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Technical Data | September 2024

3M™ EMI Absorber AB7000E series

Product Description

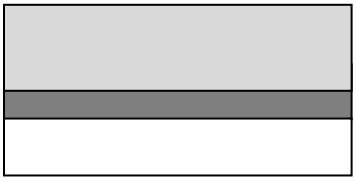
3M™ EMI Absorber AB7000E Series is a magnetic EMI absorber for helping suppress near-field EMI noise from 300 MHz to 4 GHz. 3M absorber AB7000E series consists of a polymer resin loaded with flexible and soft metal flakes with an optional acrylic non-conductive pressure sensitive adhesive. This series of grey absorbers from 3M includes model numbers AB7010E, AB7020E, AB7030E and AB7050E, which are available in sheet form.

Features and Benefits

- High permeability
- Operating frequency range from 300 MHz to 4 GHz
- Available with or without adhesive
- Multiple thicknesses
- Long shelf life (18 months)
- Broader temperature performance than 3M™ EMI Absorber AB7000HF Series (-25 ~ 105°C)
- Supplied on a removable liner for easy handling and die-cutting
- *Halogen-free

*Halogen Free is defined as having maximum 900 ppm bromine, maximum 900 ppm chlorine, and/ or maximum 1500 ppm total bromine and chlorine, per IEC 61249-2-21

3M™ EMI Absorber AB7000E



Polymeric resin with magnetic flake filler

Acrylic non-conductive adhesive (optional)

Blue PET film release liner

3M™ EMI Absorber AB7000E Series

Product Construction/ Materials Description

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

3M™ EMI Absorber AB7000E Series			
Product Code	**Magnetic Layer Thickness**	**PSA Thickness**	**Total Thickness**
AB7010E	0.10 ± 0.02mm	0.03 ± 0.003mm	0.13 ± 0.02mm
AB7020E	0.20 ± 0.03mm	0.05 ± 0.005mm	0.25 ± 0.03mm
AB7030E	0.30 ± 0.03mm	0.05 ± 0.005mm	0.35 ± 0.03mm
AB7050E	0.50 ± 0.05mm	0.05 ± 0.005mm	0.55 ± 0.05mm
AB7010E-WO	0.10 ± 0.02mm	N/A	0.10 ± 0.02mm
AB7020E-WO	0.20 ± 0.03mm	N/A	0.20 ± 0.03mm
AB7030E-WO	0.30 ± 0.03mm	N/A	0.30 ± 0.03mm
AB7050E-WO	0.50 ± 0.05mm	N/A	0.50 ± 0.05mm

-WO = without adhesive

Application Ideas

3M™ EMI Absorber AB7000E Series can potentially be used for:

- Mobile phones, computers, tablets, measurement devices, displays, cable wraps, camera modules, antenna grounds, and sensors.
- Electronic equipment protection for automobile applications.

As an initial design, it is suggested to test the 3M absorber AB7000E Series 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 absorber AB7000E XY shape, location, etc. can be reduced or changed to determine the minimum material needed to meet customers' specification.

It should be noted that once a maximum performance level is established for the end use device using 3M absorber AB7000E series, the overall design can be reviewed to understand if other absorber changes, not initially considered, but now possible with the new performance level associated with using the 3M absorber AB7000E series 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.

Effectiveness

3M absorber AB7000E series performance and effectiveness is based on several application considerations:

1) Permeability (u') and Loss (u") of this material at the frequency range or frequency peak of the intended application can affect the performance. Permeability and Loss of the 3M absorber AB7000E 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 absorber AB7000E product can be used to help optimize an applications performance.
3) End use application orientation and location affects the products interaction with an EM field.

3M™ EMI Absorber AB7000E Series

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 AB7000E Series	
Property	**Value**
Absorber Layer	Polymeric resin with magnetic flake filler
Adhesive layer	Acrylic non-conductive adhesive (Optional)
Liner layer	Blue PET film release liner (0.14 mm)
Electrical Resistivity* **	1 x 10^6 Ωm
Typical Permeability (@3 MHz)*	100u'
Temperature Range**	1) -25 ~ 105°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

Test method: Short coax (Keysight magnetic test fixture 16454A) for 1-1000 MHz and 7-mm coax 1-6 GHz per ASTM D5568–01.

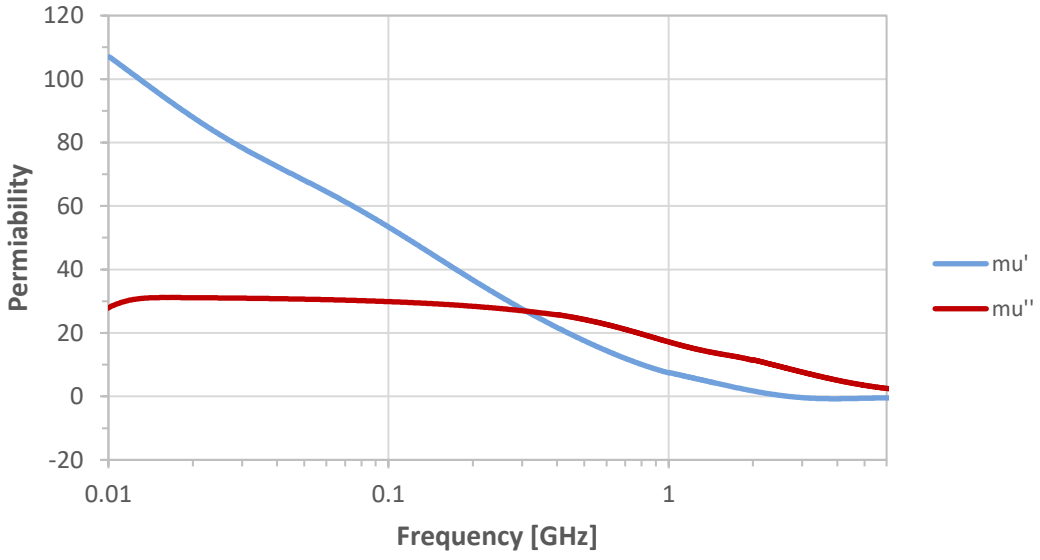


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Figure 2. Power Loss

Power loss was measured for 0-6 GHz in accordance with 3M test method TM-06-1078097.

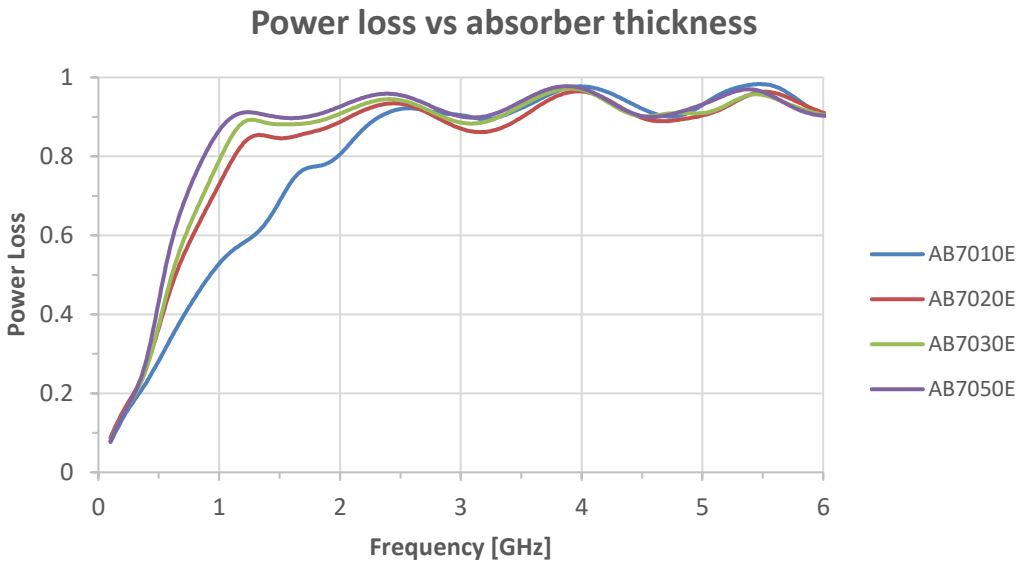
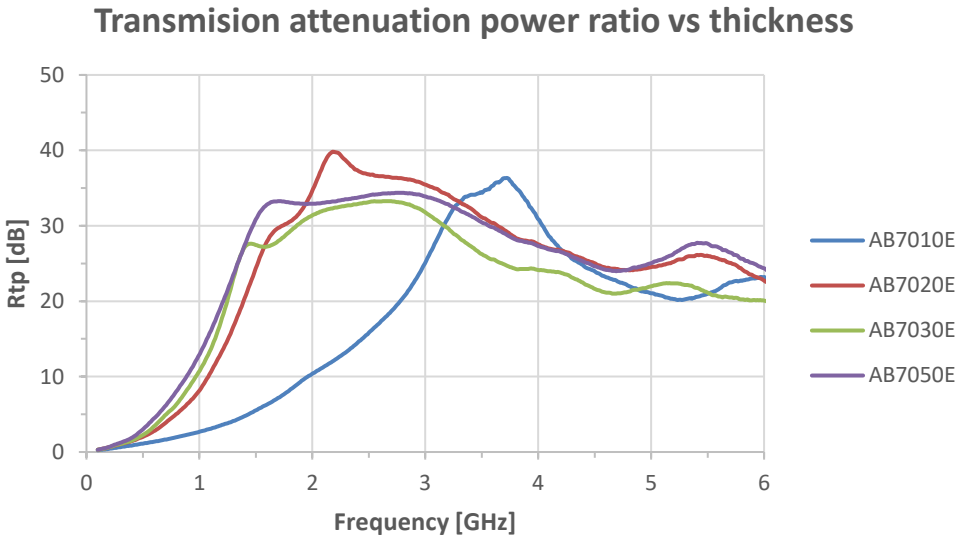


Figure 3. Transmission Attenuation Power Ratio

Transmission attenuation power ratio Rtp was measured in accordance with section 4.3 of IEC62333-2. Lateral dimensions of the samples were chosen to be 100x75 mm.



3M™ EMI Absorber AB7000E Series

Storage and Shelf Life

The shelf life of 3M™ EMI Absorber AB7000E Series is 18 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 manufactured and is deemed commercially available from 3M. The COA contains the 3M specification, 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.

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