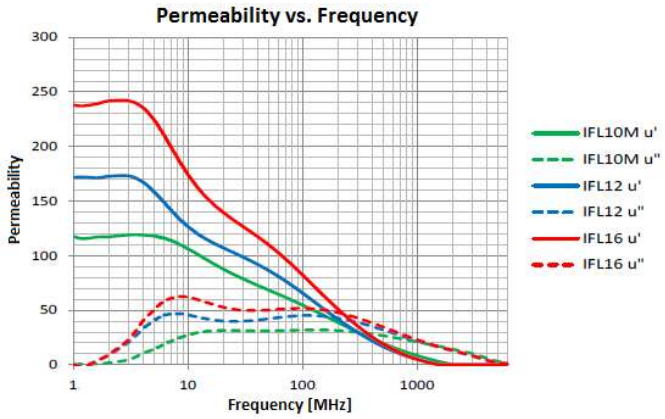
Flexield - Product Brief

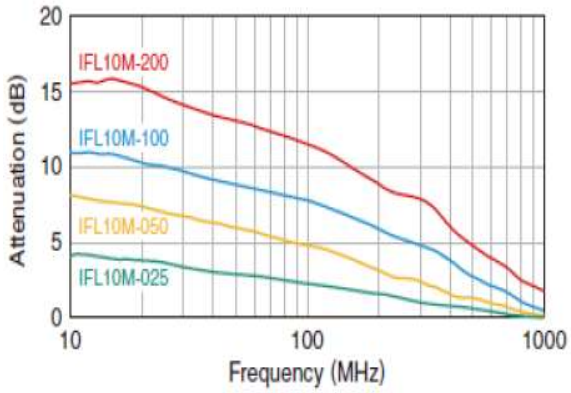
TDK magnetic Flexield shields are used in multiple applications. One of the key applications is for EMI noise suppression. Magnetic shields consist of various materials such as: metal powder, ferrite, polymer and metalized materials with the performance and behavior over frequency being different and that thickness will also impact performance. For EMI noise suppression, the following complex permeability equation can be used to help understand:

$$\mu = \mu' - j\mu'' \qquad \text{Eq. 1}$$

where μ' is the material's permeability (related to energy storage) and μ" is related to the material's losses (impedance).
Flexield suppresses EMI noise through containment, attenuation, and/or reflection:
μ' – higher yields better shielding performance through magnetic (H) field CONTAINMENT/ABSORPTION
μ" – higher yields better noise suppression via ATTENTUATION through inner-material losses
metal layer – increases noise suppression by REFLECTION of unwanted signals
grounding – reduces parasitic capacitance and helps suppress high frequency noise



μ', μ" curves for various TDK materials



Attenuation improvement by thickness

The following are the initial steps, and recommended order, that one should consider when trying to determine the best magnetic shield for EMI noise suppression:

1) **Identify the EMI noise frequency** – helps determine approach and material needed
2) **Identify the existing noise level** – helps determine approach, material and thickness
3) **Is the issue radiation or susceptibility?** – sets EMC noise level profile requirements
4) **Determine the permissible noise level** – determines needed material, stack-up, thickness
5) **Understand the mechanical limitations for solution** – sets thickness, surface resistance
6) **Determine the approach for compliance** – controls material, stack-up, thickness
7) **Identify the EMI noise source** – determines the approach, location, material, stack-up
8) **Identify sensitive components** – determines the approach, location, material, stack-up
9) **Obtain the material data curves** – provides an initial estimation of suppression
10) **Obtain the test results** – determines if approach, material or thickness needs changed
11) **Circuit re-design and/or lay-out changes** – final resolution if Flexield not effective