

EXTRA CO
COMPOSITES INDIA PRIVATE LIMITED



EXTRAGRATE GRP PULTRUDED PROFILES

GRP PULTRUDED & MOULDED
GRATINGS

**LINED WITH TRUST AND
REINFORCED WITH PERFECTION**



ABOUT OUR COMPANY

Extraco Composites India Pvt Ltd., is a leading manufacturer in fibre glass industry, operating in accordance with the quality standards of ISO 9001:2015. Commitment to quality and customer satisfaction has always ensured successful completion of projects by providing a combination of reliable products and services. Much knowledge has been accumulated during the past two decades, resulting from extensive research, Product testing and providing advanced information on product performance.

The GRP Products & services provided by Extra Co. meet client requirements by providing long - term performance solution to the highest international standards.

ACCREDITATIONS

Extra Co. has obtained the followings accreditations:

- ❖ ISO 9001 : 2015 Certified for Quality Management.



QUALITY ASSURANCE POLICY - ISO 9001 : 2015

To build Quality into the processes with Continual Improvement, to the customers standards, for achieving defect free products on time, every time aiming at Total Customer Satisfaction, by involvement of personnel and upgradation of technology with commitment to satisfy applicable legal requirement.

OVERVIEW

EXTRAGRATE products are designed and used like traditional metal grates but with the inherent benefits of fibreglass. These problem-solving products are ideal replacement for steel and aluminium gratings in corrosive environments or anywhere frequent grating and walkway replacement costs are unacceptable. EXTRAGRATE offers a significant number of benefits, mainly:

- ❖ Reliable performance
- ❖ Maintenance Free
- ❖ Long lifetime
- ❖ Cost effective solution
- ❖ Corrosion resistance
- ❖ Fire retardance
- ❖ Non-conductivity
- ❖ High impact and fatigue strength
- ❖ Slip resistance
- ❖ Ultra-violet resistance
- ❖ Light weight
- ❖ Easy installation
- ❖ Low smoke/low toxic emissions
- ❖ Flame resistance

APPLICATIONS

With its combination of flame resistance, low smoke and low toxic emissions, light weight, slip-resistant footing and corrosion resistance, Extragrate can be used in some of the most demanding conditions.

- ❖ Flooring
- ❖ Offshore platforms
- ❖ Walkways, stairs
- ❖ Marine vessels
- ❖ Chemical processing plants
- ❖ Refineries
- ❖ Food Processing plant
- ❖ Smoke filtration units
- ❖ Sewage treatment plant
- ❖ Oil & Gas Industry

MOULDED EXTRAGRATE

It combines fibreglass rovings with thermosetting resin to form a strong, one piece moulded panel. The highly durable open mesh flooring panels can be combined with the solid checker plate to provide added strength and a continuous vapour and liquid barrier.

The thicker square mesh construction allows the panels to span in either directions and carry heavier loads.



Corroded Steel Grating Vs GRP Moulded Grating



Pultruded Grating in sewerage Treatment Plant

PULTRUDED EXTRAGRATE

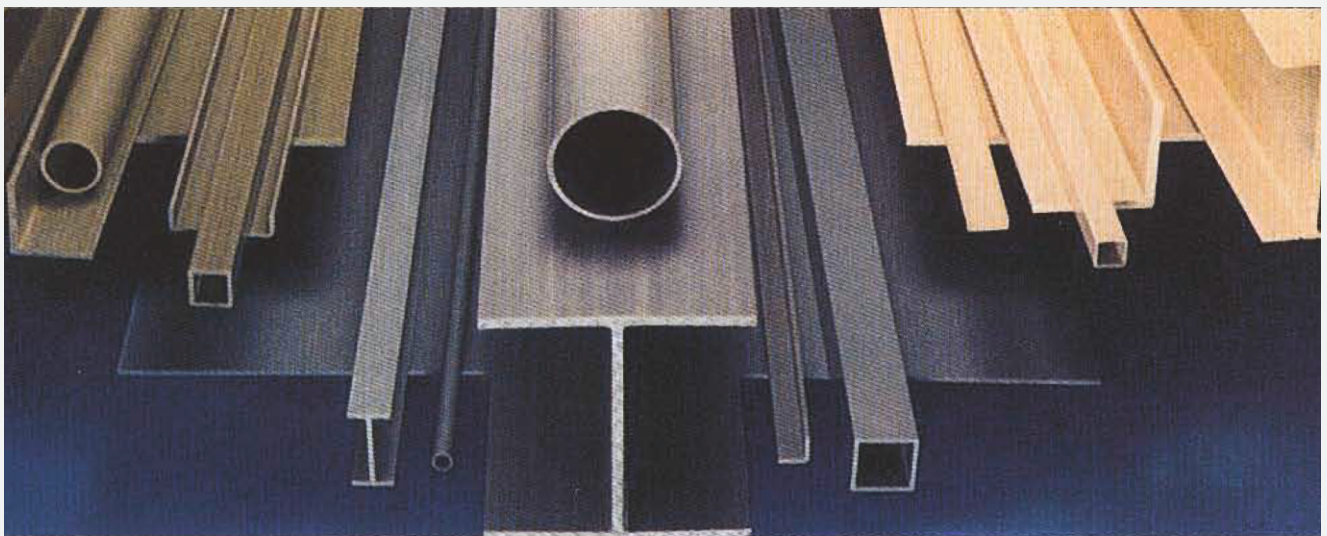
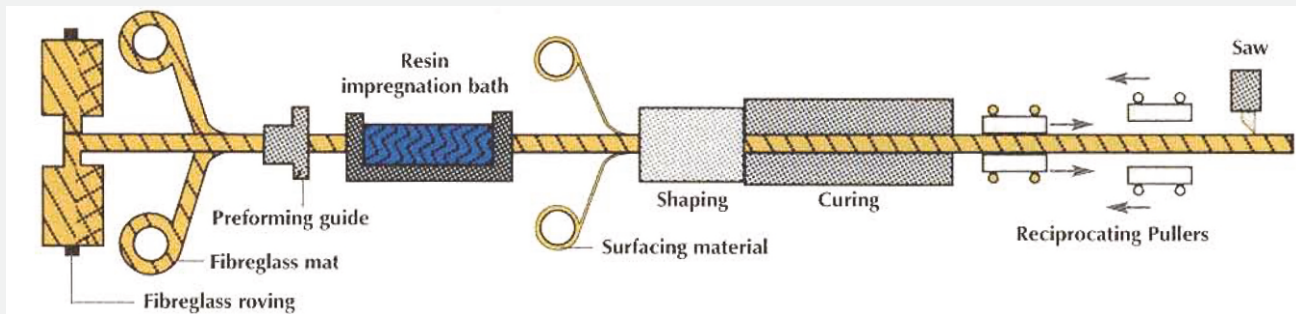
It is manufactured by combining a resin matrix with a fibre reinforcement. Continuous fibre reinforcement in roving or mat/roving form is drawn through a resin bath, which coats each fibre with a specially formulated resin mixture that can be colour pigmented.

A protective veil can be added to protect against the effects of weathering the coated fibres are performed and then drawn through a heated die. The rate of reaction is controlled by heating and coating zones in the die.

PULTRUSION

Pultrusion is a Composite of several different materials and reinforcements. As such, the designer is empowered with a freedom of design that enables the selection of reinforcements, resin systems, shape and loadings to yield a wide range of performance characteristics.

Any Profile can be produced that have mechanical properties comparable to metals. Notwithstanding, the composite matrix can be formulated to meet the most demanding chemical, flame retardant, electrical and environment requirements.



GRP GRATING SPECIFICATIONS

FEATURE	ADVANTAGE
Corrosion Resistant	Long service life, minimum maintenance cost, lower operating cost.
High Strength	Increases structural design options, strength can be oriented to load direction.
Dimensional Stability	Uniform quality output, close tolerance makes assembly or installation easier and faster.
Lightweight*	Less labour cost for installation, handles easily, lower shipping cost
Non-Conductive	Non-magnetic, predictable insulation values, safety factors
Weathering	Excellent performance over long exposure to harsh environments.

* 80% less than steel.
30% less than aluminium.

GENERAL PROPERTIES OF PULTRUDED COMPOSITES

PROPERTY (coupon test)	ISOPHTHALIC RESIN 60 - 70% Glass	VINYLESTER RESIN 60 - 70% Glass
Tensile Strength	46,000 psi	48,000 psi
Tensile Modulus	3.4x100	3.8 X 100
Flexural Strength	52,000 psi	54,000 psi
Flexural Modulus	3.4 X 100	3.8 X 100
Compressive Strength	42,000 psi	44,000 psi
Compressive Modulus	3.3 X 100	3.7 x 100
Barcol Hardness	50	60
Dielectric	260 VPM	260 VPM

Properties will vary with the product and manufacturing set-up. Properties are estimated at design stage of the profile, but tests of the manufactured product are necessary to confirm the performance and overall mechanical properties.

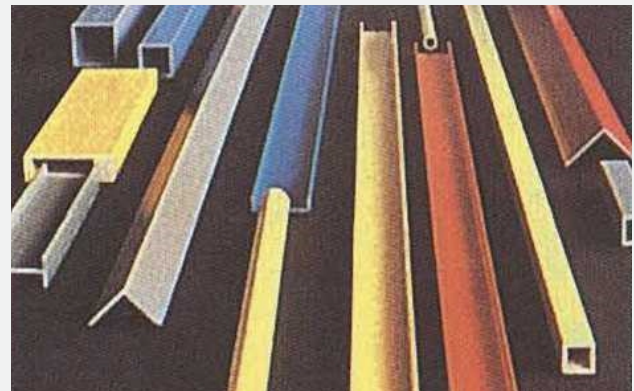
USE OF RESINS

The corrosion resistance of the product is accomplished by the Resin. There is always appropriate resin system for each type of environment.

Vinylester Resin is used when a product is exposed to severe chemical condensation (attack) and high operating temperatures, upto 850C.

Isophthalic Resin is used when the product is exposed to splash and spill chemicals and moderate operating temperature, upto 600C.

Phenolic Resin is used when the product is expected to be exposed to very high temperature, especially in fire situation. In fire tests phenolic gratings demonstrated extremely low conductivity, conducting heat at only 12% rate.



Corroded Steel Grating Vs GRP Moulded Grating

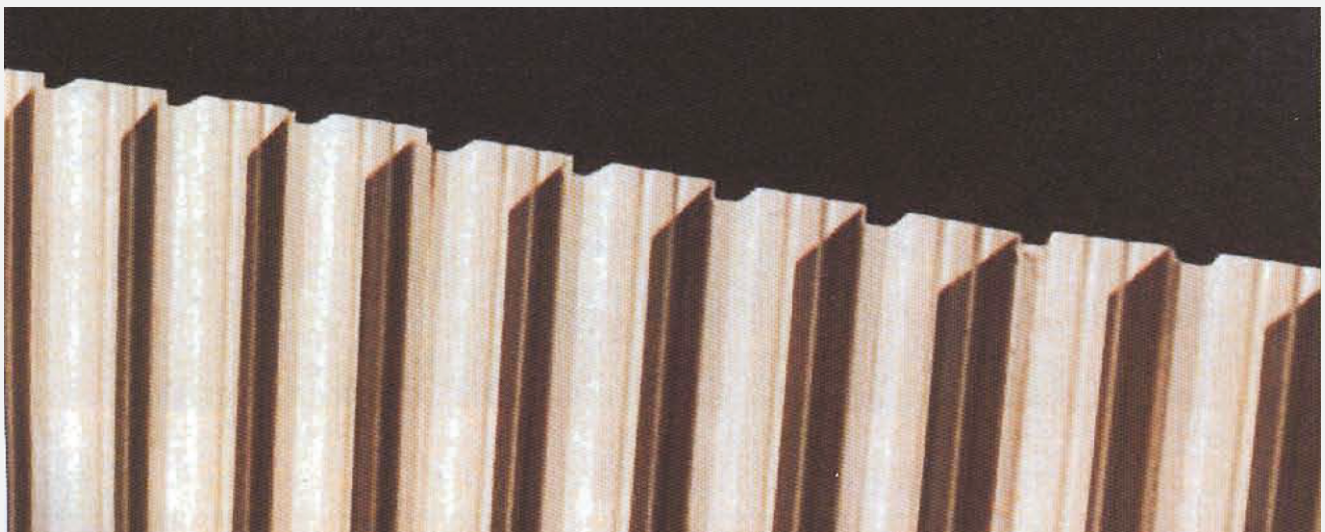


Pultruded Grating in sewerage Treatment Plant

USE OF REINFORCEMENTS

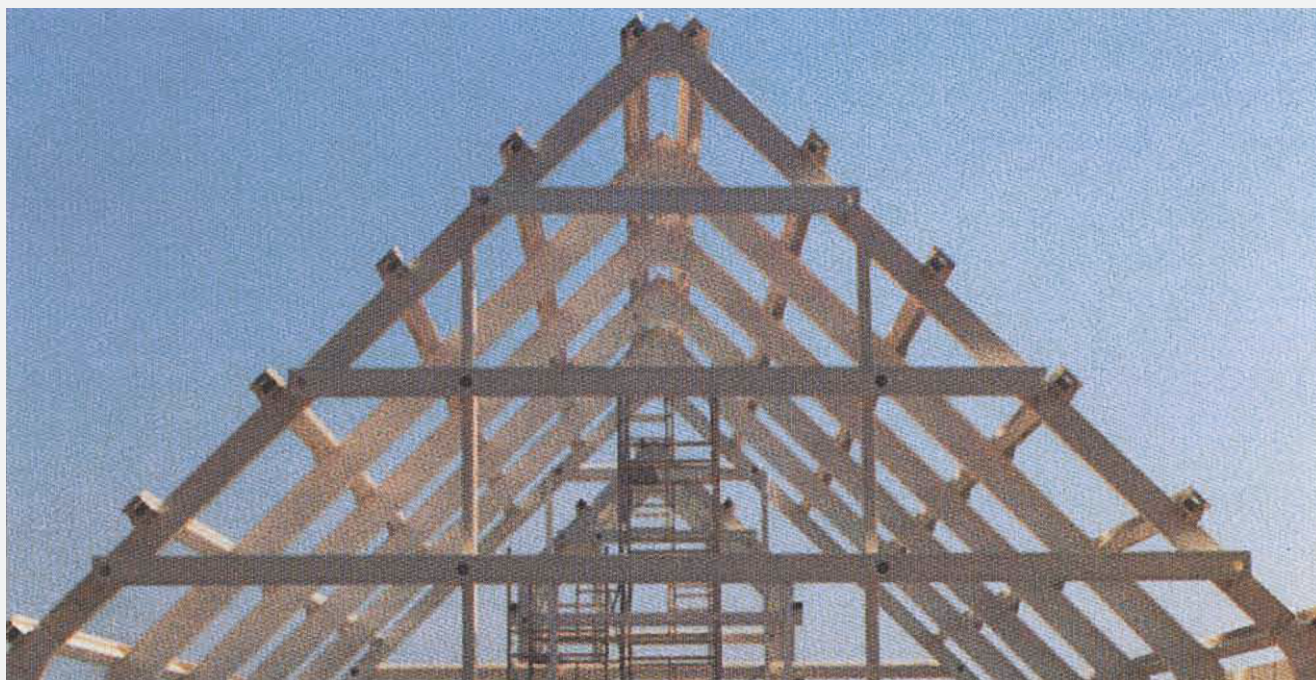
The most widely used reinforcement is Glass Fibre in the form of Type 'E' Rovings and Continuous Strand Mat.

To improve corrosion resistance of composites, Type 'ECR' / 'Advantex' Fibre is used.



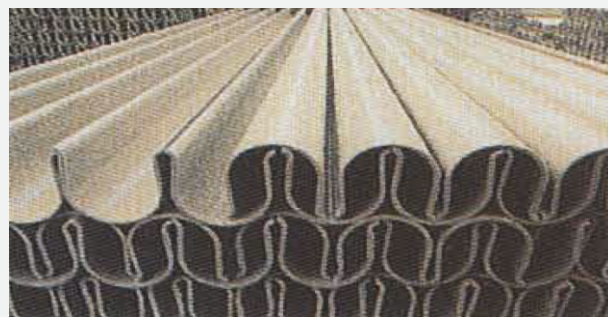
ROOF STRUCTURE

Pultruded Roof Structure using a safety factor of four-to-one are designed to support wind load and extreme temperature on the outside while withstanding corrosive environments from the inside. Columns, beams and purlins perform in the building construction the best way. Virtually, maintenance-free and non-conductivity makes the system the ideal choice for this construction.



WINDOW / DOOR FRAMES

Pultrusion moves the non-metal windows / doors to a new range of performance. Fibreglass / Polyester Resin Pultrusion form frame and pans, components and spacer bars in a new generation of thermally efficient, dimensionally stable window frames.



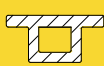
I-Beam



Embedment
Angle



Tee



Square
Beam



U-Beam



Channel &
Cover



Kicker Plate



Cable Tray



Beam



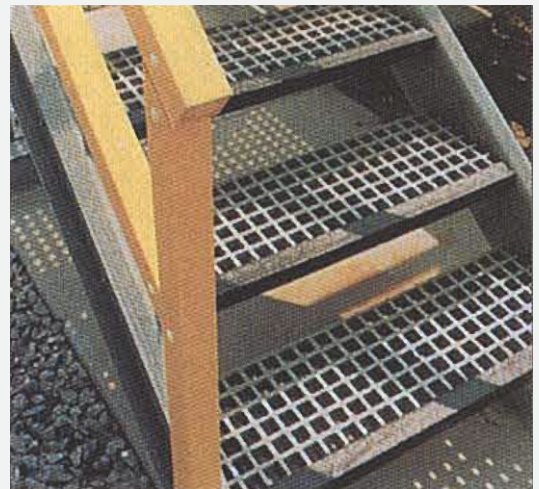
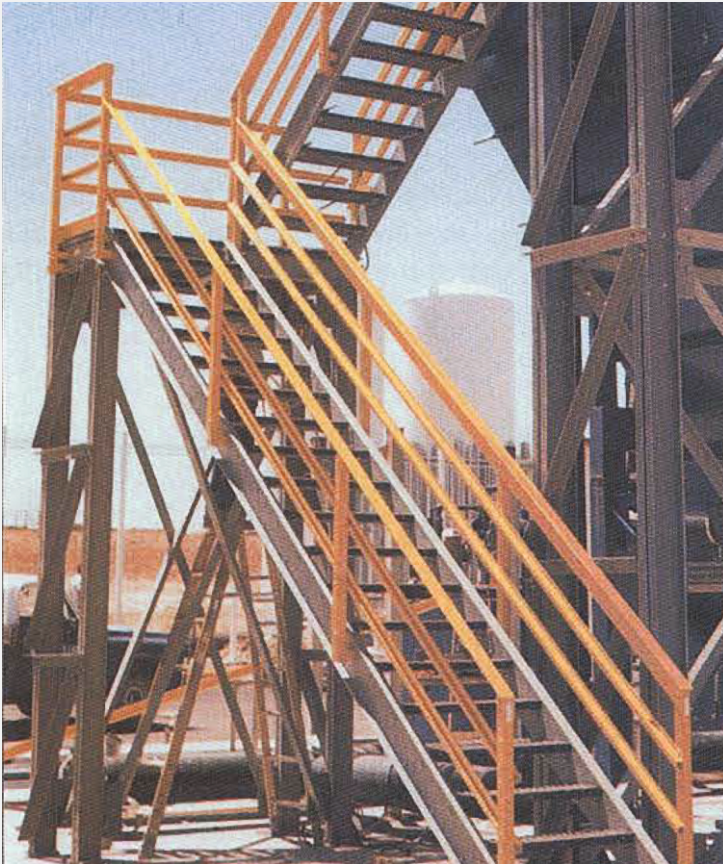
Window
Profile



Rung

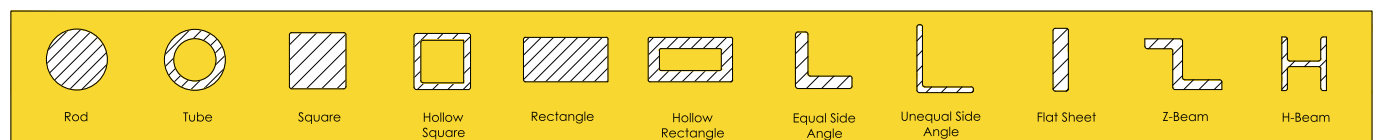
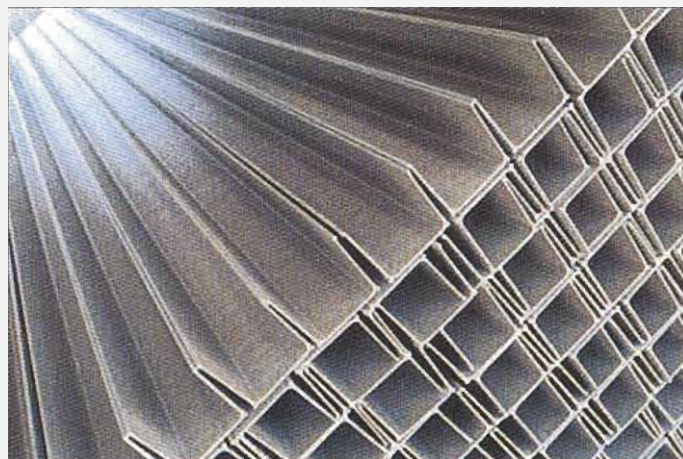
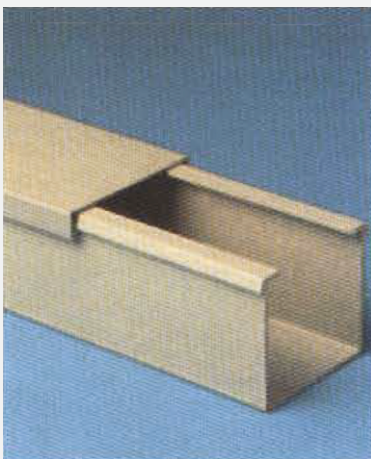
STANDARD STRUCTURALS

From small rod and flat sheet to angles, tubes, pipes and huge 'I' beams, pultruded structurals are available with no limitation. With strength that allows substitution for steel structurals, fill the demand for all types of fabricated building structures in most industries.



ELECTRICAL INDUSTRY

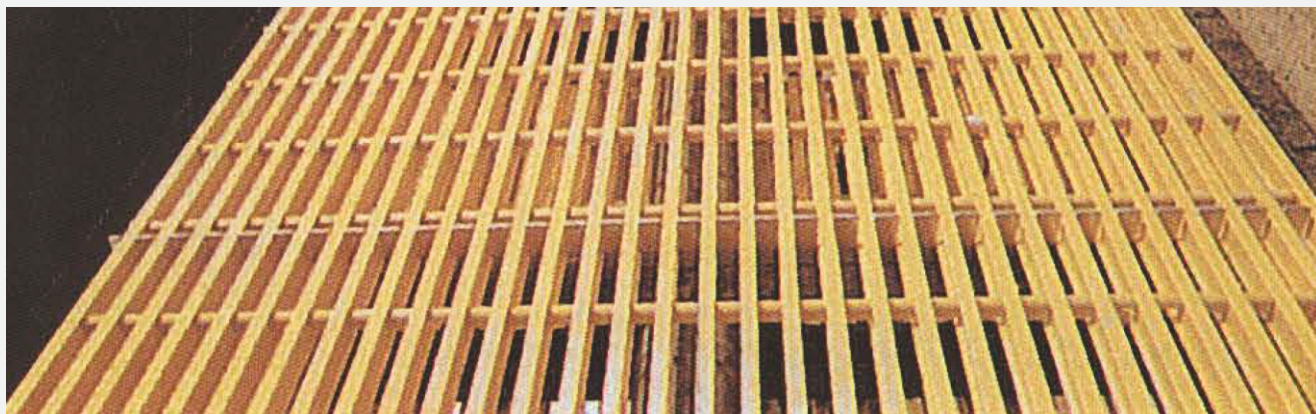
The Pultruded lay-in wireway system is designed to provide easy installation of any power, communication or control system. Cable trays and non-conductive components of DBs make pultrusion a step ahead for classical materials used till now.



GRP PULTRUDED GRATINGS & HANDRAILS

GRP Pultruded Grating is stronger than steel yet 1/3 times lighter, non-corrosive and provides a safe, non-skid surface for service personnel. It does not conduct electricity or produce sparks.

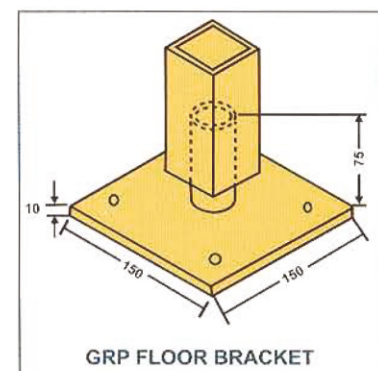
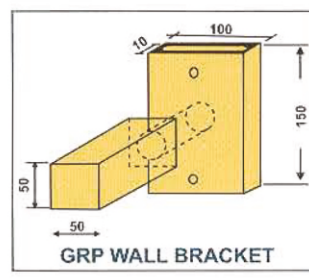
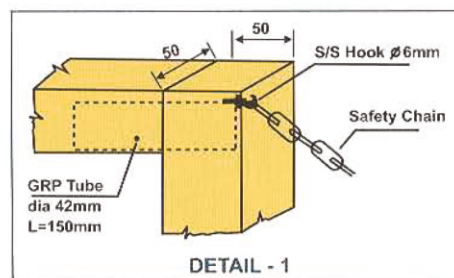
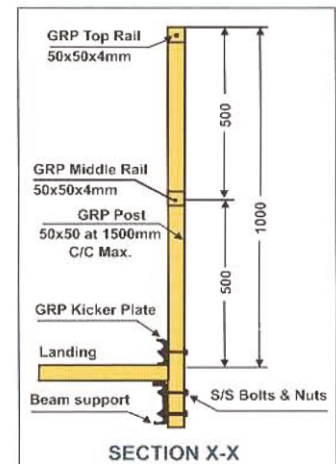
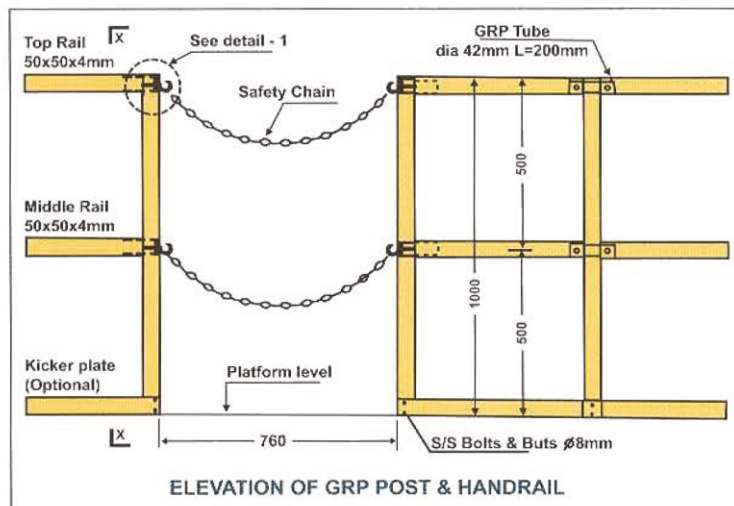
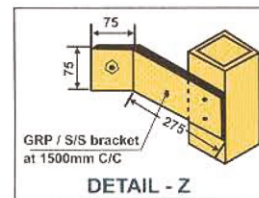
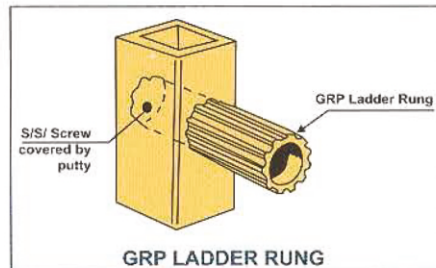
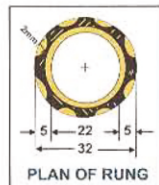
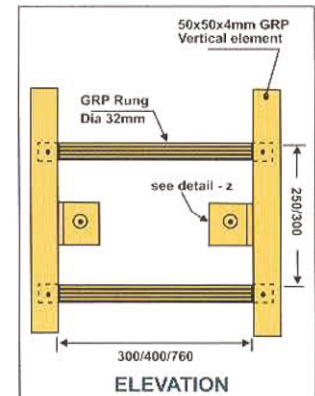
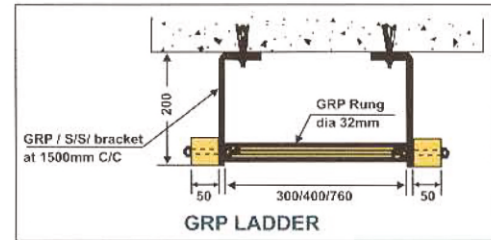
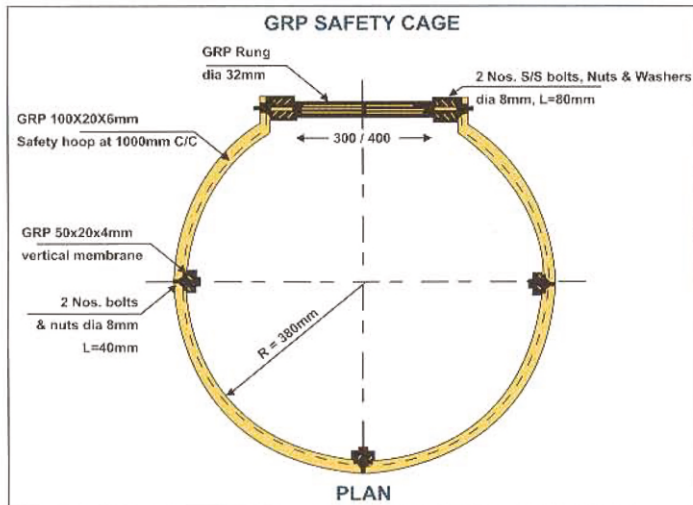
The various features of GRP Pultruded Gratings, mainly the high mechanical strength, excellent chemical resistance, excellent thermal and electrical insulation, good resistance to fire, non-slip surface and easy to clean, give it an edge over conventional metal gratings. This is why, it is widely used in chemical plants, sewerage disposal plants, electroplating facilities, plant rooms, engine rooms, decks, walkways, stairways, storage areas and especially in oil and gas industry.



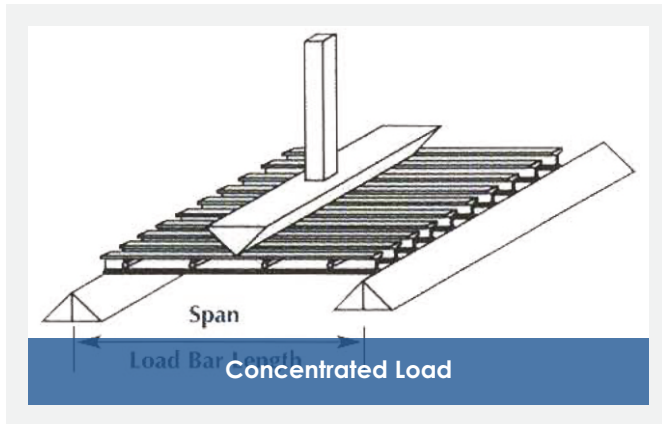
BASIC INFORMATION

Grating Types	'I' and 'T' shapes are available
Panel Sizes	6000mm Span (length) x 1900mm wide, maximum 33 bearing bars. 3000mm Span (length) x 1900mm wide, maximum 33 bearing bars. Any other size is available on request.
Bearing Bars	'I' and 'T' Section Depths 25.4mm 38.1 and 50.8mm
Maximum clear span for nominal 5000 N/M2 (maximum deflection 1/200th of span)	965 mm for 'I' and 'T' Section depth 25.4mm 1468mm for 'I' and 'T' Section depth 38.1mm 1900mm for 'I' and 'T' Section depth 50.8mm
Tensile Strength (60-70% glass content)	660 N/m2 + 700 N/m2
Weight/Square Meter	12.50 Kg for Section 'I' and 'T' 25.4mm (high) 14.50 Kg for Section 'I' and 'T' 38.1mm (high) 25.00 Kg for Section 'I' and 'T' 50.8mm (high)
Corrosion Resistance	Meets all requirements (Chemical resistant guide available on request)
Fire Retardancy	Meets BS 476:PART 7: CLASS 2- Flame Spread Rating. Class 1 could be met on request.

SOME OF THE PRODUCTS FROM PROFILES



LOAD DEFLECTION DATA (METRIC) PULTRUDED GRATINGS



Concentrated Load

'T' Section 1" (25.4mm)

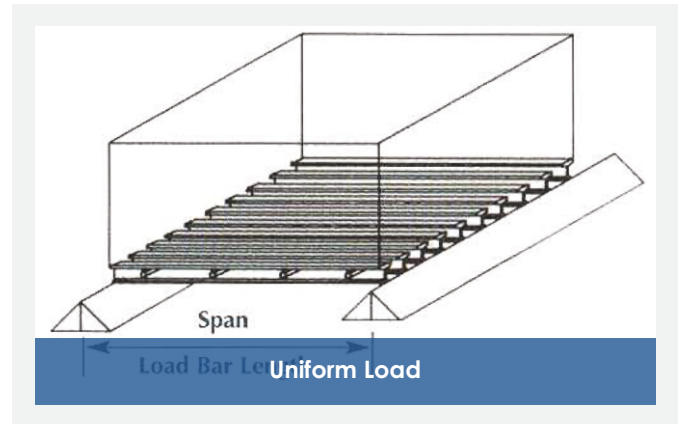
Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	0.5	4	10	15	20	
	450	-	-	0.5	2	4	10	15	20	-	
	600	0.5	2	3	5	8	16	20	-	-	
	900	1	3	5	9	12	20	-	-	-	
	1200	2	4.2	7	13	18	-	-	-	-	
	1500	3.2	8	10	18	-	-	-	-	-	
	1800	6	12	15	-	-	-	-	-	-	

'T' Section 1 1/2" (38.1mm)

Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	-	-	-	-	-	
	450	-	-	-	-	-	-	-	-	-	
	600	-	-	-	-	-	-	0.5	1.5	2	
	900	-	-	1.5	2	2.5	3	3.5	4	4.5	
	1200	-	0.4	2	3	5	6	7	8	13	
	1500	0.4	0.9	3	5	7	9	11	15	19	
	1800	0.5	1.4	5	7	9	12	16	-	-	

'T' Section 2" (51.0mm)

Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	-	-	-	-	-	
	450	-	-	-	-	-	-	-	-	0.5	
	600	-	-	-	-	-	-	-	0.5	2	
	900	-	-	-	0.5	1	2	2.5	3	5	
	1200	-	-	0.5	1	2	4	6	7	9	
	1500	-	0.5	1	3	4	7	9	11	14	
	1800	0.5	2	3	5	6	8	10	14	19	



Uniform Load

'T' Section 1" (25.4mm)

Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	0.5	0.8	1	3	6	
	450	-	-	0.5	1.2	2	3	4	7	11	
	600	-	0.5	1.1	2	4.5	6	9	11	16	
	900	0.5	1.2	3	4.5	6	10	15	17	-	
	1200	0.7	1.6	7	9	10	15	20	-	-	
	1500	1	2.5	10	12	15	20	-	-	-	
	1800	1.4	4	1.3	16	20	-	-	-	-	

'T' Section 1 1/2" (38.1mm)

Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	-	-	-	-	-	
	450	-	-	-	-	-	-	-	-	-	
	600	-	-	-	-	-	-	-	-	0.5	
	900	-	-	-	0.5	1	1.5	2	2.5	3	
	1200	0.5	1	2	3	4	5	6	7	8	
	1500	0.6	1.5	3	6	8.5	10	14	20	-	
	1800	1	3.5	7	11	15	19	-	-	-	

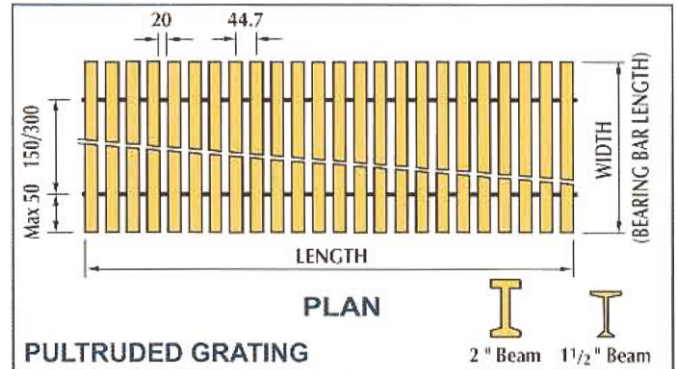
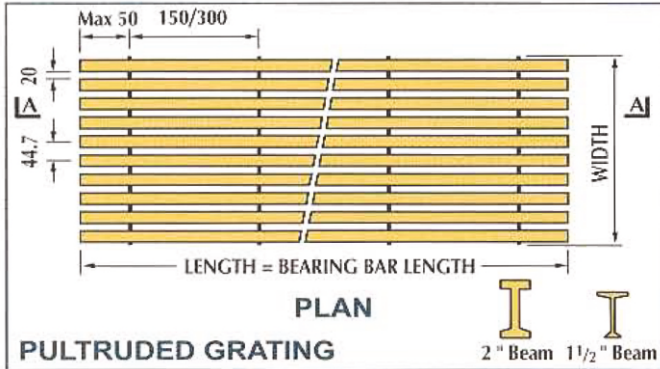
'T' Section 2" (51.0mm)

Panel Width(mm)	Span (L) (mm)	Load (KN)/M2 Panel									
		0.5	1	2	3	4	5	6	8	10	
950		Deflection (mm)									
	300	-	-	-	-	-	-	-	-	-	
	450	-	-	-	-	-	-	-	-	0.5	
	600	-	-	-	-	-	-	-	0.5	2	
	900	-	-	-	-	-	0.5	1.5	2	4	
	1200	-	-	-	0.5	-	3	5	7	9	
	1500	-	0.5	0.5	2	4	7	10	13	17	
	1800	0.5	1	2	4	8	12	15	19	-	

- ❖ Figures indicated are typical deflection values.
- ❖ Deflection values < 0.25mm and > 20mm have been neglected.

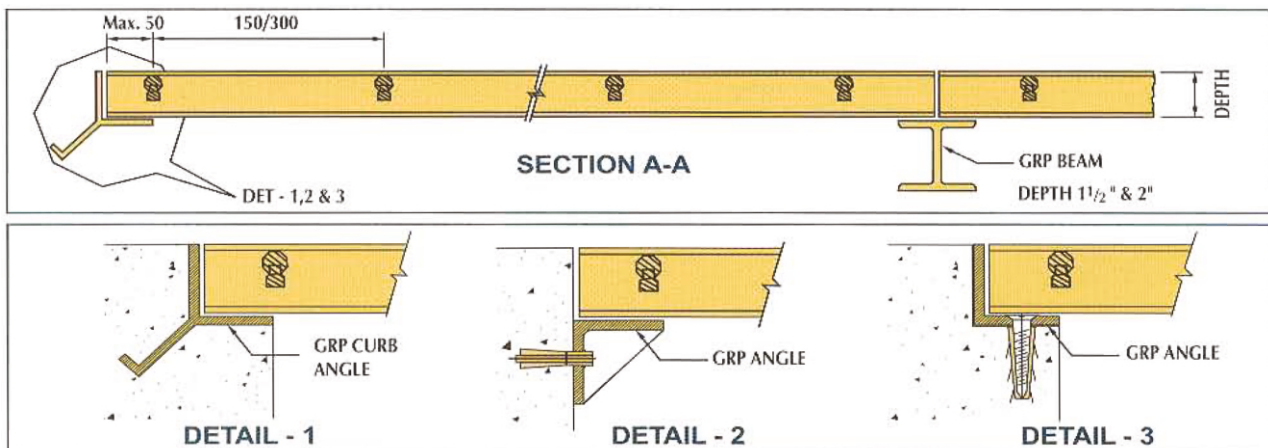
THE BEARING BARS

The main bearing bars are oriented in the correct direction shorter span. The standard cross bars (rods) spacings are 150mm and 300mm. Starting point is 50mm from edge of bearing bar. Spacings between the bearing bars are 20mm (44.7mm centre to centre).

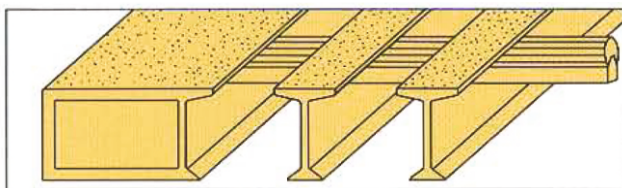


THE BEARING BARS

Gratings in concrete structure require to be on stable well horizontal base. GRP Curb Angle provides a strong base; the production process is pultrusion with same quality as Gratings.



GRP NOSING FOR STAIR TREADS & LANDINGS

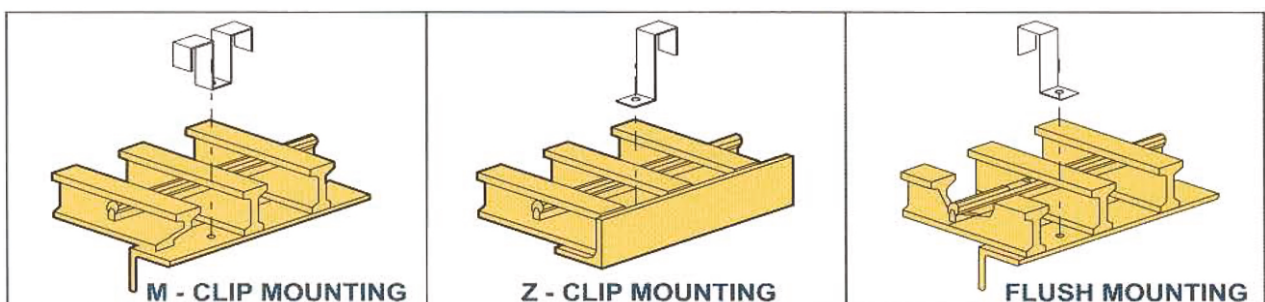


Stair Treads and Landings are produced by adding deep nosing to the leading edge.

Ordering Panels should be as follows :-

Width is the measurements from end to end of cross members. Length is the Bearing Bar Length.

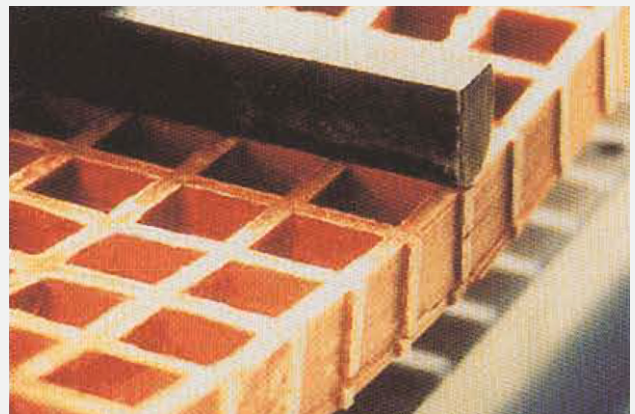
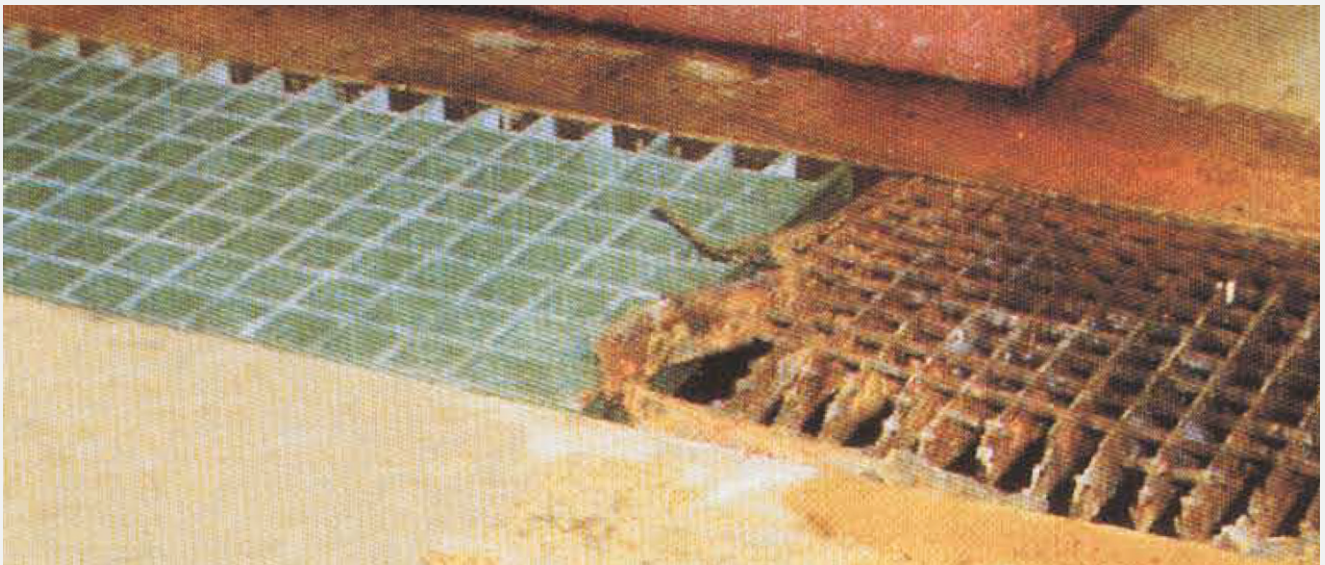
ATTACHMENTS AND CLIPS



GRP MOULDED GRATING

Extragrate moulded fibreglass grating is a strong, highly reliable mesh grating panel which allows efficient on site cutting to minimize grating waste. It is the chemical resistant flooring choice for many Industrial applications. Load bearing bars in both directions allow for use without continuous side support. A higher safety factor is achieved by designing in a higher glass content at the bottom of the grating for greater tensile strength.

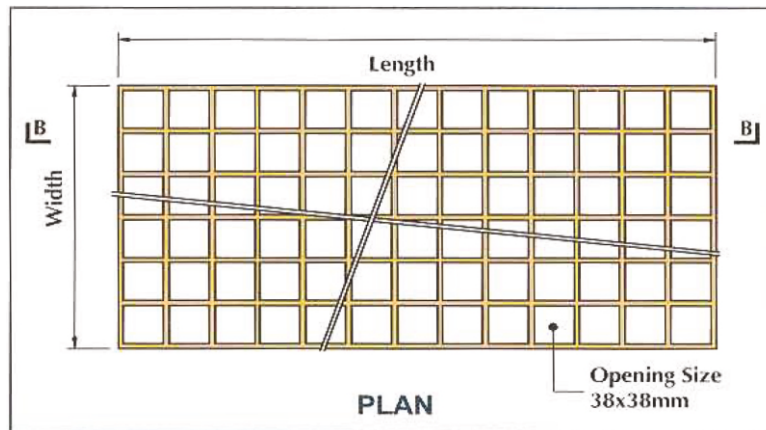
GRP Moulded grating is engineered to provide maximum corrosion resistance in lough conditions such as chemical plants, sewerage treatment plants, etc.



GRP Moulded Grating 40mm x 40mm

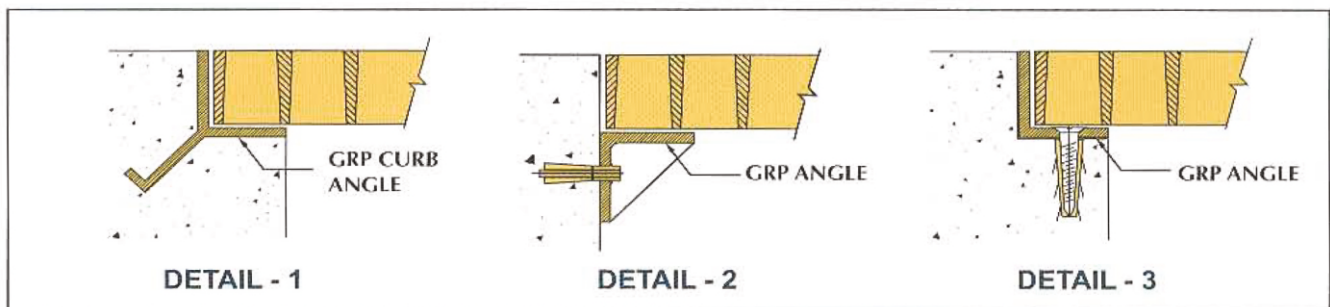
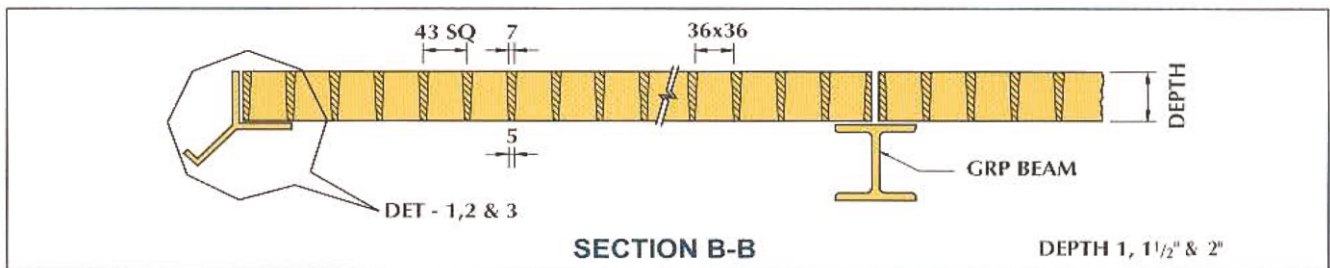
Both pultruded and moulded gratings are manufactured with UV inhibitors in the resin system to extend service life. Because of the high resin to glass ratio (65%-35%), these gratings provide maximum corrosion resistance in tough climates, chemicals plants and sewerage construction areas.

- ❖ Thicknesses available are 1", 1 1/2" and 2"
- ❖ Maximum size as one piece is 1200mm x 3500mm

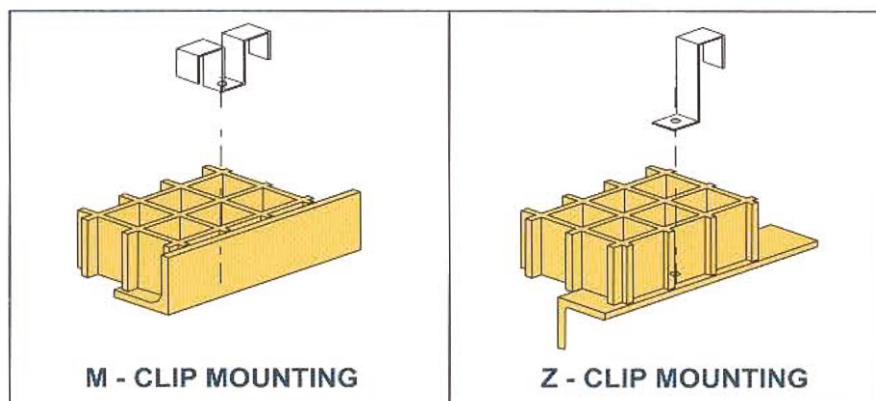


THE BEARING BARS

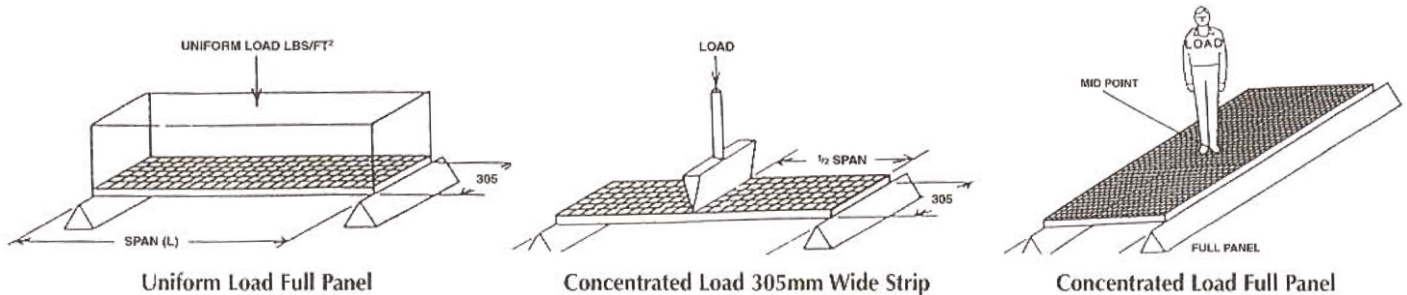
Gratings in concrete structure require to be on stable well horizontal base. GRP Curb Angles provide a strong base and are produced by pultrusion process with same quality of Gratings.



ATTACHMENTS AND CLIPS



MOULDED GRATING - LOAD DEFLECTION DATA



Uniform Load 2" (50.8mm) Thick grating (43x43mm) Open Mesh								
Panel	Span (L)	Load (KN)/M ² Panel						
Width(mm)	(mm)	430	700	806	1075	1610	2150	2687
305x1230		Deflection (mm)						
	305	0	0.01	0.01	0.18	0.43	0.57	0.76
	457	0.35	0.52	0.60	0.63	1.41	1.58	1.75
	610	0.59	1.05	1.18	1.45	2.17	2.90	2.39
	915	2.22	3.31	3.46	3.95	6.40	9.38	-
	1219	5.00	8.39	8.75	9.29	-	-	-

Uniform Load 2" (50.8mm) Thick grating with checkered plate								
Panel	Span (L)	Load (KN)/M ² Panel						
Width(mm)	(mm)	430	700	806	1075	1610	2150	2687
305x1230		Deflection (mm)						
	305	0.09	0.16	0.19	0.24	0.26	0.36	0.58
	457	0.16	0.25	0.29	0.58	0.81	1.00	1.17
	610	0.38	0.78	0.90	1.13	1.56	1.91	2.26
	915	1.46	2.61	2.96	3.45	4.92	5.35	7.21
	1219	3.30	5.15	7.53	8.76	9.94	-	-

Concentrated Load (305 mm wide strip) 2" (50.8mm) Thick Grating (43x43mm) Open Mesh								
Panel	Span (L)	Load (Kg)						
Width(mm)	(mm)	45	136	227	318	454	1300	681
305x1230		Deflection (mm)						
	305	0.16	0.41	0.60	0.78	0.98	-	1.33
	457	0.19	0.55	0.82	1.15	1.48	-	2.02
	610	0.49	1.16	1.82	2.55	3.27	-	4.24
	915	1.09	3.03	5.01	7.53	9.98	-	-
	1219	1.90	5.65	9.72	-	-	-	-

Concentrated Load (305mm wide strip) 2" (50.8mm) Thick grating with checkered plate								
Panel	Span (L)	Load (Kg)						
Width(mm)	(mm)	45	136	227	318	454	1300	681
305x1230		Deflection (mm)						
	305	0.08	0.25	0.43	0.60	0.88	-	1.20
	457	0.19	0.52	0.89	1.10	1.54	-	2.15
	610	0.27	1.87	1.37	1.98	2.89	-	3.80
	915	0.89	2.62	4.50	6.58	9.27	-	-
	1219	1.39	4.66	8.17	9.96	-	-	-

Concentrated Load (Pointed Load) 2" (50.8mm) Thick Grating (43x43mm) Open Mesh								
Panel	Span (L)	LOAD (Kg)						
Width(mm)	(mm)	45	113.5	227	340	454	681	908
1230x1230		DEFLECTION (mm)						
	305	0	0.17	0.44	0.66	0.86	1.24	1.35
	457	0.14	0.42	0.80	1.06	1.64	2.13	2.43
	610	0.20	0.69	1.30	1.89	2.42	3.33	4.10
	915	0.48	1.47	2.80	4.04	5.30	6.57	10.00
	1219	0.58	2.11	4.08	5.85	7.78	9.60	-

Concentrated Load (Pointed Load) 2" (50.8mm) Thick Grating (43x43mm) Open Mesh								
Panel	Span (L)	LOAD (Kg)						
Width(mm)	(mm)	45	113.5	227	340	454	681	908
1230x1230		DEFLECTION (mm)						
	305	0.05	0.26	0.50	0.73	0.94	1.36	1.69
	457	0.11	1.34	1.68	1.95	2.23	2.73	3.06
	610	1.09	1.96	2.40	2.78	3.17	3.90	4.38
	915	1.17	1.29	2.70	3.57	5.42	7.02	8.36
	1219	1.31	1.38	2.98	3.90	5.76	7.66	10.00

COMPARISON SCHEDULE BETWEEN MOULDED AND PULTRUDED GRATING

Fibreglass grating selection comparison factors are as below;

CHARACTERISTICS	MOULDED GRATING SQUARE MESH	PULTRUDED GRATING
Corrosion resistance	++	++
Strength/ Stiffness	+	++
Impact Resistance	++	+
Open area for drainage, aeration	++	+
One direction span	–	++
Bi-direction span	++	-
Light weight in comparison to steel	++	++
Custom panel sizes available	+	++
Ease of layout and installation	++	++

Note:

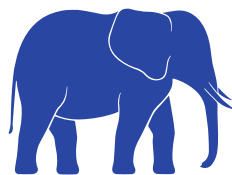
The higher glass to resin ratio of pultruded grating results in sections with higher structural properties than moulded sections of similar depth and weight. Because of longer span capability, support structures can be reduced, resulting in lower total cost when using pultruded grating instead of moulded.

The corrosion resistance of pultruded grating is considered to be outstanding and far superior to galvanised steel, aluminium or stainless steel, although it is less than moulded grating. Moulded grating is engineered to provide maximum corrosion resistance in tough conditions such as chemical plants, etc.

RESIN SYSTEM

SERIES	COLOUR	CHARACTERISTICS
ISO	Yellow	Isophthalic based, quality for industrial & Chemical applications, where corrosion resistance is important.
ISO-FR	Yellow	Ditto but Fire retardant provides ASTM-E-84 Flame spread of 25. *
VE	Grey	Vinylester based, offering reliable performance in highly corrosive environments, ranging from caustic to acidic.
VE-FR	Grey	Ditto but Fire retardant provided ASTM-E84 Flame spread of 25. *
FE-FR	Green	Phenolic resin, virtually incombustible in a fire and will maintain structural integrity at very high temperature Flame spread rating of 10. *

❖ Flames spread as compared to asbestos cement board with flame spread rate zero.



EXTRA CO

COMPOSITES INDIA PRIVATE LIMITED

GET IN TOUCH



Office: #995-P, Diamond Plaza, 12th Main Road,
2nd Avenue, Anna Nagar, Chennai-600 040



Works: Survey No.13, Tada Village & Mandal,
Tirupathi Dist, Andhra Pradesh - 524401, India



+91 44 4269 3754
+91 94 4409 1834



projects@extracomposites.com
sales@extracomposites.com



www.extracomposites.com