

# THE ULTIMATE

## Durable, Low-Maintenance Surface

Enhance Safety ✓

Reduce Risk ✓

**Slash Maintenance Costs ✓**

## Applications of FRP Gratings

### An Innovative Solution For Public Spaces

Aste Global is a Leading supplier of world-class fiber-reinforced plastic (FRP) grating. Engineered with a combination of thermosetting resin and fiberglass, FRP is a strong, corrosion-resistant material built to withstand the foot traffic of millions each year – as well as Singapore's 167 days of annual rainfall.

### Strong, versatile, and flexible enough to use for a wide range of surfaces:

- Offshore and Marine
- Petro-chemical and Refining
- Communications
- Water / Wastewater
- Transportation and Transit
- Aerospace
- Automotive
- Pulp and Paper
- Mining
- Metal Plating
- Food and Beverage
- Electrical and Power Generation
- Computer and Hi-tech
- Recreation Water Parks and Pools
- Zoos and Aquariums
- Military
- Medical
- Shipping
- Textile
- Many Others



# Benefits Of Our FRP Gratings



## 1. High Stiffness

Our FRP gratings have approximately 65% glass and 35% resin content by weight, giving them a very high strength to weight ratio.

By modifying the glass content, fiber orientation, and combination of mat and roving reinforcement, the load bearing bar capacity can be tailored to meet application requirements.



## 2. Lightweight

Weigh much less than steel gratings - as much as 50%-75% weight savings can be realized depending on the bearing bar configuration.

The use of our FRP grating can reduce the overall cost of projects involving weight-sensitive structures, such as tension-leg platforms (TLPs) for offshore deepwater facilities.



## 3. Chemical Resistance

Superb chemical resistance to various acids and caustics. We offer an array of corrosion resistant resins designed for any environment, from light or moderately corrosive environments to extreme corrosive applications.

Customers can choose between premium Isophthalic polyester or Vinyl ester.



## 4. Impact Resistance

Our FRP grating offers better impact resistance than conventional steel gratings.



## 5. Ultra-Violet Resistance

Made from resins containing UV inhibitors. A synthetic veil enhances UV resistance by creating a resin-rich surface and further strengthening the grating's UV resistance.

We can coat our pultruded grating for optimal UV resistance for custom orders.



## 6. Fire Retardancy

According to ASTM E-84 Tunnel Test, our FRP gratings exhibit a flame spread of 25 or less, comparable to UL 723, ANSI/NFPA No.255 and UBC No.8-1, and meet the self-extinguishing requirements of ASTM D-635.

There are a variety of resins available with different flame spread ratings and smoke densities.



## 7. Thermally and Electrically Non-Conductive

Our FRP gratings are thermally and electrically non-conductive, making them ideal for applications with electrical and fire hazards. Our FRP grating's thermal non-conductivity protects individuals from the heat radiation that occurs on traditional steel grating during fires, which allows firefighters to get closer to the fire source for longer periods.



## 8. Non-Skid and Safety

The topside of all bearing bars is permanently gritted, providing superior slip resistance over traditional steel grated walking surfaces.



## 9. Low Maintenance / Maintenance Free

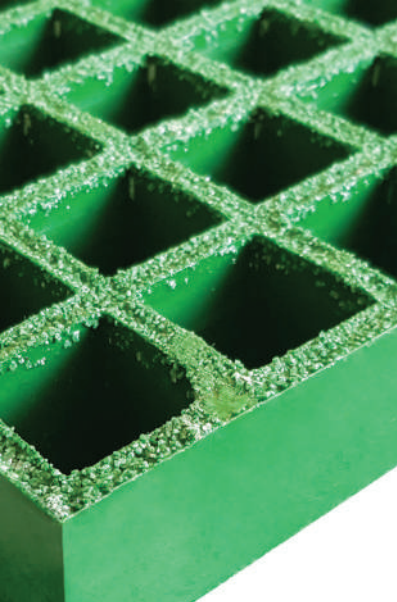
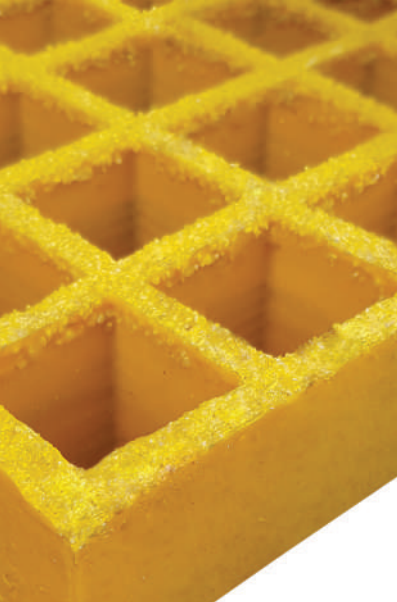
We blend resin and pigment throughout our FRP grating so that it does not need to be coated or painted - it simply does not rust.

When combined with our stainless steel attachment system, our walkway system is "maintenance-free".



## 10. ADA Compliant

Our ADA (American with Disabilities Act) compliant Molded and Pultruded gratings feature smaller openings to ensure safe and accessible pathways for wheelchair users.



## Molded FRP Grating

### What is Molded FRP Grating?

It is a one piece, fully molded fiber-reinforced plastic grating. Primary used for flooring, access walkways, platforms, bridges, and stair treads.

Aste Global's molded FRP gratings are manufactured by interfacing reinforcing glass fibre roving within a polyester resin, thermally cured in the mold. Grating produced using this technique yield a product having 30-35% (by total weight) of fiberglass reinforcement. The corrosion resistance is provided by the resin, and the stiffness is provided by the glass rovings. Possessing a higher glass content results in a stiffer fiberglass grating.

### Our Molded FRP Gratings Are Customizable

In addition to supplying FRP instock panels. We provide our customers with various FRP customization options, as well as cutting services.

Choose from two resin systems:

### IFR-25

#### Premium Isophthalic Polyester Resin

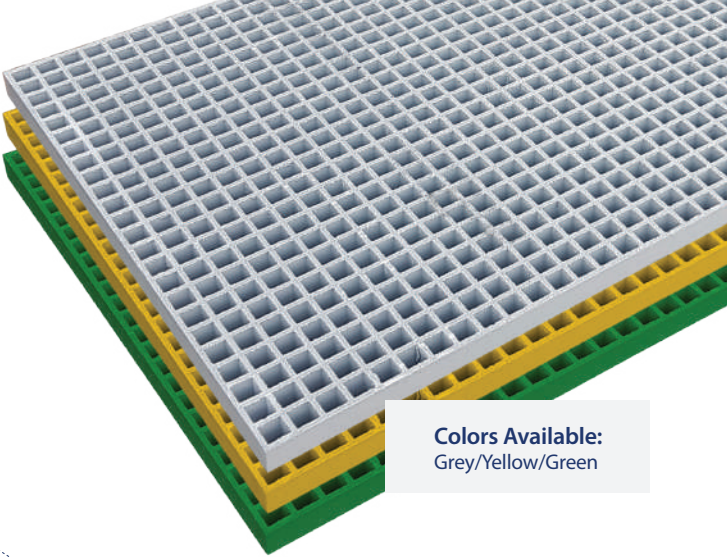
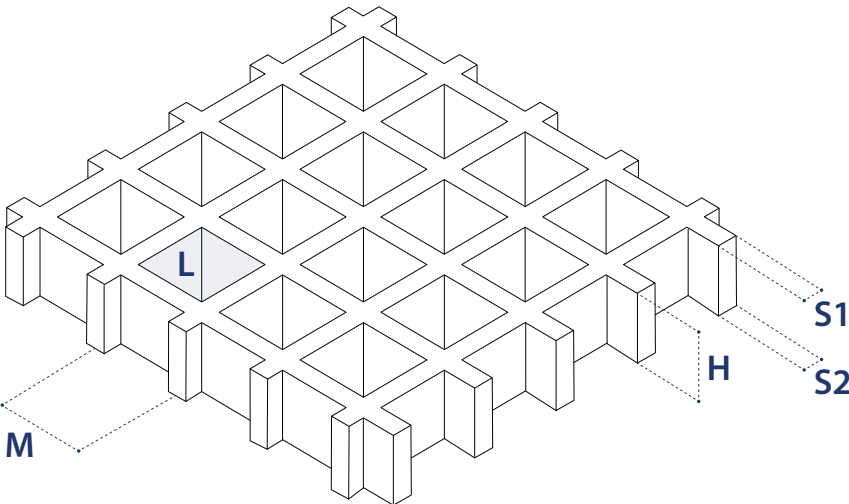
With flame spread rating of 25 or less. IFR-25 pultruded grating provides an intermediate level of chemical resistance and is the correct resin choice for grating subject to splash and spill contact with harsh chemicals, and is a very good general purpose resin at a reduced cost compared to the premium Vinyl ester resin.

### VEFR-25

#### Premium Vinyl Ester Resin

With flame spread rating of 25 or less. VEFR-25 is our most chemical resistant pultruded grating, designed to withstand the harshest chemical environments over a broad range of acids and caustics, it is primarily used in petrochemical, wastewater, mining, and plating applications where the grating is subjected to frequent and direct contact with harsh chemicals.

# FRP Molded Grating (Square Mesh)



Colors Available:  
Grey/Yellow/Green

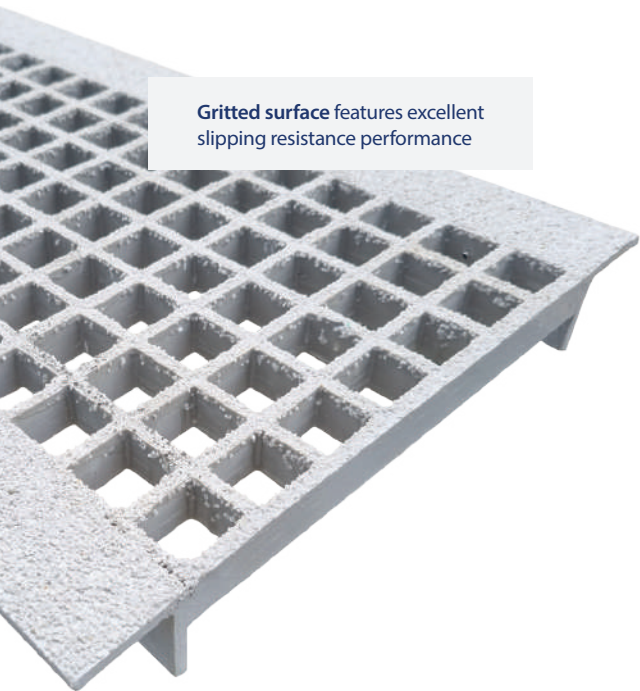


## M Holding Down Clips

(Stainless Steel) for H25mm and H40mm gratings are available as seperate order.

### Instock Panel Availability / Technical Specifications

IMPA Code	Mesh Size (M)	Mesh Size (L)	Height (H)	Bar (S1)	Bar (S2)	Standard Panels	Surface Type
673815, 673816, 673817	38 x 38 mm	31.5 x 31.5 mm	25 mm	6.5 mm	5.0 mm	1000 x 3000 mm	Gritted
673811, 673812, 673813	38 x 38 mm	31.5 x 31.5 mm	38 mm	6.5 mm	5.0 mm	1000 x 3000 mm	Gritted
673815, 673816, 673817	40 x 40 mm	33 x 33 mm	25 mm	7.0 mm	5.5 mm	1007 x 3007 mm	Gritted
673811, 673812, 673813	40 x 40 mm	33 x 33 mm	40 mm	7.0 mm	5.5 mm	967 x 2967 mm	Gritted

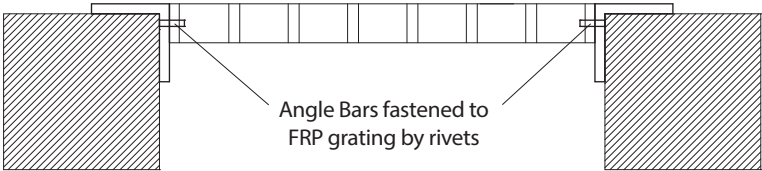
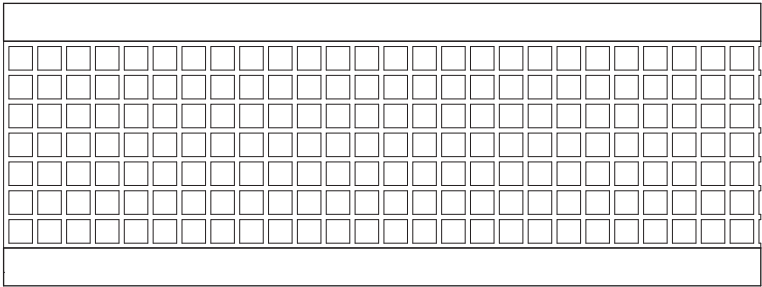


Gritted surface features excellent slipping resistance performance

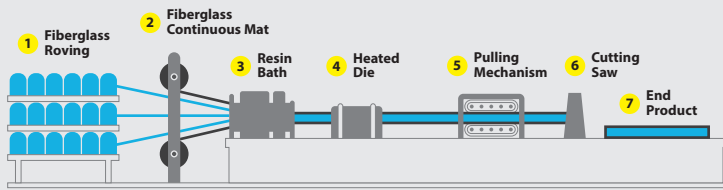
# FRP Angle Bars (Optional Add-On)

## Ideal for Structural Support

A grating support ledge can be easily attached to our FRP building system using angle bars, made from the same material as the grating.



# The Pultrusion Process



## Pultruded FRP Grating

### What is Pultruded FRP Grating?

Pultrusion is a continuous molding process in which glass roving, glass matting, and a synthetic surface veil are literally “pulled” simultaneously through a Isophthalic polyester or a Vinyl ester resin bath. Desired geometric shape are formed and solidified as they are pulled through a heated steel die.

Aste Global’s pultruded FRP gratings are manufactured by pultrusion with every panel of grating subjected to sequence of quality assurance inspections.

This ensures complete sealing of all joints, full wet-out of the glass rovings, consistent resin-to-glass ratios, and consistent non-skid features, complete traceability of resin batches and glass utilized in every panel is standard operating procedure.

For fire retardant protection, the resin used are complete with fire retardant additive to obtain class 1 fire spread rating of 25 or less as per ASTM E-84. UV inhibitors and antioxidant are included into our recipe of gratings to achieve better UV protection.

### Our Pultruded FRP Gratings Are Customizable

We provide our customers with various FRP customization options, as well as fabrication services.

Choose from two resin systems:

## IFR-25

### Premium Isophthalic Polyester Resin

With flame spread rating of 25 or less. IFR-25 pultruded grating provides an intermediate level of chemical resistance and is the correct resin choice for grating subject 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.

## VEFR-25

### Premium Vinyl Ester Resin

With flame spread rating of 25 or less. VEFR-25 is our most chemical resistant pultruded grating, designed to withstand the harshest chemical environments over a broad range of acids and caustics, it is primarily used in petrochemical, wastewater, mining, and plating applications where the grating is subjected to frequent and direct contact with harsh chemicals.

## Pultruded Pedestrian Series Grating



### Specifically designed to handle foot traffic of pedestrians.

Our pultruded pedestrian grating is manufactured from wide T-bars with a thickness of 25mm and 38mm in various configurations and panel sizes.

A pultruded pedestrian grating of 25mm thick is designed for walkways and access areas where pedestrian traffic is the heaviest. The 38mm thick pedestrian pultruded grating is approximately three times stiffer and is used in applications that require a wide span of 1800mm or low deflection criteria.

## Pultruded Industrial Series Grating



### Specifically designed for use in a wide range of industrial applications that require strength and corrosion resistance.

Manufactured with a high percentage of glass within laminate, industrial grating provides durability, extremely high unidirectional strength and stiffness. Due to its exceptional stiffness, it can be used with confidence where wide support spans are required.

Comes in 25mm, 32mm, and 38mm thick in an I-bar configuration with 40%, 50%, and 60% opening for most applications. 50mm thick T-bar configuration with either 33% or 50% open area for applications which require wider span or lower deflections.

## Pultruded Heavy Duty Series Grating



### Specifically designed for forklift and tractor trailer loads (up to Standard Truck, formerly H20) or high loads and very long spans which traditional fiberglass pultruded grating is not able to support.

This highly engineered product is often used to replace steel gratings where the spans are typically greater. Comes in five types of thickness: 25mm, 38mm, 50mm, 64mm, and 76mm.

## Pultruded SI(Standard I-Bar) Series Grating



### Widely used in cooling tower walkways due to its large open area. The bonded rod crossbars make pultruded SI Series gratings suitable for use in pedestrian traffic areas and the 73% and 83% open areas allow for excellent air flow.

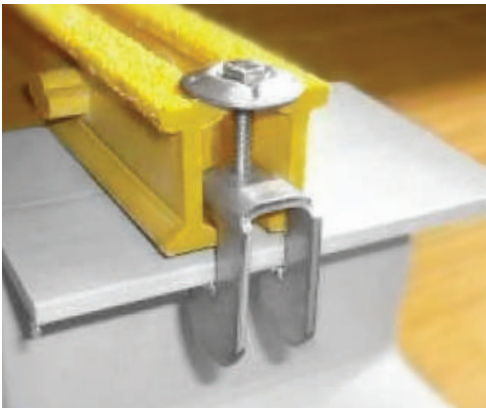
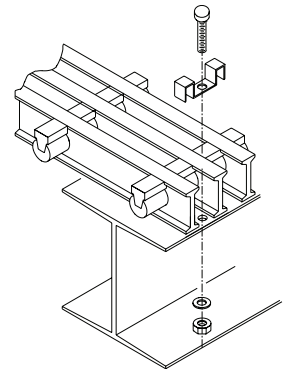
With profile appearance similar to metal grating, pultruded SI Series gratings are often used in areas where a close match to a steel or aluminum profile is desired.

# Pultruded FRP Grating Clips



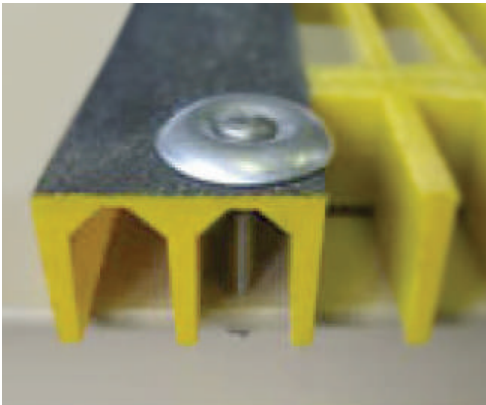
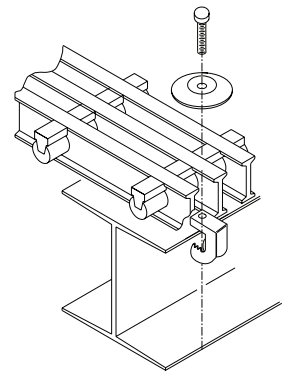
## M Clips

M Clips or saddle clips clamp two fiberglass grating load bars to the support. This provides excellent holding capability and because of this, are recommended for most pultruded fiberglass gratings.



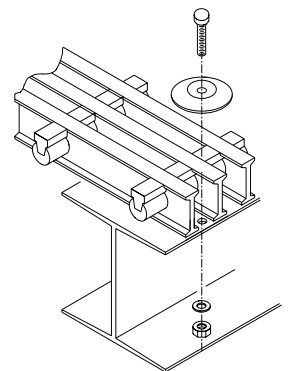
## G Clips

When drilling, the support member has to be avoided, G clips offer the solution. The lower jaw of the clip grips the support flange when the bolt is torqued. A heavier top clip then complete the assembly to carry the loads. Providing excellent bidirectional holding capability for pultruded grating.



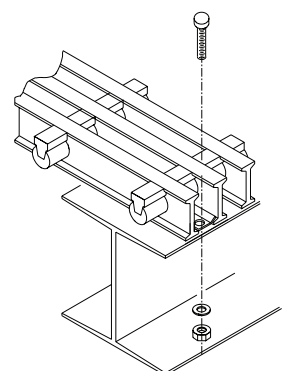
## W Clips

This 40mm diameter fastener is used for holding down pultruded gratings. The W clip's recessed center allows the fasteners to sit flush with this ADA compliant (<6.4mm high) hold down clip.



## PP Clips

PP clips offer the solution for below-surface attachment to pultruded gratings.



# Chemical Resistance Guide

Chemical Environment	Concentration (%)	Temp (°C)	VEFR	ISOFR
Acetic Acid	50	MAX	C	C
Acetone	100	23	I	N
Alcohols	100	48	I	I
Alum	ALL	MAX	C	C
Aluminum Chloride	ALL	MAX	C	C
Aluminum Fluoride	20	23	I	I
Ammonium Hydroxide	30	23	I	N
Ammonium Salts - Neutral	ALL	48	C	S
Ammonium Salts - Aggressive	ALL	23	T	N
Aromatic Solvents	ALL	23	N	N
Barium Salts	ALL	MAX	C	C
Benzene	100	60	I	N
Black Liquor (Pulp Mill)	ALL	MAX	I	N
Bleach Liquor (Pulp Mill)	ALL	MAX	I	N
Calcium Hydroxide	25	MAX	S	I
Calcium Hypochlorite	ALL	MAX	I	N
Calcium Salts	ALL	MAX	C	C
Carbon Tetrachloride	100	23	S	N
Chlorinated Hydrocarbons	100	23	T	T
Chlorine Dioxide	SAT	60	S	N
Chlorine Water	SAT	48	I	N
Chlorine, Wet	SAT	MAX	N	N
Chlorobenzene	100	23	N	N
Chlorobenzene	ALL	Up to 37	N	N
Chloroform	100	23	N	N
Chromic Acid	50	60	I	N
Citric Acid	ALL	MAX	C	C
Copper Cyanide Plating	ALL	51	S	I
Copper Salts	ALL	MAX	C	C
Cruid Oil (Sweet or Sour)	ALL	MAX	C	C
Dichlorobenzene	100	23	N	N
Ethers		23	N	N
Ferric Chloride	100	MAX	C	C
Ferric Salts	ALL	MAX	C	C
Flouride Salts + HCl	ALL	23	I	N
Fluosilicic Acid	10	23	S	I
Formaldehyde	37	65	S	I
Formic Acid	25	37	S	I
Fuel (Diesel, Jet, Gasoline)	ALL	37	C	C
Glycerine	100	MAX	C	C
Green Liquor (Pulp Mill)	ALL	MAX	I	N
Hydrobromic Acid	48	MAX	I	N
Hydrochloric Acid	10	MAX	S	S
Hydrochloric Acid	30	MAX	I	I

## KEY

**C** - Continuous exposure of the grating to the Chemical Environment listed at the temperature listed.

**N** - Not recommended for the concentrations and temperatures listed.

**I** - Infrequent exposure of the grating to splashes and spills from the Chemical Environment listed with that environment at the temperature listed and the spill immediately cleaned up or washed from the grating.

Consult Aste Global for corrosion recommendations at concentrations, temperatures or chemicals not listed in this guide. **MAX. Temp is 82°C for VEFR, and 65°C for IFR.**

The information in this Chemical Resistance Guide is correct to the best of Aste Global's knowledge. Because actual use conditions differ and mixtures of corrosives will occur in service, the end user must test for use under actual conditions. Aste Global's responsibility for claims arising from breach of warranty, negligence or otherwise is limited to the purchase price of the material sold by Aste Global. Test samples are available upon specific request.

**S** - Frequent exposure of the grating to splashes and spills from the Chemical Environment listed with that environment at the temperature listed.

**T** - Test

Chemical Environment	Concentration (%)	Temp (°C)	VEFR	ISOFR
Hydrochloric Acid (Concentrated)	ALL	Up to 82	N	N
Hydrocyanic Acid	ALL	MAX	S	I
Hydrofluoric Acid	20	23	N	N
Hydrogen Peroxide	30	23	S	N
Lactic Acid	100	MAX	C	C
Lime Slurry	SAT	MAX	C	C
Lithium Chloride	SAT	MAX	N	N
Lithium Salts	ALL	MAX	T	T
Magnesium Salts	ALL	MAX	C	C
Maleic Acid	100	MAX	S	I
Mercury Chloride	100	MAX	C	C
Nickel Salts	ALL	MAX	C	C
Nitric Acid	20	48	I	I
Nitric Acid	35	37	I	N
Nitric Acid	40	Ambient	N	N
Nitric, Hydrofluoric	20:2	23	N	N
Nitrous Acid	10	23	C	C
Ozone for Sewage Treatment		37	C	C
Perchloroethylene	100	23	I	N
Phenol	10	23	I	N
Phenol	88	Ambient	N	N
Phosphoric Acid	85	MAX	C	S
Phosphoric Acid, Super	100	MAX	S	N
Potassium Hydroxide	10	48	S	N
Potassium Salts	ALL	MAX	C	C
Silver Nitrate	100	MAX	C	C
Sodium Cyanide	ALL	23	S	I
Sodium Hydroxide	50	MAX	I	N
Sodium Hydroxide	10	MAX	N	N
Sodium Hypochlorite ( Stable)	10	37	S	I
Sodium Salts - Neutral	ALL	MAX	C	C
Sodium Salts - Aggressive	ALL	23	T	N
Sulfur Dioxide	SAT	MAX	S	S
Sulfuric Acid	25	MAX	S	I
Sulfuric Acid	50	MAX	S	N
Sulfuric Acid	75	37	I	N
Toluene	100	48	I	N
Trichloroethane 1,1,1	ALL	23	I	N
Trisodium Phosphate	50	MAX	I	N
Water (Fresh, Salt, Moderate D.I.)	100	MAX	C	C
Wet Chloride / Hydrochloric Acid	10-20	Up to 176	N	N
White Liquor (Pulp Mill)	ALL	MAX	S	N
Zinc Chloride Plating	ALL	23	S	N
Zinc Salts	100	MAX	C	C

## KEY

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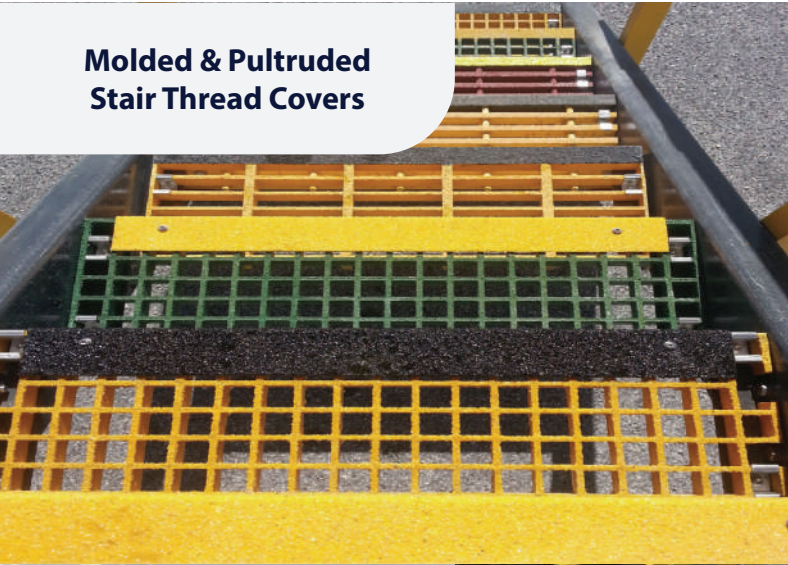
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**S** - Frequent exposure of the grating to splashes and spills from the Chemical Environment listed with that environment at the temperature listed.

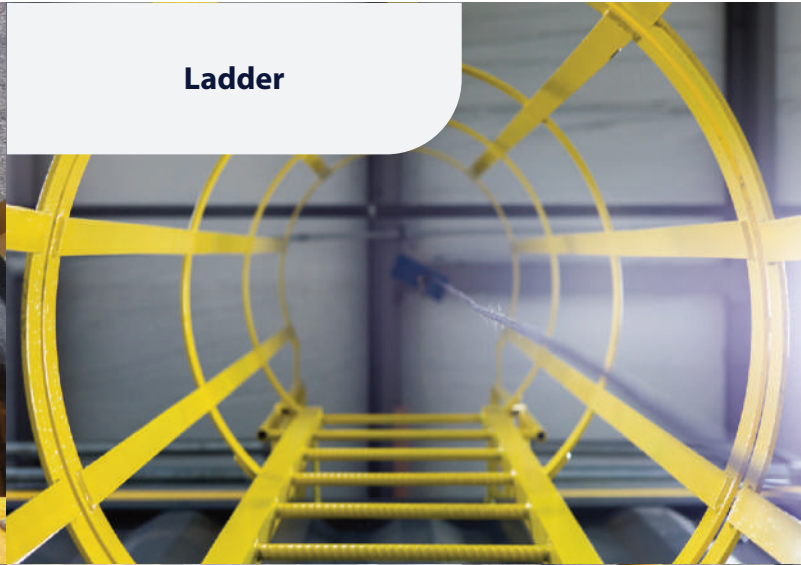
**T** - Test

# Other FRP Products

**Molded & Pultruded  
Stair Thread Covers**



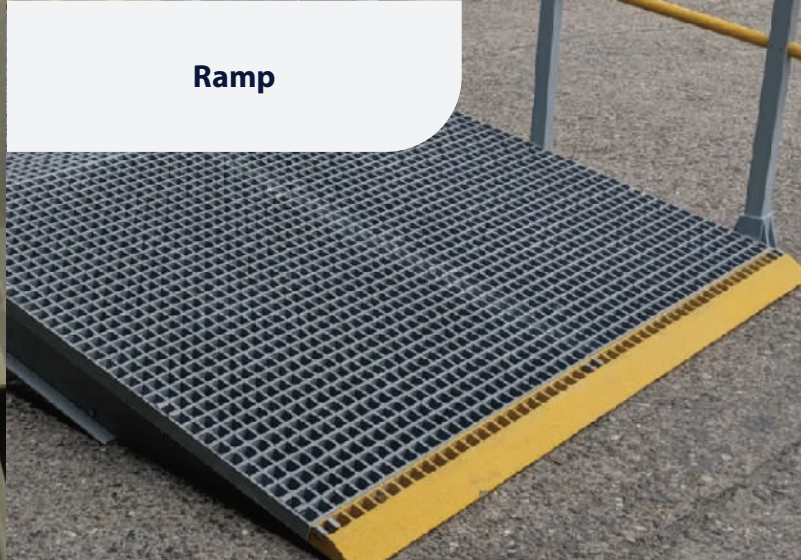
**Ladder**



**Handrail**



**Ramp**



For orders/enquiries of our gratings or services

**Drop us an email us at [info@aste.com.sg](mailto:info@aste.com.sg)**