CASE STUDY

How do you carry out electromagnetic shielding of a thermoformed or 3D-printed plastic part while keeping the weight down?

Customer

Electronic connector manufacturer

Markets

Electronics - Aeronautic
Microelectronics - Aerospace

Objective

To coat a non-conducting part with a metallic layer to provide EMC without jeopardising the design or dimensional accuracy of the part, such as here for the cover of an electronic connector.

Background

A major European company operating in the electronics sector using 3D printing - SLA technology with a functional, solid and rigid resin - to offer adaptable and modular connectivity solutions.

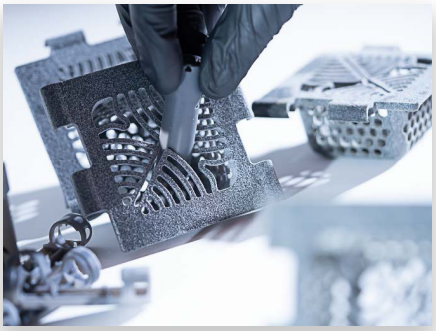
This customer wanted to provide its parts with EMI shielding without making them heavier and while providing features in line with their quality requirements.

Manufacture - Solutions

Step 1

Analysis and tests in the laboratory

Initially, our **R&D department** carried out various tests on material samples in order to identify the steps in the process which would most suit the type of substrate and to formulate the chemical solution giving the best results in terms of adhesion, uniformity and thickness of deposit.



Step 2

Cleaning

Once the process was identified, tests were carried out on the actual parts, cleaned and degreased in a special solution which removed remaining resin residues. This operation was optimised using the ultrasound technology of the **Uscleaner** machine and a suitable solvent.

Step 3

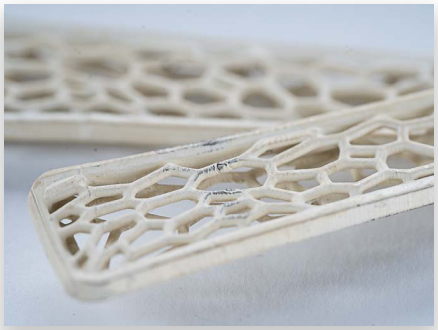
EMC shielding: Fara D Layer

Secondly, the shielding was produced through the **functional metallic coating** of the parts using the **Fara D Layer** process, obtained by spraying a silver-based solution at ambient temperature and atmospheric pressure using the **Metalfog** machine.

The deposit is between 2 and 5 microns in depth **with a weight 10 times less than copper** for attenuating equivalent pass-bands.

Step 4

Protection



Lastly, a tropicalised translucent varnish was applied as a protective coat.
Note: this step is optional and depends on the specifications provided by the customer.

Results

Once treated with the Fara D Layer, the parts manufactured operate correctly in their electromagnetic environment without being disturbed or disturbing neighbouring equipment.

Technical data

Material: technical resin

Manufacture: 3D printing, SLA

Processes used:

- Cleaning and decontamination
- Fara D Layer – EMC shielding: from 2 to 5 microns
- Translucent varnish protection

Ecological innovation!

Fara D Layer is a water-based solution, free of Carcinogenic, Mutagenic and Reprotoxic agents (CMR) and which is both people- and environment-friendly.

Advantages

Weight saving, compliance with geometry, speed - 5 mins on average - and simplicity in implementing the process, bringing innovative solutions in-house, increase in autonomy.

Conclusion

With the growth in polymer 3D printing, across all sectors, the requirement for EM shielding is a real challenge, particularly for those involved in electronics, aeronautics and aerospace.

Metalizz offers a turnkey and industrial solution with its chemical metallization process and, in particular Fara D Layer specially developed for electromagnetic shielding applications on polymers and composite materials.

The cold process, which does not involve curing, and the high conductivity of silver are key elements in the success of the Fara D Layer process.