



EXEL EXELITE™ HYBRID FIBRE TUBES

The EXEL EXELITE™ HYBRID is a range of tubes made by pullwinding process where both glass fibres and carbon fibres are utilized. EXEL EXELITE™ HYBRID tubes are made with a vinylester resin, but also various epoxy based hybrid resins can be used.

Hybrid structure targets for both high performance and economical solution that can be reached by optimizing the structure and fibre types.

EXEL EXELITE™ HYBRID tubes are used in applications where high stiffness, low weight and competitive costs are requirements.

COLOUR OF EXEL EXELITE HYBRID

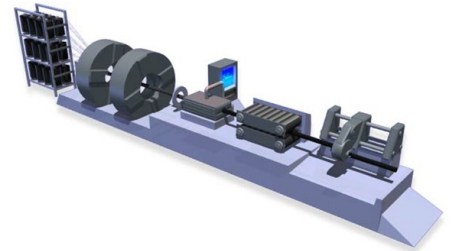
EXEL EXELITE™ HYBRID tubes can be coloured according to your choice of RAL chart.

Note that the carbon fibre tubes cannot be used as insulators as carbon conducts electricity.

SOME APPLICATION IDEAS

telescopic poles, barriers, tool handles, fences, roll up systems, defence applications and many more.

PRINCIPLE DRAWING OF PULLWINDING PROCESS



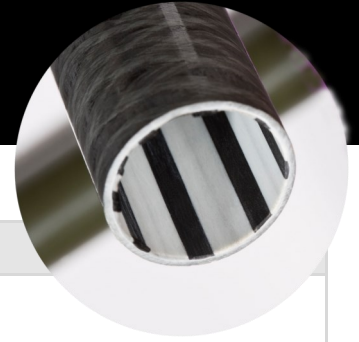
In pullwinding process the fibers are impregnated with a thermoset resin and pulled through a heated die where curing takes place.

This process enables an accurate control of the crosswise and longitudinal fibres and thus properties of the final product by adjusting the amount of lengthwise and crosswise fibres.

The products are cut to length at the end of production line.

Exel Composites has a wide range of tubes available where various reinforcements and resin systems are being utilized to compose the optimized product for each application

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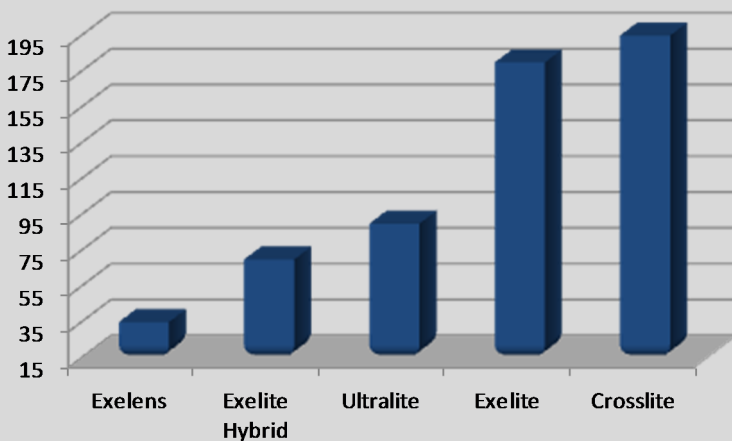


TECHNICAL DATA SHEET

Manufacturing Method	Pullwinding
Structure	UCUN or UCUCUN Reinforcement structure U = unidirectional fibers C = crosswinded fibers N = Exelens nonwoven veil
Materials	Carbon and glass fibre, vinylester resin (Epoxy also available)
Diameter Range O.D.	4 –250 mm
Wall Thickness	1,00 - 4,00 mm * thicker on request
Colours	RAL Code
Fiber volume content	58 v-%
Fiber weight content	75 w-%
Surface finish	Exelens™
Water absorption	<2,0w-%
Additioanl fibers	Glass Fibre
Stiffness	70 GPa
Bending strength	>500 MPa
Tensile strength	>600 MPa
Density	1.8g/cm ³

Typical minimum production quantity for EXEL CROSSLITE™ tubes is 500 meters

Stiffness: E-modulus, GPa



PULLWINDING process enables the reduction of wall thickness and weight while retaining and improving stiffness and strength compared to conventional pultrusion.

Each product can be optimized according to application and requirements by combining suitable fibres and resin systems and utilizing certain amount of lengthwise and crosswise layers.

- **Exel Exelens™** for glassfibre tubes.
- **Exel Exelite Hybrid™** for combination of glass- and carbon fibre tubes
- **Exel Exelite™, Ultralite, Crosslite™** for various carbon fibre tube alternatives