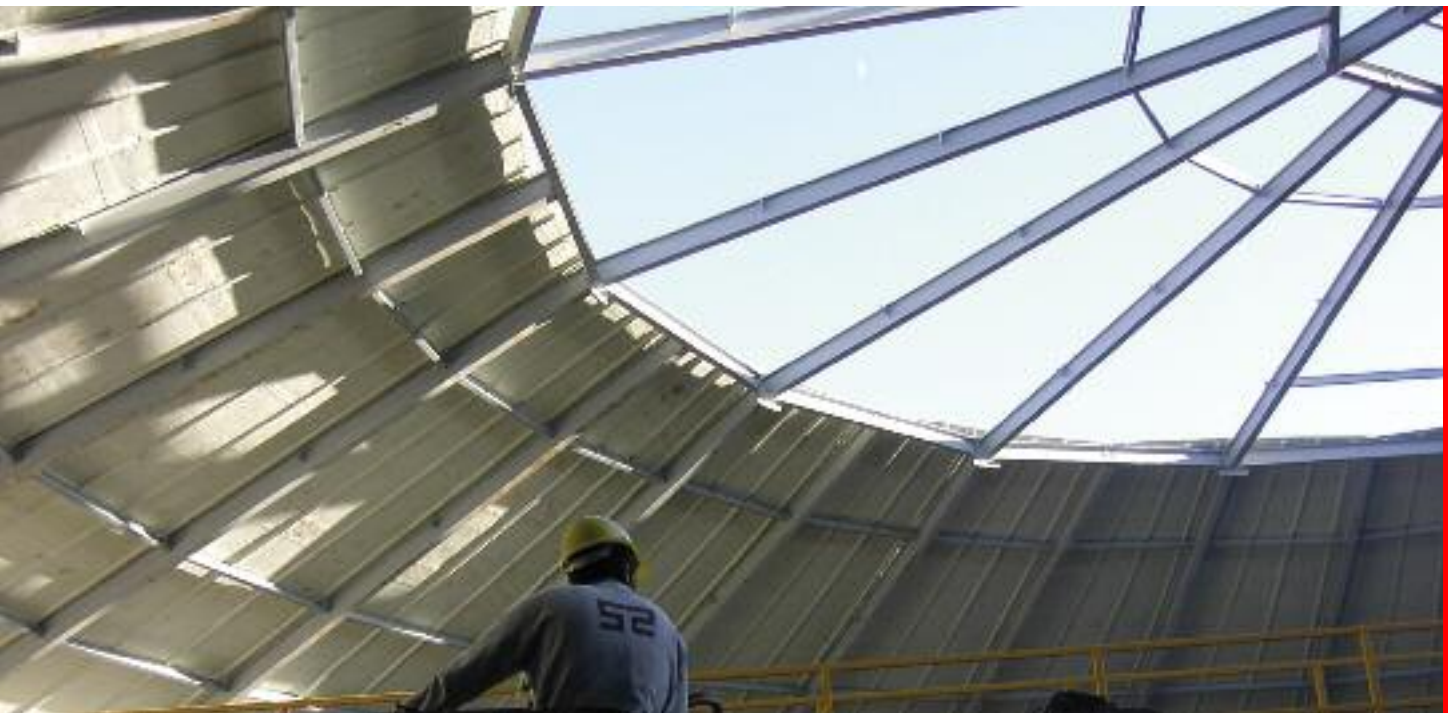


Pultruded structural profiles from Top Glass are widely used to meet mechanical, corrosion and strength requirements from engineers and industry.



- LIGHTWEIGHT
- EASY TO ASSEMBLE
- RESISTANT TO CORROSION
- MAINTENANCE FREE
- THERMAL INSULATING
- MECHANICAL STRENGTH
- WAREHOUSE READY

## MATRICES AND REINFORCEMENTS

There are two types of matrix that are generally used for structural applications - polyester and vinylester. **Polyester** provides solid resistance to chemicals and also has a high mechanical strength, which in turn ensures excellent structural rigidity. **Vinylester** is used in cases where extremely high resistance to chemicals is required, without reducing either the strength or the rigidity of polyester. In addition, other matrices are available for special uses, such as **acrylic**, which is used to ensure fire resistance. The profiles are usually made with the use of a **mat-roving-mat** composition. However, if greater transverse strength is required, **fabrics or multiaxial** reinforcements may also be added. The incorporation of a polyester veil will protect the outer surfaces against UV - rays and atmospheric agents and this also prevents surface wicking of glass fibres. Thanks to special matrices and reinforcements, these sections can be **uniquely designed** to meet the specific requirements of our customers. In addition, **special profiles** can also be made with different geometries.



## APPLICATION

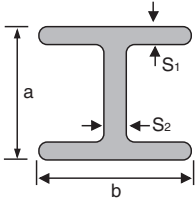
Fibreglass is an indispensable **construction material** in structures that are exposed to either corrosive chemical or electrochemical agents. Consequently, it is the preferred material for application in chemical or petrochemical plants, water treatment facilities, galvanic processes, cooling towers or platforms, bridges, offshore installations etc. Structural profiles are mainly used on an individual basis as either simple beams or in interconnected configurations to create **load bearing** structures. In both scenarios, their function is structural and they are able to support very high loads. Furthermore, the fact that they are **light in weight** makes them preferable to such materials as steel, aluminium, or wood. This is especially the case in situations where it is critical that foundation loads are minimised. As a result of their structure, these profiles can be **easily machined** (cut, milled, drilled, ground) to successfully meet all design requirements. **Connecting elements** in composite materials, such as corner pieces, plates, bolts and threaded rods are also available. These will ensure the homogeneous characteristics for the entire structure. Our best selling sections are always **kept in stock** in our warehouse to guarantee that customer orders can be met efficiently. All of our products are very smooth and clean and do not release glass fibres on contact. They are extremely light, which makes them **easy to install** at any worksite. And if this is not enough, they are also completely **maintenance free**. These articles can be produced by Top Glass to fully conform to the European standard **EN 13706-E23** (see table).

PHYSICAL AND CHEMICAL PROPERTIES OF STRUCTURAL MATERIALS					
PROPERTY	UNIT	TEST METHOD	STRUCTURAL	EN 13706	
				TEST METHOD	E23 GRADE
Specific Weight	g/cm <sup>3</sup>	ASTM D792	1,8	—	—
Glass content by weight	%	ISO 1162	60	—	—
Longitudinal tensile strength	MPa	ASTM D638	450	EN ISO 527-4	> 240
Transversal tensile strength	MPa	ASTM D638	30	EN ISO 527-4	> 50
Longitudinal elastic modulus	GPa	ASTM D638	32	EN ISO 527-4	> 23
Transversal elastic modulus	GPa	ASTM D638	8	EN ISO 527-4	> 7
Longitudinal bending strength	MPa	ASTM D790	450	EN ISO 14125	> 240
Transversal bending strength	MPa	ASTM D790	70	EN ISO 14125	> 100
Bending elastic modulus	GPa	(full bending)	28	EN 13706 Annex D	> 23
Longitudinal compression strength	MPa	ASTM D953	170	EN 13706 Annex E	> 150
Transversal compression strength	MPa	ASTM D953	60	EN 13706 Annex E	> 70
Interlaminar shear strength	MPa	ASTM D2344	25	EN ISO 14130	> 25
Thermal expansion coefficient	K <sup>-1</sup>	ASTM D696	11 x 10 <sup>-6</sup>	—	—

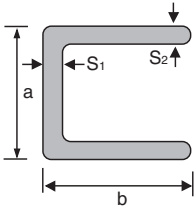
\* Structural profile average value tolerance: =10%.

To the best of our knowledge, the data contained in this publication is accurate. However, Top Glass does not assume liability for how the data is used.

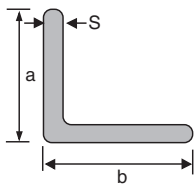
# STRUCTURAL PROFILES



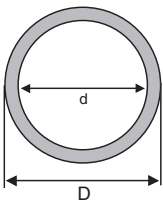
I - H							
a	b	S1	S2	a	b	S1	S2
50	50	3	3	*150	75	8	8
74	25	5	5	*200	100	10	10
*100	50	8	8	200	200	10	8
*120	60	8	8	200	200	10	15



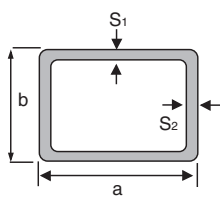
C							
a	b	S1	S2	a	b	S1	S2
20	20	2	2	83	30	3	5
24	12	1,8	1,8	89	30	3	5
50	11	5	5	89	30	3,3	5,1
50	30	3	4	90	35	8	8
50	45	5	5	110	50	5	5
60	23	3	3	111	30	2,1	2,1
60	50	5	5	120	50	3	3
*60	60	5	5	*150	45	8	8
70	12	2,5	2,5	180	70	8	8
70	27	3	3	*200	60	10	10
72	30	3,5	5,1	*300	100	15	15
82	10	2	2				



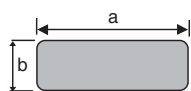
L								
a	b	s	a	b	s	a	b	s
*30	30	5	*50	50	5	*75	50	8
*35	35	5	55	55	5	*100	100	8
40	40	5	*60	60	5	140	60	4
*45	45	5	65	60	5			



TUBES							
D	d	D	d	D	d	D	d
50	34	60	50	80	74	135	115
50	40	60	52	88	79	160	120
50	42	60	54	101	96	169	149
50	45	76	60	102	92	169	153
60	40	76	66	108	102	180	170
60	44	76	70	120	110	250	240
60	48	80	68	127	121	250	245



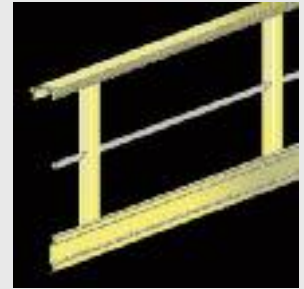
SQUARE - RECTANGULAR TUBES							
a	b	s1	s2	a	b	s1	s2
50	50	4	4	80	47	3	3
*50	50	5	5	82	32	2,8	4
58	25	3	3	82	32	4	8
60	20	2,5	3	*90	90	8	8
60	30	2,5	3	95	26	3	5
70	12	2,6	2,6	100	30	3	3
*70	70	5	5	100	100	10	10
73	25	2,5	3	150	100	3	3
73	25	3,5	6,6	150	100	5	6
73	25	4,2	6,6	200	150	3	3
80	23	3	3				



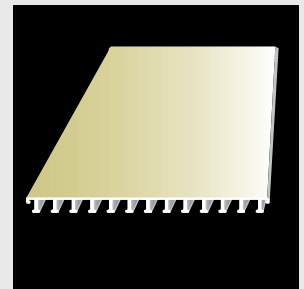
FLAT PROFILES							
a	b	a	b	a	b	a	b
150	10	310	7	1250	8	1250	13
310	3	1250	3	1250	9	1250	16
310	3,5	1250	5	1250	10	1250	17
310	4	1250	6	1250	12	1250	20
310	5,5	1250	7				



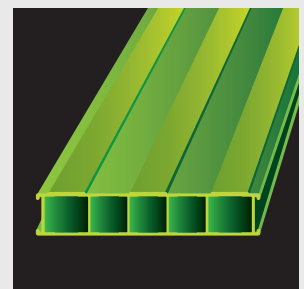
Platforms



Handrail system



Gangways



Antislip scaffolding



Supporting structures

\* = In stock

Nominal dimensions in mm.

## STRUCTURAL PROFILES

The most commonly used materials for structural applications are steel, aluminium and wood. However, **fibreglass is gradually replacing** these materials for certain applications. This is due to its low specific weight and composition (durability and corrosion resistance). Such factors will result in significant **overall savings** as it enables more cost efficient foundations to be developed and transport and assembly costs are reduced. And of course the materials are maintenance free.

The table below compares the various materials used in structures.

COMPARATIVE TABLE OF MATERIALS					
	SPECIFIC WEIGHT g/cm <sup>3</sup>	TENSILE STRENGTH MPa	ELASTIC MODULUS GPa	THERMAL EXPANSION COEFFICIENT K <sup>-1</sup>	THERMAL CONDUCTIVITY W/mK
PULTRUSION	1,8	400	26	11 x 10 <sup>-6</sup>	0,35
WOOD	0,7	80	12	14 x 10 <sup>-6</sup>	0,1
ALUMINIUM	2,7	250	70	23 x 10 <sup>-6</sup>	170
STEEL	7,8	400	210	12 x 10 <sup>-6</sup>	40
PVC	1,5	70	3	85 x 10 <sup>-6</sup>	0,1

The information contained in the table refers to standard construction materials.

The mechanical characteristics of pultruded profiles can be varied by addition of special reinforcements.

Fibreglass profiles can **easily be machined** by applying standard machine tools (saws, mills, drills, grinders) to obtain the specific pieces that are required for any project.



The machined pieces can be **glued and/or bolted** together using specific adhesives or mechanical connectors. The most common method for this involves plates and corner pieces being joined to the profiles by either bolts or threaded rods (Top Glass delivers the Fulcrum™ product line of connectors in **thermoplastic composite** material). This will in turn ensure that the entire structure will maintain uniform corrosion resistance and electrical insulation characteristics.



A number of complete **installation-ready profiles** are available, such as handrails, platforms and ladder systems, stairway/walkway structures, covers and gratings and anti-slip scaffolding planks. Fibreglass profiles can be **batch coloured** (pigmented resin, not post painting) to meet the unique needs of our customers. For external applications a surface veil prevents moisture wick-up and enhance both corrosion and UV resistance. Top Glass also provides a special material that can be used in applications where it will come into contact with **drinking water** (Pro-Food). In addition to the standard profiles listed above, Top Glass manufactures **structural custom made profiles** that will meet specific needs in relation to either the complex structures or special technical requirements. And our success is built on our technicians' continual determination to ensure that they design and deliver the fibreglass profile to meet the precise requirements of our customers.

TOP GLASS S.p.A.  
Via dei Soldani, 3 - I - 23875 Osnago (LC)  
Tel +39 039 95223.1 - Fax +39 039 587787  
info@topglass.it - www.topglass.it

**TOP  
GLASS**<sup>®</sup>  
Composite Solutions