



<i>Polyester</i>	850011725	FARADAY	P-N	<i>Nickel</i>	<i>/ epoxy resin R25T</i>
<i>Polyester</i>	850012625	FARADAY HC	P-N	<i>High Conductivity Nickel</i>	<i>/ epoxy resin R25T</i>
<i>Polyester</i>	850012525	FARADAY G	P-N	<i>Nickel</i>	<i>/ epoxy resin R25T</i>
<i>Carbon</i>	850047925*	FARADAY	C-N	<i>Nickel</i>	<i>/ epoxy resin R25T</i>
<i>Carbon</i>	850047925*	FARADAY	C-C	<i>Copper</i>	<i>/ epoxy resin R25T</i>

**prototype pre-preg*

Conductive pre-pregs for composite components with shielding performance

examples of interiors applications



panels and covers



ducts



boxes

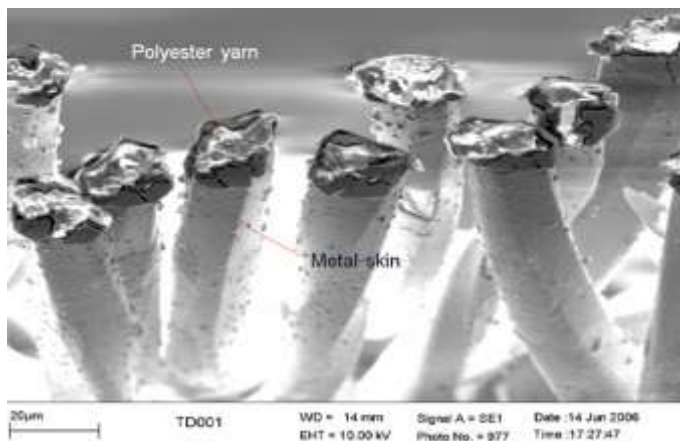


joints

FEATURES

FARADAY pre-pregs, are produced with epoxy resin and woven metalized with Nickel, Copper (available also Zinc on request), have the aim of solving the problems of shielding from electromagnetic interference on composite structures virtually devoid of natural Faraday cage that instead is still guaranteed by a metal structure. Polyester reinforcement is the standard configuration; optimal solution for light and conductive layer in a composite structure, using the carbon reinforcement it is possible to meet an high level of shielding mixed with an optimal mechanical and flame retardant behavior; it is the best solution for structural and shielding applications.

The electronics devices and cable for electrical connection as well doesn't offer in many installation a security for the range of new sources involved out side from Telecommunication and other power magnetic generator . In this condition with the new increasing transformation of structure from metal to composite, it's natural to offer more vulnerability to many devices.



The scope to use the fabric metalized in a combination of the composite are the best solution to reduce the interferences from out side or inside to out side .

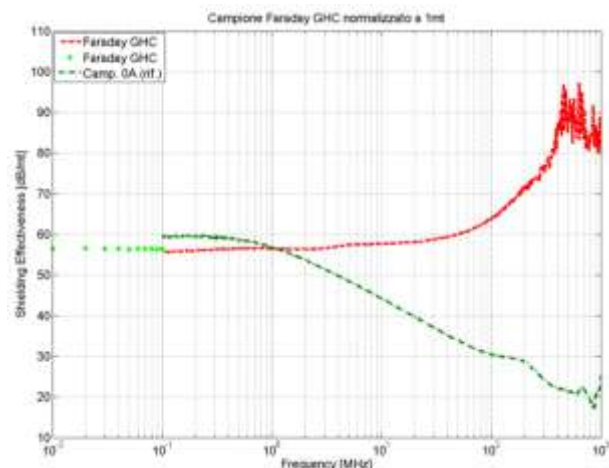
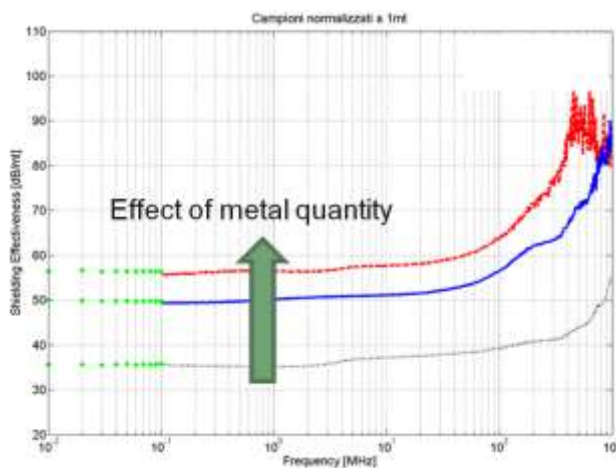
The use of NICKEL as metal over the textile structure is a guaranties for the electrical surface resistivity of the composite.

The level o the metallization in very deep; each filament is covered with a metal skin.

The R25T system is designed to guarantee a very good surface and curing cycle at medium – high temperature.

FARADAY pre-pregs can offer an huge frequency range of shielding.

A comparison with standard copper mesh solution show this behavior.

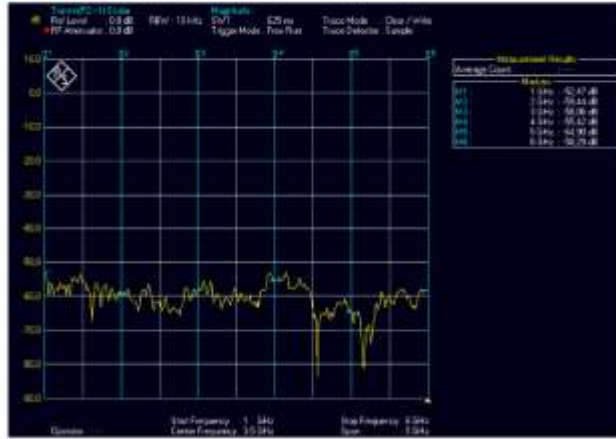


green copper mesh(300g/m²) – gray FARADAY P_N / blue FARADAY HC P_N / red Faraday GHC P_N

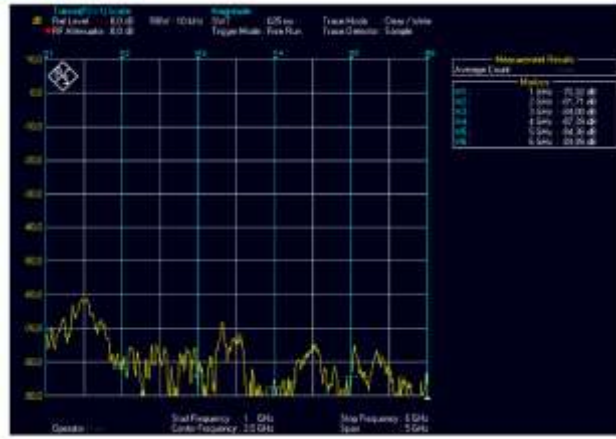
FARADAY P - dB Effective Shielding (EMI duct tests) according to EN 60512-23-3 (1 conductive layer)

The quantity of the metal increases the shielding performance but also the grammage of the pre-preg; a correct concept of shielding gives a compromise between weight and shielding level.

FARADAY P_N



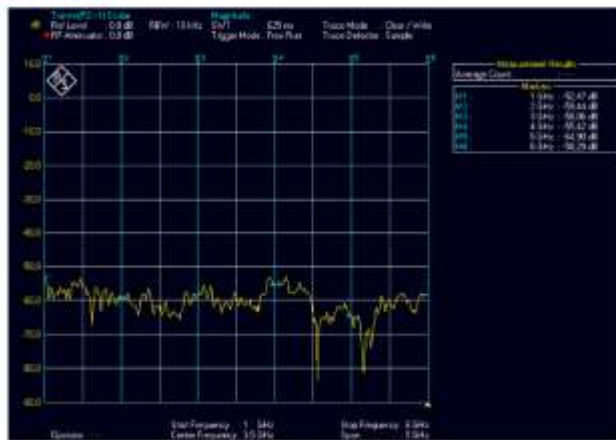
FARADAY HC P_N



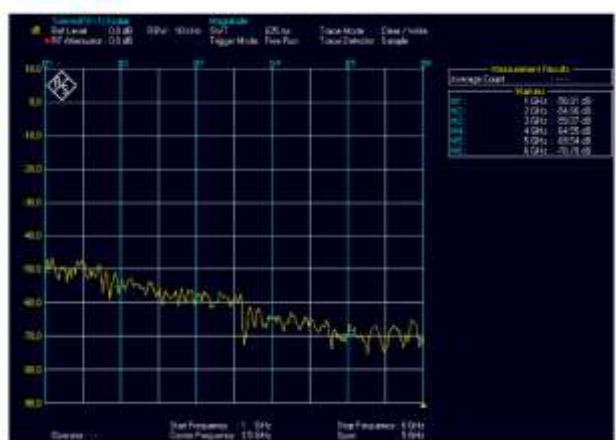
Testing IEEE 299:2006 shielding panels (1GHz to 6GHz)
(where non specified is one conductive layer molded in epoxy resin)

The structures of reinforcement modifies the shielding performance; the more compact structure increases the shielding at the high frequencies.

FARADAY P_N

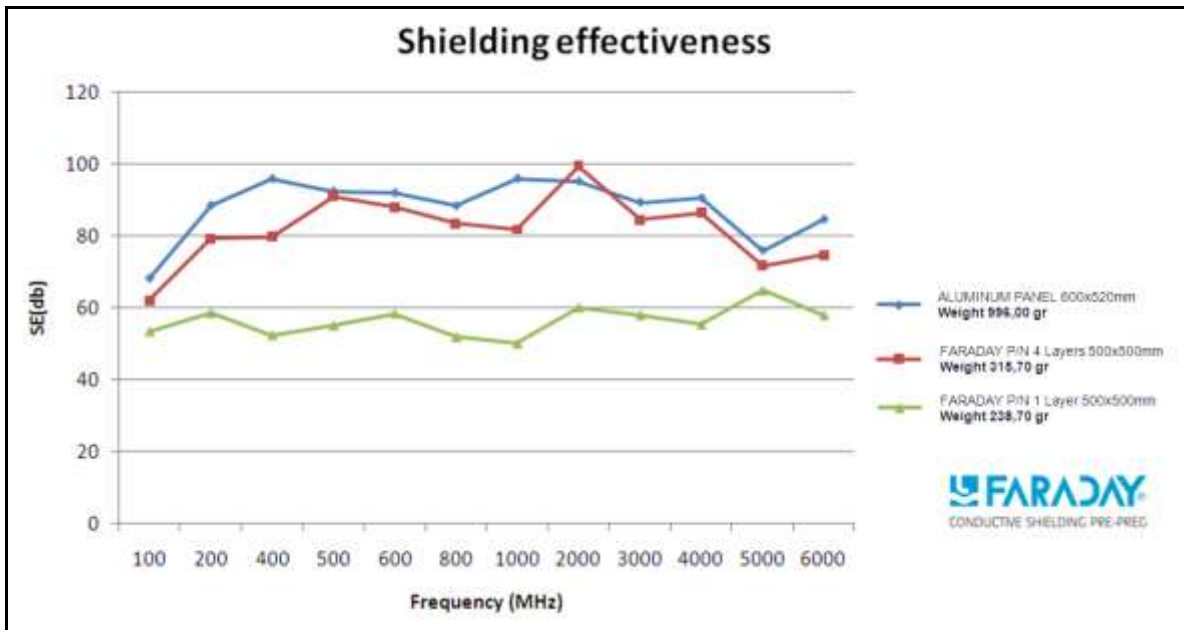


FARADAY G P_N

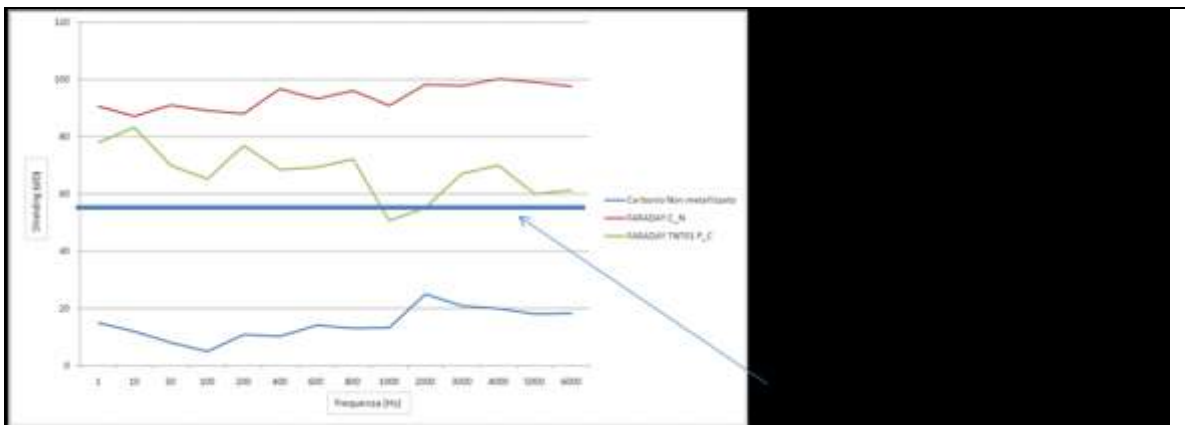


Testing IEEE 299:2006 shielding panels (1GHz to 6GHz)
(where non specified is one conductive layer molded in epoxy resin)

The composites FARADAY solution gives an advantage in term of weight; at the same shielding level the weight is 1/3 less than an aluminum panel with 2mm of thickness.



FARADAY P_N - dB Effective Shielding (EMI Panel tests Faraday P_N vs Aluminum) according to IEEE 299:2006



FARADAY C_N - dB Effective Shielding (EMI Panel tests Faraday C_N vs Faraday TNT01 P_N and Faraday P_N according to IEEE 299:2006
The Blue line is the standard shielding capability of carbon without metallization

PROPERTIES of EPOXY RESIN R25

- From 45dB up to 90dB attenuation level from 1 Mhz to 18 GHz (value for single layer)
- Stability of the surface conductivity
- Flexibility in design
- Weight reduction in comparison to the metal mesh
- High performance of electromagnetic shielding
- Curing in autoclave, with vacuum bag and oven or by press with hot plates
- Excellent tack (using at room temperature, between 21°C and 25°C)
- Excellent resin flow
- Excellent compatibility with Hexcel resin 1454 Airbus homologated
- long pot life at ambient temperature > than 1 month

CURING CYCLE

Curing cycle may be performed between 100 and 180 ° C.

example of curing

5 h at 100°C

1 h at 130°C

40 min at 140°C

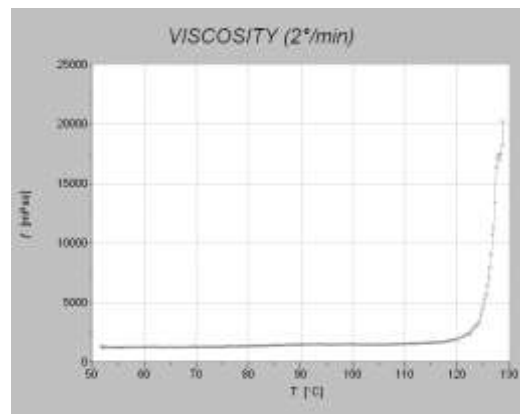
1 h 120°C + 2 h 140°C

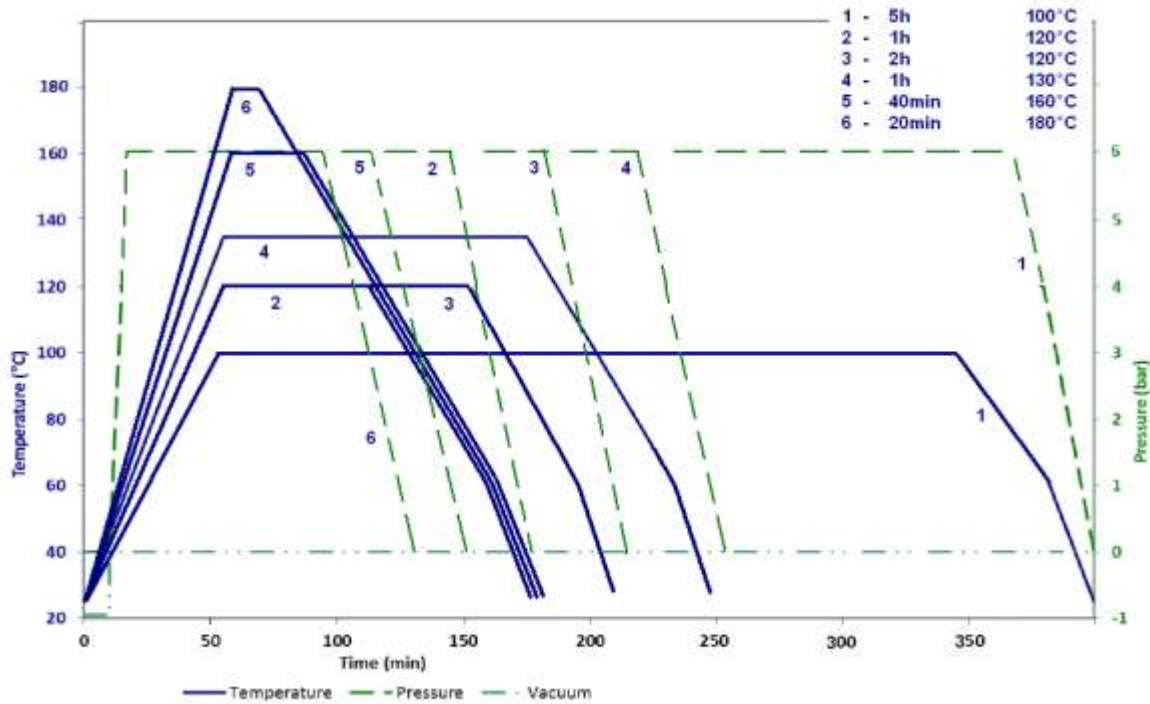
30-40 min at 160°C

30 min at 180°C (not exceed 45-50 min at 180 ° C to avoid excessive yellowing resin)

Tg temperature

Curing	Tg
5 h 100°C	100-110°C
1 h 120°C	110°C
2 h 120°C	110-120°C
1 h 130°C	112-122°C
40 min 140°	114-124°C
30 min 90°+1 h 120°C	114-124°C
1 h 120°C+2 h 140°C	115-125°C
30-40 min at 160° C	120-125°C
30 min at 180°C	120-125°C





STORAGE CONDITIONS

Pre-preg could be stocked at controlled temperature -15/-18 °C; at this range pot life is:

12 months at -18°C

4-6 weeks at 23°C

Before using it is recommended to maintain product at the room temperature for many hours into the polyethylene bag to avoid the moisture contact. Before to stock in to the freezer put the product into the bag.

PRE-PREG FEATURES

Color:	Grey
Tack :	medium - low
Gel time (miscela) at 130°C :	14 ± 3 minutes
Volatiles:	<1%
Length:	max: 150m carbon – 200m polyester

	<i>metal</i>	<i>fabric</i>	<i>pre-preg</i>	<i>height</i>	<i>metal content</i>	<i>superficial resistance</i>
		<i>g/m²</i>	<i>g/m²</i>	<i>mm</i>	<i>g/m²</i>	<i>mΩ/cm²</i>
FARADAY	P_N nickel	60	110+/-10	550	10	<250
FARADAY HC	P_N nickel	100	200+/-10	550	35	20-30
FARADAY G	P_N nickel	75	120+/-10	500	10	<250
FARADAY	C_N nickel	250	340+/-10	550	50	<20-30
FARADAY	C_C copper	250	340+/-10	550	50	<10-20

values are typical for low quantities of resin. Gel times could be modified in function of laminate thickness

Customized grammages are available for more than 300ml.

Customized superficial resistance are available under request for more than 300ml.

PACKAGING

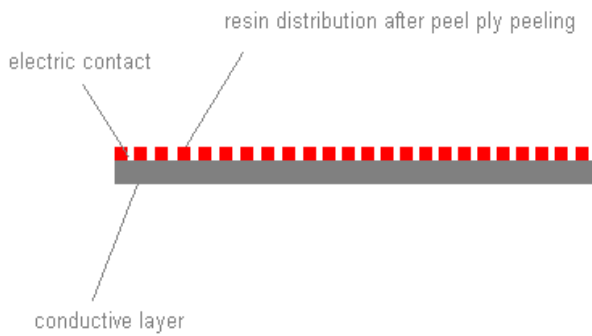
Pre-preg are packed in vacuum polyethylene bag, dry ice available and cardboard box with label.

DATA LABEL

- Code:
- Manufactory date:
- Quality control:
- Length:
- Width:

USING RECOMMENDATIONS

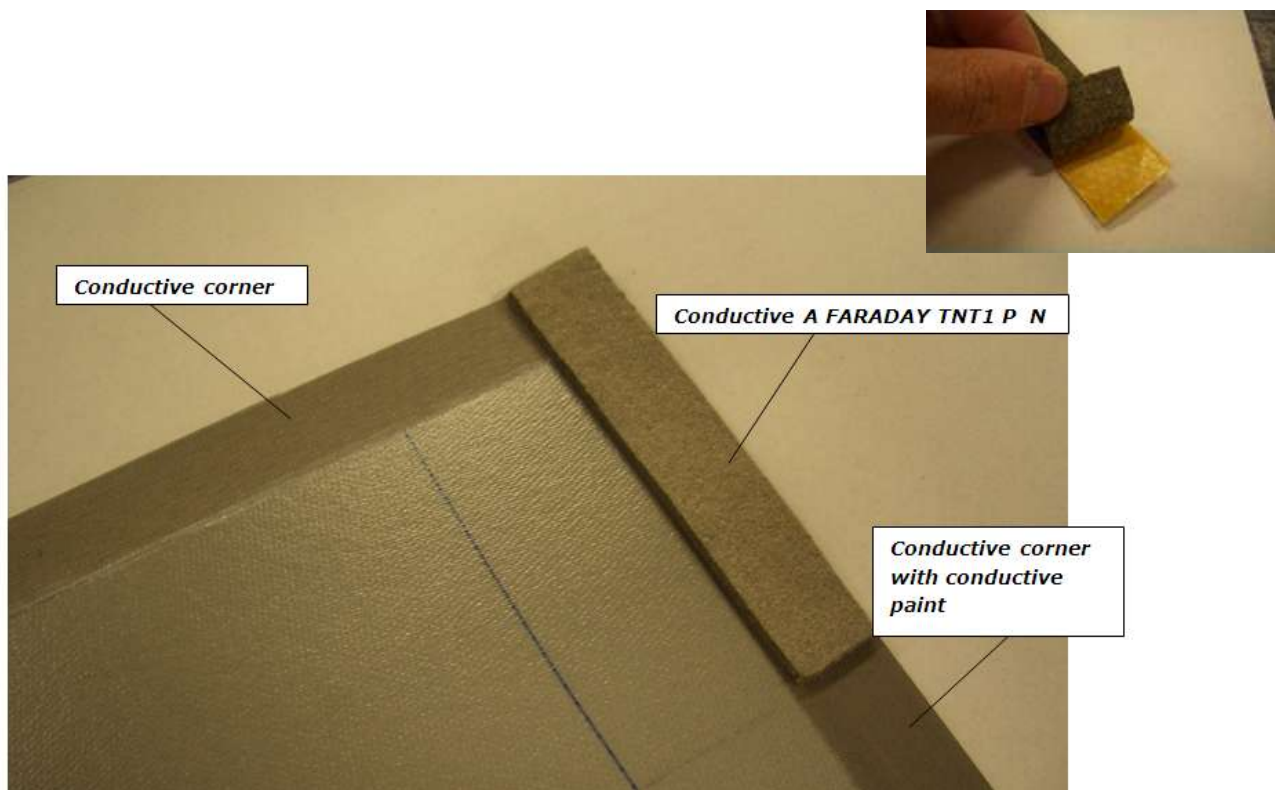
Peel Ply and conductive FARADAY PAINT



Pic. 1

Using peel ply avoid a non conductive layer of resin over the conductive fabric. The section of composite, after curing and peeling, could be show in picture 1. Some residual spot of resin could give electric contact problems.

A solution is using a layer of conductive FARADAY PAINT available in Lamiflex and a conductive-adhesive TNT (available in 1mm or 3mm of thickness)



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