



EMI Shielding of Plastics

Vacuum Metallization Method of EMI shielding

The main objective of any type of shielding is to prevent the passage of electromagnetic waves into or out of the device. EMI shielding can work by reflection, absorption, or by carrying the electromagnetic radiation to ground. The fundamental aim is to establish a Faraday cage (named after Michael Faraday who formulated the laws of electromagnetism) to provide an EMI shield.

Metals were the original EMI shielding method and metal casings were, for many years, the only method of shielding electronic devices. Metal cans placed on the circuit board are still used in many cases to reduce EMI. However, their use must be considered early in the design stage and on some circuits the number of metal cans used can add significantly to the weight of the device. This can increase the difficulty of recycling the product during disposal.

Plastics have made great inroads into the electronics enclosure market for a range of reasons such as:

- Cost reduction.
- Weight reduction.
- Ease of production
- Improved design freedom (integral and multiple colors, soft touch and product complexity).

Unfortunately, unlike metals, plastics are transparent to electromagnetic radiation and provide no inherent EMI shielding. The rapid rise in the use of plastics in portable consumer electronics has therefore driven the development of a variety of methods for EMI shielding of plastics.

Dixline Corporation utilizes the advanced method of Vacuum metallization to establish a Faraday cage and EMI shielding.

The specialized equipment of this application method applies a thin coating of aluminum to the surface of the plastic to provide a highly conductive layer and very effective EMI shielding.

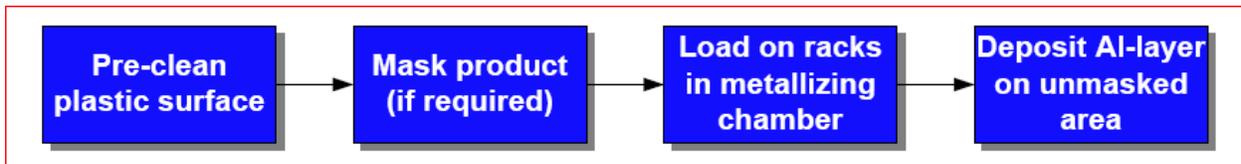
Aluminum is used because it has a very high conductivity and is highly corrosion resistant in most environments. Vacuum metallizing is a multiple stage process:





1. The part is cleaned, if required, to give good adhesion between the substrate and the vacuum deposited aluminum.
2. If selective coating is being used, the product is masked to cover any areas that do not require coating.
3. A layer of aluminum (up to 10 microns) is applied to the plastic surface to provide the conductivity and main EMI shielding.

The steps in vacuum metallizing are shown below:



The process of vacuum metallizing



Vacuum metallizing can be used for complex shapes, but often requires a mask to ensure that the metal is deposited in the correct locations. This can be done either by custom mask tooling or by hand masking although custom mask tooling is preferred for larger volumes.

Vacuum metallizing can also be carried out on thermoformed parts to form the equivalent of a metal can for board level EMI shielding.

Applications

EMI shielding is used for a wide variety of products such as:

- Personal computer and mobile communication housings
- Medical equipment housings
- GPS devices
- Aerospace components
- Automotive components
- Analytical instruments
- Defense and military component housings