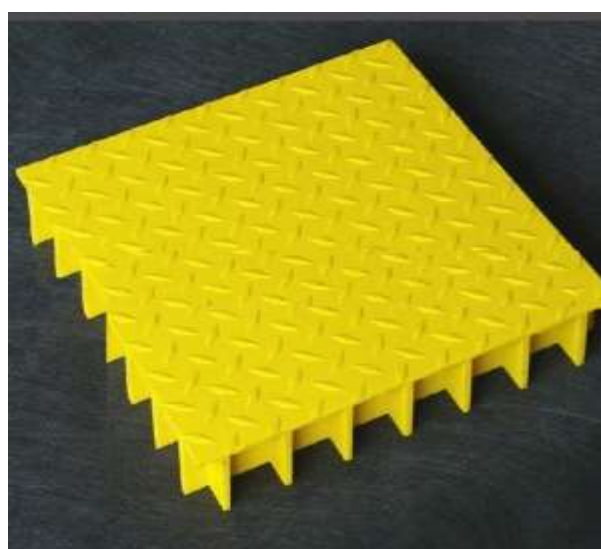
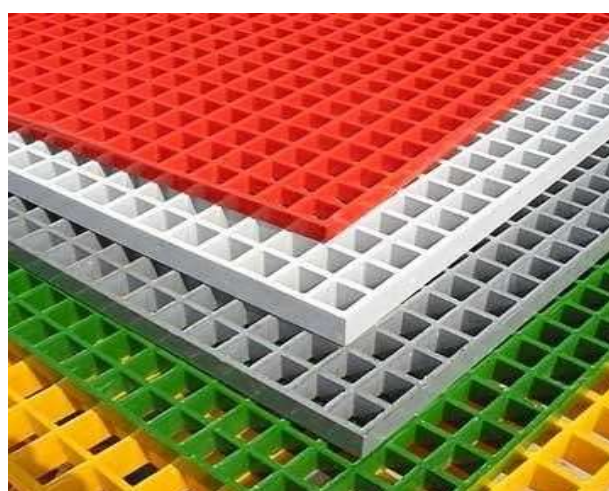


NO: AC.۲۰۰۶.MG.۰۱



**Asia Composite Co.
(Knowledge Base)**

SPECIFICATIONS OF GRP/FRP MOLDED GRATINGS



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MOLDED GRATING PROCESS

Molded grating is manufactured in an open, heated mold that resembles a large waffle iron. Continuous reinforcements are placed in the mold in alternating layers and thoroughly wetted out with resin. This continuous process produces an integral, one-piece construction, which offers excellent corrosion resistance as well as bi-directional strength.

When the weaving process is completed, the mold is heated to cure the panel. If the grating is to have embedded grit, the mold will receive the grit at this time before the part is cured.

After curing, the part is extracted from the mold. The standard part would have a meniscus (concave) top surface for slip resistance. Should a standard grit surface be specified, the grit would be bonded to the top of the completed grating panel as a secondary operation.

MOLDED GRATING

Liquid resin and continuous fiberglass roving are systematically laid in the mold, layer after layer manually, to produce the desired thickness and panel dimensions. The finished molds are set aside for a predetermined time to allow the panel to cure. The panel is then ejected from the mold. The molds are cleaned and prepared for the process to begin again.



The one piece interwoven square mesh construction of molded grating produces two primary benefits: maximum corrosion resistance and high strength.

Because the grating is "cast" in one piece, there is no mechanical joint between bearing bars. The high percentage of resin in molded grating offers superior corrosion resistance. The molded grating with a square mesh pattern offers increased load capacity and panel utilization due to this bi-directional trait.



Cutting access holes in the molded grating does not weaken the panel and does not require additional or costly supports.

APPLICATIONS AND MARKET OF MOLDED GRATING

Applications

- Flooring
- Platform
- Walkways
- Assembly Lines
- Trench Covers
- Stairs
- Ramps
- Greenhouse Shelving
- Pool Drainage
- Portable Building Floors
- channel's cover

Markets

- Oil & Gas
- Chemical
- Electronics
- Marine (including military vessels)
- Petroleum Processing
- Plating
- Pulp and Paper
- Water/Wastewater
- Zoos/Aquariums
- Recreational Facilities
- Manufacturing



Benefits and Characteristics of GRP/FRP Molded Grating

- Non-Slip
- Corrosion Resistance
- Fire Resistance
- Non-Magnetic
- Impact Resistance
- Non-sparking
- Maintenance Free
- Light Weight
- Design
- Cost Savings
- Non-conductive
- Low Installation Costs
- High Strength-to-Weight Ratio
- Conductive Grating
- High Performance



DESCRIPTION

NON-SLIP

Composite Grating's integral grit top surface provides outstanding anti-slip protection for personnel in wet and oily environments. The grit is embedded in the top surface of each panel prior to curing. This combination of integral construction, plus depth of the embedded grit, creates a long-lasting maximum anti-slip top surface.

CORROSION RESISTANCE

Over a wide PH range (both acidic and caustic) is achieved by use of a premium grade resin system. FRP grating will outperform metallic grating when exposed to continuous submersion, splashing, spills, fumes or gases. Corrosion is a major problem for metal grating, stair treads and other products in many different industries such as chemical plants, food and beverage factories, water and wastewater facilities, power facilities. Molded grating are particularly designed to provide safe, long lasting and economical and worry-free solutions environments where chemicals and other corrosive materials attack and destroy metal.

FIRE RESISTANCE

Composite Grating is available in various resin systems, two of which meet the Class 1 flame spread rating of 20 or less, in accordance with ASTM E-84 Tunnel Test Method. If a flame spread of 10 or less is required, it will be available in request.

NON-MAGNETIC

The non-magnetic properties allow the Composite grating to be used in sensitive installations where the inherent magnetic properties of metallic grating would prove unsuitable.

IMPACT RESISTANCE

The impact resistance of Composite Grating allows repeated deflection without permanent deformation. A certain amount of deflection can occur with loading. However, once the load is removed, the grating will return to its original shape, unlike metallic grating, which will remain deformed and require costly repairs or replacement.

NON-SPARKING

The non sparking qualities of Composite Grating systems are ideally suited for those installations where hydrogen or other combustible gases may be found and which may explode or cause a fire from sparks produced from accidental dropping of tools onto the grating.

MAINTENANCE FREE

The use of Composite Grating virtually eliminates maintenance costs since painting is not required, and UV inhibitors protect against degradation from the sun.

LIGHT WEIGHT

Composite Grating weighs about one-quarter as much as steel grating. Two men can easily handle full panels, without the need for hoists, pulleys or dollies. If the Composite Grating needs to be moved for cleaning, maintenance or utility access, there is less chance of back injuries. The lightweight design of the grating reduces installation and fabrication costs, weighing only 12 kilos per sq meter for 30mm and 14 kilos per sq meter for 38mm.

COST SAVINGS

In a review of costs, Composite grating showed significant savings over the use of stainless steel grating, and when consideration is given to 'life cycle costs', combining anti-slip benefits, the saving over the use of metal grating alternatives is quite considerable.

NON-CONDUCTIVE

The non-conductive properties make Composite Grating ideally suited for work platforms and flooring situated in electrically hazardous locations.

LOW INSTALLATION COSTS

Composite Grating weights considerably less than conventional metal gratings, and are easier and less expensive to transport, install and remove. Only simple hand tools are required for installation and removal, eliminating the need for costly equipment and labor costs associated with heavy lifting, cutting and welding.

HIGH PERFORMANCE

Composite structural Composite grating materials have demonstrated a proven ability to withstand the harsh side effects of corrosive conditions better than galvanized steel. For many years, composites have been reliably used in traditionally corrosive industries such as chemical processing, plating and marine construction. While the cost of material is an important criteria in the design of a project, it does not reflect the total cost of the project. Beyond material purchase price, the engineer also should consider the related costs of installation, maintenance over time and replacement of debilitated materials.



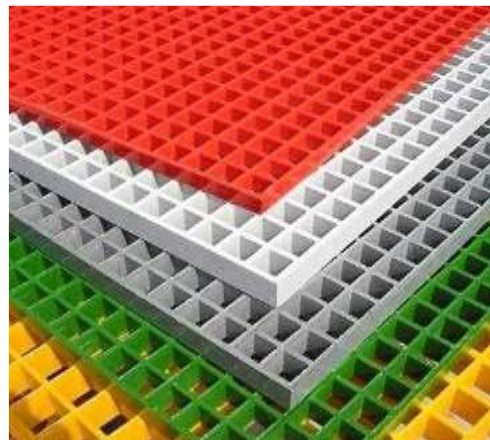
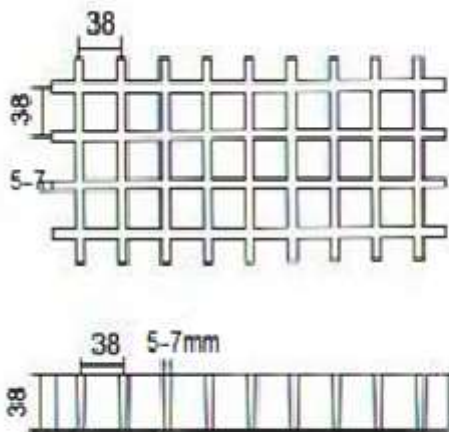
MOLD GRATING SELECTION

There are two types:

1-Mold Gratings without cover:

The Pannels will be cutted according to the customer's enquiry.

Type	Panel Size(mm ^۲)	Thickness(mm)	Mesh Size(mm)
MGR۲۰	۳۶۶.۰×۱۲۲.۰	۲۰	۳۸×۳۸
MGR۳۰	۳۶۶.۰×۱۲۲.۰	۳۰	۳۸×۳۸
MGR۳۸	۳۶۶.۰×۱۲۲.۰	۳۸	۳۸×۳۸
MGR۰.۰	۳۶۶.۰×۱۲۲.۰	۰.۰	۰.۰×۰.۰



۲-Mold Gratings with cover:

The Pannels will be cutted according to the customer's enquiry.

Type	Panel Size(mm ^۲)	Thickness(mm)	Mesh Size(mm)
MGRC۲۸	۳۶۶.۰×۱۲۲.۰	۲۸	۳۸×۳۸
MGRC۳۳	۳۶۶.۰×۱۲۲.۰	۳۳	۳۸×۳۸
MGRC۴۱	۳۶۶.۰×۱۲۲.۰	۴۱	۳۸×۳۸
MGRC۵۳	۳۶۶.۰×۱۲۲.۰	۵۳	۵۰×۵۰



MOLD GRATING CHEMICAL RESISTANCE GUIDE

CHEMICAL	TYPE VINIL		TYPE ISO		TYPE ORTHO	
	Environment	% Conc. Max. Oper. Temp. F/C	% Conc.	Max. Oper. Temp. F/C	% Conc.	MAX. OPER. TEMP. F/C
Acetic Acid	۵۰	۱۸۰/۸۲	۵۰	۱۲۵/۵۲	۲۵	N/R
Aluminum Hydroxide	۱۰۰	۱۸۰/۸۲	۱۰۰	۱۶۰/۷۱	ALL	-
Ammonium Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	-
Ammonium Bicarbonate	۵۰	۱۶۰/۷۰	۱۵	۱۲۵/۵۲	ALL	-
Ammonium Hydroxide	۲۸	۱۰۰/۳۸	۲۸	N/R	ALL	N/R
Ammonium Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	-
Benzene	ALL	N/R	ALL	N/R	ALL	N/R
Benzoic Acid	SAT	۲۱۰/۹۹	SAT	۱۵۰/۶۶	ALL	۷۷/۲۵
Borax	SAT	۲۱۰/۹۹	SAT	۱۷۰/۷۷	ALL	-
Calcium Carbonate	ALL	۱۸۰/۸۲	ALL	۱۷۰/۷۷	ALL	-
Calcium Nitrate	ALL	۲۱۰/۹۹	ALL	۱۸۰/۸۲	ALL	-
Carbon Tetrachloride	۱۰۰	۱۵۰/۶۵	۱۰۰	N/R	۱۰۰	N/R
Chlorine, Dry Gas	-	۲۱۰/۹۹	-	۱۴۰/۶۰	-	N/R
Chlorine Water	SAT	۲۰۰/۹۳	SAT	۸۰/۲۷	SAT	N/R
Chromic Acid	۱۰	۱۵۰/۶۵	۵	۷۰/۲۱	۵	N/R
Citric Acid	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۷۷/۲۵
Copper Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Copper Cyanide	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۷۷/۲۵
Copper Nitrate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	-
Ethanol	۵۰	۱۰۰/۳۸	۵۰	۷۵/۲۴	۱۰	۷۷/۲۵
Ethylene Glycol	۱۰۰	۲۰۰/۹۳	۱۰۰	۹۰/۳۲	۱۰۰	۱۰۴/۴۰
Ferric Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Ferrous Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۸۶/۳۰
Formaldehyde	ALL	۱۵۰/۶۵	۵۰	۷۵/۲۴	۲۵	-
Gasoline	۱۰۰	۱۸۰/۸۲	۱۰۰	۸۰/۲۷	۱۰۰	۷۷/۲۵
Glucose	۱۰۰	۲۱۰/۹۹	۱۰۰	۱۷۰/۷۷	ALL	-
Glycerin	۱۰۰	۲۱۰/۹۹	۱۰۰	۱۵۰/۶۶	۱۰۰	-
Hydrobromic Acid	۵۰	۱۵۰/۶۵	۵۰	۱۲۰/۴۹	۱۸	-
Hydrochloric Acid	۳۷	۱۵۰/۶۵	۳۷	۷۵/۲۴	۱۰	۸۶/۳۰
Hydrogen Peroxide	۳۰	۱۵۰/۶۵	۵	۱۰۰/۳۸	۵	N/R
Lactic Acid	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۷۷/۲۵
Lithium Chloride	SAT	۲۱۰/۹۹	SAT	۱۵۰/۶۶	ALL	-
Magnesium Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰

CHEMICAL	TYPE VINIL		TYPE ISO		TYPE ORTHO	
	Environment	% Conc. Max. Oper. Temp. F/C	% Conc.	Max. Oper. Temp. F/C	% Conc.	MAX. OPER. TEMP. F/C
Magnesium Nitrate	ALL	۲۱۰/۹۹	ALL	۱۴۰/۶۶	ALL	۸۶/۳۰
Magnesium Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Mercuric Chloride	۱۰۰	۲۱۰/۹۹	۱۰۰	۱۰۰/۶۶	۱۰۰	۱۰۴/۴۰
Mercurous Chloride	ALL	۲۱۰/۹۹	ALL	۱۴۰/۶۰	ALL	۱۰۴/۴۰
Nickel Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Nickel Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Nitric Acid	۲۰	۱۲۰/۴۹	۲۰	۷۰/۲۱	۲	N/R
Oxalic Acid	ALL	۲۱۰/۹۹	ALL	۷۰/۲۴	ALL	N/R
Perchloric Acid	۳۰	۱۰۰/۳۸	۱۰	N/R	۱۰	N/R
Phosphoric Acid	۱۰۰	۲۱۰/۹۹	۱۰۰	۱۲۰/۴۹	۸۰	N/R
Potassium Chloride	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Potassium Dichromate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۷۷/۲۰
Potassium Nitrate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Potassium Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Propylene Glycol	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Sodium Acetate	ALL	۲۱۰/۹۹	ALL	۱۶۰/۷۱	ALL	۱۰۴/۴۰
Sodium Bisulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	-
Sodium Bromide	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	۰	-
Sodium Cyanide	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	۰	N/R
Sodium Hydroxide	۲۰	۱۸۰/۸۲	N/R	N/R	۱	N/R
Sodium Nitrate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Sodium Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Stannic Chloride	ALL	۲۱۰/۹۹	ALL	۱۶۰/۷۱	ALL	۱۰۴/۴۰
Sulfuric Acid	۷۰	۱۰۰/۳۸	۲۰	۷۰/۲۴	۱۰	-
Tartaric Acid	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	-
Vinegar	۱۰۰	۲۱۰/۹۹	۱۰۰	۱۷۰/۷۷	ALL	-
Water, Distilled	۱۰۰	۱۸۰/۸۲	۱۰۰	۱۷۰/۷۷	ALL	۸۶/۳۰
Zinc Nitrate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰
Zinc Sulfate	ALL	۲۱۰/۹۹	ALL	۱۷۰/۷۷	ALL	۱۰۴/۴۰

ALL...Concentrations; SAT...Saturated Solution; N/R...Not Recommended; -...No Information Available.

Mechanical and Physical Properties of Mold Grating

Property	Test Method	Units	Value
Tensile Strength	ASTM D-۶۳۸	PSI	۱۰۰,۰۰۰
Tensile Modulus	ASTM D-۶۳۸	PSI	۵,۶ ۱,۶
Flexural Strength	ASTM D-۷۹۰	PSI	۱۰۰,۰۰۰
Flexural Modulus	ASTM D-۷۹۰	PSI	۵,۶ ۱,۶
Compressive Strength	ASTM D-۶۹۰	PSI	۶۰,۰۰۰
Izod Impact Notch	ASTM D-۲۰۶	Ft.-Lbs./In.	۴۰
Barcol Hardness	ASTM D-۲۵۸۳		۵۰ (Min.)
Specific Gravity	ASTM D-۷۹۲	gr/cm ^r	۲
Water Absorption	ASTM D-۵۷۰	Max. %	۰.۳
Flame Retardant	ASTM D-۶۳۰		Self-Extinguishing

MOLDED GRATING FASTENERS

Type "**L**" Clip-For use in securing grating to support frames.



Type "**M**" Hold Down Clips-Designed to fix grating on support structure & prevent it from turning in all four directions.



Type "**C**" Clips-Applied to connect two adjacent grating bars.



STANDARDS OF FRP COMPOSITES

The Following Standards are used in composite productions:

ASTM C-1۷۷-۸۰	Heat Flux
ASTM D-۱۴۹-۸۷	Dielectric Strength
ASTM D-۲۲۹-۸۶	Testing Rigid Sheet for Electrical Insulation (Ladder)
ASTM D-۲۰۶-۸۷	Impact Resistance
ASTM D-۴۹۰-۸۴	Electrical Resistance
ASTM D-۰۷۰-۸۱	Water Absorption
ASTM D-۶۳۰-۸۱	Flammability
ASTM D-۶۳۸-۸۷b	Tensile Strength
ASTM D-۶۹۰-۸۰	Compressive Strength
ASTM D-۶۹۶-۷۹	Thermal Expansion
ASTM D-۷۰۹-۸۷	Specifications for Laminated Thermosetting Materials
ASTM D-۷۳۲-۸۰	Shear Strength by Punch
ASTM D-۷۹۰-۸۶	Flexural Strength
ASTM D-۷۹۲-۸۶	Specific Gravity
ASTM D-۹۰۳-۸۷	Bearing Strength
ASTM D-۱۴۹۹-۸۴	Weathering
ASTM D-۱۰۰۰-۸۰	Density
ASTM D-۲۳۴۴-۸۹	Interlaminar Short Beam Shear Strength
ASTM D-۲۰۸۳-۸۷	Hardness
ASTM D-۲۰۸۴-۸۰	Ignition Loss
ASTM D-۳۶۴۷-۸۴	Classifying Pultruded Shapes
ASTM D-۳۸۴۶-۸۰	In-plane Shear Strength
ASTM D-۳۹۱۴-۸۴	In Plane Shear
ASTM D-۳۹۱۶-۸۴	Tensile
ASTM D-۳۹۱۷-۸۸	Dimensional Tolerances
ASTM D-۳۹۱۸-۸۰	Pultrusion Terms
ASTM D-۴۳۸۰-۸۸	Visual Defects
ASTM D-۴۴۷۰-۸۰	Short Beam Shear Strength
ASTM D-۴۴۷۶-۹۰	Flexural Properties
ASTM E-۸۴-۸۷	Tunnel Beam Test
ASTM E-۶۶۲-۸۳	Smoke Chamber
ASTM E-۸۳۱-۸۶	Linear Thermal Expansion (CTE)
ASTM F-۱۰۹۲-۹۴	Handrails