

## GENERAL DESCRIPTION

Parabeam® 3D Glass Fabrics is a three dimensional woven fabric for simple and quick production of sandwich constructions. Its outstanding mechanical performance and ease of use make it a perfect material for composite industry. Sandwich parts can be manufactured in just one single step. Parabeam® 3D Glass Fabrics is available in a thickness range from 3-22mm and can be used with polyester, vinylester, epoxy as well as phenolic resins.

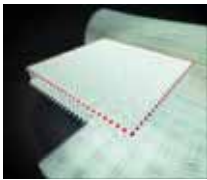
## FIBER-RESIN RATIO

The resin content depends upon the desired weight and compression values. Optimum fiber-resin ratio ranges between 1:0,9 and 1:1,5.

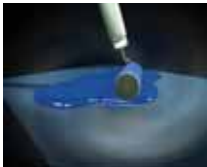
## DRAPEABILITY

Parabeam 3D Glass Fabrics can be shaped in three-dimensional forms depending upon the thickness of the fabric and the complexity of the shape. Thinner fabrics, in general, have a better drape than thicker fabrics. In a corner with a 90° angle, the Parabeam 3D Glass fabric is squeezed down with a corner roller. Within 15mm of the corner, the fabric will raise to its original thickness. Extra tapes of reinforcement in the corner can be applied to increase the corner stiffness. Together with the geometry stiffness of a corner this adds superior stiffness to your product.

## APPLICATION INSTRUCTIONS



Calculate the Parabeam® 3D Glass Fabrics' weight for the surface area desired. Define resin quantity according to the fiber-resin ratio (see for resin consumption indicator overleaf). Precautions should be taken to avoid cure inhibition when using UP resins. A low styrene emission (LSE) type or alternatively the addition of a styrene emission reducer to the resin is recommended.



Evenly apply approximately 40 % of the recommended resin quantity on the surface of the mould.



Apply the Parabeam® 3D Glass Fabric into the resin layer and roll the fabric firmly from the centre outwards with a mohair roller or a longitudinally grooved aluminum roller to achieve a good contact with the surface underneath.



Evenly apply the remaining approximately 60 % of the recommended resin quantity over the fabric. The capillary forces in the Parabeam® 3D Glass Fabric will automatically impregnate the fabric. De-airing is not necessary since the layers are thin and air will escape on all sides.



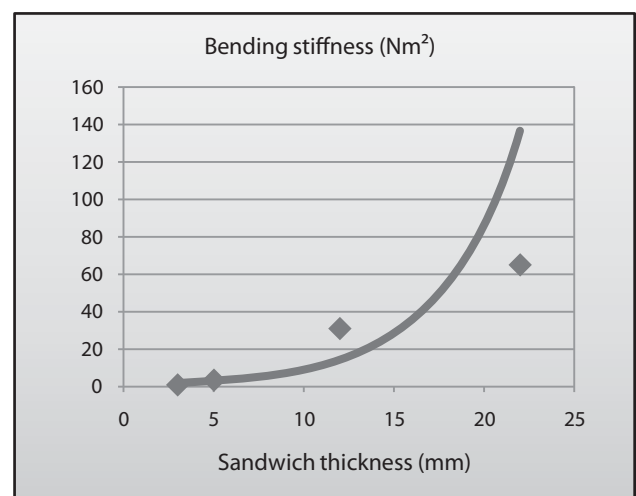
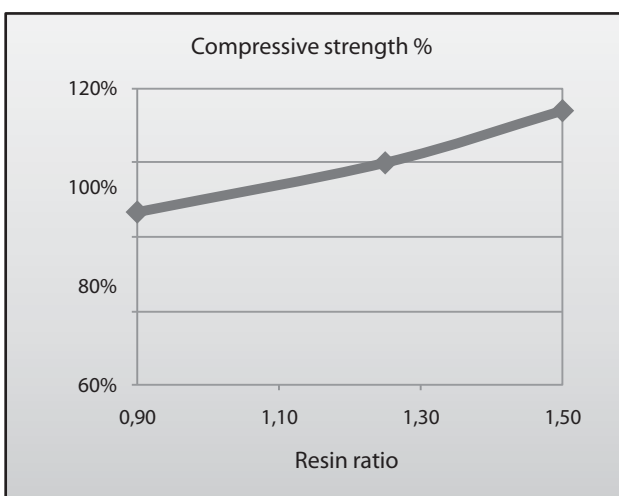
Gentle rolling of the top face of the fabric will secure a plain surface. For all fabrics up to 22 mm, the maximum height is achieved by finishing with gently rolling in weft direction against the pile direction.

The above steps can be used in making complete laminate with additional fibre reinforcements in the inner and outer skins and doing so in a wet-in-wet process.

## TECHNICAL DATA SHEET FOR PARAGLASS WITH EPOXY RESIN

Type			PG/3	PG/5	PG/8	PG/10	PG/12	PG/15	PG/18	PG/22
Sandwich thickness*		mm	3,0	5,0	8,0	10,0	12,0	15,0	18,0	22,0
Weight										
Fabric weight		kg/m <sup>2</sup>	0,78	0,84	0,93	1,43	1,50	1,60	1,72	1,68
Laminated weight		kg/m <sup>2</sup>	1,64	1,76	1,95	3,00	3,15	3,36	3,61	3,53
Thermal properties										
Thermal conductivity	DIN 52616	W/mK	0,06				0,08			
Thermal resistance	DIN 52616	m <sup>2</sup> K/W	0,05	0,09	0,13	0,13	0,13	0,16	0,22	0,28
Mechanical properties										
Compressive strength	ASTM 365	N/mm <sup>2</sup>	8,1	4,6	1,6	1,4	1,2	1,1	1,0	0,8
Shear strength	ASTM 273	N/mm <sup>2</sup>	1,8	1,6	0,7	0,6	0,5	0,4	0,4	0,1
Shear modulus	ASTM 273	MPa	12,2	11,1	8,7	9,8	8,7	8,1	7,7	1,0
Bending stiffness	ASTM 393	Nm <sup>2</sup>	1,1	3,5	8,8	15,1	31,4	47,0	87,6	65,0
Flexural modulus	ASTM 393	GPa	11,4	14,8	19,0	21,9	24,3	28,9	30,3	27,3

\*Final sandwich thickness may vary due to tolerance of dry fabric thickness, pile angle, resin type, laminating process as well as working conditions. All given values are average values.



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