



MFP230

For more information on Product Status Definitions, see page 3.

## EMI-suppression products

## Ferroxfoil EMI absorber sheet

### FerroxFoil - Flexible sheet EMI absorbers

Radiated EMI can be confined by enclosing the source in a metal box. This reflects the signal back without attenuation and will not lower the general noise level around the source. It's better to enclose the source with an absorbing material. That is the case with FerroxFoil products, consisting of a sheet of absorptive material, constituted by a lossy magnetic material distributed in an organic matrix, which absorbs the electromagnetic energy of the incident radiation and converts it into heat. Its flexible structure provides an excellent processability and allows its use in a huge variety of configurations and applications : the sheets can easily be cut to custom shapes and sizes and wrapped closely around the radiation source. This makes them very well suited for retrofit solutions if the source of interference has not been found yet. Moreover, with its high electrical resistivity it can be applied on conductive material. The materials are effective in the wide frequency band 100 MHz - 30 GHz and one HF material around the RFID frequency 13.56 MHz. Ferroxfail comes in four different grades :

- 5W1 The basic grade
- 5R1 High resistivity for high insulation
- 5F1 Higher frequencies (500 MHz - 30 GHz)
- 5T1 Shielding metal parts in RFID at 13.56 MHz

For all grades, the sheets are available with different thickness, depending on the degree of attenuation required.

### Applications / Examples of use

Applications can be found where ever radiated EMI is present : in the far field (prevention of EMI radiation and protection against incoming EMI) or in the near field (between components on a PCB, between PCB's, around transmission lines) and to shield metal objects for RFID in

the HF band (13.56 MHz). In the far field, plane waves coincide with the sheet surface and are either frontally reflected, absorbed in the sheet or transmitted. All materials have been engineered in such a way that reflection is low and absorption high. Reflection depends on the ratio of permeability and permittivity, while absorption depends on magnetic losses. In the near field, the geometry of the shielded object is important and it's difficult to give general rules other than absorption by magnetic losses.

### Examples :

- Noise coupling reduction between components on the same PCB
- Top shields for fast digital IC's (clock, microprocessor, memory)
- Prevention of unwanted high frequency circuit resonances
- Noise coupling reduction between circuits on different (stacked) PCB's
- Noise coupling reduction between PCB circuits and an LCD display
- SAR regulation for mobile phones (human head protection)
- Noise absorption from PCB transmission lines and flat cable connections
- Noise absorption on steel casing inside to lower general radiation level
- Enhanced reading distance of RFID tags in the proximity of metals
- Directional shielding to prevent interference in wireless communication
- Directional shielding to prevent interference from radar equipment
- Directional shielding to prevent interference from medical equipment

### Materials and properties

| PARAMETER   | 5W1                                       | 5R1                                | 5F1                          | 5T1               |
|---|---|------------------------------------|------------------------------|-------------------|
| Main Feature / Application                              | High Performance Wide Band                | High Resistivity / High Insulation | HF Use / Semi-Microwave Band | RFID Applications |
| Recommended frequency range                             | 100 MHz - 10 GHz                          | 100 MHz - 10 GHz                   | 500 MHz - 30 GHz             | 13.56 MHz         |
| Operating temperature range (°C)                        | -25 to +125                               |                                    |                              |                   |
| Resistivity (Ωm)  | 10  | 10 <sup>4</sup>                    | 10                           | 10                |
| Density (g/cm <sup>3</sup> ), typical                   | 3.0                                       | 3.0                                | 4.0                          | 3.0               |
| Typical initial permeability (μ <sub>i</sub> ), 100 MHz | 10  | 5                                  | 5                            | 10                |
| Min / Max sheet dimensions (mm)                         | 50 x 50 / 300 x 200                       |                                    |                              |                   |
| Min / Max sheet thickness (mm)                          | 0.1 / 6.0                                 |                                    |                              |                   |
| Typical sheet dimensions / thickness (mm)               | 100 x 100 x 0.5                           |                                    |                              |                   |
|   | 100 x 100 x 1.0                           |                                    |                              |                   |
| Environment   | RoHS Compliant : Lead Free / Halogen Free |                                    |                              |                   |

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