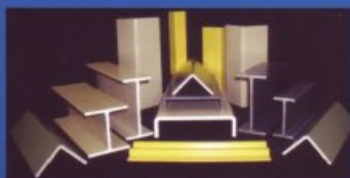




MUIGRATE®

High Performance Composite Solution



MuiGrate® Molded Gratings

MuiGrate® Pultruded Gratings

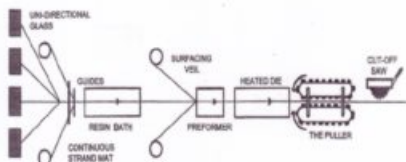
MuiGrate® Pultruded Profiles



MuiGrate® Pultruded FRP Grating



The pultrusion process utilized in the manufacturing of pultruded fiberglass grating and structural shapes is a continuous and automated process where continuous fiberglass rovings and mat are pulled through guides, a resin bath and pre-formers, then wrapped with a synthetic veil before being pulled through a heated die. The individual components of pultruded fiberglass grating – load bars and each piece of the two piece tie-bar are pultruded separately.

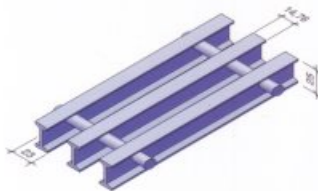


Pultruded fiberglass grating is uni-directional in strength and provides increased load capacity and very good levels of corrosion resistance. The components (bearing bars and cross bars) which are pulled by machine, provide a higher glass to resin ratio content (65% glass to 35% resin) which gives it superior load capacity, yet reduces the corrosion resistance when compared to molded fiberglass grating.

Model	Height (mm)	Standard Panel Size (mm)	Open Area %	Weight (kg/m ²)
ML25-25	25		60	8.1
MFG25-25	25	Width: 914, 1220, 1524	60	11.7
MFG38-25	38	Length: 2438, 3048, 5486, 6096	58	17.0
MFG50-25	50		50	17.4

Muigrate® Pultruded Grating performance Chart

Uniform Distributed Load (UDL), Concentrated Load (CL), ΔU : UDL deflection in mm, ΔC : CL deflection in mm



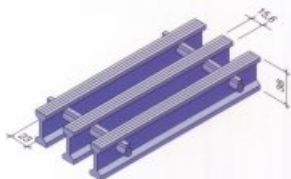
SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)									
	Δ	5	8	10	15	25	50	100	200	300
457	ΔU	0.32	0.52	0.65	0.97	1.61	3.22	6.45	12.9	
	ΔC	1.13	1.8	2.26	3.39	5.65	11.3			
610	ΔU	1.02	1.64	2.05	3.07	5.12	10.2			
	ΔC	2.69	4.29	5.37	8.06	13.4				
914	ΔU	5.16	8.26	10.3						
	ΔC	9.03	14.5							
1200	ΔU	15.3								
	ΔC	20.5								

ML25-25



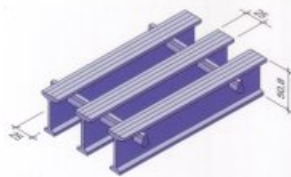
SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)									
	Δ	5	8	10	15	25	50	100	200	300
457	ΔU	0.23	0.37	0.46	0.69	1.15	2.3	4.6	9.2	13.8
	ΔC	0.8	1.29	1.61	2.41	4.02	8.05	16.1		
610	ΔU	0.73	1.17	1.46	2.19	3.65	7.29	14.6		
	ΔC	1.91	3.06	3.83	5.74	9.58	19.1			
914	ΔU	3.68	5.89	7.36	11					
	ΔC	6.44	10.3	12.9						
1200	ΔU	10.9	17.5							
	ΔC	14.6								

MFG25-25



SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)									
	Δ	5	8	10	15	25	50	100	200	300
610	ΔU	0.21	0.33	0.42	0.62	1.03	2.1	4.12	8.23	12.4
	ΔC	0.54	0.86	1.08	1.62	2.7	5.4	10.8		
914	ΔU	1.03	1.66	2.08	3.11	5.19	10.4	20.7		
	ΔC	1.82	2.91	3.63	5.45	9.08	18.2			
1200	ΔU	3.08	4.93	6.17	9.25	15.4				
	ΔC	4.12	6.58	8.22	12.3					
1524	ΔU	8.02	12.8							
	ΔC	8.42	13.5							

MFG38-25



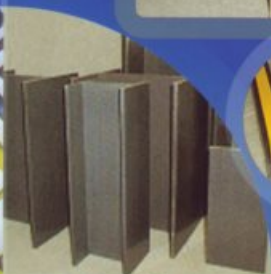
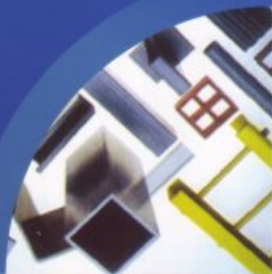
SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)									
	Δ	5	8	10	15	25	50	100	200	300
914	ΔU	0.54	0.87	1.09	1.63	2.72	5.45	10.9	21.8	
	ΔC	0.95	1.52	1.91	2.86	4.71	9.54	19.1		
1200	ΔU	1.62	2.59	3.24	4.86	8.1	16.2			
	ΔC	2.16	3.45	4.32	6.48	10.8	21.6			
1524	ΔU	4.21	6.74	8.43	12.6					
	ΔC	4.42	7.08	8.85	13.2					
1828	ΔU	8.72	14							
	ΔC	7.63	12.2							

MFG50-25

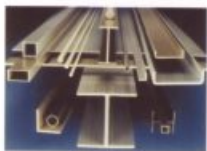
Notes

- Deflection for pedestrian comfort shall not exceed 6.0mm or clear span divided by 200. Recommended load for pedestrian traffic is typically around 3.0 to 7.5 kN/m² (as per BS4592 Part 4 : 1992)
- The load on the charts are subjected to Static Load Condition at ambient temperature only.
- Long term loads will results in added deflection due to creep in the material and will also will require high safety factors to ensure acceptable performance. For design purposes, the recommended safety factor is 2.0.

MuiGrate[®] Pultruded FRP Profiles



Pultruded FRP Profiles and Application



MuiGrate® pultruded profiles have a surface veil to protect against glass fibers penetrating the resin surface and to increase corrosion and ultraviolet resistance. Standard MuiGrate®

structural pultruded profile shapes include equal angle, I beam, square tube, round tube, flat plate etc. These structural shapes are used in a wide range of applications, offering a unique combination of chemical resistance, size stability, high strength, and electrical non-conductivity. For special uses, custom shapes are also available.



Frp Cable Ladders And Trays

MuiGrate® cable trays and cable ladders are made of either polyester or vinyl ester resin and are available from 50mm to 1,000mm widths. A complete range of tees, bends, couplers and other accessories in FRP are available.

The design meets NEMA specification and are ideal for offshore oil platforms, refineries, chemical plants, water treatment plants, the electroplating industry, railways, power plants, fertilizer plants, and ports.



FRP Safety Handrail System



MuiGrate® Safety Handrail System has been developed to meet OSHA and Building Regulation requirements as well as offering a unique, extremely strong handrail system.

Benefits of MuiGrate® Handrail System

- Extremely strong fiberglass construction
- Permanent or temporary installations
- Modular internal connection system
- Quick and easy installation
- Chemical resistant



The completed handrail installation shall meet the following load requirements:-

- Concentrated Load: 200 lb (891 N) applied in any direction at the top rail.
- Uniform Load: 50 lb/ft (730.5 N/m) of the top rail in any direction
- Loads are assumed not to act concurrently





MuiGrate® FRP Safety Handrail System

MuiGrate® Fiberglass Reinforced Plastic (FRP) Ladders and Safety Cages are designed, engineered and custom fabricated in accordance with OSHA standards, Section 1910.27, entitled "Fixed Ladders". Rung to side rail connections are bonded and pinned with a dowel rod to prevent any possibility of rung rotation and pullout. Rungs have a factory applied epoxy/base nonskid grit surface for maximum safety.

MuiGrate® fiberglass ladder is a slip resistant FRP Ladder that will reduce the risk of slips from ladders and improve ladder safety by increasing the surface area for foot contact and greatly increasing the friction co-efficiency and visibility. Severe weather, spillages and even immersion in viscous or corrosive fluids will not adversely affect the performance of MuiGrate® or it's ladder safety life span.

Benefits of MuiGrate® FRP ladder

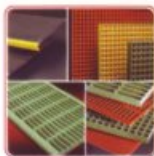
- Permanent slip resistancy in most environments
- Exceptionally hard wearing integral grit surface
- Superior corrosion resistant compare to steel
- Cost efficient solution to ladder safety in corrosive environments



MuiGrate® Molded FRP Grating

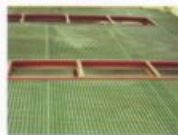


Muigrate® Molded FRP Grating



Muigrate® is a one-piece (integral), reinforced FRP grating available in standard panels and sizes. It is manufactured by interweaving continuous, thoroughly-wetted, fiberglass strand with thermosetting resin systems. Typical applications include floor systems, walkways, work platforms, stairs, ramps, trench covers and catwalks. Muigrate's integral, long-lasting anti-slip top surface makes this the grating of choice in many industries. It is preferred when slippery working conditions are present.

The high resin content (65%) provides long maintenance-free performance. The strong mesh grating panel allows efficient on-site cutting to minimize grating waste. Molded grating is significantly lighter in weight than metallic gratings. Standard Muigrate® grating has a concave profile on the upper surface for skid resistance. Grit tops are available upon request.



Molded Grating vs. Pultruded Grating

Characteristic	Molded Grating	Pultruded Grating
Chemical Resistance	Excellent	Good
Bi-directional Strength	Excellent	Not Recommended
Unidirectional Strength	Very Good	Excellent
Impact Resistance	Excellent	Average
Open Area	Excellent (70% to 80%)	Good (40% to 60%)
Panel Sizes Available	Excellent	Excellent
Pipe Penetrations	Excellent	Average
Safety	Excellent	Excellent

Standard Size Specification:-

Series	Height (mm)	Mesh Size (mm)	Standard Panel %	Open Area	Weight (kg/m ²)
MG25(38/38)	25	38.1 x 38.1	995 x 3050 1220 x 3660	69%	12.3
MG25(25/102)	25	25.4 x 101.6	1220 x 3660	67%	13.1
MG25(19/19)	25	19 x 19(U) 38 x 38 (D)	1220 x 4000 1220 x 2440	38%	15.5
MG30(38/38)	30	38.1 x 38.1	997 x 3050 1220 x 3660 1525 x 4008 1220 x 4005	69%	14.6
MG38(38/38)	38	38.1 x 38.1	997x3050 1220 x 3660 1525 x 3969 1220 x 4005	68%	19.2
MG38(20/20)	38	20 x 20(U) 40 x 40(D)	1007 x 4007 1247 x 4047	42%	22.0
MG40(40/40)	40	40 x 40	1007 x 3007 1007 x 4047 1247 x 4047	67%	20.0
MG50(50/50)	50	50.7 x 50.7	1222 x 3660	69%	13.5

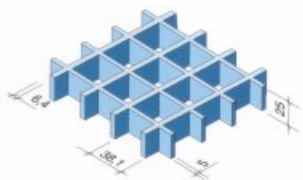
* U : Upper Mesh D : Lower Mesh

Migrate[®] Molded Grating Performance Chart

Uniform Distributed Load (UDL), Concentrated Load (CL), ΔU : UDL deflection in mm, ΔC : CL deflection in mm

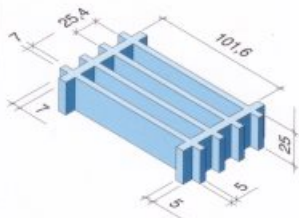
MG25(38/38)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)						
	UDL	1.2	2.4	3.6	4.8	9.7	L/100
	CL	1.0	1.5	3.0	6.0	9.0	
305	ΔU	0.0	0.0	0.0	0.0	0.0	38.60
	ΔC	0.53	0.81	1.62	3.16	4.50	5.72
457	ΔU	0.21	0.38	0.56	0.75	1.51	29.40
	ΔC	1.83	2.76	5.42	10.8		2.52
610	ΔU	0.58	1.17	1.75	2.32	4.68	12.60
	ΔC	4.27	6.38	12.72			1.44
914	ΔU	3.03	6.04	12.1			3.62
	ΔC	0.0					0.56



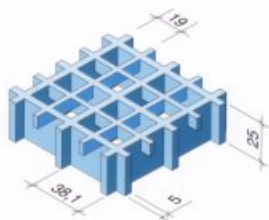
MG25(25/102)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)						
	UDL	1.2	2.4	3.6	4.8	9.7	L/100
	CL	1.0	1.5	3.0	6.0	9.0	
305	ΔU	0.0	0.0	0.0	0.0	0.0	56.20
	ΔC	0.34	0.48	0.92	1.81	2.72	10.16
457	ΔU	0.12	0.24	0.35	0.46	0.93	47.85
	ΔC	1.21	1.69	3.37	6.71	10.07	4.10
610	ΔU	0.4	0.78	1.18	1.52	3.05	19.93
	ΔC	2.7	4.06	8.08			2.28
914	ΔU	1.86	3.7	5.57	7.4		5.95
	ΔC	8.92					1.02



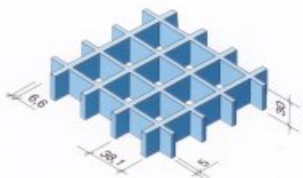
MG25(19/19)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)						
	UDL	1.2	2.4	3.6	4.8	9.7	L/100
	CL	1.0	1.5	3.0	6.0	9.0	
305	ΔU	0.0	0.0	0.0	0.0	0.0	45.60
	ΔC	0.46	0.65	1.34	2.62	3.90	6.90
457	ΔU	0.14	0.31	0.49	0.61	1.21	37.11
	ΔC	1.47	2.26	4.4	8.53		3.18
610	ΔU	0.47	0.97	1.39	1.87	3.68	16.09
	ΔC	3.35	5.02	9.89			1.84
914	ΔU	2.36	4.71	7.06	9.38		4.67
	ΔC	0.00					0.82

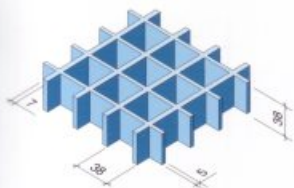


MG25(38/38)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)						
	UDL	1.2	2.4	3.6	4.8	9.7	L/100
	CL	1.0	1.5	3.0	6.0	9.0	
457	ΔU	0.1	0.2	0.3	0.5	0.9	50.18
	ΔC	1.09	1.67	3.21	6.36	3.90	4.30
610	ΔU	0.36	0.69	1.02	1.35	2.71	22.03
	ΔC	2.45	3.68	7.22			2.52
914	ΔU	1.58	3.15	4.78	6.27	12.69	7.00
	ΔC	7.62					1.20
1219	ΔU	2.85	5.67	8.48	11.3		5.16
	ΔC	0.0					0.74

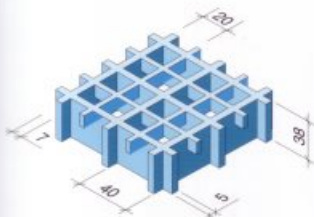


Muigrate® Molded Grating Performance Chart



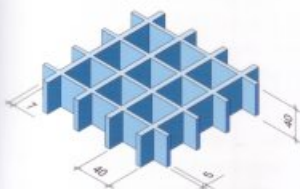
MG38(38/38)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)							L/100
	UDL	1.2	2.4	3.6	4.8	9.7		
	CL	1.0	1.5	3.0	6.0	9.0		
457	ΔU	0.0	0.0	0.0	0.0	0.0	55.30	
	ΔC	0.53	0.81	1.62	3.16	4.50	5.72	
610	ΔU	0.18	0.37	0.54	0.72	1.45	40.22	
	ΔC	1.35	2.03	3.92	7.86	11.93	4.60	
914	ΔU	0.93	1.84	2.77	3.7	7.37	11.90	
	ΔC	4.45	6.7	13.34			2.04	
1219	ΔU	2.85	5.67	8.48	11.3		5.16	
	ΔC	10.3					1.18	



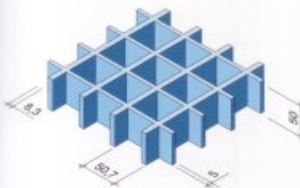
MG38(20/20)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)							L/100
	UDL	1.2	2.4	3.6	4.8	9.7		
	CL	1.0	1.5	3.0	6.0	9.0		
457	ΔU	0.0	0.0	0.0	0.0	0.0	63.50	
	ΔC	0.51	0.75	1.48	2.91	4.42	9.36	
610	ΔU	0.15	0.31	0.45	0.61	1.22	48.96	
	ΔC	0.77	1.53	2.28	3.02	6.01	14.59	
914	ΔU	1.02	1.58	3.2	6.5	9.71	5.60	
	ΔC	3.63	5.58	10.8			2.50	
1219	ΔU	2.46	4.89	7.35	9.78		5.95	
	ΔC	8.98	13.38				1.36	



MG40(40/40)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)							L/100
	UDL	1.2	2.4	3.6	4.8	9.7		
	CL	1.0	1.5	3.0	6.0	9.0		
457	ΔU	0.0	0.0	0.0	0.0	0.0	66.35	
	ΔC	0.46	0.66	1.30	2.61	4.02	10.32	
610	ΔU	0.14	0.29	0.42	0.57	1.17	51.40	
	ΔC	1.02	1.53	3.17	6.27	9.43	5.88	
914	ΔU	0.68	1.38	2.08	2.75	5.48	16.10	
	ΔC	3.35	4.92	9.92			2.76	
1219	ΔU	2.43	4.81	7.24	9.7		6.03	
	ΔC	8.80	13.3				1.38	



MG50(50/50)

SPAN mm	LOAD (UDL : kN/m ² , CL : kN/m)							L/100
	UDL	1.2	2.4	3.6	4.8	9.7		
	CL	1.0	1.5	3.0	6.0	9.0		
610	ΔU	0.1	0.2	0.3	0.4	0.8	78.34	
	ΔC	0.71	1.05	2.14	4.16	6.13	8.96	
914	ΔU	0.49	0.91	1.35	1.82	3.61	24.39	
	ΔC	2.19	3.3	6.56	13.1		4.18	
1219	ΔU	1.41	2.79	4.19	5.56	11.21	10.50	
	ΔC	5.09	7.62	15.24			2.40	
1372	ΔU	2.28	4.52	6.73	9.01		7.31	
	ΔC	7.32	10.98				1.88	

Notes

1. The load on the charts are subjected to Static Load Condition at ambient temperature only.
2. Long term loads will result in added deflections due to creep in the material and will also require high safety factors to ensure acceptable performance. For design purposes, the recommended safety factor is 2.0.



About Us

With over 20 years experience in the custom fiberglass fabrication industry, Mui Fatt Group will meet or exceed your fiberglass production needs. Starting with a modest operations facility, Mui Fatt Group has grown to one of the leading fiberglass fabricators in the Malaysia, with over 70,000m² of manufacturing space.

Over the years, Mui Fatt Group has supplied fiberglass parts to an extensive range of customers in the marine, agricultural, industrial, transportation, and recreational industries. All of our products are made from tough, maintenance-free reinforced fiberglass for virtually unlimited life and top performance. Under the MuiGrate® brand we offer both pultruded fiberglass structural and moulded gratings for a variety of uses and industries. Our factory is located in Telok Gong, Selangor, strategically situated 10 km from Port Klang Port and 30 km from KLIA International Airport.

One of the many strengths of Mui Fatt Group is its extensive experience in the design and fabrication of a wide range of fiberglass products. Manufacturing processes at Mui Fatt Group include Contact Moulding, Pultrusion, Resin Transfer Molding(RTM), Filament Wounding, Vacuum Infusion and Sheet Molding Compound (SMC).

Mui Fatt Group's tie-up with the biggest FRP gratings producer in China (Nantong Group) allows us to tap into their vast array of products and expertise to cater to just about any FRP requirement.

Mission

Mui Fatt Group strives to deliver only the highest quality in fiberglass products. With our wide range of resources, we put the customer first and create a winning partnership. We employ highly skilled staff to ensure constant reliability, consistency, and profitability. We also support our local community and endeavor to create a safe and productive environment where our employees may grow and prosper. At Mui Fatt Group, we pride ourselves on our ability to exceed our customers' expectations and needs.

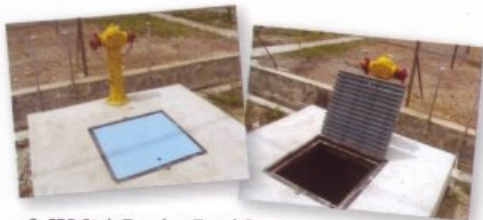
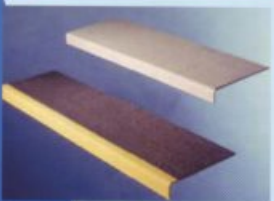
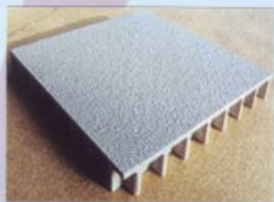
Special Surface Type

1. FRP Covered Grating

FRP plate is laminated on top of FRP grating by adding successive layers of glass mat and resin until the desired thickness is achieved. A 5 tons press machine is used to ensure consistent and even bonding between the FRP grating and the checker plate. An additional layer of gel coat is used to enhance the surface cosmetic finish and better protection against UV.

Surface finish available:-

- Smooth Flat Surface
- Diamond Covered Surface
- Logo Embedded Surface
- Gritted Surface
(surface coated with silica sand or quartz).



2. FRP Stair Tread or Tread Cover

FRP stair tread can be made of MuGrate molded FRP grating, the square size often being 38mm x 38mm or 25mm x 152mm. The standard width and length are 228mm, 367mm, 305mm and 762mm, 914mm respectively. Of course, it can also be cut to the sizes at customer' request.

Tread cover use fiberglass fabric as reinforcement with such properties as non-conductive, fire resistant, easy installation, light weight, etc., whose standard thickness is 3mm or 6mm or at customers' request.

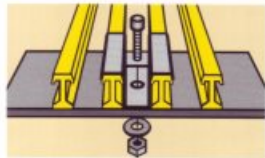




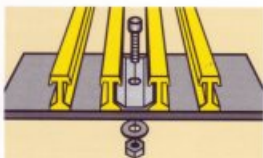
Installation Method of FRP Grating

Pultruded Grating

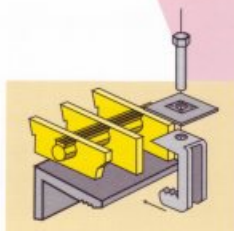
Accessories



SS316 M-Clip



SS316 Insert Clip



SS316 G-Clip

Molded Grating

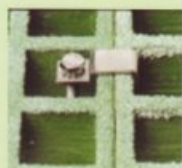
Accessories



SS316 M-Clip



SS316 L-Clip



SS316 C-Clip

Choice of MuiGrate® Gratings

Customers can choose the most economical resin type and specification of MuiGrate® grating according to the corrosion requirements, CHEMICAL RESISTANCE CHART FOR MUIGRATE®, loading type, load span, supporting frame, deflection chart etc.

Remarks:

1. Tolerance per full panel:
± 5mm in length and width direction, ± 1.5mm in thickness direction and warp tolerance
2. Tolerance for cutting
Length : ± 5mm, Width : ± 5mm, Circle : ± 3mm

Muigrate® Chemical Resistant Chart

Chemicals	Resistant				Chemicals	Not Resistant			
	Vinyl Ester	Vinyl Ester	Polyester	Polyester		Vinyl Ester	Vinyl Ester	Polyester	Polyester
	R.T	165°F	R.T	150°F		R.T	165°F	R.T	150°F
Acetic Acid 0-25%	R	R	R	125	Chromic Acid 20%	R	120	-	-
Acetic Acid 25-50%	R	R	R	NR	Chromium Sulfate	R	R	R	R
Alcohol, Butyl	R	NR	NR	NR	Citric Acid	R	R	R	R
Alcohol, Ethyl 10%	R	150	-	-	Coconut Oil	R	R	R	NR
Alcohol, Ethyl 100%	R	NR	-	-	Copper Chloride	R	R	R	R
Alcohol, Isopropyl 10%	R	150	-	-	Copper Cyanide	R	-	NR	NR
Alcohol, Methyl 10%	R	150	-	-	Copper Nitrate	R	-	R	R
Alum	R	R	R	R	Copper Sulfate	R	R	R	R
Aluminum Chloride	R	R	R	120	Corn Oil	R	R	R	NR
Aluminum Hydroxide 5%	R	120	-	-	Corn Starch-Slurry	R	R	R	NR
Aluminum Nitrate	R	R	-	-	Corn Sugar	R	R	R	NR
Aluminum Potassium Sulfate	R	R	R	R	Cottonseed Oil	R	R	R	NR
Ammonia, Aqueous 0-10%	R	100	-	-	Crude Oil, Sour	R	R	R	NR
Ammonia, Gas	R	100	-	-	Crude Oil, Sweet	R	R	R	NR
Ammonium Bicarbonate	R	120	R	NR	Detergents, Sulfonated	R	R	R	NR
Ammonium Carbonate 10%	R	120	-	-	Dibutyl Ether	R	120	NR	NR
Ammonium Citrate	R	120	-	-	Diesel Fuel	R	R	R	NR
Ammonium Hydroxide 5%	R	120	R	NR	Dimethyl Phthalate	R	R	NR	NR
Ammonium Hydroxide 10%	R	120	NR	NR	Dipropylene Glycol	R	R	R	NR
Ammonium Hydroxide 20%	R	120	NR	NR	Esters, Fatty Acids	R	R	-	-
Ammonium Nitrate	R	R	R	R	Ethylene Dichloride	NR	NR	-	-
Ammonium Phosphate	R	120	NR	NR	Ethylene Glycol	R	R	R	R
Ammonium Sulfate	R	R	R	R	Fatty Acids	R	R	R	R
Barium Carbonate	R	R	R	NR	Ferric Sulfate	R	R	R	R
Barium Chloride	R	R	R	200	Ferrous Chloride	R	R	R	R
Barium Sulfate	R	R	R	R	Ferrous Sulfate	R	R	R	R
Barium Sulfide	R	R	NR	NR	Fertilizer: Urea Ammonia	R	120	-	-
Beer	R	120	R	NR	Flue Gas	R	R	-	-
Benzene Sulfonic Acid 30%	R	R	R	R	Fluoboric Acid 10%	R	120	NR	NR
Benzoic Acid	R	R	R	NR	Fluosilic Acid 0-20%	R	R	NR	NR
Benzyl Alcohol	R	NR	NR	NR	Formaldehyde	R	R	R	NR
Butylene Glycol	R	R	R	R	Formic Acid 10%	R	R	R	NR
Butyric Acid 0-50%	R	R	R	R	Fuel Oil	R	R	R	NR
Cadmium Chloride	R	R	R	NR	Gas, Natural	R	R	R	NR
Calcium Bisulfate	R	R	R	R	Gasoline, Auto	R	R	R	NR
Calcium Carbonate	R	R	R	NR	Gasoline Aviation	R	R	R	NR
Calcium Chlorate	R	R	R	R	Gasoline, Ethyl	R	R	R	NR
Calcium Chloride	R	R	R	R	Gasoline, Sour	R	R	R	NR
Calcium Hydroxide	R	120	R	NR	Glycolic Acid	R	R	R	NR
Calcium Hypochlorite	R	120	R	NR	Glucose	R	R	R	R
Calcium Nitrate	R	R	R	R	Glycerine	R	R	R	R
Calcium Sulfate	R	R	R	R	Glycol, Propylene	R	R	R	R
Calcium Sulfite	R	R	R	R	Glycolic Acid 70%	R	R	R	NR
Carbon Dioxide	R	R	R	R	Hydraulic Fluid	R	R	R	NR
Carbon Monoxide	R	R	R	R	Hydrobromic Acid 0-25%	R	R	R	NR
Carbon Tetrachloride	R	100	-	-	Hydrochloric Acid 0-37%	R	R	-	-
Carbonic Acid	R	R	R	R	Hydrocyanic Acid	R	R	-	NR
Carbon Methyl Cellulose	R	120	-	-	Hydrofluosilic Acid 10%	R	R	-	NR
Chlorinated Wax	R	R	-	-	Hydrogen Bromide, Wet Gas	R	R	-	NR
Chlorine Dioxide/Air	R	R	R	NR	Hydrogen Chloride, Dry Gas	R	R	-	-
Chlorine Dioxide, Wet Gas	R	R	-	-	Hydrogen Chloride, Wet Gas	R	R	NR	NR
Chlorine, Dry Gas	R	R	R	NR	Hydrogen Fluoride, Vapor	R	NR	R	95
Chlorine, Wet Gas	R	R	NR	NR	Hydrogen Peroxide 35%	R	120	R	120
Chlorine, Water	R	R	NR	NR	Hydrogen Sulfide Dry	R	R	R	250
Chloroacetic Acid 0-50%	R	100	NR	NR	Hydrogen Sulfide, Aqueous	R	R	-	-

R.T: Room Temperature R: Resistant NR: Not Resistant

Muigrade® Chemical Resistant Chart

Chemicals	Vinyl Ester	Vinyl Ester	Polyester	Polyester	Chemicals	Vinyl Ester	Vinyl Ester	Polyester	Polyester
	R.T.	195° F	R.T.	150° F		R.T.	195° F	R.T.	150° F
Hypochlorous Acid 0-10%	R	R	R	104	Sodium Bisulfate	R	R	R	R
Kerosene	R	R	R	120	Sodium Bromide	R	R	R	R
Lactic Acid	R	R	R	-	200Sodium Carbonate 0-25%	R	R	R	NR
Lauroyl Chloride	R	R	-	-	Sodium Chlorate	R	R	R	NR
Lauric Acid	R	R	-	-	Sodium Chloride	R	R	R	NR
Lead Acetate	R	R	R	160	Sodium Chlorite 25%	R	R	R	NR
Lead Chloride	R	R	-	-	Sodium Cyanide	R	R	R	NR
Lithium Bromide	R	R	-	-	Sodium Ferricyanide	R	R	R	R
Lithium Sulfate	R	R	-	-	Sodium Fluoride	R	120	-	-
Magnesium Carbonate	R	R	R	160	Sodium Fluoro Silicate	R	120	-	-
Magnesium Chloride	R	R	R	220	Sodium Hydroxide 0.5%	R	150	R	R
Magnesium Hydroxide	R	140	-	-	Sodium Hydroxide 5-25%	R	150	-	-
Magnesium Nitrate	R	R	R	160	Sodium Hydroxide 50%	R	150	-	-
Magnesium Sulfate	R	R	R	200	Sodium Hydrosulfide	R	R	R	NR
Maleic Acid	R	R	-	-	Sodium Hypochlorite	R	150	R	NR
Mercuric Chloride	R	R	R	212	Sodium Nitrate	R	R	R	R
Mercurous Chloride	R	R	R	212	Sodium Silicate	R	R	R	NR
Methanol (See Alcohol)	R	R	-	-	Sodium Sulfate	R	R	R	R
Mineral Oils	R	R	R	180	Sodium Sulfide	R	R	R	NR
Molybdenum Disulfide	R	R	-	-	Sodium Sulfite	R	R	R	NR
Motor Oil	R	R	-	-	Sodium Tetraborate	R	R	R	R
Nickel Chloride	R	R	R	NR	Sodium Thiocyanate	R	R	-	-
Nickel Nitrate	R	R	R	R	Sodium Thiosulfate	R	R	R	NR
Nickel Sulfate	R	R	R	R	Sodium Tripolyphosphate	R	R	R	NR
Nitric Acid 0-5%	R	R	R	R	Sodium Solutions	R	R	R	NR
Nitric Acid 20%	R	120	-	-	Sodium Crude Oil	R	R	R	R
Nitric Acid Fumes	NR	NR	-	-	Soya Oil	R	R	R	R
Octanoic Acid	R	R	R	NR	Stannic Chloride	R	R	R	R
Oil, Sour Crude	R	R	R	R	Stannous Chloride	R	R	R	R
Oil, Sweet Crude	R	R	R	R	Stearic Acid	R	R	R	R
Oleic Acid	R	R	R	R	Sugar, Beet and Cane Liquor	R	R	R	NR
Olive Oil	R	R	R	R	Sugar, Sucrose	R	R	R	R
Oxalic Acid	R	R	R	R	Sulfamic Acid	R	R	R	NR
Phosphoric Acid	R	R	R	R	Sulfanilic Acid	R	R	-	-
Phosphoric Acid Fumes	R	R	R	R	Sulfur Dioxide, Dry or Wet	R	R	-	-
Phthalic Acid	R	R	R	R	Sulfuric Acid 0-30%	R	R	R	R
Polyvinyl Acetate Latex	R	R	R	NR	Sulfuric Acid 30-50%	R	R	NR	NR
Polyvinyl Alcohol	R	100	R	NR	Sulfuric Acid 50-70%	R	120	R	150
Polyvinyl Chloride Latex	R	120	-	-	Sulfurous Acid 10%	R	100	NR	NR
Potassium Carbonate	R	140	R	NR	Toluene Sulfonic Acid	R	R	-	-
Potassium Chloride	R	R	R	R	Trichloro Acetic Acid 50%	R	R	R	NR
Potassium Ferricyanide	R	R	R	R	Tridecylbenzene Sulfonate	R	R	R	NR
Potassium Ferrocyanide	R	R	R	R	Triiodine Phosphoric	R	R	R	NR
Potassium Hydroxide	R	150	-	-	Turpentine	R	100	-	-
Potassium Nitrate	R	R	R	R	Urea	R	140	R	NR
Potassium Permanganate	R	140	R	NR	Vegetable Oils	R	R	R	R
Potassium Sulfate	R	R	R	R	Vinegar	R	R	R	R
Propionic Acid 1-50%	R	120	-	-	Water:				
Propionic Acid (50-100%)	NR	NR	-	-	Deionized , Demineralized	R	R	R	R
Pulp Paper Mill Effluent	R	R	R	NR	Distilled, Fresh, Salt, Sea	R	R	R	R
Selenious Acid	R	-	-	-	White Liquor (Pulp Mill)	R	R	R	NR
Soaps	R	R	R	NR	Xylene	NR	NR	NR	NR
Sodium Acetate	R	R	R	NR	Zinc Chlorate	R	R	R	R
Sodium Benzoate	R	R	R	NR	Zinc Chloride	R	140	R	122
Sodium Bicarbonate	R	R	-	-	Zinc Chloride	R	R	R	R
Sodium Bifluoride	R	120	R	NR	Zinc Nitrate	R	R	R	R
					Zinc Sulfate	R	R	R	R

R.T.: Room Temperature R: Resistant NR: Not Resistant



MUI FATT

Klang (Headquarters):

Mui Fatt Marketing Sdn Bhd (109953-M)

Mui Fatt Industries Sdn Bhd (124891-H)

MF Marketing Sdn Bhd (148957-T)

Kuala Lumpur:

Mui Fatt Composite Sdn Bhd (1619853-U)

Sungai Petani:

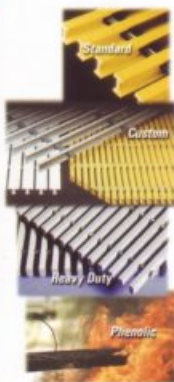
Mui Fatt Rotomoulder Sdn Bhd (188975-T)

Kota Bharu:

Mui Fatt East Coast Sdn Bhd (100968-M)



Excellent Properties Of Fiberglass Reinforced Polyester



Corrosion and Chemical Resistant

MuiGrate® composite material is particularly designed to provide safe, long lasting, economical and maintenance free solutions in environments where chemicals and other corrosive materials will destroy metal or wood.

High Strength to Weight Ratio

MuiGrate® composite material is constructed by integration of continuous fiberglass strand and high quality resin, but it weight less than 50-60% of steel allowing easy removal and handling.

Ergonomic

Employees experience fatigue after standing on solid concrete or heavy non-adjustable galvanized steel platform all day. MuiGrate® gratings are the best solution to ease the strain on backs, feet and legs of workers, increasing worker comfort and productivity due to its natural slight resiliency.

Low Maintenance

Install and forget about it. MuiGrate® grating is free from re-painting year after year, not only for the inherent corrosion resistance but also for the moulded-in colour and ultraviolet resistant character.

Comprehensive Economical Efficiency

The cost of MuiGrate® grating is about 10 – 30% more than steel grating but the maintenance cost is zero and it is theft deterrent. Further, steel grating must be maintained every year and the accumulated cost will be a very high sum. So, the cost of MuiGrate® grating is a little higher than steel grating, but the comprehensive economical efficiency, plus other advantages is so much more than steel.





Reinforcements

Roving

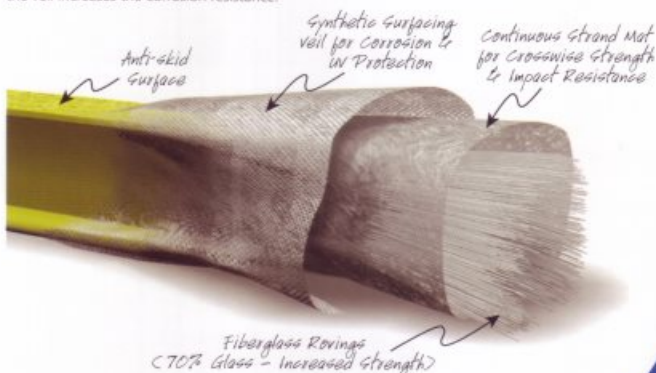
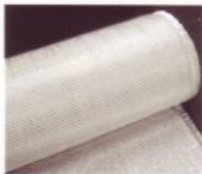
Roving is made up of fiberglass unidirectional filaments, which are manufactured in continuous rolls. Roving is always present in pultruded products comprising 50% to 70% of the total glass content. In addition to supplying the necessary strength to pull the profile, roving supplies the product with high tensile, flexural properties and is a big contributor to the overall section stiffness.

Mat

Continuous strand mat (CSM) is the remainder of glass reinforcement used in the pultrusion process. Typically, it is 30%-50% of the total glass content. This CSM is designed specifically for the pultrusion process and offers good wet-out characteristics, conformability to a variety of shapes and good physical properties, including the required pull strength. Fiberglass CSM is used to obtain the desired transverse properties of the product. Whereas the roving ties the composite together in the longitudinal direction, the mat is responsible for tying the composite together in all directions, but mainly in the transverse direction.

Veil

Veils are used to enhance the surface of pultruded profiles. Most widely used today are synthetic veils. A veil is added to the outside of a profile just prior to entrance of the die. As a result, the finished profile has a resin-rich surface that aids in resistance to ultraviolet (UV) degradation and makes the profile more hand-friendly. Since the veil brings more resin to the surface and the resin is the ingredient that gives the corrosion resistance, adding the veil increases the corrosion resistance.





Resin System

Resin Base	Description	Application
Isophthalic Polyester Resin	Industrial grade corrosion resistance, operating temperature -50°C – 105°C	Provides an intermediate level of chemical resistance and is the correct resin choice for grating subjected to splash and spill contact with harsh chemicals, and is a very good general purpose resin at a reduced cost compared to the premium vinyl ester resin.
Isophthalic Fire Retardant Polyester Resin (ISO-FR)	Industrial grade corrosion resistance and fire retardant, flame spread rating ASTM E84 Class 1, 25 or less, or BS 476 Part 7 Class 1, operating temperature -50°C – 105°C	Such resin can be used in the environments of middle concentration of inorganic acid and alkali which required better flame resistance.
Vinyl Ester Resin (VE)	Superior corrosion resistance, operating temperature -50°C – 110°C	Such resin provides the most chemical resistance in the industry, designed to withstand the harshest chemical environments over a broad range of acids and caustics, it is primarily used in petrochemical, waste water, and plating
Vinyl Ester Resin (VE-FR)	Superior corrosion resistance and fire retardant, flame spread rating ASTM E84 Class 1, 25 or less or BS 476 Part	This resin exhibits excellent corrosion resistance and is capable of higher service temperatures and has low smoke generation.
Phenolic Resin	Low smoke and superior fire resistance, flame spread rating ASTM E84 Class 1, 5 or less, smoke developed 0, operating temperature up to 180°C	Such resin can be used in the areas where fire resistance, low smoke and low toxic fumes are critical.

Ultimate Coupon Properties

Property	ASTM	Units	Polyester	Vinyl Ester
MECHANICAL (50% Mat & Roving)				
Tensile Strength, LW	D638	Mpa	207.0	207.0
Tensile Strength, CW	D638	Mpa	48.3	48.3
Tensile Modulus, LW	D638	Gpa	17.2	17.9
Tensile Modulus, CW	D638	Gpa	5.5	5.5
Compressive Strength, LW	D695	Mpa	207.0	207.0
Compressive Strength, CW	D695	Mpa	103.0	110.0
Compressive Modulus, LW	D695	Gpa	17.2	17.9
Compressive Modulus, CW	D695	Gpa	5.5	5.5
Flexural Strength, LW	D790	Mpa	207.0	207.0
Flexural Strength, CW	D790	Mpa	68.9	68.9
Flexural Modulus, LW	D790	Gpa	11.0	11.0
Flexural Modulus, CW	D790	Gpa	5.5	5.5
Modulus of Elasticity, E	Full Section	Gpa	17.9	19.3
Shear Modulus	-	Gpa	2.9	2.9
Interlaminar Shear	D2344	Mpa	31.0	31.0
Notched Izod Impact, LW	D256	J/mm	1.3	1.3
Notched Izod Impact, CW	D256	J/mm	0.2	0.2
Maximum Bearing Strength, LW	D953	Mpa	207.0	207.0
Poisson's Ratio, LW	D3039	mm/mm	0.3	0.3
MECHANICAL (70% Roving Only)				
Tensile Strength, LW	D638	Mpa	689.7	207.0
Tensile Modulus, LW	D638	Gpa	41.2	17.9
Compressive Strength, LW	D695	Mpa	413.8	207.0
Flexural Strength, LW	D790	Mpa	689.7	207.0
Flexural Modulus, LW	D790	Gpa	41.2	11.0
Notched Izod Impact, LW	D256	J/mm	2.1	1.3
PHYSICAL				
Barcol Hardness	D2583		45.0	45.0
24 Hr Water Absorption	D570	% Max	0.6	0.6
Density	D792	10-3g/mm ³	1.72-1.94	1.72-1.94
Coefficient of Thermal Expansion	D696	10-5mm/mm/°C	1.2	1.2
		10-6mm/mm/°F	7.0	7.0
Thermal Conductivity	C177	W.m/m-2°C	83.1	83.1
ELECTRICAL				
Arc Resistance, LW	D495	seconds	120.0	120.0
Dielectric Strength, LW	D149	kV/mm	1.38	1.39
Dielectric Strength, PF	D149	kV/mm	7.9	7.9
Dielectric Constant, PF	D150	60Hz	5.2	5.2
FLAMMABILITY				
	Test	Value		
Flammability Classification	UL 94	VO		
Tunnel Test	ASTM E84	25 Max		
Flammability Extinguishing	ASTM D635	Self Extinguishing		
NBS Smoke Chamber	ASTM E662	650-700		
British Fire Test	BS 476- Part 7	Class 1		

LW = Lengthwise CW = Crosswise PF = Perpendicular to Laminate Surface

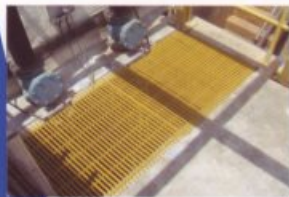
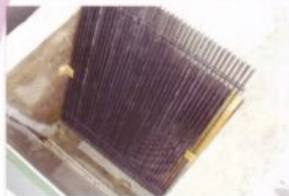


Application

MuiGrate® products are designed to accommodate various applications-



- Platforms
- Stair Treads
- Louvers Door
- Floorings
- Screen
- Recreational Facilities
- Walkways
- Fencing
- Road Sign
- Trench Cover
- Safety Handrails
- Safety Ladder
- Cable Ladders & Trays
- Structural
- FRP roof truss



MuiGrate[®] Pultruded FRP Grating

