

DURA[®]

Innovative Composites Solution

offers an outstanding range of top-quality **GRP** products manufactured to the highest standards and designed to meet the most demanding specifications

玻璃纖維創新
環保產品系列

ISO 9001:2008 CERTIFIED

國際品質管理體系標準認可

Excellent Alternative to Stainless Steel
不鏽鋼產品之最佳代替品

Over 50,000 m² sold in Hong Kong
於香港市場已出售逾 50,000 平方米

▶ ▶ ▶ www.dura.hk

info@dura.hk

Composites Product Guide

DSD & WSD Approved Type
此產品已獲香港渠務署
及香港水務署認可



ISO 9001:2008
Certificate No: Q173
國際品質管理體系標準認可



2008 獲獎
香港新動力
獎牌計劃
傑出獎狀
Certificate of Excellence



2008
Hong Kong
Environmental Award
香港環保獎牌
獎牌計劃

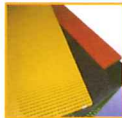




Innovative Composites Solution

have offered GRP / Composites floorings and other applications for over 25 years and through continued development have become the leading manufacturer of GRP access systems and standard products from design , through to fabrication and installation.

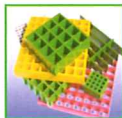
Table of Contents 目錄



Page 4-7

玻璃纖維有蓋格柵

DuraDeck™ Covered Grating (flooring) is perfect for fixing slippery spots or in large slippery areas. The anti-slip surface helps slips and falls even when hazardous liquid are present.



Page 4-7

玻璃纖維格柵

DuraGrat™ Moulded Grating offers superior load-carrying ability over longer spans, at a competitive price. It can be manufactured in fire-retardant and anti-corrosive.



Page 8

玻璃纖維預製組合屋

DuraHub™ Provides you the best hub or kiosk for Cell sites, security stand, storage shed or storage room to suit your unique requirement. All materials are electromagnetic wave transmittable.



Page 9-10

玻璃纖維螺絲及絲帽

DuraBolt™ Studs and nuts Are ideal for applications requiring mechanical fasteners that must be non-corrosive, low in conductivity and/or transparent to electromagnetic waves.



Page 11-12

玻璃纖維鋼根

DuraBar™ is made from high strength glass fibers and extremely durable vinyl ester resin. They significantly improves the longevity of civil engineering structures where corrosion is a major factor.



Page 13

玻璃纖維鋼材

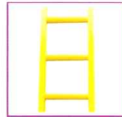
DuraPro™ structural shapes are available in Standard configurations including angles, I-Beams, wide flange beams, channels, bars, round and square tubes or hollow sections.



Page 14-15

玻璃纖維 / 玻璃纖維水泥花盆

DuraPlant™ architectural precast products in fiberglass/ GRP / GRC for bowls, planters, bollards, trash receptacles, ash urns or fountains.



Page 16

玻璃纖維梯

DuraLad™ ladders are excellent alternative to stainless steel ladders against slips. Built for positive traction and easy gripping to withstand rugged use in all environment.



Page 17

玻璃纖維安全護欄

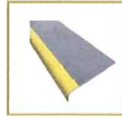
DuraRail™ are pultruded GRP handrails and safety guards against slips and falls. Built to OSHA standards. Available in yellow and light grey with choice of square and round



Page 18

玻璃纖維電線槽

DuraTray™ has proven since 1985 in daily exposure to wind, weather and saltwater. The load capacity of steel, non-corrosive, non-magnetic and corrosive resistant. NEVER rust and repaint.



Page 19

玻璃纖維防滑梯級保護

DuraStair™ Stair Tread Covers improve traction on existing concrete, wood or metal stairs. Easy to cut and install. High visibility yellow nosing for increased safety and durability.

Introduction to Products

For use almost anywhere

Flooring, Stairways, Bridges, Platforms and Walkways, Racking, Machine Guards, Screens, Pit Covers ... etc



Fire Resistant

DuraGrat® and DuraDeck® Fiberglass Grating is suitable where a flange spread rating fulfilled BS 476 Part 6 and Part 7 standard



Corrosion Resistant

Constructed of a composition of resin and continuous fiberglass strand for chemical resistance in the harshest corrosive environment. DuraGrat® and DuraDeck® Fiberglass Grating cannot rust, never needs painting and eliminates expensive corrosion-related maintenance problems.



Load bearing

The impact resistance of DuraGrat® and DuraDeck® Fiberglass Grating allows repeated deflections without permanent deformation. Unlike metal grating, once the object is removed the fiberglass grating will fully recover to its original position.



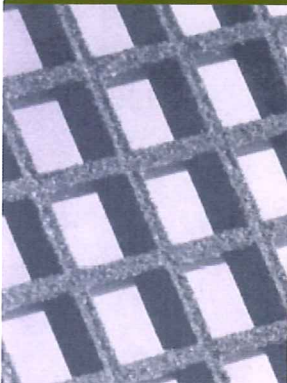
Anti-slip surface

DuraGrat® and DuraDeck® fiberglass grating comes with a choice of grit or concave surfacing, both offer excellent anti-slip properties for added safety. Its slight resiliency means it is comfortable to stand on reducing worker fatigue.

The Grating Range

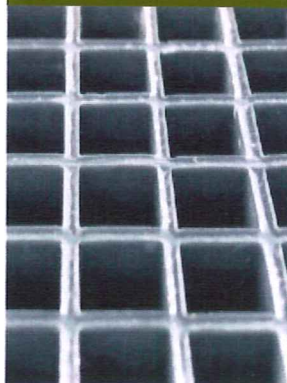
Gritted Grating

Gritted Grating has Quartz Crystal bonded to the top surface giving a very effective and hard wearing anti-slip surface



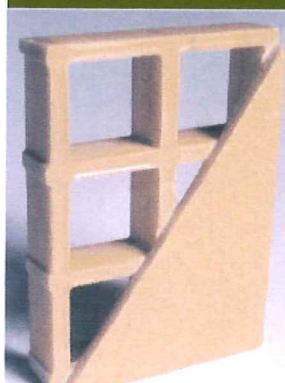
Concave Grating

The Concave Grating is particularly suitable for hygiene applications such as the food industry due to its very clean top section (twin-edges, concave finish offering a slip-resistant surface)



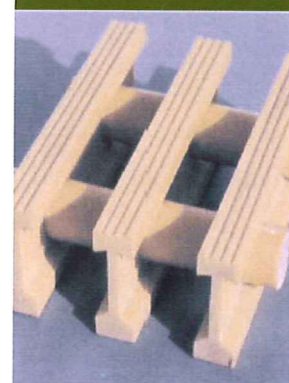
Covered Grating (DuraDeck®)

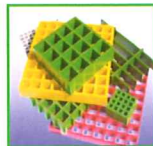
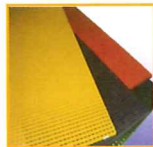
Covered grating is available with a solid one-piece laminate surface, offering a light-weight, strong, anti-slip flooring panel. Gritted surface can be added to the laminate surface panel as well.



Pultruded Grating

Pultruded Grating is ideal for a wide range of applications, it offers the same high strength-to-weight ratio as our Fiberglass Grating. The main benefits of Pultruded Grating, apart from its aesthetic appearance, is that it's designed to span greater distances.





玻璃纖維 格柵 GRP Moulded Grating

玻璃纖維 有蓋格柵 GRP Cover System

Grating Size and Specification (Metric Units)

Figure	Model No.	Height (mm)	Mesh Size (mm)	Bar Width (mm)	Full Panel Size (mm)	Surface Density (kg/m ²)	Weight (kg)
	G-25	25	25 x 100	7.0	1000 x 2000	11	22
	G-30A	30	38 x 38	6.4	1000 x 2000	14.5	29
					1000 x 4000		58
G-30B	30	20 x 20 Mini-Mesh	6.4	1007 x 2007	15.8	32	
				1007 x 3007		48	
	G-38A	38	38 x 38	6.4	1220 x 4000	18.3	82
	G-38B	38	20 x 20 Mini-Mesh	6.4	1000 x 2000	18.8	38
					1000 x 3000		57
	G-50*	50	38 x 38	11.2	1530 x 4004	34.3	210
	G-63*	63	38 x 38	12.0	1530 x 4004	42.5	260

*Heavy Duty Grating are customer manufactured upon special and extreme condition

Color



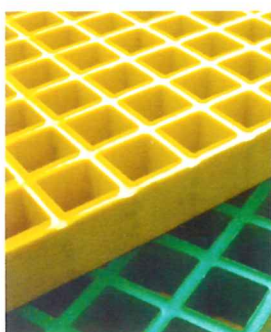
Why Use DuraDeck Grating?

DURADECK™ & DURAGRAT™ molded fiberglass grating is a strong mesh grating panel which allows efficient on-site cutting to minimize grating waste. Molded in one piece with a plain concave non-slip walking surface, they are chemical resistant flooring choice for many industrial applications. Load bearing bars in both directions allow for use without continuous side support.

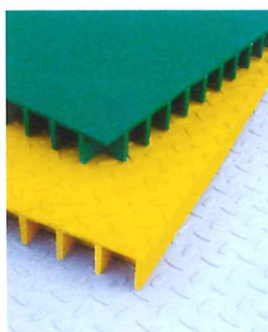
Features

- Corrosion Resistant
- Structurally Strong
- High Impact & Fatigue Strength
- Lightweight
- Non-Conductive
- Resistant to Chipping and Cracking
- Aesthetically Pleasing Appearance
- Skid Resistant
- Rigid
- Easy to Fabricate and Install
- Low Maintenance
- Low Thermal Conductivity
- Non-Sparking

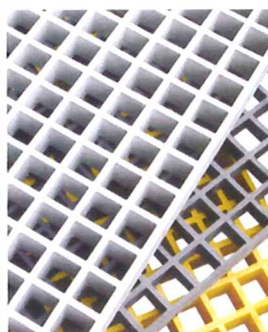
SURFACE



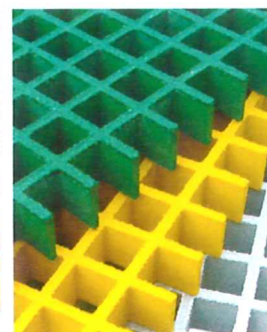
Concave surface



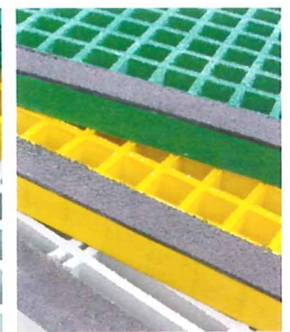
Covered surface (gritted or chequre)



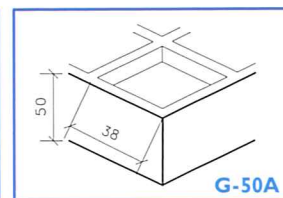
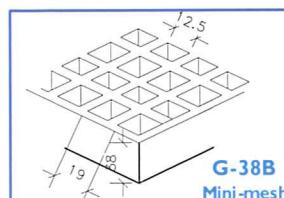
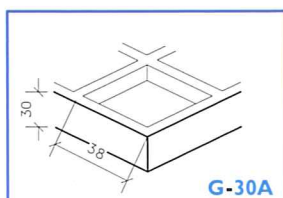
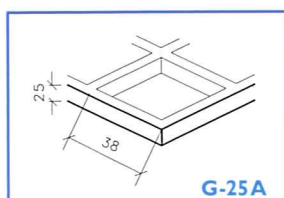
Flat surface

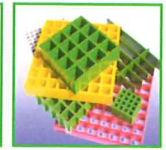
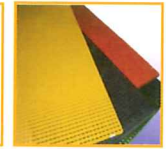


Gritted surface

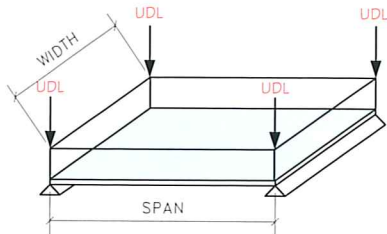


Stair treads with nosing



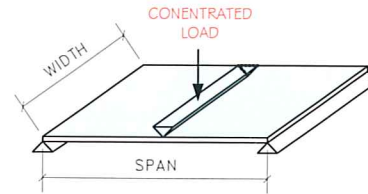


Load and Deflection Table



Uniformed Distributed Loads (UDL) - kN/m²

Mesh	G-25A (25mm Height) 38 x 38mm		G-38A (38mm Height) 38 x 38mm		G-50A (50mm Height) 38 x 38mm	
	UDL (kN/m ²)	Deflection (mm)	UDL (kN/m ²)	Deflection (mm)	UDL (kN/m ²)	Deflection (mm)
Span (mm)						
300	34.53	1.5	80.67	1.5	153.73	1.5
400	14.57	2.0	34.03	2.0	64.85	2.0
500	7.96	2.5	22.74	2.5	39.89	2.5
600	4.61	3.0	13.16	3.0	28.37	3.0
700	3.01	3.5	9.04	3.5	17.87	3.5
800	2.02	4.0	6.77	4.0	14.09	4.0
900	1.42	4.5	4.76	4.5	10.28	4.5
1000	-	-	3.47	5.0	7.46	5.0
1100	-	-	2.61	5.5	5.98	5.5
1200	-	-	2.14	6.0	4.60	6.0
1300	-	-	1.69	6.5	3.62	6.5
1400	-	-	1.35	7.0	2.90	7.0
1500	-	-	-	-	2.36	7.5
1600	-	-	-	-	1.94	8.0
1700	-	-	-	-	1.62	8.5
1800	-	-	-	-	1.36	9.0



Concentrated Load (kN/300mm width at mid-span)

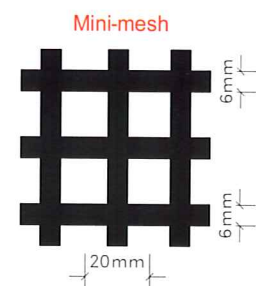
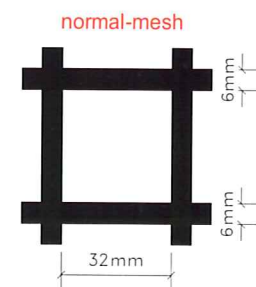
Mesh	G-25A (25mm Height) 38 x 38mm		G-38A (38mm Height) 38 x 38mm		G-50A (50mm Height) 38 x 38mm	
	C/L (kN)	Deflection (mm)	C/L (kN)	Deflection (mm)	C/L (kN)	Deflection (mm)
Span (mm)						
300	6.47	1.5	15.13	1.5	28.82	1.5
400	3.64	2.0	8.51	2.0	16.21	2.0
500	2.49	2.5	7.11	2.5	12.47	2.5
600	1.73	3.0	4.94	3.0	10.64	3.0
700	1.32	3.5	3.95	3.5	7.82	3.5
800	1.01	4.0	3.39	4.0	7.05	4.0
900	0.80	4.5	2.68	4.5	5.78	4.5
1000	0.65	5.0	2.17	5.0	4.68	5.0
1100	0.53	5.5	1.79	5.5	4.11	5.5
1200	-	-	1.61	6.0	3.45	6.0
1300	-	-	1.37	6.5	2.94	6.5
1400	-	-	1.18	7.0	2.54	7.0
1500	-	-	1.03	7.5	2.21	7.5
1600	-	-	-	-	1.94	8.0
1700	-	-	-	-	1.72	8.5
1800	-	-	-	-	1.53	9.0

Clear Span - Deflection Limited to L/200

1.50 kN/m ²	883 mm	1352 mm	1744 mm
3.00 kN/m ²	701 mm	1049 mm	1384 mm
5.00 kN/m ²	591 mm	902 mm	1167 mm
7.50 kN/m ²	517 mm	773 mm	1020 mm

Mechanical and Physical Data

Model	Grating Depth	Bar thickness		Per 300mm of Width				No. of bars per 300mm	Glass Content %	Weight kg/m ²	Open Area %
		TOP	BOTTOM	cm ²	cm ⁴	cm ³	EI kg/m ²				
G-22B	22mm	6.60	4.00	10.90	5.90	4.81	105	16	65	12.10	42
G-25A	25mm	6.60	5.00	12.39	6.71	5.24	119	8	65	12	69
G-30A	30mm	6.60	5.00	14.87	8.10	6.32	145	8	65	14.5	69
G-30B	30mm	6.60	4.00	16.85	10.25	7.95	168	16	65	16.5	42
G-38A	38mm	6.60	5.00	17.74	21.81	11.31	275	8	65	18	69
G-38B	38mm	6.60	4.00	19.56	23.22	13.32	325	16	65	19.8	42
G-50A	50mm	6.60	5.00	23.35	45.25	16.25	356	8	65	23.7	69
G-63A	63mm	6.60	5.00	38.25	53.25	18.52	385	8	65	29.8	69

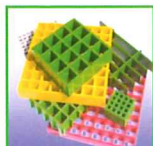


MECHANICAL DATA

Tensile Strength	171 MPa
Elongation	1.8%
Tensile Modulus	12600 N/mm ²
Compressive Strength	102 N/mm ²
Flexural Strength	250 N/mm ²
Flexural Modulus	12810 N/mm ²
Interlaminar Shear Strength	18.5 N/mm ²
Dielectric Strength	18 kN/mm
Specific Gravity	1.5-1.7
Thermal Expansion Factor	13 x 10 ⁻⁶ mm/mm°C
Water Absorption	0.1% + 0.3% x 24 hours ISO R62)
Operating Temperature	- 100°C to +180°C

MANUFACTURING TOLERANCES

Standard Panel Size	+3mm	-0mm
Cut Panel Size	+5mm	-5mm
Thickness	+1.5mm	-1mm
Mesh Pattern	+1mm	-1mm



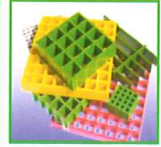
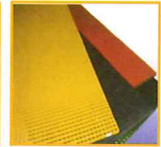
玻璃纖維 格栅
GRP Moulded Grating

玻璃纖維 有蓋格栅
GRP Cover System

Simplified Load and Deflection Table

LOAD AND DEFLECTION						
Height	Span	Load	Load 1% Deflection in kg using 75 mm x 300 mm Block	Concentrated Load kg/m		Uniformly Distributed Load (UDL) in 1% deflection
				Load of 1% Deflection	Load of Failure in Flexure	
G-25	25 mm	250 mm	1170	3570	12900	-
		500 mm	340	890	4900	2810
		750 mm	185	400	3600	750
		1000 mm	140	230	2850	300
G-30A	30 mm	250 mm	-	4610	11980	-
		500 mm	840	1165	7020	5215
		750 mm	645	530	5180	1270
		1000 mm	310	280	3240	495
G-30B (Mini-mesh)	30 mm	500 mm	930	1165	7660	5675
		750 mm	500	530	5580	1350
		1000 mm	340	280	3540	540
G-38A	38 mm	250 mm	-	6980	17500	-
		500 mm	1370	1920	10110	9175
		750 mm	655	939	6100	2240
		1000 mm	450	500	4500	870
		1200 mm	395	326	3770	455
G-38B (Mini-mesh)	38 mm	500 mm	1500	2100	11120	9985
		750 mm	720	1030	6650	2430
		1000 mm	490	545	4900	950
		1200 mm	430	355	4000	495
G-63*	63 mm	1000 mm	4000	2690	12100	5900
		1200 mm	3100	1860	9500	2800
		1500 mm	2700	1190	8100	1900





Resin Types

Resin

Unsaturated Polyester

Isophthalic Polyester

Isophthalic Vinylester

Phenolic*

* See Phenolic Data Sheet

Features

For General Purpose Application

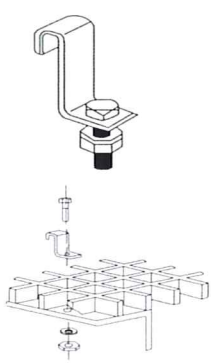
Chemical Resistant, Fire Retardant to BS 476 Part 7, ASTM - E84 and ASTM -D635

Enhanced Chemical Resistant, Fire Retardant to BS 476 Part 7, ASTM - E84 and ASTM -D635

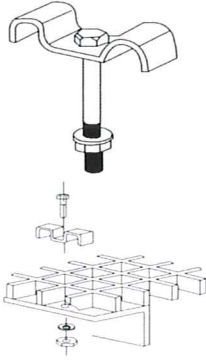
Excellent Fire Retardant Properties, Fire Retardant to BS 476 Part 7 Class 0 and US Coastguard Approval

Clips Type

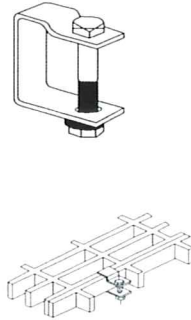
Five type of S/S clips to fix and connect the grating



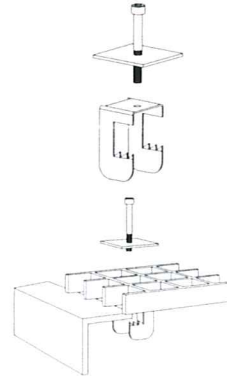
L - Clip



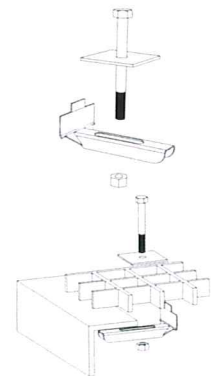
M - Clip



C - Clip



G - Clip



J - Clip

Customer Enquiry

Please copy and fax this form to (852) 2893 6321 with your namecard Thanks.

Height

- 25mm
- 30mm
- 38mm
- 50mm*
- 63mm*

Grid Size

- 38x38
- 20x20 (mini-mesh)

Cover

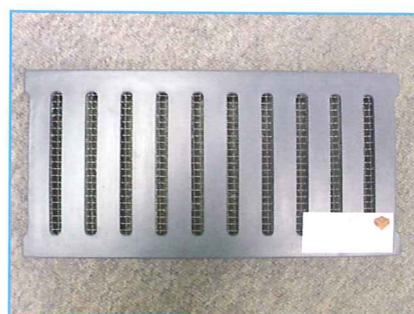
- Yes
- No

Clips

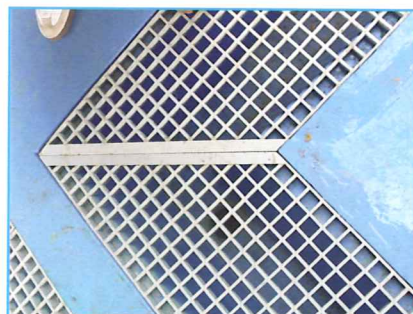
- L-Clip
- M-Clip
- C-Clip
- G-Clip
- J-Clip



AC Condenser Unit Platform
Sau Mau Ping ASD School Project



Custom-made Trench Cover
(Model No. GZ-A-1)



Vet Hospital, Ocean Park, HK





STANDARD MODEL

Standard Size Guard House

Model No.	Size (mm)
YF-1	1500 x 1000 x 2150mmH
SH-1	1250 x 1250 x 2100mmH
GH-1	1520 x 1220 x 2250mmH
SH-2	2350 x 1250 x 2100mmH
GH-2	2340 x 1520 x 2350mmH
GH-3	3460 x 1520 x 2350mmH
GH-4	2820 x 2340 x 2350mmH
GH-6A	4120 x 2340 x 2350mmH
GH-6B	3460 x 2820 x 2350mmH
GH-8B	4580 x 2820 x 2350mmH
GH-10A	6720 x 2340 x 2350mmH
GH-10B	5700 x 2820 x 2350mmH

Custom-made size is available upon your unique request



DURAHUB™ housings often many advantages in comparison to traditional constructions:

- Flexible sizes
- Light weight
- Modular assembly
- Sound proofing
- Stable sandwich construction
- Advantagous heat insulation

Standard Panels: 0.5m, 1.0m, 1.5m, 2.0m, 2.5m
Accessories: Louver, Ventilation Fan, A/C Unit, Windows (Fixed/Folding/Sliding), Doors and other specified



GH-1 with Sun Cover



YF-1



YF-1 with Sun Cover (Special Colour)



GH-8B with Sun Cover



GH-8B (Special Colour)



GH-6 with Sun Cover and Protective Mesh



GH-2 with Sun Cover



GH-10A with Sun Cover

玻璃纖維 螺絲及絲帽 GRP Bolt and Nut System



DORABOLT™ fiberglass studs and nuts are ideal for applications requiring mechanical fasteners that must be non-corrosive, low in conductivity and/or transparent to electromagnetic waves. **DORABOLT™** studs are machined from pultruded fiberglass vinyl ester rods. The hex shaped nut is thermoplastic. They are easily assembled with a standard six point socket wrench.

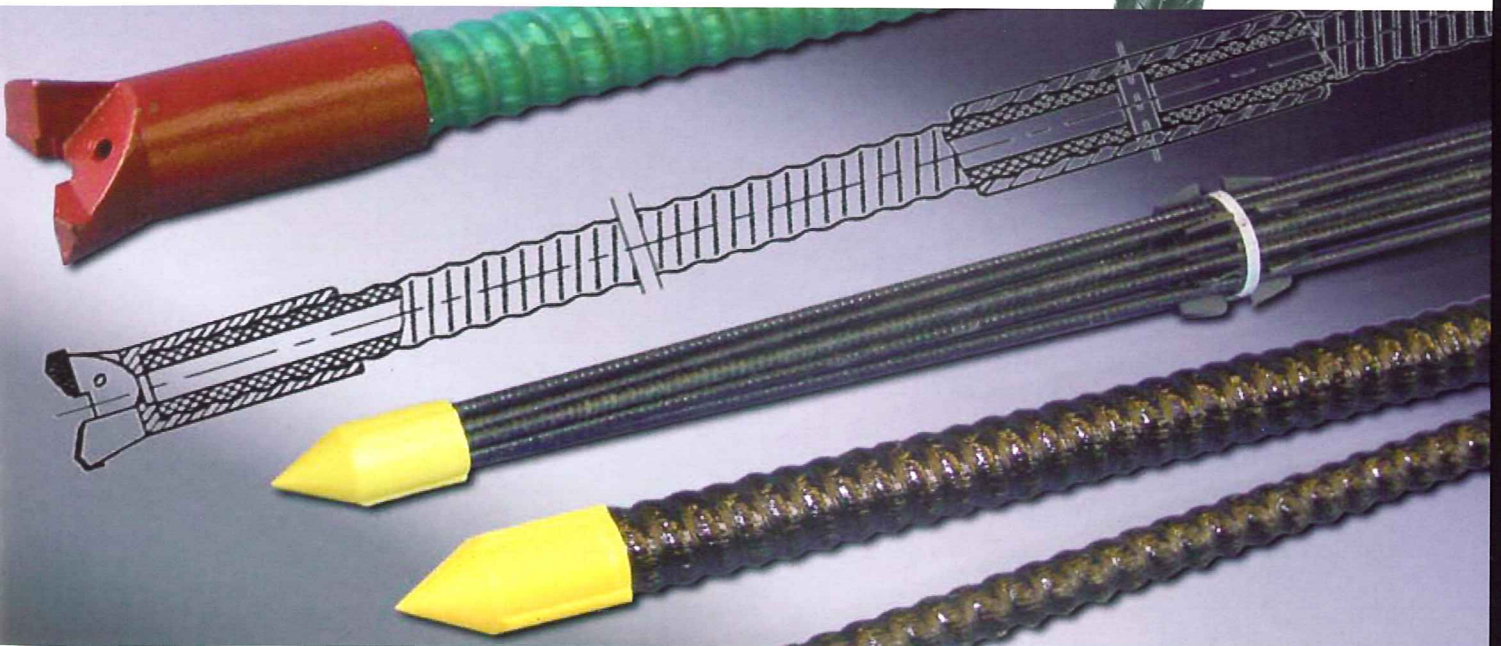
DORABOLT™ studs and hex nuts are available in diameters of 3/8", 1/2", 5/8", 3/4" and 1" for immediate delivery. Standard lengths available are 100,120,150,180,200,220,250 and 300mm or partial length threading available on request. Jade Green is the standard color. The studs and nuts have UV inhibitors to provide resistance to ultraviolet degradation and corrosion.

Typical applications include:

- Chemical process equipment
- Air and water pollution equipment
- Marine applications
- Cellular antenna mounts and screens

Properties:

1. Anti-Corrosive
2. Non-Magnetic
3. Light Weight
4. High Strength
5. High Impact Strength
6. Design Flexibility
7. Non-Conductive
8. Dimension Stability
9. Radar Transparent
10. Low Thermal Conductivity
11. Durable





DURABOLT™ THREAD ROD SIZE AND DIMENSIONS 玻璃纖維 螺絲竿

Description 項目	Thread Diameter 螺絲竿直徑 (mm) (毫米)	Thread Diameter 螺絲竿長度 (mm) (毫米)
Threaded Rod 螺絲竿	M12 DURABOLT™ Thread Rod 直徑12毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M14 DURABOLT™ Thread Rod 直徑14毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M16 DURABOLT™ Thread Rod 直徑16毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M18 DURABOLT™ Thread Rod 直徑18毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M20 DURABOLT™ Thread Rod 直徑20毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M22 DURABOLT™ Thread Rod 直徑22毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M24 DURABOLT™ Thread Rod 直徑24毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M26 DURABOLT™ Thread Rod 直徑26毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)
	M28 DURABOLT™ Thread Rod 直徑28毫米螺絲竿	100, 120, 150, 180, 200, 220, 250, 300 mm (毫米)

DURABOLT™ BOLTS 玻璃纖維 螺絲

Description 項目	Bolt Diameter (inch) 螺絲直徑 (寸)
Bolts 螺絲	3/8" Bolt Head 直徑 3/8 寸螺絲頭
	1/2" Bolt Head 直徑 1/2 寸螺絲頭
	5/8" Bolt Head 直徑 5/8 寸螺絲頭
	3/4" Bolt Head 直徑 3/4 寸螺絲頭
	1" Bolt Head 直徑 1 寸螺絲頭

DURABOLT™ NUT DIMENSION 玻璃纖維 絲帽

Description 項目	Nut Int. Diameter (mm) 絲帽內直徑 (毫米)
Nut 絲帽	M12 DURABOLT™ Nut 直徑12毫米絲帽
	M14 DURABOLT™ Nut 直徑14毫米絲帽
	M16 DURABOLT™ Nut 直徑16毫米絲帽
	M18 DURABOLT™ Nut 直徑18毫米絲帽
	M20 DURABOLT™ Nut 直徑20毫米絲帽
	M22 DURABOLT™ Nut 直徑22毫米絲帽
	M24 DURABOLT™ Nut 直徑24毫米絲帽
	M26 DURABOLT™ Nut 直徑26毫米絲帽
	M28 DURABOLT™ Nut 直徑28毫米絲帽

Specification of DURABOLT (in inch)

Properties	ASTM	UNITS	Bolt Size Diameter(Inch)-Threads Per Inch				
			3/8"	1/2"	5/8"	3/4"	1"
Ultimate Transverse Shear	B-565 (Double Shear)	lb	4200	6800	10000	13400	24000
Longitudinal Compressive Strength	D-695	psi	50000	50000	50000	50000	50000
Flexural Strength	D-790	psi	30000	30000	30000	30000	30000
Flexural Modulus	D-790	Psi×10 ⁶	2.5	2.5	2.5	2.5	2.5
Flammability	D-635	-----	Self-extinguishing for all				
Fire Retardant	E-84	-----	Class 1				
Water Absorption (24hr. immersion)	D-570	% max	0.8	0.8	0.8	0.8	0.8
Longitudinal Coefficient of Thermal Expansion	D-696D	10 ⁻⁶ /in/in ^o F	6	6	6	6	6
Ultimate Thread Shear using fiberglass nut	-----	lb	1200	2400	3600	4000	8200
Color	-----	-----	Jade-Green				

Specification of DURABOLT (in SI Unit)

Properties	ASTM	UNITS	Bolt Size Diameter(Inch)-Threads Per Inch				
			3/8"	1/2"	5/8"	3/4"	1"
Ultimate Transverse Shear	B-565 (Double Shear)	kg	190.90	309.10	454.50	609.09	10909.10
Longitudinal Compressive Strength	D-695	MPa	344.74	344.74	344.74	344.74	344.74
Flexural Strength	D-790	MPa	206.84	206.84	206.84	206.84	206.84
Flexural Modulus	D-790	GPa	172.37	172.37	172.37	172.37	172.37
Flammability	D-635	-----	Self-extinguishing for all				
Fire Retardant	E-84	-----	Class 1				
Water Absorption (24hr. immersion)	D-570	% max	0.8	0.8	0.8	0.8	0.8
Longitudinal Coefficient of Thermal Expansion	D-696D	10 ⁻⁶ /in/in ^o F	6	6	6	6	6
Ultimate Thread Shear using fiberglass nut	-----	lb	1200	2400	3600	4000	8200
Color	-----	-----	Jade-Green				

玻璃纖維 鋼根

GRP Reinforcement Bar

DURABAR™
Reinforcement Bar



DuraBar rebar reinforcement for concrete

R-bars by combining the pultrusion process and an in-line winding & coating process for the outside sand surface. The FRP composite rebar is made from high strength glass fibers along with an extremely durable vinyl ester resin. The glass fibers impart strength to the rod while the vinyl ester resin imparts excellent corrosion resistance properties in harsh chemical and alkaline environments. For improved stiffness and mechanical properties a carbon /vinyl ester or Epoxy product is also available. FRP rebar significantly improves the longevity of civil engineering structures where corrosion is a major factor.



DuraBar GFRP rebar Features & Benefits:

High Strength-to-Weight Ratio	provides good reinforcement in weight-sensitive applications.
Non-Corrosive	will not corrode under exposure to a wide variety of corrosive elements including chloride ions.
Non-Conductive	provides excellent electrical and thermal insulation.
Excellent Fatigue Resistance	performs very well in cyclic loading situations.
Good Impact Resistance	resists sudden and severe point loading.
Magnetic Transparency	not affected by electromagnetic fields. Excellent for use in MRI and other types of electronic testing facilities.
Lightweight	easily transported and assembled in the field without need for heavy lifting equipment.

Applications



1

DuraBar GFRP Rebar Applications

Six general categories of applications have been identified for which FRP reinforcement are suitable alternatives to steel, epoxy-coated steel, and stainless steel bars.



2

Reinforced Concrete Exposed to Deicing Salts

DuraBar bars can eliminate the corrosion problems and reduce maintenance and repair costs in northern climates where deicing salts are used every year on roads and pavements.

Applications most likely to benefit include: parking structures; bridge decks; jersey barriers, parapets; curbs; retaining walls and foundations; roads and slabs on grade; and many others.



3

Structures Built in or Close to Seawater

Corrosion of steel reinforcement is a common problem in structures built in or close to seawater. Examples of possible applications: quays; retaining walls; piers; pilings; jetties; caissons; decks; bulkheads; floating structures; canals; roads and buildings; offshore platforms; swimming pools and aquariums.



4
Applications Subjected to Other Corrosive Agents
Chemical processing industries of all types, as well as wastewater of domestic or industrial origin, constitute major sources of corrosion for steel reinforcement. Typical applications include: wastewater treatment plants; petrochemical plants; pulp and paper mill and liquid gas plants; pipelines and tanks for fossil fuel; cooling towers; chimneys; mining operations of various types; nuclear power plants; and nuclear dump facilities.

6
Applications in Tunneling/ Boring Requiring
Reinforcement of Temporary Concrete Structures: Structures including mining walls; underground rapid transit structures and underground vertical shafts.

5
Applications Requiring Low Electric Conductivity or Electro-magnetic Neutrality
Using steel bars in applications where low electric conductivity or electromagnetic neutrality is needed often result in complex construction layouts, if such use is possible at all. Potential applications are: aluminium/copper melting plants; manholes for electrical and telephone communication equipment; structures supporting electronic equipment such as transmission towers for telecommunications; airport control towers; magnetic resonance imaging in hospitals; railroad crossing sites; and military structures needing radar invisibility.

7
Applications in Weight Sensitivity or Thermally Sensitivity Structures Concrete construction in areas of poor load
Bearing soil conditions, remote geographical locations, sensitive environmental areas, Apartment patio decks; thermally insulated concrete housing and basements; thermally heated floors and conditioning rooms, or active seismic sites posing special issues that the use of lightweight reinforcement will solve.

Mechanical Properties

1. Physical Behaviour

Bar Size		Nominal Diameter		Cross-Sectional Area		Ultimate Tensile Strength		Guaranteed Tensile Strength		Young's Modulus	
mm	inch	mm	inch	mm ²	inch ²	MPa	ksi	MPa	ksi	GPa	psi x 10 ⁶
6	#2	6.35	0.25	33.23	0.0515	950	136	860	123	43	6.23
9	#3	9.53	0.375	84.32	0.131	900	130	820	118	43	6.23
12	#4	12.70	0.50	144.85	0.224	860	123	750	109	43	6.23
16	#5	15.88	0.625	217.56	0.337	800	115	710	102	43	6.23
19	#6	19.05	0.75	295.50	0.458	750	109	660	95	43	6.23
22	#7	22.23	0.875	382.73	0.593	710	102	640	92	43	6.23
25	#8	25.40	1.000	537.90	0.834	670	96	600	86	43	6.23
32	#9	31.75	1.251	807.34	1.251	620	89	560	80	43	6.23

2. Tensile Stress, Nominal Diameter & Cross-sectional Area, Modulus of Elasticity

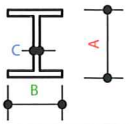
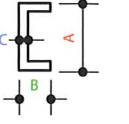
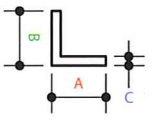
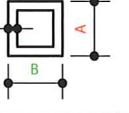
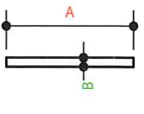
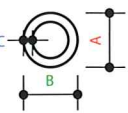
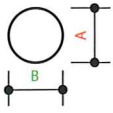
Properties	Rated (GVI)		Actual (Experimental)		ASTM Ref.
Longitudinal Tensile Strength	90 ksi	620 MPa	97.1 ksi	670 MPa	ASTM D5083
Longitudinal Compressive Strength	68 ksi	465 MPa	88.5 ksi	610 MPa	ASTM D3410
Short Beam Shear Strength	5.5 ksi	38 MPa	8.5 ksi	59 MPa	ASTM D2344
Longitudinal Tensile Modulus	5.5 Msi	38 GPa	6.1 Msi	42 GPa	ASTM D5083
Longitudinal Compressive Modulus	4.1 Msi	28 GPa	6.1 Ms	42 GPa	ASTM D3410
Fiber Content by Weight (min.)	55%		75%		ASTM D2584
Barcol Hardness	50		55-65		ASTM D2583
Glass Transition Temperature (min.)	203 °F	95 °C	230 °F	105 °C	ASTM E1640
Water Absorption (max.)	1.00%		0.20%		ASTM D570
Longitudinal Coefficient Of Thermal Expansion (max.)	6 x 10 ⁻¹ /°F	11 x 10 ⁻⁶ /°C	3.6 x 10 ⁻¹ /°F	6.58 x 10 ⁻⁶ /°C	ASTM D696
Transverse Coefficient Of Thermal Expansion (max.)	30 x 10 ⁻¹ /°F	54 x 10 ⁻⁶ /°C	18.7 x 10 ⁻¹ /°F	3.37 x 10 ⁻⁶ /°C	ASTM D696

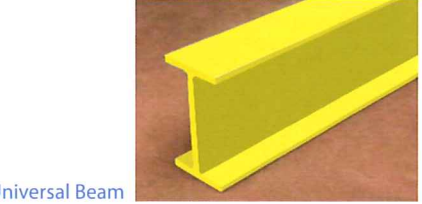
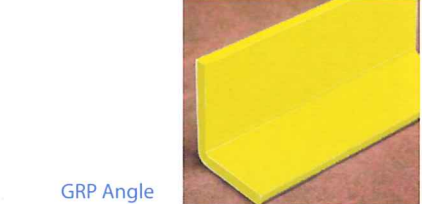
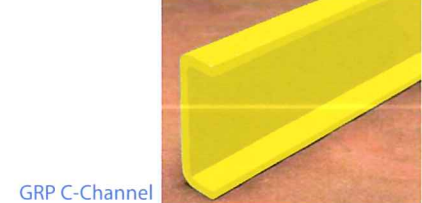
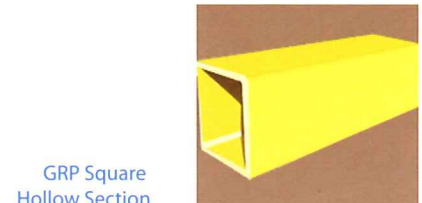
3. Durability

Potential durability versus traditional steel reinforcement is one of the chief benefits of GFRP Rebar. In environments that would traditionally degrade steel reinforcement, there is little concern in the international research area that these same agents (low pH solutions) will degrade the quality of GFRP rebar. Typical portland concrete pour water is very alkaline with a pH of approximately 13. In addition, it is presumed that any water that hydrates through the concrete also creates a high pH solution that could potentially degrade the rebar. Most durability studies have focused on subjecting GFRP Rebars to alkaline solutions of 13pH at elevated temperatures to simulate service lives on the order of 50 years.

玻璃纖維 鋼材 GRP Profile / Structures



PROFILES	DIMENSION (mm)			WEIGHT kg/m
	A	B	C	
 UNIVERSAL I-BEAM	100	100	6.5	3.95
	150	80	8	4.96
	250	125	12	9.6
	300	150	15	16
 C-CHANNEL	50	30	5	0.98
	76	25	5	1.06
	76	35	5	1.32
	120	40	5	1.68
	200	44	7.6	4.40
	200	60	10	5.60
	250	68	12	9.30
 EQUAL ANGLE	38	38	5	0.68
	50	50	6.4	1.03
	76	76	6.4	1.93
	76	76	8	2.43
	76	76	10	3.10
	100	100	10	3.22
 HOLLOW SECTION	38	38	5	1.03
	51	51	6.3	1.93
	60	60	5	2.43
	210	110	5	3.10
 PLATE	400	3	/	2.45
	400	6		4.86
	400	8		6.45
	400	10		8.10
 ROUND HOLLOW SECTION	18	18	3.5	0.45
	50	50	3.5	1.15
	50	50	4.0	1.31
	50	50	4.8	1.58
 ROUND SOLID SECTION	11	11	/	0.23
	16	16		0.42
	18	18		0.53
	20	20		0.59





玻璃纖維 / 玻璃纖維 水泥花盆 GRP Planter

For over 20 years, DuraPlant Planters has been an industry leader in the manufacture of GRP/Fiberglass Industry. The company has consistently been a pioneer in the development of improved materials, techniques and processes.

DuraPlant's technical personnel are anxious to make their expertise and experience available at the earliest stages of a project. Preliminary discussions and consultations between our engineers and the architect result in determination of appropriate materials, methods of attachment, appropriate finish and the development of engineering details as well as other relevant technical participation.



Callaway

MOULD NAME



SHAPE

S-1 Slate Gray



ROUND (RO)

S-1 Slate Gray



SQUARE (SQ)

DIMENSION SELECTION

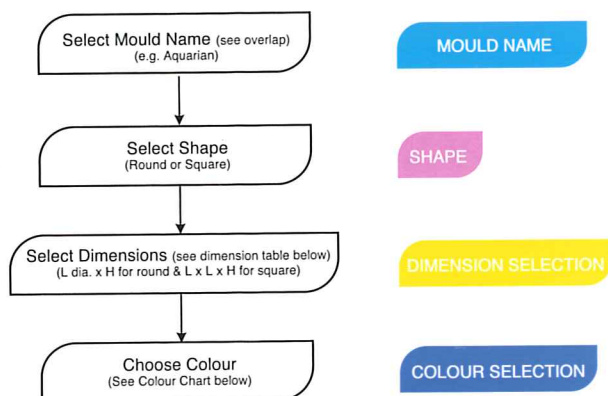
	L (mm)	H (mm)
	600	300
	900	450
	1200	600
	1500	750
	1800	900
		1050

COLOUR SELECTION

S-1 Slate Gray	S-2 Charcoal	S-3 White
S-4 Tan	S-5 Terra Cotta	S-6 Beach Brown
S-7 Sand buff	S-8 Dark Brown	S-9 Rustic Brown
S-10 Limestone	S-11 Surf Green	S-12 Rust
S-13 Nordic Cream	S-14 Dove Gray	S-15 Silica White
S-16 Mexican Tile	S-17 Mojave Sand	S-18 Stone Gray

Planter serial number procedure

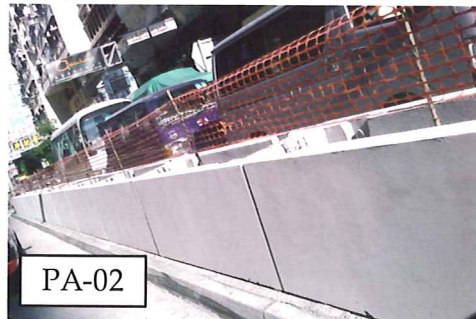
Selection of Planters:



其他設計
CUSTOM-MADE PLANTERS



PA-01



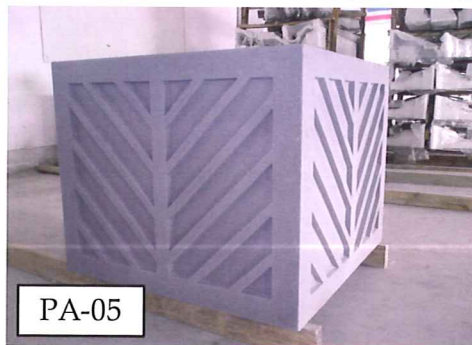
PA-02



PA-03



PA-04



PA-05



PA-06



PA-07



PA-08



PA-09



PA-10



Other Models



SM-01



AM-02a



SM-02b



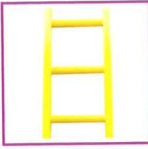
DM-03



FM-03a to d



SM-02



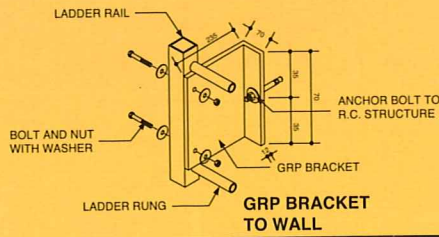
玻璃纖維 梯 GRP Ladder

Components:

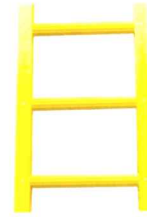
Ladder Rail : 50mm x 50mm x 6.3mm thk. GRP SHS
 Ladder Rung : 30mm x 30mm x 4mm thk. GRP SHS
 Stand-off Brackets : 235mm x 70mm x 70mm x 12mm thk. GRP

Safety Rungs in quincuncial tube is available for height over 2500mmH

Comply with BS 4211 : 1994 and BS 5395 Part 3:1985 Requirements



GRP LADDER



GRP LADDER WITH SAFTY CAFE

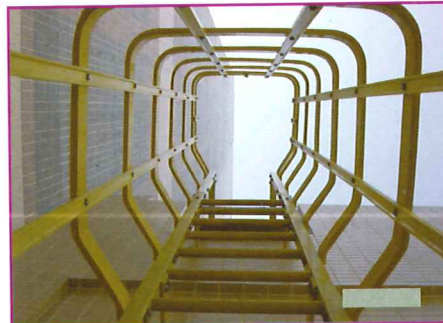


Siu Ho Wan, DSD Project, HKSAR

For Household Use



J140GF J160GF J180GF



CLP Project, HKSAR
GRP Ladder with Safety Cage



One-Sided Type



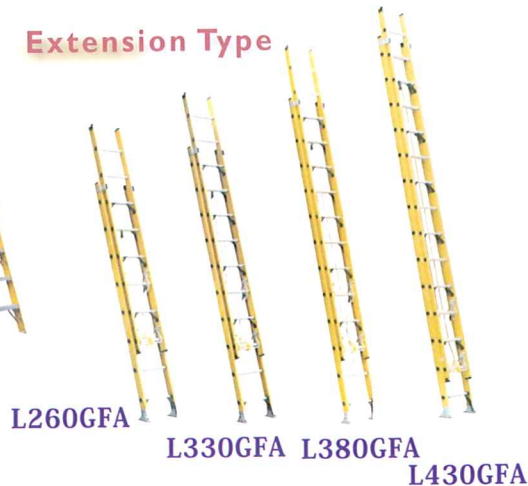
D90SGF D120SGF D150SGF D180SGF D210SGF D240SGF

Double-Sided Type



S250SGF S300SGF S360SGF

Extension Type



L260GFA L330GFA L380GFA L430GFA



FS-01
With optional L-shaped Brackets




FS-02
Ladder with Safety Cage

玻璃纖維 安全護欄 GRP Handrails



DORARAIL™ fiberglass handrails are industrial/commercial railing systems for stair rails, platform/walkway handrails and guardrails. **DORARAIL™** systems are fabricated from pultruded fiberglass components produced by molded thermoplastic connectors. **DORARAIL™** systems are particularly well-suited to corrosive environments like those found in industrial, chemical and wastewater treatment plants as well as commercial structures with urban and salt air corrosion.

Comply **BS 6180** and **BS EN ISO 14122**, Side or Base mounted systems can be supplied pieced small or in pre-fabricated frames for site installation



DORARAIL™ handrails are industrial /commercial railing systems for stair rails, platform/walkway handrails and guardrails. **DORARAIL™** systems are fabricated from pultruded fiberglass components produced by molded thermoplastic connectors. They are particularly well-suited to corrosive environments like those found in industrial, chemical and sewerage treatment plants as well as commercial structures with urban and salt air corrosion.

Round Handrail System
(Standard Safety Height = 1100mmH)

The round fiberglass handrail system is ideal for any high traffic area where handrail is needed. The round rails are easy to grip and 90 degree molded corners eliminate sharp edges. Height and width can be adjusted at your unique requirement. The handrail system includes a UV inhibitor for additional resistance to ultraviolet degradation and corrosion.

Colors

DORARAIL™ handrail systems are produced in a standard safety yellow color. Other colors are available upon request.



Stonecutter Island, DSD Project, HKSAR

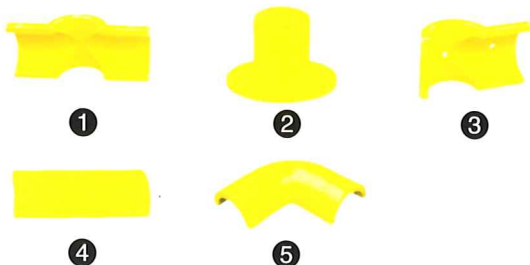


Round Handrail



Square Handrail with Safety Kick Plate

Connectors for Round Handrail



Legend

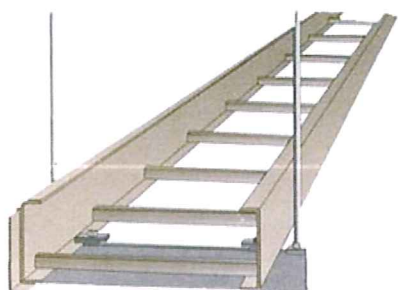
1. 4-way connector
2. base unit and bolt to ground
3. 3-way connector
4. 2-way connector (straight)
5. 2-way connector (90 deg. Bend)



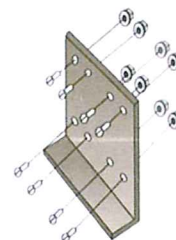
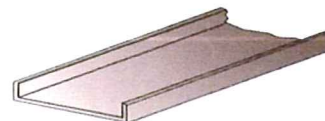
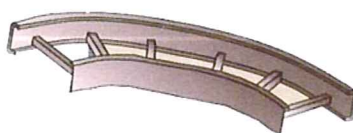
Electrical insulation material, can withstand heavy electrical pressures at 8 - 12 kv/mm as per ISO 10192 depending on application and material choice. Very low water absorption coupled with fire retardant as per BS 476 Part 6 and Part 7 makes it ideal for indoor / outdoor use .



- * Dry type transformers spaces sticks
- * Rectifier internals
- * Bus Covers
- * Other custom shapes as per requirements



Straight Section



Connectors and Accessories

Straight Section Tables

Material	Rung Spacing (x)	Width (y)	Length (z)
<input type="checkbox"/> Polyester Resin	<input type="checkbox"/> 150mm	<input type="checkbox"/> 150mm	<input type="checkbox"/> 3000 mm
	<input type="checkbox"/> 225mm	<input type="checkbox"/> 225mm	<input type="checkbox"/> 4000 mm
	<input type="checkbox"/> 300mm	<input type="checkbox"/> 300mm	<input type="checkbox"/> 5000 mm
<input type="checkbox"/> Vinyl Ester (Corrosive Resistance)	<input type="checkbox"/> 450mm	<input type="checkbox"/> 450mm	<input type="checkbox"/> 6000 mm
		<input type="checkbox"/> 600mm	
		<input type="checkbox"/> 750mm	
		<input type="checkbox"/> 900mm	

Cable Tray Connectors

Material	Height (m)	Width (n)	Angle (p)	Radius (t)
<input type="checkbox"/> Polyester Resin	<input type="checkbox"/> 75mm	<input type="checkbox"/> 150mm	<input type="checkbox"/> 30 deg.	<input type="checkbox"/> 300mm
	<input type="checkbox"/> 100mm	<input type="checkbox"/> 225mm	<input type="checkbox"/> 45 deg.	<input type="checkbox"/> 600mm
	<input type="checkbox"/> 150mm	<input type="checkbox"/> 300mm	<input type="checkbox"/> 60 deg.	<input type="checkbox"/> 900mm
<input type="checkbox"/> Vinyl Ester (Corrosive Resistance)		<input type="checkbox"/> 450mm	<input type="checkbox"/> 90 deg.	<input type="checkbox"/> 1500mm
		<input type="checkbox"/> 600mm		
		<input type="checkbox"/> 750mm		
		<input type="checkbox"/> 900mm		

玻璃纖維 防滑梯級保護
GRP Stair Tread Plate



The cost effective answer to slippery steps and ladders

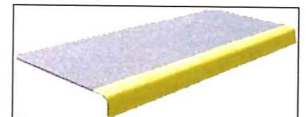
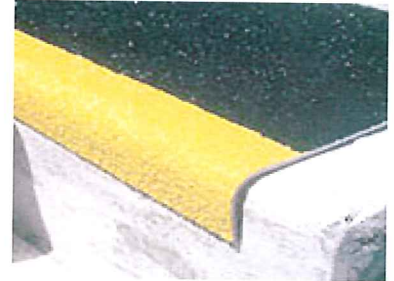
Our DuraStair tread plates can be fitted over the top of existing stair treads. The treads are manufactured from a high quality Isophthalic resin that is corrosion resistant, fire resistant and extremely hard wearing.

The tread plates are typically 4mm thick and have a quartz grit finish providing superior anti-slip properties reducing slips and falls in the work place.

They are corrosion resistant over a wide pH range both acidic and caustic.

The hazard strips are yellow as standard. Solid plate is also available for landing areas to complete the installation and a range of stainless steel fixings are available from stock to fix down the treads and plates.

Ladder Grip is a slip resistant ladder rung cover that greatly reduces the risk of slips and falls. It is fixed into place using a powerful marine adhesive which is impervious to severe weather and corrosive chemicals.



Advantages

Corrosion resistant

- * Durable Fibreglass construction

Excellent slip-resistance

- * High visibility yellow nosing
- * Easy to install
- * Fixings can be supplied
- * Fibreglass non-slip solid fibreglass plate is available for staircase landings sizes

Any length up to 3660mm

Standard Size of Stair Tread Plate
1. 25.4mm x 152.4mm x 3.5mm Thick (Length can be cut to size)
2. 25.4mm x 228.6mm x 3.5mm Thick (Length can be cut to size)
3. 45mm x 345mm x 4.8mm Thick (Length can be cut to size)
4. 45mm x 250mm x 4.8mm Thick (Length can be cut to size)



Corrosion Resistant



Fire Resistant



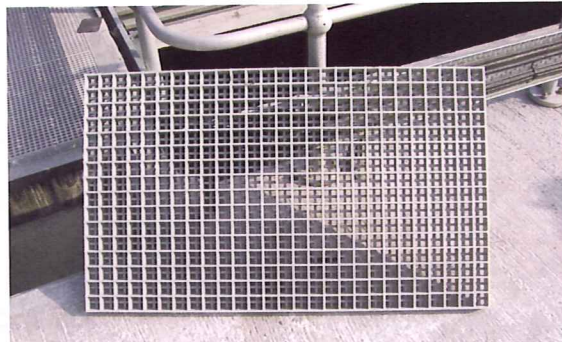
Impact Resistant



Anti-Slip



Light-weight



ISO 9001:2008 CERTIFIED
國際品質管理體系標準認可

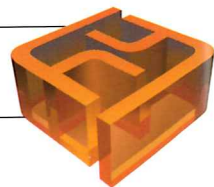


玻璃纖維創新 環保產品系列

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楊氏玻璃纖維 est. 1983

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