XY-axis Ω (3M ETM-7) | Adhesion to SUS (gf/inch) | Unique features and benefits |
|---|---|---|---|---|---|---|---|---|
| ★ **5113SFT** | 2.0 (0.05) | Fabric backing C-SFT | Polyolefin | PET release liner | <0.03 Ω | <0.1 Ω | 1500 (ASTM D3330) | » XYZ-axis conductivity through adhesive<br>» Excellent electrical contact to small size areas<br>» Resists moisture to maintain the products' integrity enabling a 4-year shelf-life<br>» Excellent EMI shielding in bond line gap<br>» Expands long-term operating temperature range to 105°C |
| **3304BC-S** | 1.8 (0.45) | Ni/Cu nonwoven foil backing | Acrylic | Silicone coated PET film | 0.05 Ω | 0.1 Ω | 1300 (ASTM D1000) | » Scratch-resistant black copper foil<br>» Excellent edge conformability<br>» High shielding performances |
| ★ **1050TC** | 0.9 (0.023) | Foil backing C-SCT | | PET release liner | N/A | 0.015 Ω | 1200 (ASTM D1000) | » XYZ-conductivity<br>» Conformable, quick bonding<br>» Copper foil backing |
| **1020BC** | 1.0 (0.025) | Foil backing C-SCT | | | | 0.015 Ω | 1300 (ASTM D1000) | » XYZ-conductivity<br>» Excellent EMI shielding performance<br>» Excellent conformability and quick bonding<br>» Reliable contacts to small size grounding areas<br>» High adhesion and good grounding performance to many surface types<br>» Black conductive coating |
| **CEF-3BV** | 2.8 (0.07) | Black fabric backing C-SFT | | Paper liner | | 0.4 Ω | 1300 (ASTM D1000) | » Scratch resistance<br>» Black fabric tape<br>» High reliability for Auto Electrification market<br>» Liquid Crystal Modules (LCM) wrapping |

★ = Indicates which select thicknesses are part of the GTML.

The above technical information and data should be considered representative or typical only and should not be used for specification purposes. Contact your 3M Technical Representative for details.

# 3M™ Electrically Conductive Double-Coated Tapes

3M™ Electrically Conductive Double-Coated Tapes feature XYZ-axis conductivity and have a layer of adhesive coated on both sides of the carrier and are easier to die-cut and handle than adhesive transfer tapes (no carrier). They come in a variety of conductive adhesives, carriers and fillers to provide enhanced EMI performance where you need it (flexibility, conformability, adhesion, temperature resistance). The tapes provide a broad spectrum of performance in a variety of applications.

## Features and benefits

- XYZ-axis conductivity
- A broad range of thicknesses
- Electrical contact to small contact areas and bond lines
- Excellent grounding performance over time
- Great EMI shielding in bond line gap
- Multiple levels of adhesion, conformability, and flexibility
- Adhesion to a variety of substrates and surfaces
- Great handling & workability

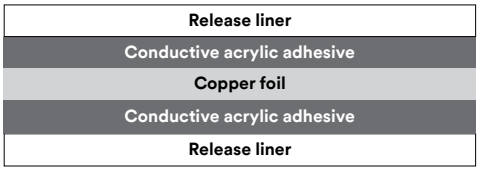
## Product construction

### 3M Woven Fabric Tapes

5113DFT Series,
9711S Series

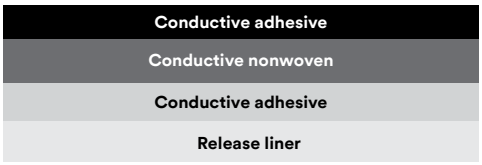

### 3M High Performing Foil Tapes

9772 Series




### 3M Nonwoven Tapes

9750




## Applications

Flex circuit to flex circuit interconnection

Sensor grounding

Electrostatic discharge (ESD)

EMI shield and gasket attachment

PCB/flex/ chassis grounding

Flexible circuits and PCBs

FPC grounding

| 3M product number | Thickness mil (mm) | Conductive filler type and tape format | Adhesive type | Liner type | Electrical resistance through Z-axis Ω (3M ETM-12) | Electrical resistance through XY-axis Ω (3M ETM-7) | Adhesion to SUS (gf/inch) | Unique features and benefits |
|---|---|---|---|---|---|---|---|---|
| ★ **5113DFT** | 2.0 (0.05) | Fabric backing | Polyolefin | PET release liner | 0.03 Ω | 0.1 Ω | 1500 (ASTM D3330) | » XYZ-axis conductivity through adhesive<br>» Excellent electrical contact to small size areas<br>» Resists moisture to maintain the products' integrity enabling a 4-year shelf-life<br>» Excellent EMI shielding in bond line gap<br>» Expands long-term operating temperature range to 105°C |
| **9772** | 1.2 (0.03), 2 (0.05) | Foil backing | Acrylic | | N/A | 0.015 Ω | 1000 (ASTM D1000) | » Good EMI shielding in the bondline gap<br>» Best XY-axis electrical resistance in double-sided conductive PSAs<br>» Low PIM |
| **9711S** | 2 (0.05) | Ni/Cu woven | | | 0.05 Ω | 0.15 Ω | 1800 (ASTM D1000) | » Low contact resistance<br>» High adhesion<br>» Excellent conformability<br>» Quick bonding<br>» Wide range of thickness options |
| **9750** | 2.1(0.55) | Ni/Cu PET nonwoven | | Paper liner | 0.07 Ω | – | Face 1300 Back 1800 (ASTM D3330) | » High adhesion<br>» Lower resistance nonwoven conductive scrim |

★ = Indicates which select thicknesses are part of the GTML.

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# 3M™ Electrically Conductive Adhesive Transfer Tapes

3M™ Electrically Conductive Adhesive Transfer Tapes deliver a broad spectrum of performance, including high EMI shielding in the bond line gap for high-frequency attenuation, stable contact resistance for reliable electrical conductivity, and conformability for creating a strong bond. Multiple thicknesses, conductive fillers, and particle designs are available.

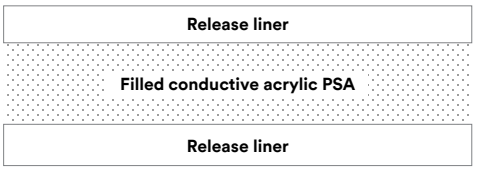
## Features and benefits

- XYZ-axis conductivity or Z-axis based conductivity
- A broad range of thicknesses
- Electrical contact to small contact areas and bond lines
- Excellent grounding performance over time
- Great EMI shielding in bond line gap
- Multiple levels of adhesion, conformability, and flexibility
- Adhesion to a variety of substrates and surfaces
- Great handling & workability

## Product construction

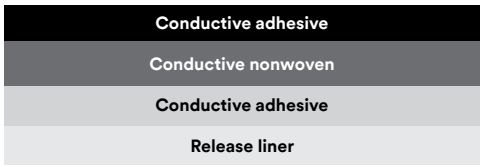
### 3M Conductive Tapes with silver filler

9703, 9709SL




### 3M Conductive Tapes with conductive fibers

9712, 9713




## Applications

Flex circuit to flex circuit interconnection | Camera module grounding | Electrostatic discharge (ESD) | EMI shield and gasket attachment | PCB/flex/chassis grounding | Medium pitch flexible circuits and PCBs | FPC grounding | Sensor grounding | Bond line gap shielding

| 3M product number | Thickness mil (mm) | Conductive filler type | Adhesive type | Liner type | Electrical resistance through Z-axis Ω (3M ETM-12) | Electrical resistance through XY-axis Ω (3M ETM-7) | Adhesion to SUS (gf/inch) | Unique features and benefits |
|---|---|---|---|---|---|---|---|---|
| ★9703 | 2 (0.05) | Silver particles | Acrylic | Silicone treated PCK | 0.01 Ω | N/A | 907 (ASTM D1000) | » Anisotropic Z-axis electrical conductivity<br>» Low outgassing<br>» Pressure-sensitive adhesive (PSA) tack properties<br>» Thermal curing not required |
| 9709SL | | | | PCK release liner, PET release liner | 0.06 Ω | 40 Ω | 825 (ASTM D1000) | » Standard adhesion<br>» Good EMI shielding in bond line gap<br>» High frequency<br>» Thermal conductivity<br>» Excellent conformability<br>» Low liner release (SL) |
| 9712 | 5 (0.127) | Carbon nonwoven | | Silicone treated PCK | 13 Ω | 50-70 Ω | 1500 (ASTM D3330) | » Standard adhesion<br>» No nickel<br>» Non-magnetic material<br>» Nonwoven conductive scrim |
| 9713 | 3.5 (0.089) | Ni/Cu nonwoven | | | 1.7 Ω | 5 Ω | | » Standard adhesion<br>» Isotropic XYZ-axis electrical connectivity<br>» Uses nickel plated carbon scrim<br>» Good contact with both hard and soft surfaces<br>» Excellent die-cutting and converting capabilities |

★ = Indicates which select thicknesses are part of the GTML.

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# 3M™ Electrically Conductive Gasket Tapes

3M™ Electrically Conductive Gasket Tapes are compressible electrically conductive open-cell urethane foam gaskets with single or double-coated conductive adhesives and an additional internal copper foil layer for shielding gaskets (3M™ Gasket Tape MSG7000SDX/MSG6000F Series). These XYZ-axis conductive gaskets feature excellent conductivity to ground two surfaces with a wide gap and/or EMI shielding.

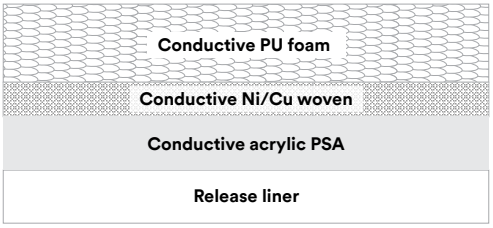
## Features and benefits

- Multiple thickness options for a range of gap sizes
- Grounding connection under compression
- Reworkable during assembly
- Single or double-coated conductive adhesive
- Conductive foam laminated with fabric allows compression for very wide gaps (3M tape MSG600F series)
- High adhesion conductive acrylic pressure sensitive
- Removable liner for easy handling and die-cutting
- Halogen-free products available

## Product construction

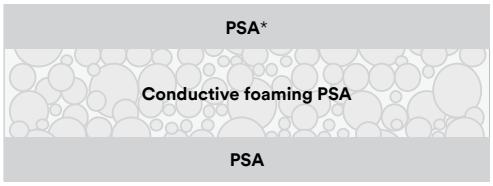
### 3M Electrically Conductive Foam Gasket

MSG6000F Series
MSG7000SDX Series
*coming soon*




### 3M Electrically Conductive Foaming PSA

ECG7000H Series,
ECG8000H Series*




*This layer is **ONLY** used in ECG8000H Series

## Applications

**Sensor grounding**

**Electrostatic discharge (ESD)**

**Bond line gap shielding**

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Halogen free is defined as having maximum 900 ppm bromine, maximum 900 ppm chlorine, and maximum 1500 ppm total bromine and chlorine, per IEC 61249-2-21.

# 3M™ Electrically Conductive Gasket Tapes

| 3M product number | Thickness mil (mm) | Carrier type | Conductive filler type | Adhesive type | Liner type | Operating temp °C | Unique features and benefits |
|---|---|---|---|---|---|---|---|
| **MSG6030F** | 11.8 (0.3) | Foam laminated with conductive fabric | Polyurethane plated with Cu/Ni (foam) | Acrylic | PET liner | ST 121°C, LT 85°C | » Single side conductive adhesive<br>» Highly compressible<br>» Metal plated<br>» Open cell urethane |
| **MSG6060F** | 23.6 (0.6) | | | | | | |
| **MSG6100F** | 40 (1.0) | | | | | | |
| **MSG7030SDX**<br>**MSG7045SDX**<br>**MSG7060SDX**<br>**MSG7080SDX**<br>**MSG7100SDX**<br>**MSG7150SDX**<br>**MSG7200SDX**<br>**MSG7250SDX**<br>**MSG7300SDX**<br>***Coming soon*** | 11.8 (0.3)<br>17.7 (0.45)<br>23.6 (0.6)<br>31.5 (0.8)<br>39.4 (1.0)<br>59 (1.5)<br>78.7 (2.0)<br>98.4 (2.5)<br>118 (3.0) | Foam laminated with conductive fabric | Polyurethane plated with Cu/Ni (foam) | Conductive Acrylic PSA | PET film liner | ST -40°C LT 105°C | » Anticipated single-sided conductive adhesive<br>» Anticipated to have thicker versions available vs 3M gasket MSG6000F series<br>» Anticipated highly compressible foam structure for wide range gap filling capability |
| **ECG7033H** | 13 (0.33) | Plated polyurethane foam | Ni | Acrylic | PE coated paper liner | ST 125°C, LT 80°C | » Single side conductive adhesive<br>» Metal plated<br>» Open cell urethane |
| **ECG7053H** | 20.8 (0.53) | | | | | | |
| **ECG7073H** | 28.7 (0.73) | | | | | | |
| **ECG8035H** | 13.8 (0.35) | | | | | | » Double side conductive adhesive<br>» Metal plated<br>» Open cell urethane |
| **ECG8055H** | 21.6 (0.55) | | | | | | |
| **ECG8075H** | 29.5 (0.75) | | | | | | |

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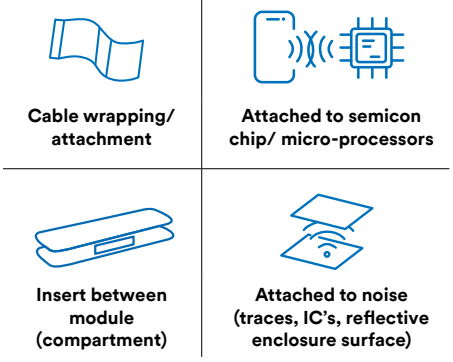
# 3M™ EMI Absorbers

3M™ EMI Absorbers are flexible composite sheets incorporating specialized magnetic particles and an optional non-conductive PSA to absorb near-field EMI. These absorbers help protect nearby electronics from EMI by suppressing EMI noise at multiple frequencies. 3M absorbers are available with a range of performance characteristics for effective EMI management in different environments from 400MHz to 10 GHz. Reliable resin system options enable high temperature resistance and stable performance over time. These thin magnetic absorbers are used in aerospace & defense, consumer electronics, automotive, and general electronics to help reduce EMI noise and improve the signal-to-noise ratio for optimal system performance.

## Features and benefits

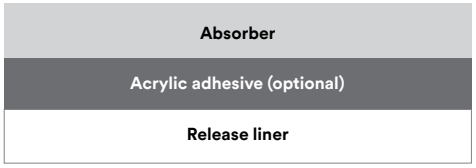
- Absorbing capabilities up to 10GHz with targeted permeability up to 10 GHz
- Absorbing performance is thickness dependent (ex. 200MHz to 4GHz for 3M absorber EM25TP)
- Helps improve antenna performance and reduce EMI interference within a device
- Multiple thicknesses and optional adhesive to create a custom stack-up
- Longer shelf life options available (up to 2 years)
- Supplied on a removable liner for easy handling
- Halogen free

## Applications



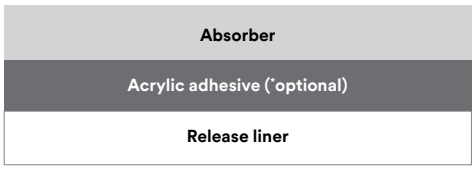

## Product construction

### 3M EMI Absorber & Magnetic Shielding Materials

| | |
|---|---|
| AB3000<br>*coming soon*<br>Operating frequency: 1GHz – 10GHz |  |
| EM25TP<br>Operating frequency: 200MHz – 4GHz | |



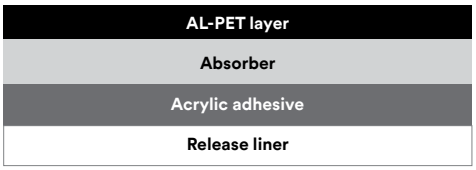
### 3M EMI Absorbers

| | |
|---|---|
| AB5000HF, AB5000SHF<br>Operating frequency: 300MHz – 2GHz |  |
| AB7000E, AB7000HF<br>Operating frequency: 300MHz – 4GHz | |
| AB8000 (high temp)<br>Operating frequency: 300MHz – 4GHz | |



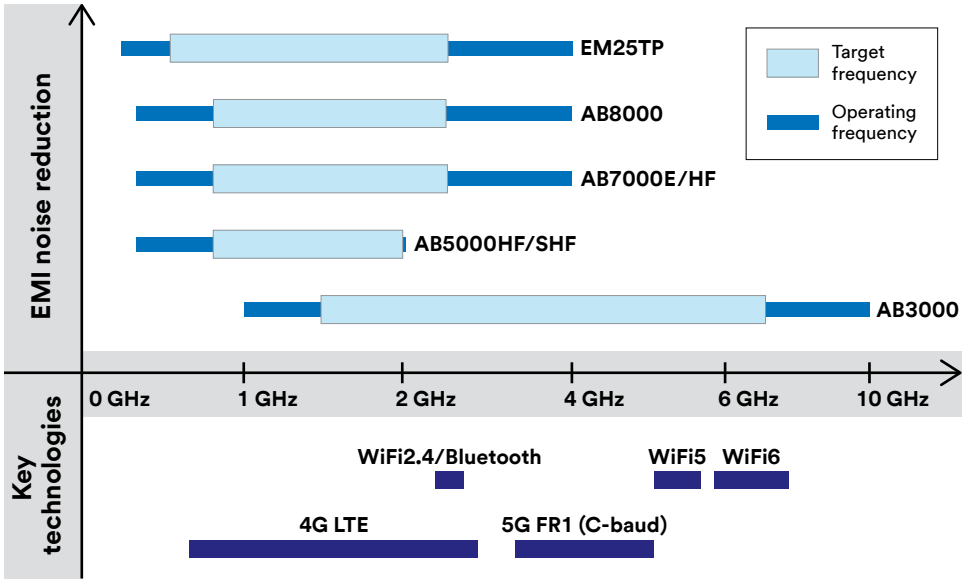
**Select absorber series offer with and without adhesive. Check the Technical Data Sheet to learn more*

### 3M Hybrid Shielding Absorber

| | |
|---|---|
| AB6005HF (AL+PET),<br>AB6005SHF (PET+AL+PET)<br>Shielding frequency - 10MHz – 18GHz |  |



## EMI absorbing performance




The above technical information and data should be considered representative or typical only and should not be used for specification purposes. Contact your 3M Technical Representative for details.

Halogen free is defined as having maximum 900 ppm bromine, maximum 900 ppm chlorine, and maximum 1500 ppm total bromine and chlorine, per IEC 61249-2-21.

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# 3M™ EMI Absorbers

| 3M product number | Thickness mil (mm) | Adhesive | Initial permeability @1MHz or 3MHz [μ'] | Operating frequency MHz-GHz | Operating temp range (°C) | Unique features and benefits |
|---|---|---|---|---|---|---|
| ★ **EM25TP-005-A10**<br>**EM25TP-0100-A10**<br>**EM25TP-0200-A20** | 2 (0.05),<br>4 (0.1),<br>8 (0.2) | Non-conductive acrylic (optional) | 250 | 200MHz – 4GHz | -25 ~ 90°C | » Broad frequency absorber<br>» High permeability magnetic film<br>» Absorbing performance 200GHz – 4GHz<br>» Targeted permeability for magnetic shielding <100 kHz – 3 MHz |
| **AB7010HF**<br>**AB7020HF**<br>**AB7030HF**<br>**AB7050HF** | 5.2 (0.13),<br>9.8 (0.25),<br>14 (0.35),<br>22 (0.55) | Acrylic non-conductive PSA | 110 | 300MHz – 4GHz | -25 ~ 85°C | » Good workability<br>» High resistivity<br>» High permeability<br>» Improved lower frequency absorber vs the 3M Absorber AB5000 series (@ <1GHz) |
| **AB5010HF/SHF**<br>**AB5020HF/SHF**<br>**AB5030HF/SHF**<br>**AB5050HF/SHF**<br>**AB5100HF/SHF** | 4 (0.1),<br>8 (0.2),<br>12 (0.3),<br>19.5 (0.5)<br>39 (1.0) | | 55 HF,<br>30 SHF | 300MHz – 2GHz | -25 ~ 85°C | » AB5000HF: Standard absorber<br>» AB5000SHF: Advanced EMI absorber, lower peak absorber frequency than 3M EMI Absorber AB5000HF, thermal conductivity 0.7 W/m-K |
| **AB6005SHF**<br>**AB60005HF** | 4 (0.1) | | 30 – 250 | 10MHz – 18GHz | -30 ~ +105°C | » Excellent for EMI shielding & insulation<br>» Aluminum layer provides excellent shielding effectiveness up to 18 GHz<br>» Available in sheets or rolls<br>» PET absorber reduces EMI and ESD in enclosed cavities |
| **AB7010E/AB7010E-WO**<br>**AB7020E/AB7020E-WO**<br>**AB7030E/AB7030E-WO**<br>★ **AB7050E/AB7050E-WO** | 4 (0.1),<br>8 (0.2),<br>12 (0.3),<br>19.5 (0.5) | Non-conductive acrylic (optional) | 100u' @ 3 MHz | 300MHz – 4GHz | -25°C – 105°C | » High permeability<br>» Available with and without (-WO) adhesive<br>» Long shelf life (18 months)<br>» Broader temperature performance than 3M absorber AB7000HF series |
| **AB8010-WO**<br>**AB8020-WO**<br>**AB8030-WO**<br>**AB8050-WO** | 4 (0.1),<br>8 (0.2),<br>12 (0.3),<br>19.5 (0.5) | No adhesive | 110u'~130 @ 3 MHz | 300MHz – 4GHz | -40°C – 150°C | » High permeability<br>» High performance resin system for solder reflow stable performance<br>» High temperature resistance (150°C)<br>» Available without adhesive (-WO)<br>» Long shelf life (2 years) |
| **AB3010/AB3010-WO**<br>**AB3030/AB3030-WO**<br>**AB3050/AB3050-WO**<br>***Coming soon*** | 4 (0.1),<br>12 (0.3),<br>19.5 (0.5) | Non-conductive acrylic (optional) | 30 | 1GHz – 10GHz | -25°C – 90°C | » Predicted broad absorbing performance 1-10 GHz<br>» Anticipated availability with and without (-WO) adhesive<br>» Large sheet format for improved yield (340mm x 340mm) |

★ = Indicates which select thicknesses are part of the GTML.

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# 3M™ Magnetic Shielding Materials

3M™ Magnetic Shielding Materials are thin magnetic materials that interact and influence electro-magnetic (EM) fields. These materials help protect sensitive electronic components and circuitry by shielding external low magnetic fields (<1MHz). Magnetic shielding materials "capture" the magnetic field and isolate the interference. The high magnetic permeability and low magnetic loss helps enable flux field redirection for applications less than 20MHz.

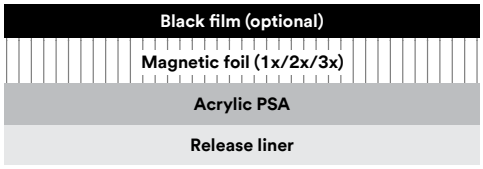
## Features and benefits

- High permeability magnetic foil
- Low and resistivity options
- Good workability
- Approximately 80,000 permeability dependent on product and thickness
- Thin overall construction
- Pressure sensitive acrylic tape for high adhesion
- Supplied on a removable liner for easy removal

## Product construction

### 3M Single Layer Metal Alloy Foil

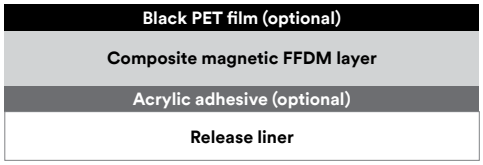
EM80KM




### 3M Composite Magnetic Foil

EM25TP Series

AB3000 Series
*coming soon*



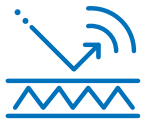

*(3M absorber AB3000 does not include a black PET film)*

## Applications

### Enhanced wireless power charging

Improved near field communication (NFC) antenna range

Improved radio frequency identification (RFID) antenna range



| 3M product number | Total thickness mil (mm) | Magnetic type (magnetic foil layer type) | Adhesive type | Permeability (u') | Operating temp range (°C) | Unique features and benefits |
|---|---|---|---|---|---|---|
| **3M™ Flux Field Directional Material EM80KM** | 2 (0.05) | Soft magnetic foil, nanocrystalline | Acrylic PSA | Max 80,000 | -25 ~ 110°C | » Low frequency focused for magnetic field<br>» High permeability magnetic foil<br>» Thin overall product construction allows for thinner design |
| ★ **EM25TP-005-A10 EM25TP-100-A10 EM25TP-0200-A20** | 2 (0.05), 4 (0.1), 8 (0.2) | Soft magnetic composite | Acrylic PSA | 250 | – | » Broad frequency absorber<br>» High permeability magnetic film<br>» Absorbing performance 100MHz - 4GHz<br>» Targeted permeability for magnetic shielding <5MHz - 10MHz |
| **AB3010/AB3010-WO AB3030/AB3030-WO AB3050/AB3050-WO *Coming soon*** | 4 (0.1), 12 (0.3), 19.5 (0.5) | – | Non-conductive acrylic (optional) | 30 | -25°C – 90°C | » Predicted broad absorbing performance 1-10 GHz<br>» Anticipated availability with and without (-WO) adhesive<br>» Large sheet format for improved yield (340mm x 340mm) |

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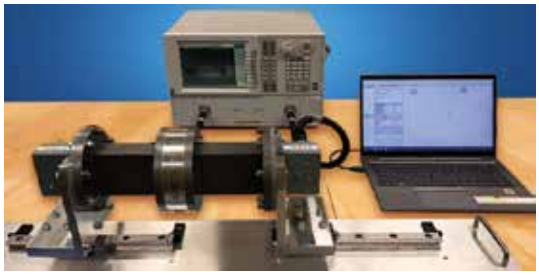
# Future-tested Solutions

At 3M, we're testing our EMI absorbing and magnetic shielding solutions for the future. Our testing capabilities include:

- Simulation and modeling
- Frequency measurement
- Mechanical property measurement
- Material magnetization
- Reliability testing for age, humidity and temperature cycling
- And more



In many cases, 3M can focus our technical and testing capabilities to help you identify the right solution for you and your customers. No matter what your field, you can feel confident that the 3M solutions you specify will be tested and proven for performance. Virtually anywhere in the world. Now and in the future.

## Contact your 3M sales representative or visit 3m.com/electronicsassembly to learn more.

**Regulatory:** For regulatory information about this product, contact your 3M representative.

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