

euromere NEWS

COMPOSITES *by passion!*

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POLYESTER PLUG BUILDING PRODUCTS BY EUROMERE SPECIALTY COMPOSITES

BACKGROUND

Since 1987, EUROMERE is producing out of the range and niche specialty products like the well-recognized FSP® Sprayable Core (cf. EUROMERE NEWS n°8 – July 2017), or the FSP® Barrier Coat products which are still nowadays state of the Art technology wise

This has made EUROMERE a special supplier to the Composite Industry, with commodity type product such as Gel Coat, Bonding Paste, but with a unique range of specialty products.

As we often say, EUROMERE people are as if they were at work in a "3*** restaurant", always looking for the "best blend to get best taste" and happy customers!

The use of lightweight fillers, adequate unsaturated resin chemistries with record properties and additives to formulate the ideal product sound like a very familiar recipe in house and we are continuously adding new technologies in our product portfolio.

The last years have been a lot concentrated around TOOLING technologies where incredible steps have been overcome!

FSP®-SC Spray Coring



FSP®-BC Barrier Coat





EUROMERE TOOLING PRODUCT TECHNOLOGIES

Even if we have an exhausting Tooling Product range, we will stay concentrated on EUROMERE latest technologies in this issue of Euromere News! Just keep the Euromere product list below as a memo and do not hesitate to ask your EUROMERE closest representative to get information on products we will not be speaking here:

REFERENCE	PRODUCT DESCRIPTION	APPLICATION	INFORMATION
IMEX 11W	Modified bi components (50/50) Polyurea for low density EPS foam Reinforcement	Spraying	Fast process and improved properties compare to wet lamination.
CNC-3000LG	Hybrid Paste for plug building process	Spraying	Very consistent and heat resistant paste for spraying 12-18 mm thick crust for milling. Fast curing, minimum shrink, no air entrapment, easy to mill.
CNC-2002LD	Hybrid Paste for plug building process	Extrusion or manual	For applying thick layers in one shot up to 25 mm. Very low cure and close to zero shrink. Very easy to mill. No dust, only flakes.
PRIMER 1206	Polyester Primer	Spraying	Off white finish spray layer 400-500µ for easy and quick sanding. Can be polished to a smooth and satin look and will be good for direct modelling.
EUROLAQUE	Polyester Lacquer	Spraying	White or Black hard coat with very high gloss finish and elevated molding temperature resistance.
EUROGEL GCP-812	100% Vinylester Tooling Gel coat	Spraying	Long ageing resistance during cycling tool usage and high heat resistance. High gloss resilience for numbers of demolding.
RESIMOLD 606TAE	Tooling resin system one pack	Spraying/ Hand lamination	Fast building process with zero shrink resin system and excellent wet out either by Chopped Spray or Hand lamination.



LATEST TECHNOLOGIES IN TOOLING PASTE APPLICATIONS

We are often designing new products and new processes together with customer requests, and the need of replacing existing tooling paste appeared early in 2000's, already 15 years ago! At that time, the most advanced composite toolmakers for large and small parts were using PU Paste and/or Epoxy paste with some level of frustration! There were numerous issues and mainly around product cost, machine cost and maintenance, but also about the whole process that was giving too low quality according to their requirements.

It took some years to develop the first *Polyester Spraying Paste*, but thanks to EUROMERE background in Sprayable Coring and other High Viscosity products formulation's, we launched **CNC-3000LG sprayable Tooling paste** verrrrrry successfully early in the 2010's! (see next pages)

TOOLING PASTE CNC-3000LG – SPRAYING PASTE

This sprayable paste is a ready to use Polyester/Vinylester Hybrid system. Formulated for being sprayed with a specific two component spraying equipment (Matrasur – MVP – GEPO are machine producers with existing models for this process).

Milling CNC-3000LG is very performant, making small chips, as requested for avoiding dust in the working area and to protect the equipment.

- Process consist of spraying multiple layers of 2-3 mm until required thickness, generally from 12 to 25 mm (cf. Figure 1). Very often, minimum 5-6 layers will need to be sprayed.
- Fast Curing is achievable, with Gel Time around 10 minutes and cure time in less than 40 min at 20 °C with 1.5 % P MEC50 catalyst; operators are spraying layers on layers turning around the part.
- Possible to start milling a few hours after spraying is over.
- Makes no dust during milling but flakes
- 2 components system – MEKP 50 Peroxide 1,5-2,0 %
- Density : 0,60
- Low styrene content – Low VOC
- Volume Shrinkage < 1 %
- Shore D Hardness = 60 after 40 min
- No need of post curing or processing at elevated temperature



Figure 1 - CNC3000LG during spraying phase



Figure 2 - CNC3000LG after milling

Table 1 Source: Structural Composites, Inc, 7705 Technology Drive - W. Melbourne - FL 32904

REFERENCE	VALUE	UNIT	STANDARD
Tensile Strength	41,58	MPa	ASTM D638
Tensile Modulus	3508,05	MPa	ASTM D638
Flexural Strength	98,73	MPa	ASTM D790
Tensile Modulus	5510,98	MPa	ASTM D790
Core shear Strength	3,59	MPa	ASTM C273
Core shear Modulus	33,81	MPa	ASTM C273
Compressive Strength	3,66	MPa	ASTM D1621A
Compressive Modulus	110,45	MPa	ASTM D1621
Screw pull test	149,68	Kg	-
Elongation at break	3,94	%	-

Table 2 HDT Testing CNC-3000LG product Deflection Temperature under flexural load

HDT under flexural load	0,45 MPa	1,82 MPa	UNIT	STANDARD
CNC3000LG	46,11	40,55	° C	ASTM D648-82
CNC3000LG in sandwich *	250	155	° C	ASTM D648-82

* Sandwich in between 450 gr/m² CSM layers impregnated with GP Ortho polyester resin

Table 3 Coefficient of Thermal Expansion (CTE)

CNC3000LG CTE = 102 x 10-6
Test performed from 0 °C to 100 °C under a force of 0,05N

TOOLING PASTE CNC-2002LD – EXTRUDABLE PASTE

CNC-2002LG is a ready to use Polyester/Vinylester Hybrid paste. This specific formulation is well adapted for extrusion process to apply up to 25 mm in one shot directly on the shape.



Same as for Spraying, a few machine producers will have the well-adapted machine to extrude CNC-2002LG as Matrasur, MVP and GEPO. This is a key factor with this process; the machine has to be properly designed to give optimum result!

- Process consist of applying by extrusion a thick layer (up to 25-30 mm) in one shot
- MEKP 50 Peroxide at 1,25 – 2,0% level will give long Gel Time (2-3 hours) and even longer cure time (4 – 5 hours), depending on product and workshop temperatures, as well as machine dosage accuracy. If you want to use another catalyst type, please to revert to us for recommendations.
- Catalyst indicator built in process
- Hardness : 50-60 Shore D after 15 hours at 20°C
- No need of post curing nor elevated process temperatures
- Compensated shrink = >1%
- Density = <1
- Very Low Styrene Content for improved working area
- Milling makes no dust, only large flakes
- Heat stable
- Hand application is possible

For large surfaces and other big parts, it is necessary to reinforce the low density EPS foam shaped before applying pastes to avoid deformation due to potential differences into coefficient of thermal expansion coming from the different materials in use for building a model. On the other hand, CNC-2002LG is formulated with unsaturated resins containing low level of styrene but it is necessary to protect the foam to get rid of melting risks.

EUROMERE developed a new solution for reinforcing low-density EPS foam (cf. EUROMERE News n°2). **IMEX 11W** is on the market at very demanding plug and toolmakers already since 2013.

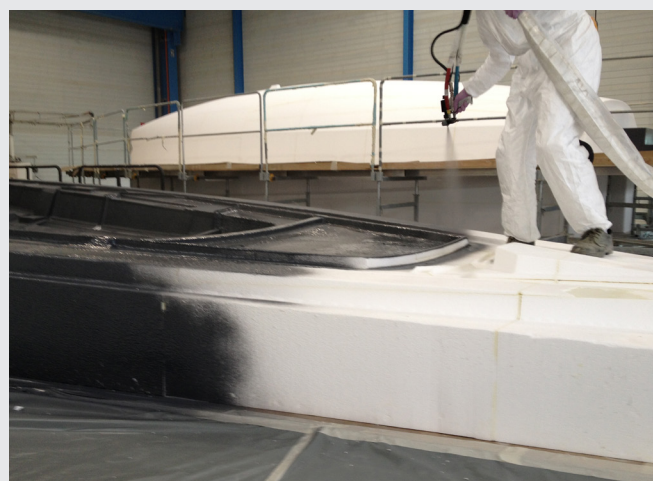


Figure 3 - CNC2002LD during extrusion phase



Figure 4 - CNC2002LD after CNC milling

IMEX 11W – Hybrid Polyurea solution for EPS foam reinforcement and protection



Surface finishing of master plugs will be done with EUROMERE products such as PRIMER 1206 and EUROLAQUE to obtain the cosmetics and the gloss level requested.

Mold building can be done afterwards, using the right demolding agents, and EUROMERE products designed especially for tool construction.

Do not hesitate to ask for all details when you will have questions there are many options to build a good mold and better to think all together around the best solution!

