



Vitrulan
Composites



HighFlow

by Vitrulan

MARINE

New, unrivalled performance for manufacturing
lightweight composites for the marine industry

VITRULAN HIGHFLOW MARINE

HighFlow by Vitrulan is an innovative fabric which optimizes resin infusion permeability, helping designers and manufacturers deliver better, lightweight composites for the marine industry.

Lightweight composite materials have always helped in bringing down fuel consumption and emissions, as well as being suitable for the corrosive and challenging marine environment.

Marine industry is moving to closed mold processes, such as resin infusion and resin transfer molding.

KEY MARKET REQUIREMENTS

- | Minimal air voids
- | Complete resin wet out
- | Efficient resin infusion
- | Ease of processing

THE HIGHFLOW BY VITRULAN PORTFOLIO CONTAINS BOTH GLASS FIBER AND CARBON FIBER FABRICS.



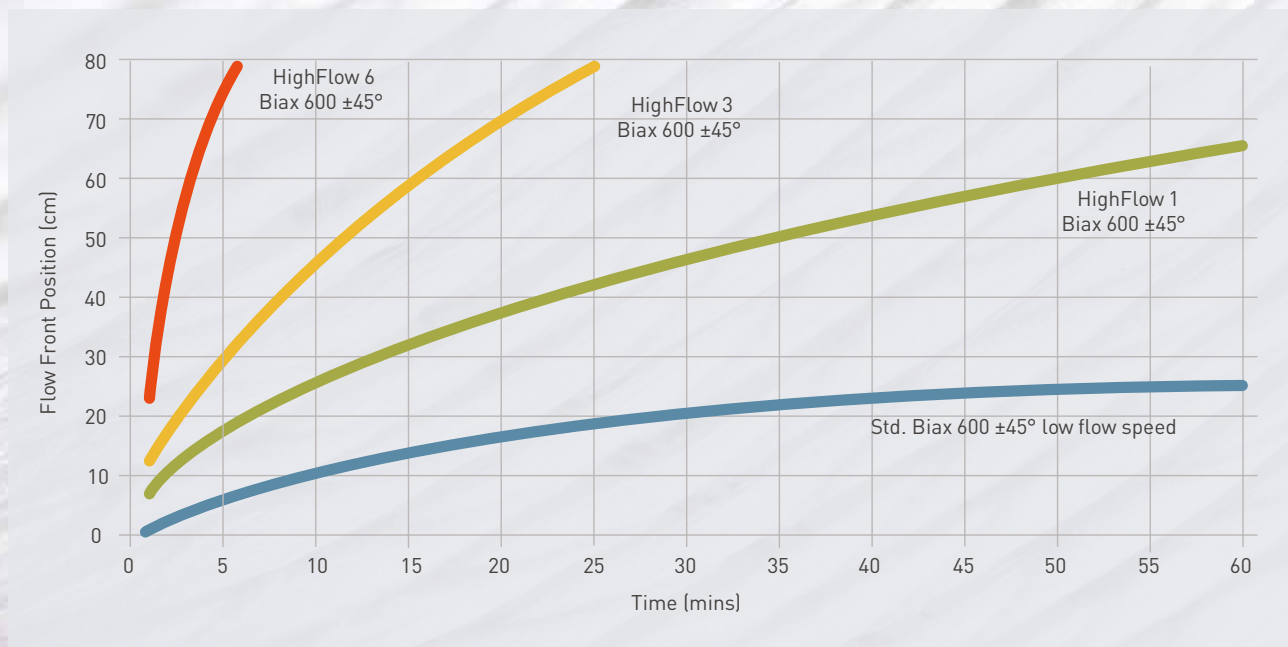
VITRULAN HIGHFLOW MARINE

As the marine industry moves over to closed mold manufacturing and infusion becomes a critical success factor, HighFlow by Vitrulan is the solution.

THE BENEFITS OF HIGHFLOW BY VITRULAN

- | Delivers complete fabric wet out, minimizing air voids
- | Maximises resin infusion, with process speeds up to 500% faster for the entire laminate construction
- | Customises infusion speed, without any restrictions to product construction and weight
- | Reduces total cost of ownership by up to 15%

ILLUSTRATION OF RESIN INFUSION SPEED, SHOWING HOW HIGHFLOW OUTPERFORMS STANDARD FABRIC



Test setup

5 x HighFlow 6 Biax 600 ±45
5 x HighFlow 3 Biax 600 ±45
5 x HighFlow 1 Biax 600 ±45
5 x Standard Biax 600 ±45

Infusion resin

Ashland AME6001 Vinyl ester

GLASS FIBER

BENEFITS

- Delivers complete fabric wet out, minimizing air voids
- Maximises resin infusion, with process speeds up to 500% faster for the entire laminate construction
- Customises infusion speed, without any restrictions to product construction and weight
- Reduces total cost of ownership by up to 15%
- HighFlow Glass Fiber products are compatible with epoxy, vinyl ester and polyester resins

HIGHFLOW BY VITRULAN BIAx 600 ±45° FABRICS (E-GLASS FIBER)

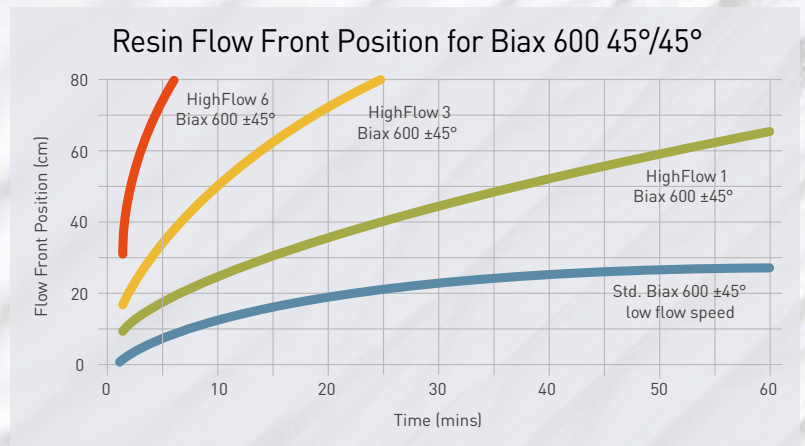
GRADE CODE	BASIS WEIGHT (g/m ²)	RESIN FLOW SPEED
HighFlow 1 Biax 600 ±45°	600	Fast
HighFlow 3 Biax 600 ±45°	600	Faster
HighFlow 6 Biax 600 ±45°	600	Fastest

Test setup

5 x HighFlow 6 Biax 600 ±45°
 5 x HighFlow 3 Biax 600 ±45°
 5 x HighFlow 1 Biax 600 ±45°
 5 x Standard Biax 600 ±45°

Infusion resin

Ashland AME6001 Vinyl ester



HIGHFLOW BY VITRULAN BIDI 600 0°/90° FABRICS (E-GLASS FIBER)

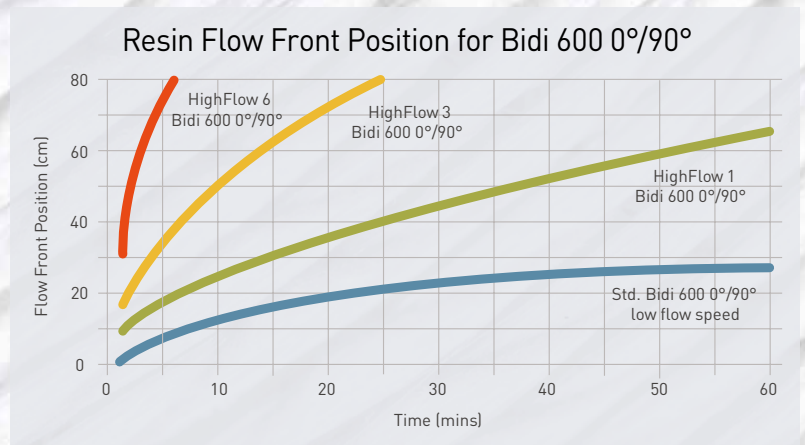
GRADE CODE	BASIS WEIGHT (g/m ²)	RESIN FLOW SPEED
HighFlow 1 Bidi 600 0°/90°	600	Fast
HighFlow 3 Bidi 600 0°/90°	600	Faster
HighFlow 6 Bidi 600 0°/90°	600	Fastest

Test setup

5 x HighFlow 6 Bidi 600 0°/90°
 5 x HighFlow 3 Bidi 600 0°/90°
 5 x HighFlow 1 Bidi 600 0°/90°
 5 x Standard Bidi 600 0°/90°

Infusion resin

Ashland AME6001 Vinyl ester



HIGHFLOW BY VITRULAN UD FABRICS (E-GLASS FIBER)

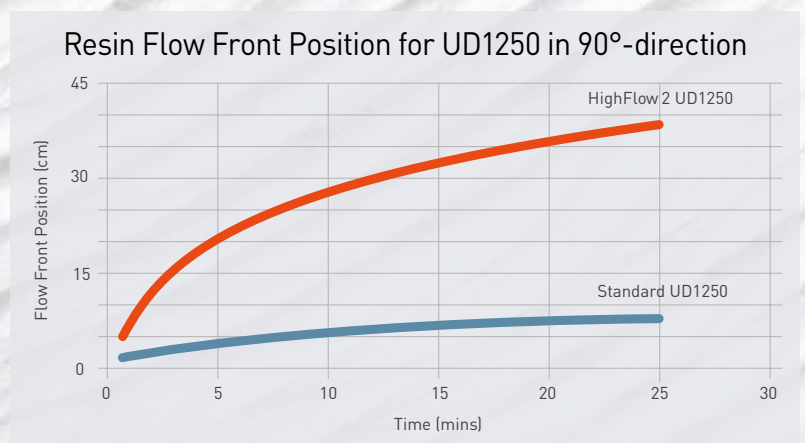
GRADE CODE	BASIS WEIGHT (g/m ²)	RESIN FLOW SPEED
HighFlow 2 UD1250	1250	Faster

Test setup

5 x HighFlow 2 UD1250
 5 x Standard UD1250

Infusion resin

Ashland AME6001 Vinyl ester



CARBON FIBER

BENEFITS

- | Efficient resin infusion, complete resin wet out and minimal air voids
- | Maximises resin infusion, with process speeds up to 400% faster for the entire laminate construction
- | Customises infusion speed, without any restrictions to product construction and weight
- | Reduces total cost of ownership by up to 15%
- | HighFlow Carbon Fiber products are compatible with epoxy and vinyl ester resins

HIGHFLOW BY VITRULAN BIAx 600 ±45° FABRICS (CARBON FIBER)

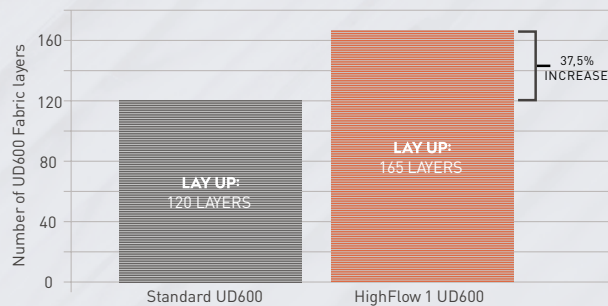
GRADE CODE	BASIS WEIGHT (g/m ²)	RESIN FLOW SPEED
HighFlow 1 Biax 600 ±45°	600	Fast
HighFlow 3 Biax 600 ±45°	600	Faster

HIGHFLOW BY VITRULAN UD600 FABRICS (CARBON FIBER)

GRADE CODE	BASIS WEIGHT (g/m ²)	RESIN FLOW SPEED
HighFlow 1 UD600	600	Fast

HighFlow UD600 Carbon

Illustration of efficient resin infusion, complete resin wet out and minimal air voids.



Test Setup

HighFlow 1 UD600
Infusion with VAP membrane

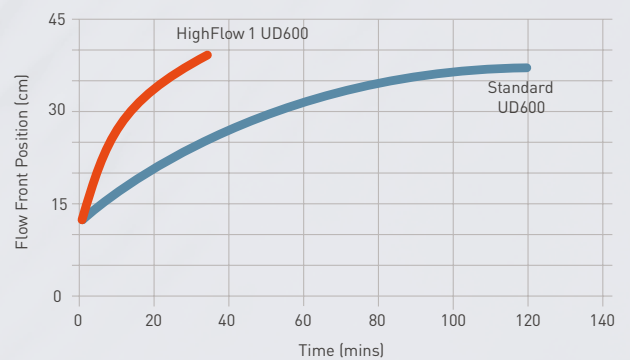
Width
600mm

Infusion Resin

CTP Cetepox 3325 A/B

Infusion time
2.5 hours

Resin Flow Front position for UD600 Carbon in 90°-direction



Test setup

6 x HighFlow 1 UD600

Infusion resin
CTP Cetepox 3325 A/B

The Vitrulan Group includes the three in Germany based companies Vitrulan Textile Glass, V4heat and Vitrulan Technical Textiles as well as Vitrulan Composites in Mikkeli / Finland.

Wall coverings manufactured from glass fabrics, modern infrared surface heating based on glass fabrics and technical textiles and composites made of glass, synthetic and carbon fibers are the core products of the Vitrulan Group.

The new subsidiary of the Vitrulan group, Vitrulan Composites Oy, is a manufacturer of fabrics made of glass, carbon, aramid and polyester fibers for the composite industry. The portfolio of the Mikkeli plant complements the technical textiles range of Vitrulan Technical Textiles GmbH. The application fields comprise transportation, marine, wind energy, anticorrosion as well as construction, insulation and sealing.

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