

3M™ EMI Absorber EM25TP

Product Description

3M™ EMI Absorber EM25TP is a composite material consisting of a carrier resin, magnetic fillers, an optional acrylic pressure sensitive adhesive (PSA) and optional Black PET top film layer. This magnetic material interacts and influences an Electro-Magnetic (EM) field. The EM field could be generated for various reasons and in many applications. It is designed to focus on the EM field across a specific volumetric area, such as a secondary EM field pick-up coil, or antenna in a frequency range of below 5-10 MHz typically.

The 3M EMI Absorber EM25TP in the frequency range above the 5-10 MHz range is typically as an EMI/EM field absorber as the higher loss (μ'') characteristics of the 3M EMI Absorber EM25TP provide for excellent EM field reduction.

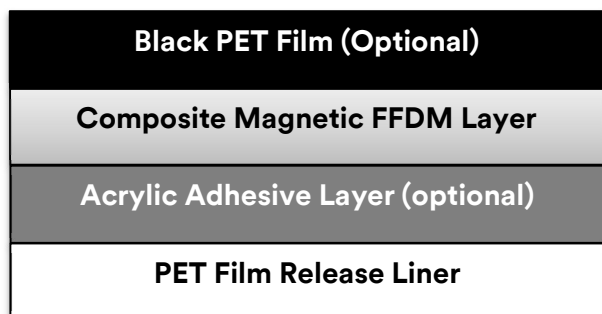
3M EMI Absorber EM25TP is designed to efficiently couple to the EM field and redirect and focus the field as desired in each application or to provide EM absorbing.

Key Features

- Targeted permeability for < 5-10MHz EMI Absorber performance for EM field coupling.
- EMI absorption performance for frequencies above 5-10 MHz.
- Excellent absorbing performance from 100MHz to 4 GHz
- Multiple thickness options available for design flexibility
- Black PET protection cover-film layer (optional)
- Pressure sensitive acrylic adhesive layer (optional)
- Supplied on a removable liner for ease of handling

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Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.



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Product Construction/ Materials Description

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3M™ EMI Absorber EM25TP		
Structure	Type	Thickness
Cover Film Type	Black-colored PET (C, optional)	10 µm
Magnetic Type	Soft Magnetic Composite	See options below
Adhesive Type	Acrylic Adhesive (A, optional)	10 – 50 µm
Magnetic Layer Thicknesses (excluding removable liner) Tolerance: +/-10%	EM25TP-0025 EM25TP-0035 (See Note*) EM25TP-0050 EM25TP-0075 EM25TP-0100 EM25TP-0150 EM25TP-0200 EM25TP-0250 EM25TP-0500	0.025mm 0.035mm 0.050mm 0.075mm 0.100mm 0.150mm 0.200mm 0.250mm 0.500mm
Product Nomenclature	EM25TP-XXXX-Azz-Czz Examples: EM25TP-0025 EM25TP-0050-A10 EM25TP-0100-A10-C10 EM25TP-0500-A30	XXXX = magnetic layer thickness Azz = optional Adhesive layer thickness Czz = optional Cover film thickness 0.025mm magnetic only 0.050mm magnetic + 10 µm A 0.100mm magnetic + 10 µm A + 10 µm C 0.500mm magnetic + 30 µm A

Note: The product 3M absorber EM25TP is available in 340 mm x 340mm sheets. Contact your local 3M representative for more information.

*In an earlier version of the product, the numbering was also stated as EM25TP-004. For 2019 forward, use a four-digit format to clarify magnetic layer thickness.

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the product's Certificate of Analysis (COA) that is provided once the product is approved by 3M for general commercialization and development work is completed.

3M™ EMI Absorber Magnetic Composite EM25TP	
Property	Value
Electrical Resistivity***	$2 \times 10^4 \Omega \cdot m$
Typical Permeability	250
Operating Temperature Range	-25 – ~90°C

*Permeability and noted results of Vibrating Sample Magnetometers (VSMs) can vary with test method and/or equipment used for testing at different test sites

** Based on general environmental performance characteristics of the polymer binder resin type. Each application should verify temperature and environmental performance in the end-use specific configuration.

*** ASTM D257 Type Test Method

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Absorbing Effectiveness

3M™ EMI Absorbers EM25TP performance and effectiveness is based on several application considerations:

- 1) Permeability (μ') and Loss (μ'') of this material at the frequency range or frequency peak of the intended application can affect the performance. Permeability and Loss of the 3M EMI Absorber EM25TP varies with frequency and is a measure of how well the EM material may be coupled with the EM field and impact performance.
- 2) Thickness of the 3M EMI Absorber EM25TP product can be used to optimize an application's performance.
- 3) End use application orientation and location affect the 3M EM products interaction with an EM field.

Applications

3M EMI Absorber EM25TP has potential to be used for:

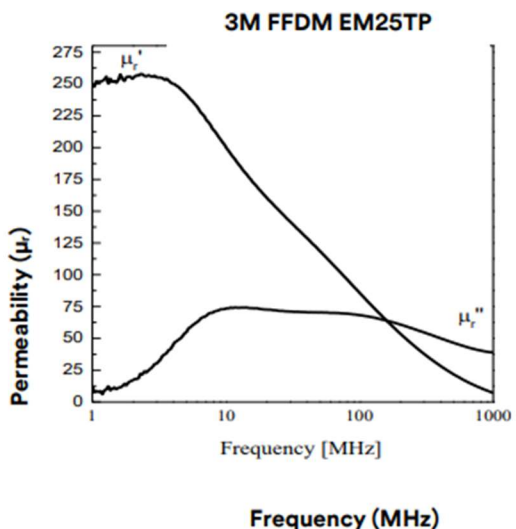
- Shield DC and low frequency magnetic field
- Wireless power system power transfer efficiency improvement
- EMI Absorber
- Potential devices include mobile phones, computers, tablets, measurement and sensors.
- Protect magnetic flux sensitive devices such as a hall sensor and a flux gate from external low frequency magnetic fields
- Assembly of magnet coil for Wireless Charging System
- Electronic equipment protection for automobile applications

As an initial design, it is suggested to test the 3M™ EMI Absorbers at the greatest thickness allowed (1x, 2x, 3x layers, etc.), largest XY dimension, in multiple locations or use multiple parts to determine a potential maximum performance level associated with the material and the end use assembly. Once a baseline level of performance is established, the 3M EMI Absorber material thickness, XY shape, location, etc. can be reduced or changed to determine the minimum material needed to meet a specification.

It should be noted that once a maximum performance level is established for the end use device using the 3M EMI Absorber EM25TP as an EMI absorber, the overall design can be reviewed to understand if other, non- EMI Absorber changes not initially considered, but now possible with the new performance level associated with using the 3M EMI Absorber materials could be considered. An example would be the absorber reducing EMI noise levels to allow for improved antenna Signal to Noise (SNR) ratio that could allow for higher data transfer speeds and/or longer-range performance.

Figure 1. Real and Imaginary Part of Permeability with Frequency

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Storage and Shelf Life

The shelf life of 3M™ EMI Absorber EM25TP Series is 12 months from the date of manufacture when stored in sheet form, in the original packaging materials, and stored at 10°C-25°C (50°F-77°F) and <60% relative humidity.

Once the 3M EMI Absorber is removed from the original packaging materials, the 3M EMI Absorber should be converted, shipped, and stored in the prescribed temperature and humidity-controlled conditions to ensure stable material performance. Adhesion, tack, conductivity, and reliability of the 3M EMI Absorber in an application can be reduced if the 3M EMI Absorber is not controlled to the prescribed handling and usage conditions.

In addition, in some applications the 3M EMI Absorber may be converted (die cut, laminated to other materials or release/processing liners) in such a manner that the release liner that the product material is shipped with is removed and the different release or processing/carrier liner is applied to the adhesive side of the material. The new release/carrier liner may transfer release agents (silicone, fluoropolymer, etc.) to the material's adhesive surface and reduce the applied tack and/or adhesion strength of the 3M EMI Absorber in the end user's application to a surface versus when no release/carrier liner changes have occurred. Any proposed release/carrier liners to be used with the 3M EMI Absorber should be tested with the material to ensure that the material's performance is not negatively impacted for the intended end use application and that shelf life is not negatively impacted. If a poor performing liner is selected for a liner exchange, it can have a significant negative impact on the conductive 3M EMI Absorber's adhesion/tack/electrical performance and/or significantly reduce shelf life.

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is manufactured and is deemed commercially available from 3M. The COA contains the 3M specifications, test methods and test results for the product's performance attributes that the product will be supplied against. Contact your local 3M representative for this product's COA.

This technical data sheet may contain preliminary data and may not match the COA specification limits and/or test methods that may be used for COA purposes.

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

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