

Marine



Solutions that make a difference

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OCV[™] Reinforcements



OCV[™] Technical Fabrics



OCV[™] Non-Woven Technologies

OCV[®] SOLUTIONS FOR BOAT BUILDING

Leader in glass reinforcement solutions, OCV[®] business offers the widest range of technical reinforcements to meet all your boat building needs, whatever the process you use.

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Composite materials used in the marine industry deliver high strength, reduced weight, excellent corrosion resistance, dimensional stability and improved cost performance. Composites materials also surpass traditional materials in offering enhanced aesthetics and reduced maintenance/replacement costs.

Composites for boat building can be made through several processes:

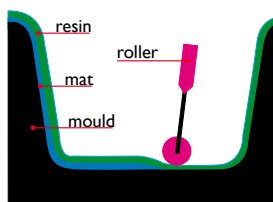
- Open Mould process: Spray-Up and Hand Lay-up
- Closed Mould process: Light RTM and Infusion



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HAND LAY-UP

The Hand Lay-Up (or contact) molding method consists in applying a release agent for easy demolding, a gel coat for cosmetic finish, a layer of polyester or vinylester liquid resin and one to several layers of glass reinforcement, onto a mold surface.



PROCESS CHARACTERISTICS

REINFORCEMENT	Glass veils Chopped Strand Mats Woven Rovings Combinations
SERIES (pieces/year/mold)	<1000
COMPOSITE PIECE SIZE	1 to 150 m ²
LEVEL OF INVESTMENT	Low
MANPOWER INDEX	High
MECHANICAL PROPERTIES	Low to medium

OCV[®] PRODUCT RANGE USED IN HAND LAY-UP FOR BOAT BUILDING:

Glass veils: those low surface weight reinforcements, typically 30 to 50g/m², may be used in the first layer to obtain a smooth surface. M564 C64 is an example of C-Glass veil reference and is available in 5 to 200 cm wide rolls.

Chopped Strand Mats: they are easy to process and allow to increase quickly the laminate thickness:

- M113: Powder mat for first layers, optimum surface finish when used in close contact with gel coat layer.
- M123 and M723C: Powder mat, fast impregnation, well suited for structural layers.
- M5 and M705: Emulsion mat, good adaptability and easy processing, well suited for internal layers.

Woven Rovings: they allow to reach a high glass content and to increase mechanical properties.

- RT500, RT600 and RT800 are some reference examples of Woven Rovings of 500, 600 and 800 g/m² respectively. Woven Rovings are available from 200 to 1500g/m² in rolls of 30 cm up to 3.4 m width.

Combinations: those product allow to have (in one layer only) a Woven Roving and a Chopped Strand Mat stitched together. Combination fabrics offer high mechanical properties and allow to increase quickly the laminate thickness:

- R500/S450 is a 500g/m² Woven Roving stitched with a 450g/m² of Chopped Strand Mat.
- R800/S300 is another example of the combination fabrics available from 30 cm up to 3 m width.

SPRAY-UP

The Spray-Up process consists in simultaneously spraying chopped glass strands from a Multi-End roving along with the resin necessary for their impregnation. Then, Hand-rolling is necessary to thoroughly flatten and compact the glass-resin mixture. Glass fiber strands must have a good choppability and adaptability to the shape of the mold and also for impregnation and rolling.



PROCESS CHARACTERISTICS

REINFORCEMENT	Multi-End rovings
SERIES (pieces/year/mold)	< 1000
COMPOSITE PIECE SIZE	1 to 100m ²
LEVEL OF INVESTMENT	Low
MANPOWER INDEX	High
MECHANICAL PROPERTIES	Low

OCV® MULTI-END ROVINGS USED IN SPRAY-UP FOR MARINE:

- P207: very good processability, excellent regularity of the Spray-Up pattern.

- P218: easy air release, product very well suited to Applicator spray-gun.

- ME3003A: excellent stability on vertical surfaces like deep hulls.

OCV® Technical Fabrics products range is very wide. Please contact your OCV® representative to determine precisely the products that will meet your needs.

INFUSION

The Infusion process consists in impregnating reinforcements placed in a composite mold and covered by an airtight plastic film used as an upper mold. The thermoset resin is drawn by vacuum into the reinforcement between mold and film and is not in contact with the air of the workshop (closed mold process). Once the resin is cured, the plastic film can be removed and the part demolded.



PROCESS CHARACTERISTICS

REINFORCEMENT	Glass veils Unifilo® Uniconform® Multimat® Lite Multiaxials/UD Carbons
SERIES (pieces/year/mold)	200 to 800
COMPOSITE PIECE SIZE	1 to 100m ²
LEVEL OF INVESTMENT	Low
MANPOWER INDEX	Medium
MECHANICAL PROPERTIES	High

OCV® PRODUCT RANGE FOR INFUSION OF HULLS OR DECKS: Reinforcements used in infusion are mainly Unidirectionals, Multiaxials and Unifilo®, but some three-dimensional complexes can be used as well.

Glass veils: ECR20A and ECR70A are two examples of E-CR glass veils that provide a smooth surface. They have a 20g/m² and 70g/m² surface weight respectively and both have a low solubility binder to prevent fibre washing during infusion. They are available in rolls of 5 to 210 cm width.

Unifilo® U813, U816, U850 or U852 are continuous filament mats used both as a flow media and as a reinforcement material. They are available from 225 to 900 g/m² in rolls from 30 cm to 3 m width.

Uniconform® is a soft and binder-free continuous filament mat. When used with a surfacing flow media, it shows a high transversal permeability and can be impregnated through high thicknesses. It is easy to adapt on a mould and show good surface finish. Uniconform® is available from 450 up to 2400g/m², in rolls of 125 or 250 cm width.

Multimat® Lite is a 3D complex with a light glass/PE mix knitted core. It has a huge compression resistance and is very well suited to vacuum assisted Light RTM. S300/GPI 35/S300 and S450/GPI 70/S450 are two type examples.

Uni-Directionals and Multiaxials: they allow to reach very high glass contents and orientation controlled mechanical properties. ELT 850, ELTM 600/300, EXB 602, EQX 1168 are references of 0/90° or Multiaxials possibly with stitched Chopped Strand Mat.

Carbons: CBX 400 12k, R 400 C 12k are examples of products from the full range of cost-effective carbon fibre reinforcements – Multiaxials, Woven fabrics and Unidirectional tapes.

LIGHT RTM

The Light Resin Transfer Molding process consists of injecting a resin into a composite closed mold where one or several layers of reinforcement have been dressed. Light RTM can be used to make small composite parts such as boxes, seats and benches, covers, console supports, etc, but also allow to mould wide decks if moulds are well designed.



PROCESS CHARACTERISTICS

REINFORCEMENT	Glass veils - Unifilo® Uniconform® Multiaxials/UD Multimat® Lite Multicore®
SERIES (pieces/year/mold)	200 to 2,000
COMPOSITE PIECE SIZE	0,5 to 80 m ²
LEVEL OF INVESTMENT	Low to medium
MANPOWER INDEX	Medium
MECHANICAL PROPERTIES	Low to medium

OCV® PRODUCT RANGE FOR LIGHT RTM:

Glass veils: ECR20A and ECR70A are two examples of E-CR glass veils that provide a smooth surface. They have a 20g/m² and 70g/m² surface weight respectively and both have a low solubility binder to prevent fibre washing during injection. They are available in rolls of 5 to 210 cm width.

Unifilo® U813 or U852 are continuous filament mats both used as a flow media and reinforcement material. They are available from 225 to 900 g/m² in rolls from 30 cm to 3 m width.

Uniconform® is a soft and binder-free continuous filament mat. It is easy to adapt on a mould and show good surface finish. Uniconform® is available from 450 up to 2400g/m², in rolls of 125 or 250 cm width.

Uni-Directional and Multiaxials

Multimat® Lite is a 3D complex with a light glass/PE mix knitted core. It has a huge compression resistance and is very well suited to vacuum assisted Light RTM. S200/GPI 35/S300 and S600/GPI 70/S600 are two type examples.

Multicore® is a 3D complex with Chopped Strand Mat stitched on one side of a non woven PP core. It is easy to handle and dress on a complex mould and very well suited for sandwich structure where the balsa or foam is placed between two layers of Multicore®.

Multimat® and preformable Unifilo® are other OCV® products for closed mould process. They can be used with the standard RTM process. Please contact your OCV® representative for more information.

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