

# **Composites for Shielding Solutions**

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Lamiflex's thirty years of business are marked by constant innovation and improvements, based on the strongest principles of modern industry: advanced technology, the management's indisputable know-how and an intelligent use of ideas and materials. The results are easily seen: constant, competitive growth. The Group's dynamism, excellence in production and research, plus constant technological innovation have led to its current strong position in Italy and abroad: a market leader in the field of technical composite laminates, proposing innovative, often revolutionary and always cutting-edge products.

Technological evolution in all industrial sectors, including civil and military sectors, is accompanied by an ever more increasing use of electronic instruments that handle, automates and simplify technology itself. Wireless connections and greater power transmission have made clear how delicate and vulnerable electronic technology has become.

Electromagnetic interferences are often the cause of malfunctioning that can lead to accidents, loss of machinery and instruments and in the worst of cases to loss of human lives.

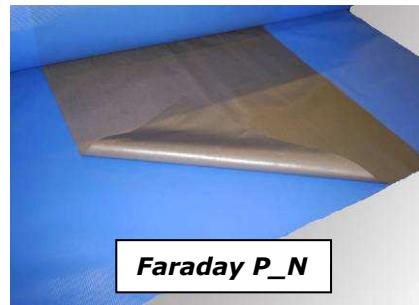
A few years ago, use of metal equipment provided secure protection through the "Faraday cage" effect but the greater use of composite material to lighten structure has caused electronic technology to be

lacking in this type of protection and therefore more vulnerable.

Companies specialized in electromagnetic protection, like EMI and RFI have united their skills and joined companies in the composite sector creating a new series of products that can fuse lightness with conductive shielding properties.

Lamiflex has consequently developed a series of semi-manufactured pre-impregnated material starting from metallic textile solutions with different types of metal:

nickel, zinc, gold and silver according to the high levels of electrical conductivity or the high resistance to corrosion they provide or the compatibility of human interaction without causing health risks as is the case with zinc.



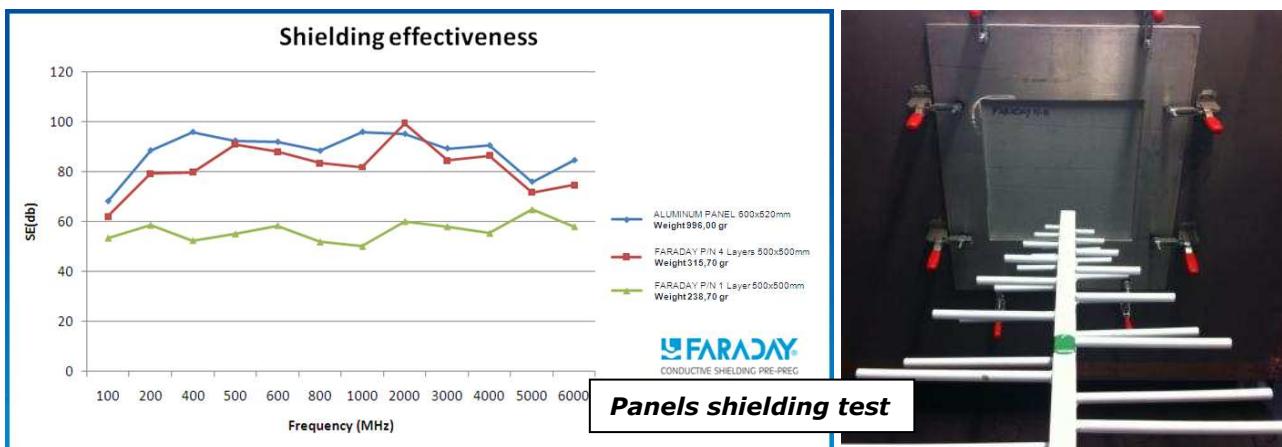
**Faraday C\_N**

Also the types of reinforcements developed can provide a wide range of choice according to the specific type of application. As a result pre-impregnated articles in low grain polyester material can be produced in order to create layers of conductive shielding combined with pre existing composite structures with minimum impact on weight but with a low signal measuring

# Lamiflex shielding solution

between 40 and 70dB for each layer depending on frequency. Thus, pre-impregnated products can be obtained with reinforcements in metallic carbon for the construction of parts that have the necessary requirements for mechanical functioning and shielding.

The Faraday pre-impregnated series developed by Lamiflex technicians, brings together the above characteristics creating a series of pre-impregnated pieces in reinforced polyester, glass, Nomex, carbon and epoxy resin with an ample range of temperatures for polymerization (from 120° to 180°) in order to satisfy a wide range of applications that are compatible with most Aeronautical approved resins (tests carried out on Hexel resins for example - 1454)

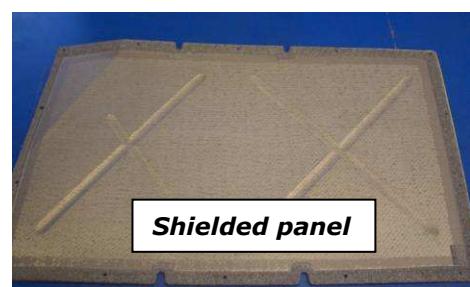


The choice of pre-impregnated pieces of this kind combines the drapability of the material and its conductive capacity making more complex forms possible that perform well and offer a high degree of shielding.

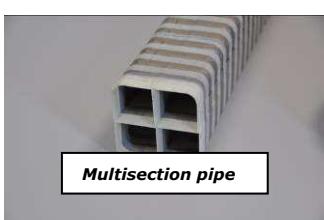


Flexible pipe

However, it is important to know how to handle these fabrics, in fact, incorrect use could cause problems of conduction due to unforeseen and unchecked excess resin that can form an insulating film and impede the electrical contacts necessary to close the circuits.

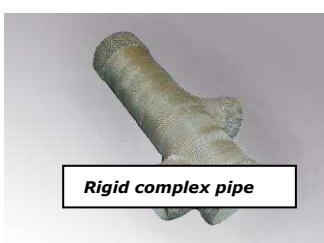


Shielded panel



Multisection pipe

Lamiflex technicians have set up a series of user techniques and complementary conductive material that optimize the electrical contacts so that pre-impregnated material can be adapted to any geometric solution.



Rigid complex pipe

The main applications for this type of material is certainly cable trunking and protective paneling for containers of electronic equipment..



Electrical joint

A practical example that shows the union of textile flexibility with the technology of composite material concerns the creation of ultra-light rigid and flexible tubes for the helicopter sector which continues to have an increasing need to combine

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the reduction of weight with greater and more complex avionics that, in the absence of protective metallic structures, is more vulnerable.

Apart from producing semi-manufactured articles like pre-impregnated pieces, Lamiflex can also produce finished parts or make products conductively shielding in composite material already in use by means of molding conductive layers with a suitable cycle in an autoclave or oven which permits products to have shielding characteristics without rebuilding the whole piece.

Because of the complexity of systems and precision of requirements of military products and more stringent on electromagnetic compatibility, all military products are mandatory through the EMC standards. Electromagnetic shielding pre-preg are to achieve electromagnetic compatibility of the election will be the composite shielding material, widely used in supporting land, sea and air military communications equipment, electronic module, cabinet shielding, satellite radar, military terminals.

Avionic equipments are easily interfered by electromagnetic waves. EMC shielding pre-preg helps to protect millions dollars of advanced avionic devices.

Due to communications equipment industry's own high-speed digital signal processing and wide microwave operating band, highly sensitive to electromagnetic interference, communications products have enacted mandatory electromagnetic compatibility standards and procedures for complex networks. According to the applications and equipment work of the different environment, wave shield to provide communications equipment electromagnetic compatibility composite shielding materials.

Other uses of these materials may find its way into applications where there is need of localized heating by Joule effect (heating, deicing, etc...) and all other designs where the imagination can wander.

Consequently finished products are available for final application that could potentially attract sectors technically more sensitive to costs such as civil and construction sectors.

If we consider domestic electronic gadgets and the increasing use of wireless devices we can imagine (and we've had proof of this in the last few years) the rise in interferences and problems when using increasingly more indispensable instruments on a daily basis like mobile phones, GPS, and other equipment to access the web network.

In conclusion, it can be said that Lamiflex is introducing a new constructive solution to the market, a response to the ever more frequent electromagnetic interference problems that are part of electronic technology in continuous evolution.