



REAL®
SAFETY

It's all about people



FIBERGLASS PULTRUDED GRATING

Composite Materials

Material Details

Composites are material that are made up of at least two different component materials, of which neither are well suited for construction purposes on their own, but the combination result in a very sturdy and firm material.

FRP / GRP Material

Fibre Reinforced Plastic/ Glass Fibre Reinforced Plastic is a composite material made of a polymer matrix reinforced with fibres. The fibers are usually Fiberglass, Carbon, or Aramid, while the polymer is usually an Epoxy, Vinylester or Polyester Thermosetting Plastic.



Raw Material of FRP

Glass fibres: Glass Fibres are used to give stiffness and resist tensile and compressive loads

Resin: Resin is matrix material which transfers load between fibres and bonds and holds fibres together.

Other additives: To provide additional properties like fire retardant, high electrical insulation etc.

Resin System

Polyester: Unsaturated polyester resins are the most commonly used for the composites industry. Polyester resins have a good balance of mechanical, electrical and chemical properties. The polyester resins are mainly used in glass fibre profiles. Polyester resins can be modified so that they are flame-retardant or self-extinguishing.

The polyester resins have good chemical resistance properties. The chemical environment has to be known before a polyester or vinylester resin can be chosen. Polyester resins are good in weak alkalis and excellent in weak acid conditions.

The maximum recommended operation temperature is 80°C for the basic grade polyesters. Modified versions are also available

Vinyl esters(VE): Vinyl ester resins combine the best features of polyester- and epoxy resins. The strength is good and the resin has a very good chemical resistance in acids and alkalis environments, especially at high temperatures. The glass fibre vinyl ester profile has good electrical and thermal insulation properties.

Epoxy based vinyl ester resins have good chemical resistance at elevated temperatures.

The maximum recommended operating temperature is 90-150°C. Modified versions are also available.

Comparison with conventional materials

	Real Safety	Steel	Aluminium	Timber
Corrosion Resistance	High	Low	Medium	Low
Strength	High	High	High	Low
Weight	Low	High	Low	Medium
Electrical conductivity	Low	High	High	Moderate
Thermal Conductivity	Very Low	High	High	Low
EMI / RFI Transparency	Yes	No	No	Yes
Fabrication	Easy	Easy	Moderate	Easy
Life Cycle cost	Low	Moderate	Moderate	High
Environmental Impact	Low	High	High	Low

Pultrusion Process



Pultrusion is the process of pulling fiberglass reinforcements such as mats and strands through a proprietary resin and heated die. The result is a specific complex profile that can be cut to any length. This process offers speed and consistency making it the best method for producing high-volume linear fiberglass products that require constant cross sections.

Pultrusion refers to pulling plastic raw material through a performer. This production method is particularly suitable for tubes, profiles etc. reinforced with continuous fibres, involving pulling of impregnated fibres via preformers providing the form as, simultaneously, the plastic is hardened with heat (thermo-set) or cooled until solid (thermoplast).

Moulding Process

GRP/FRP Gratings are produced by wet moulding and hot curing in a heated mould.

The reinforcement consists of continuous fibre-glass rovings in alternating layers, so the loads are distributed evenly in all directions.

Regularly Moulded GRP Gratings have a polyester resin matrix. Glass content is approximately 35%. Standard colours are green, yellow or grey, but other colours are available according to RAL.



Advantages of FRP Fiberglass



Flame retardant



High strength



Electrical non-conductivity



Low weight



Ease of fabrication



Thermal non-conductivity



Less environmental Impact



EMI/RFI transparent



Corrosion/chemical resistance



Low Life Cycle cost

Fiberglass Pultruded Grating Systems

Fiberglass Pultruded Gratings

Real Safety Pultruded Gratings

Real Safety Pultruded Gratings are famous for their high strength, corrosion resistance, long life and safety in the most difficult environments. These also adhere to the highest international standards.

Being lightweight, easy to put together and install, good performance and cost effectiveness makes it a better choice than steel in several major industries.

An entire collection of gratings is offered to satisfy wide-ranging industrial needs and high load requirements for safety at work.

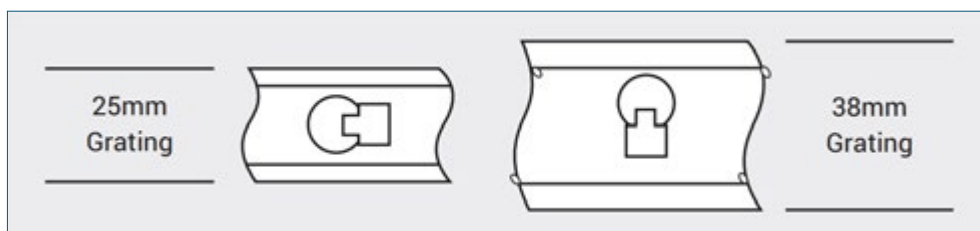
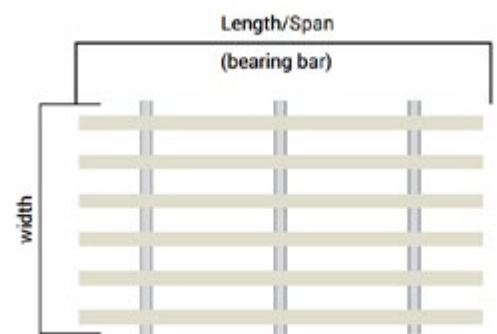


Bearing Bars & Cross-rod Assemblies

Unlike molded grating which has equal strength in both directions, Real Safety's pultruded grating is stronger in the longitudinal direction as it is fabricated from bearing bars & interlocking rod and groove bar assemblies. For that reason, Real Safety's Pultruded grating sizes are specified by width (the cross-rod dimension) x length or span (the bearing bar dimension).

The bearing bars used for Real Safety Industrial grating are pultruded I bars and T Sections and these bars are 25mm (1 Inch) and 38mm (1.5 inches) deep.

For the 25mm (1 inch) deep grating, the cross-rod assembly is used horizontally, whilst for 38mm (1.5 inches) and 50mm (2 inches), deep products cross rods are used vertically.



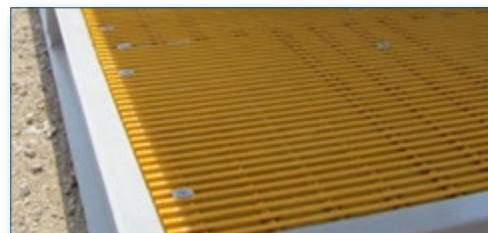
Fiberglass Pultruded Grating Systems

Fiberglass Pultruded Gratings

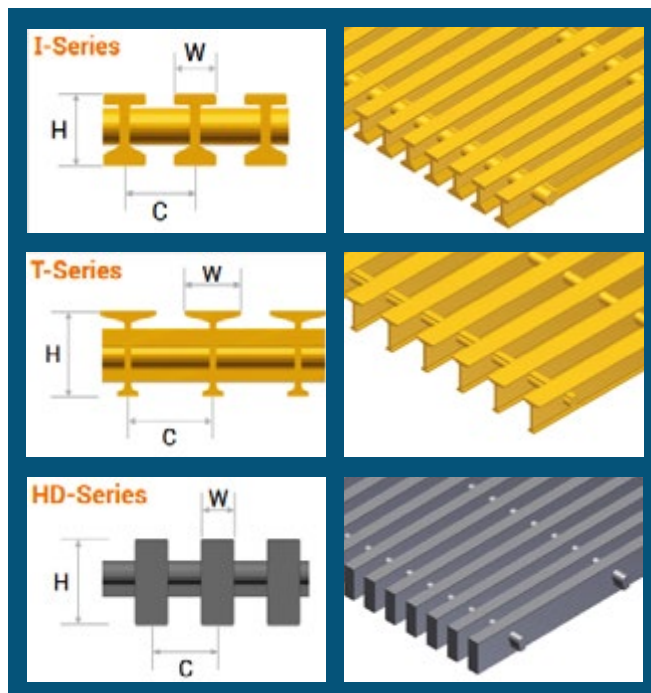
The I bar assemblies are offered in standard size with 40%, 50% and 60% open areas whereas the T bar assemblies have 17%, 33% and 50% open areas as standard. Nomenclature use to describe each industrial grating style refers to its bearing bar style (I or T), its open area and its metric depth. For example:

I 1560= I bearing bar: 60% open area: 38mm deep

T 1033= T bearing Bar: 33% open area: 25 mm deep



	H-Height (mm) Base	W-Top width (mm)	C-Spacing (mm)	Open Area (mm)
I-1040	25	15	25	40
I-1050	25	15	30	50
I-1060	25	15	38	60
I-1240	30	15	25	40
I-1260	30	15	38	60
I-1540	38	15	25	40
I-1550	38	15	30	50
I-1560	38	15	38	60
T-1033	25	25	38	33
T-1050	25	25	50.8	50
T-1517	38	25	30.5	17
T-1533	38	25	38	33
T-1550	38	25	50.8	50
T-2033	50	25	38	33
T-2050	50	25	50.8	50
HD-1540	38	15	25	40
HD-1550	38	15	30	50
HD-1560	38	15	38	60



Allowable Spans for Vehicle Loads

		Wheel Load (kg) 1/2 Axle Load +30% Impact	Load Distribution (in mm)	Allowable span in mm		
				HD 1540	HD 1550	HD 1560
	AASHTO Standard Truck4 / 14500kg Axle Load Dual Wheels(*formerly AASHTO H-20)	9425 kg	500	425	350	300
	Automobile Traffic / 2200 kg Vehicle 700 kg Load / 55% Drive Axle Load	1000 kg	200	700	675	650
	5 ton Capacity Forklift / 6500 kg Vehicle 11500 kg Total Load / 85% Drive Axle Load	6350 kg	275	375	350	300
	3 Ton Capacity Forklift / 4500kg Vehicle 7500 kg Total Load / 85% Drive Axle Load	4150 kg	175	400	350	300
	1 Ton Capacity Forklift / 2000 kg Vehicle 3000 kg Total Load / 85% Drive Axle Load	1650 kg	100	500	500	475

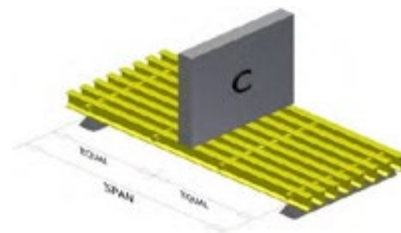
For customized size and loading standards please contact our sales team.

Pultruded Grating of Height 30mm, 50mm and whom height also available on request.

Real Safety Grating complies standards stipulated by FGMC of (Fiberglass Grating Manufacturers Council) of ACMA (American Composite Manufacturing Association)

Pultruded Gratings - Load Deflection Table

Concentrated Line Load (deflection in mm)



I-1040 - 25MM Thick Grating : 40% open area

SPAN In mm	LINE LOAD IN KG / MTR														MAX REC.
	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	25000	
400	0,3	0,4	0,7	0,9	1,1	1,3	1,7	2,1	3,3	4,3	8,5	12,8			8300
600	0,7	1,2	1,9	2,3	3,0	3,5	4,7	5,8	9,1	11,7					6200
800	1,5	2,6	4,1	5,2	6,7	7,7	10,3	12,9							5000
1000	2,9	4,9	7,8	9,8	12,7	14,7									3800
1200	5,0	8,3	13,3												3100
1400															
1600															

I-1050 - 25MM Thick Grating : 50% open area

SPAN In mm	LINE LOAD IN KG / MTR														MAX REC.
	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	25000	
400	0,3	0,5	0,8	1,1	1,4	1,6	2,1	2,6	4,1	5,3	10,6				6950
600	0,8	1,4	2,3	2,9	3,7	4,3	5,8	7,2	11,3						5150
800	1,9	3,2	5,1	6,4	8,3	9,6	12,8								4150
1000	3,6	6,1	9,7	12,2											3150
1200	6,2	10,3													2600
1400															
1600															

I-1060 - 25MM Thick Grating : 60% open area

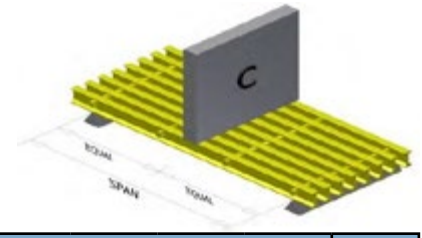
SPAN In mm	LINE LOAD IN KG / MTR														MAX REC.
	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	25000	
400	0,4	0,6	1,0	1,3	1,7	1,9	2,6	3,2	5,0	6,4	12,8				5600
600	1,0	1,7	2,8	3,5	4,5	5,2	7,0	8,7	13,6						4100
800	2,3	3,9	6,2	7,7	10,0	11,6	15,4								3300
1000	4,4	7,3	11,7	14,7											2500
1200	7,5	12,4													2100
1400															
1600															

NOTES:

1	It is advised not to exceed the MAX RECOMMENDED LOAD at any given span. MAX RECOMMENDED LOAD represents a 2:1 factor of safety on ULTIMATE CAPACITY.
2	ULTIMATE CAPACITY represents a complete and total failure of the grating. Max recommended and ultimate loads do not change as a result of adding a 3mm thick covered plate.
3	Walking loads, typically 250-300 kg/m ² maximum are recommended for pedestrian traffic. Deflections for worker comfort are typically limited to the lesser of 10mm or CLEAR SPAN divided by 125; for a firmer feel, limit deflection to the lesser of 6 or CLEAR SPAN divided by 200.
4	The allowable loads in this table are for STATIC LOAD CONDITIONS at ambient temperatures only. Allowable loads for impact or dynamic conditions should be a maximum of ONE-HALF the values shown. Long term loads will result in added deflection due to creep in the material and will also require higher safety factors to ensure acceptable performance. For applications at elevated temperatures, consult our technical team
5	All gratings were tested in accordance with the proposed standard of the Fiberglass Grating Manufacturers Council of the American Composites Manufacturers Association

Pultruded Gratings - Load Deflection Table

Concentrated Line Load (deflection in mm)



I-1540 - 38MM Thick Grating : 40% open area

SPAN	LINE LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,1	0,2	0,3	0,4	0,5	0,6	0,8	0,9	1,5	1,9	3,8	5,6	7,5	9,4	11400
600	0,3	0,5	0,7	0,9	1,2	1,4	1,9	2,3	3,6	4,6	9,3	13,9			7800
800	0,6	1,0	1,6	2,0	2,6	2,9	3,9	4,9	7,7	9,8					6100
1000	1,1	1,8	2,9	3,7	4,7	5,5	7,3	9,1	14,2						5000
1200	1,9	3,1	5,0	6,2	8,1	9,3	12,5	15,6							3900
1400	3,0	4,9	7,9	9,9	12,8	14,8									2900
1600	4,4	7,3	11,7	14,7											2400

I-1550 - 38MM Thick Grating : 50% open area

SPAN	LINE LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,1	0,2	0,4	0,5	0,6	0,7	0,9	1,1	1,8	2,3	4,7	7,0	9,4	11,7	9500
600	0,3	0,6	0,9	1,1	1,5	1,7	2,3	2,9	4,5	5,8	11,6				6450
800	0,7	1,2	2,0	2,4	3,2	3,6	4,9	6,1	9,6	12,2					5100
1000	1,3	2,2	3,6	4,6	5,9	6,8	9,1	11,4							4150
1200	2,3	3,9	6,2	7,7	10,1	11,6									3250
1400	3,7	6,1	9,8	12,3											2400
1600	5,5	9,1													1950

I-1560 - 38MM Thick Grating : 60% open area

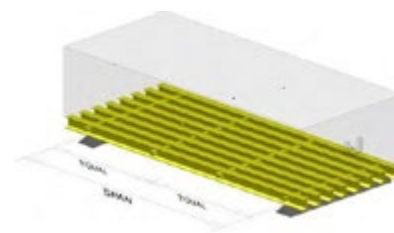
SPAN	LINE LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,2	0,3	0,5	0,6	0,7	0,8	1,1	1,4	2,2	2,8	5,6	8,4	11,36	14,1	7600
600	0,4	0,7	1,1	1,4	1,8	2,1	2,8	3,5	5,4	7,0	13,9				5100
800	0,9	1,5	2,4	2,9	3,8	4,4	5,9	7,4	11,5	14,7					4100
1000	1,6	2,7	4,4	5,5	7,1	8,2	10,9	13,7							3300
1200	2,8	4,7	7,5	9,3	12,1	14,0									2600
1400	4,4	7,4	11,8	14,8											1900
1600	6,6	11,0													1500

NOTES:

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Pultruded Gratings - Load Deflection Table

Uniformly Distributed Load *(deflection in mm)*



I-1040 - 25MM Thick Grating : 40% open area

SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,1	0,1	0,2	0,2	0,3	0,3	0,4	0,5	0,8	1,1	2,1	3,2	4,3	5,3	41900
600	0,3	0,4	0,7	0,9	1,1	1,3	1,8	2,2	3,4	4,4	8,8	13,1			20700
800	0,8	1,3	2,1	2,6	3,4	3,9	5,2	6,4	10,1	12,9					12600
1000	1,8	3,1	4,9	6,1	8,0	9,2	12,3	15,3							7700
1200	3,7	6,2	9,9	12,4											5200
1400															
1600															

I-1050 - 25MM Thick Grating : 50% open area

SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,1	0,2	0,3	0,3	0,4	0,4	0,5	0,7	1,0	1,5	2,9	3,8	5,4	7,0	34900
600	0,3	0,6	0,9	1,1	1,5	1,9	2,3	3,0	4,9	6,0	12,1				17200
800	1,0	1,5	2,7	3,0	4,0	5,2	6,7	8,6	14,1						10500
1000	2,2	4,0	6,3	8,2	10,7	12,8									5600
1200	4,5	8,9	13,7												4300
1400															
1600															

I-1060 - 25MM Thick Grating : 60% open area

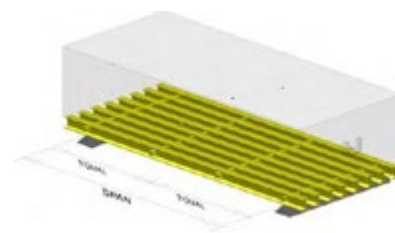
SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,1	0,2	0,3	0,3	0,4	0,5	0,6	0,8	1,2	1,6	3,2	4,8	6,4	8,0	27900
600	0,4	0,7	1,0	1,3	1,7	2,0	2,6	3,3	5,1	6,6	13,1				13800
800	1,2	1,9	3,1	3,9	5,0	5,8	7,7	9,6	15,1						8500
1000	2,8	4,6	7,3	9,2	11,9	13,8									5100
1200	5,6	9,3	14,9												3500
1400															
1600															

NOTES:

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Pultruded Gratings - Load Deflection Table

Uniformly Distributed Load (deflection in mm)



I-1540 - 38MM Thick Grating : 40% open area

SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,0	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,4	0,5	0,9	1,4	1,9	2,3	57400
600	0,1	0,2	0,3	0,3	0,5	0,5	0,7	0,9	1,4	1,7	3,5	5,2	7,0	8,7	25900
800	0,3	0,5	0,8	1,0	1,3	1,5	2,0	2,5	3,8	4,9	9,8	14,7			15500
1000	0,7	1,1	1,8	2,3	3,0	3,4	4,6	5,7	8,9	11,4					10000
1200	1,4	2,3	3,7	4,7	6,1	7,0	9,3	11,7							6600
1400	2,6	4,3	6,9	8,6	11,2	13,0									4200
1600	4,4	7,3	11,6	14,7											2900

I-1550 - 38MM Thick Grating : 50% open area

SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,0	0,1	0,1	0,1	0,1	0,2	0,2	0,3	0,5	0,7	1,9	2,4	2,9	3,0	47800
600	0,1	0,2	0,3	0,3	0,5	0,6	0,7	0,9	1,9	1,7	3,5	5,2	8,0	9,9	21600
800	0,4	0,5	0,9	1,0	1,4	1,5	3,0	3,5	4,8	5,7	11,8				12900
1000	1,0	1,1	1,9	2,9	3,4	3,9	4,9	6,7	10,9						8300
1200	1,7	3,3	4,7	5,7	7,1	8,0	12,3	14,7							5400
1400	3,2	5,4	8,9	10,0	13,2										3500
1600	5,4	8,4	13,6												2400

I-1560 - 38MM Thick Grating : 60% open area

SPAN	UNIFORM DISTRIBUTED LOAD IN KG / MTR														MAX REC.
	In mm	300	500	800	1000	1300	1500	2000	2500	3900	5000	10000	15000	20000	
400	0,0	0,1	0,1	0,1	0,2	0,2	0,2	0,4	0,5	0,7	1,4	2,1	2,8	3,5	38300
600	0,2	0,3	0,4	0,5	0,7	0,8	1,0	1,3	2,0	2,6	5,2	7,8	10,4	13,0	17300
800	0,4	0,7	1,2	1,5	1,9	2,2	2,9	3,7	5,7	7,4	14,7				10300
1000	1,0	1,7	2,7	3,4	4,4	5,1	6,8	8,6	13,3						6700
1200	2,1	3,5	5,6	7,0	9,1	10,5	14,0								4300
1400	3,9	6,5	10,4	10,9											2800
1600	6,6	11,0													1900

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Fittings and Accessories

Real Safety Fittings and Accessories

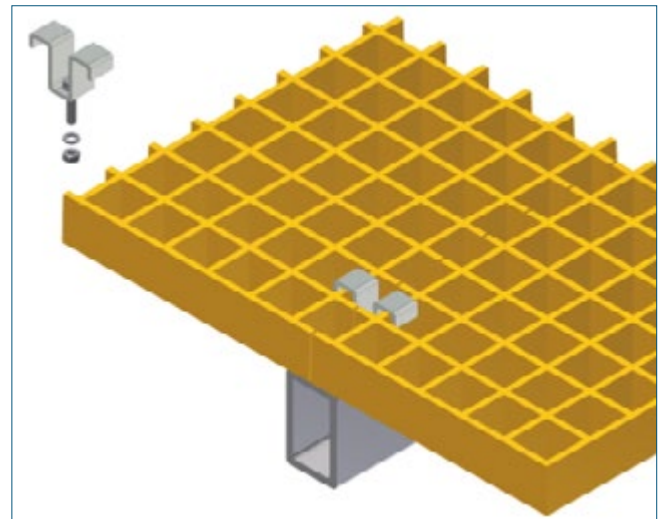
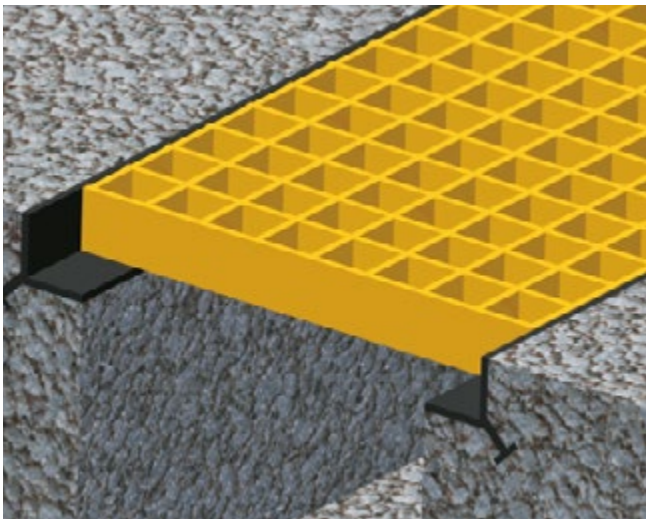
Applicable for our gratings, we have special support angles which are concreted into the basement directly.

Fixing Sets

Easy to assemble without any special tools.

A pultruded Fiberglass angle can be used as a frame for all Fiberglass gratings.

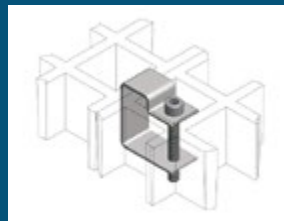
Stainless steel fixing sets can be used for all standard Fiberglass gratings and support constructions. To prevent Fiberglass gratings against lifting and sliding away, each panel should be fixed on at least four points.



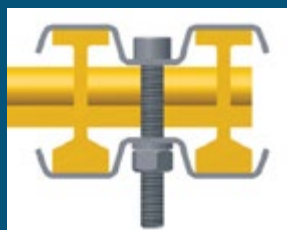
M-Clip for Molded Grating



C-Clamp for Molded Grating



M-clip for Pultruded Grating



Fiberglass Pultruded Profiles

Structural Pultruded Profiles

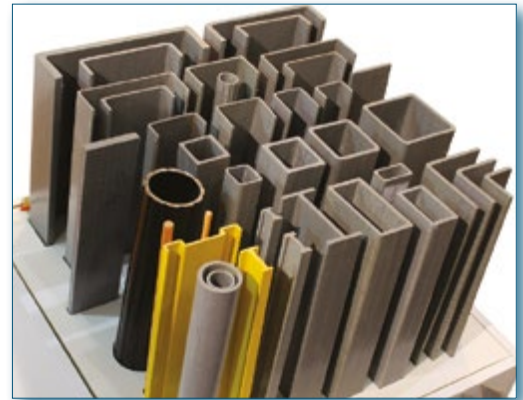
GRP or FRP Structural pultruded profiles are manufactured by combining a resin matrix with a fibre reinforcement. This is formed and cured in a continuous process creating a product of extraordinary strength and resilience. GRP Structural Pultruded Profiles provide a variety of benefits and mechanical properties matching or exceeding steel equivalents.

A wide range of structural profiles are available including: U Channel, I - Beam, Tube, Box, Angle, Rod and Hand Rail.

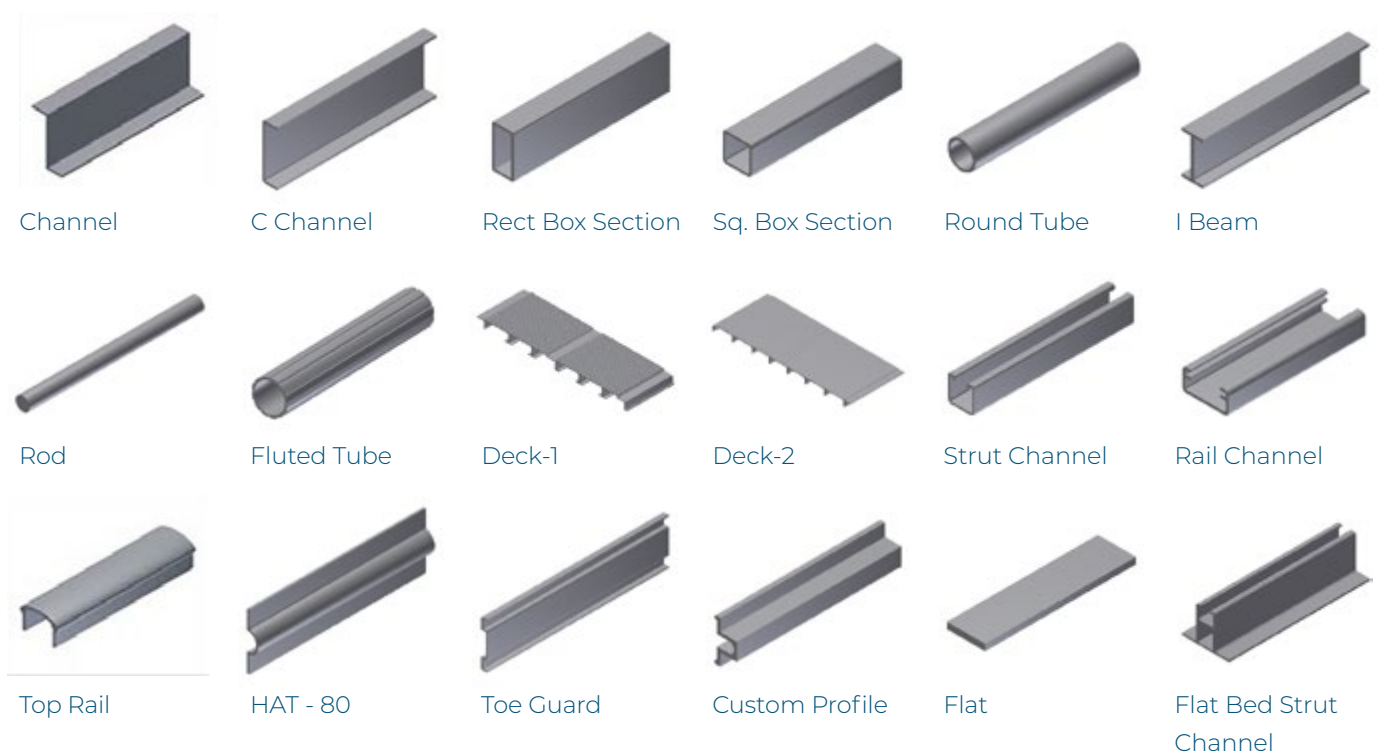
Resin System

As a standard, Isophthalic polyester resins are used for the matrix. To fulfill special requirements the following resin types are applied:

- Isophthalic resin : moderate corrosion resistance and fire resistance
- Vinyl ester resin : extreme corrosion resistance and fire resistance



Types of Structural Profiles



The profiles listed above are only a very small proportion of our range. If you should require a custom profile please do not hesitate to contact us. All profiles manufactured in accordance with CTI 137 Standard.

Fiberglass Advantage

Industry Segment



7 Follow-up



1 Inspection



6 Finished Solution



2 Consultation



5 Installation



3 Recommendation



4 Production



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