

3M™ Flux Field Directional Material EM04TP

Product Description

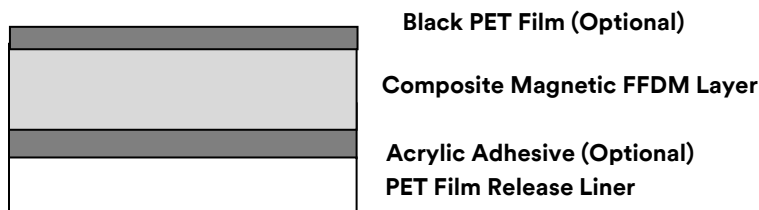
3M™ Flux Field Directional Material (FFDM) EM04TP is a composite material consisting of a carrier resin, magnetic fillers and an acrylic pressure sensitive adhesive (PSA). This magnetic material is designed to interact and influence an Electro-Magnetic (EM) field. The EM field could be generated for various reasons and in many applications, it is desired to focus the EM field across a specific volumetric area, such as a secondary EM field pick-up coil or antenna.

3M FFDM EM04TP is designed to efficiently couple to the EM field and redirect and focus the field as desired in a given application.

Key Features

- Targeted permeability for < 20MHz FFDM performance
- Multiple thickness options
- Black PET protection tape cover film (optional)
- Pressure sensitive acrylic adhesive
- Supplied on a removable liner for ease handling

3M™ Flux Field Directional Material (FFDM) EM04TP



3M™ Flux Field Directional Material (FFDM) EM04TP

Product Construction/ Materials Description

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

3M™ Flux Field Directional Material EM04TP		
Structure	Type	Thickness
Cover Film Type	Black Colored PET (C is optional)	10µm
Magnetic Type	Soft Magnetic Composite	Options below (L= Layers)
Adhesive Type	Acrylic Adhesive (ADH optional)	10 – 50 µm
Magnetic Layer Thickness (excluding protective film)	EM04TP-005 EM04TP-010 EM04TP-XXX-A-C*	0.05 mm 0.10 mm -XXX-A-C
Total Thickness		Cover Film (Optional) + Magnetic Layer + Adhesive Layer (Optional)

*XXX = custom magnetic layer thickness options, Azz = optional Adhesive layer thickness micron (um) A= Adhesive, Czz= optional Cover film thickness (um), C= Cover film; Adhesive layer thickness can vary based on application need. Heat Activated Films (HAF) can also be options. L= Layers

Application Ideas

3M FFDM EM04TP has potential to be used for:

- Shield DC and low frequency magnetic field
- Shield DC and low frequency magnetic field
- Shielding solution for RFID and NFC system.
- Wireless power system power transfer efficiency improvement
- Potential devices include mobile phone, computers, tablets, measurement and sensors.
- Protect magnetic flux sensitive device 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™ Flux Field Directional Materials 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 FFDM material thickness, XY shape, location, etc. can be reduced or changed to determine the minimum material needed to meet a specification.

The desire to test first the 3M FFDM products with the thickest and/or largest footprint design is to establish that an FFDM material solution is reasonable and also to understand a maximum associated performance. Once a maximum performance level is established, the overall design can be reviewed to understand if other, non-FFDM changes not initially considered, but now possible with the new performance level associated with using the 3M FFDM materials could be considered.

3M™ Flux Field Directional Material (FFDM) EM04TP

Effectiveness

3M™ Flux Field Directional Material (FFDS) EM04TP material performance and effectiveness is based on several application considerations:

- 1) Permeability of this material at the frequency range or frequency peak of the intended application can affect the performance. Permeability of the 3M FFDM EM04TP varies with frequency and is a measure of how well the EM material may couple with the EM field and impact performance.
- 2) Thickness of the 3M FFDM EM04TP product can be used to optimize an applications performance.
- 3) End use application orientation and location affects the 3M EM products interaction with an EM field.

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.

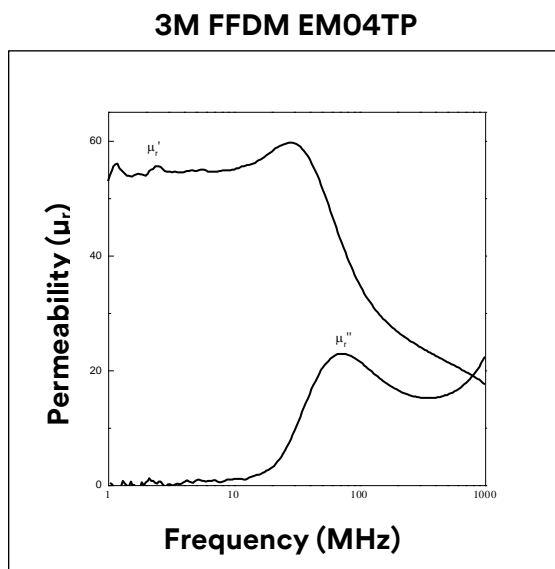
3M™ Flux Field Directional Material EM04TP	
Property	Value
Electrical Resistivity***	$1 \times 10^5 \Omega\text{m}$
Typical Permeability (@1 MHz)*	50-60
Temperature Range**	-25 ~ 90°C

*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

Figure 1. Real and Imaginary Part of Permeability with Frequency



3M™ Flux Field Directional Material (FFDM) EM04TP

Storage and Shelf Life

The shelf life of 3M™ Flux Field Directional Material EM04TP is 12 months from the date of manufacture when stored in the original packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Certificate of Analysis (COA)

The 3M Certificate of Analysis (COA) for this product is established when the product is commercially available from 3M. The commercially available product will have a COA specification established. The COA contains the 3M specifications and test methods for the products performance limits that the product will be supplied against. The 3M product is supplied to 3M COA test specifications and the COA test methods. Inquire with 3M for the COA for this product.

The TDS data contains preliminary data and is not the COA specification limits and/or test methods that may be used for COA purposes.

Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is provided once the product is approved by 3M for general commercialization and development work is completed.

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

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer: Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OR TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.



Electronics Materials Solutions Division

3M Center, Building 224-3N-11

St. Paul, MN 55144-1000

1-800-251-8634 phone

651-778-4244 fax

www.3M.com/electronics

3M is a trademark of 3M Company.

Please recycle.

©3M 2019. All rights reserved.

60-5002-0970-9