EMI SHIELDING EFFECTIVENESS OF PRESSURE SENSITIVE FOIL TAPES

An easy-to-use and cost-effective method for combating EMI is to use foil tape with pressure-sensitive adhesive. Foil tapes can be molded to conform to almost any shape for a variety of applications including shielding electronic cabinets, connectors, cables and components. The tapes featuring a protective liner allow fast, simple die-cutting to meet specific application shapes such as gaskets or circuit board shields. These pre-cut parts can be in roll form to speed handling.

Foil tapes consist of a metal foil layer (copper or aluminum) and a layer of adhesive. The adhesive can be made conductive by adding a mixture of conductive particles or by embossing the foil so that regularly spaced "ridges" protrude through the adhesive layer to contact the underlying substrate. Tapes that are conductive through the adhesive provide greater shielding effectiveness and are useful for static charge draining applications. Foil tapes should have an electronic grade pressure-sensitive adhesive to prevent possible electrolytic corrosion of fine wires (18 AWG and smaller) in coils, transformers and other electronic components.

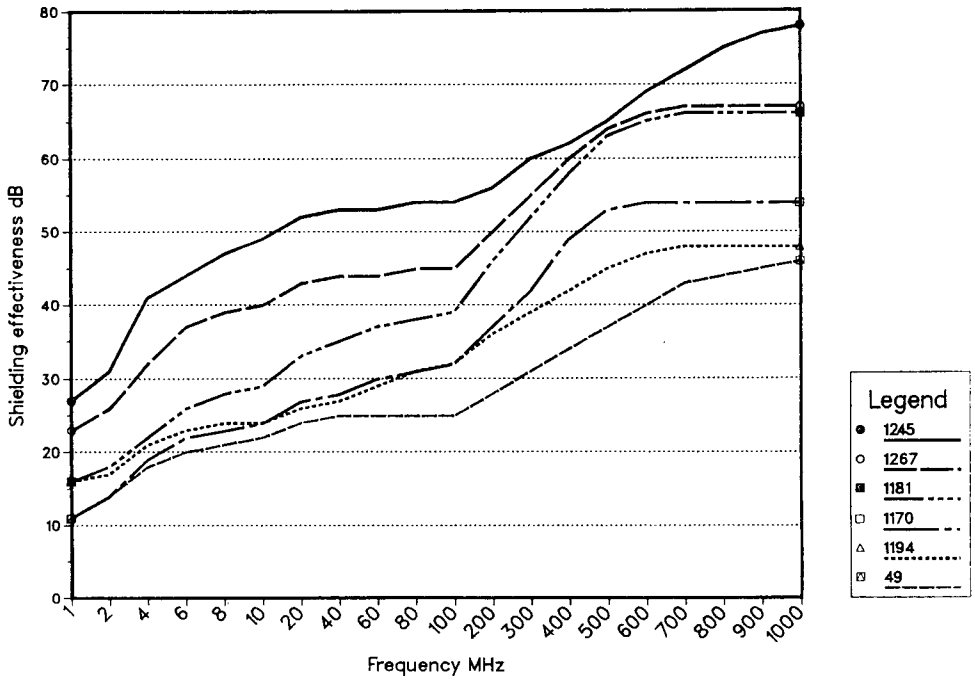
To establish the shielding effectiveness of copper and aluminum foil tapes, a series of tests were conducted by a major computer organization. Seven brass plates, each having a 12 inch by ¼ inch slot aperture, were provided. On six plates, one inch wide tape samples were affixed over the aperture. The seventh plate had an open aperture, which served as a control against which the shielding effectiveness of the tape samples could be measured.

The tape samples were tested over the frequency range of 1 to 1000 MHz using a standard shielding test method and fixture. In this fixture, the electromagnetic field is produced by a leaky 50 ohm transmission system spaced 5 inches from the test sample. The field passing through the test sample is sensed by a magnetic field loop sensor. This test set-up provides low impedance field conditions, which tend to simulate conditions found in digital electronic equipment where the shielding would function to contain electromagnetic emissions generated within the equipment. The resultant data tend to be biased toward the worst case, rather than the best case, which would be obtained from a high-impedance, far-field source.

The test results are shown in Figure 1. At frequencies above 500 MHz, the shielding effectiveness of 1245 tape reached the measurement limitation of the system. The six foil tapes ranked in the following order by shielding effectiveness:*

1. (BEST)	1245	Embossed Copper - Conductive through the Adhesive
2.	1267	Embossed Aluminum - Conductive through the Adhesive
3.	1181	Smooth Copper - Conductive through the Adhesive
4.	1170	Smooth Aluminum - Conductive through the Adhesive
5.	1194	Smooth Copper
6.	49	Smooth Aluminum

Figure 1. IEP Foil Tape Testing Results.



* This data was taken from a limited number of samples and the results agree with previous data obtained. A brass substrate was used in laboratory tests; field results may vary somewhat when other substrates are used.

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