SecurEX®
Fencing & Screening

Fencing & Screening Product Guide

World leaders in the design and supply of Fibreglass Reinforced Plastic (FRP) Fence & Barrier Systems for industry.

We bring to you the latest in our product line of secure FRP Fencing Systems. An FRP solution of choice in applications where conductivity and corrosion present challenges. SecurEX® is customisable with height, panel width and picket spacing or screen type as flexible options. This product also offers the option of razor hoops and barbed wire for added security. This guide will show you the benefits and features of SecurEX® and its various applications.

At Treadwell, we believe that the Fibreglass Reinforced Plastic (FRP) sector is poised for evolution into new and unchartered territories, where its many benefits will provide a return on investment unequalled by traditional alternatives and leave a smaller footprint on the environment.
With warehouses and distribution centres throughout Australia and New Zealand, Treadwell Group is the name you can rely on to consistently offer FRP solutions that exceed expectations.

A BRIEF HISTORY

Treadwell Group is one of the most established names in the supply of FRP solutions throughout Australia. Our fabrication facility is centrally located in South Australia, coupled with an extensive distribution network across Australia and New Zealand. Our commitment to quality and testing allows our technical staff to provide engineering and design assistance for any project.

With a broad history of installation in a wide range of challenging applications, including the rail industry, industrial process plants, mining applications, marine and coastal environments, as well as public infrastructure, to name but a few, Treadwell has the experience to help you specify the right resin systems and products every time.

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2022.10

TREADWELL™

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Quality Policy

Quality is at the forefront of Treadwell's working practices. With several decades of manufacturing to the highest quality standards, Treadwell prides itself on its implementation of strict quality control measures, and strives to supply products that surpass customers' expectations. The company works on a policy of continuous improvement.

Environmental Policy

Treadwell is conscious of the impact it has on the environment and its associated responsibilities. The company is committed to ensuring its operations satisfy both legal obligations and moral duties. Treadwell has been committed to sustainability for many years and is not just responding to current trends.

Features & Benefits of FRP

Introduction

Treadwell has been making inroads into industries previously dominated by traditional materials like steel, timber and concrete for over a decade now. We have been doing so with FRP composites, which are established to be a realistic, cost-effective and long-term alternative for a wide range of applications.

With the advancement in FRP composites and the increasing benefits, the cause to use FRP has extended in various ways. FRP presents different and more flexible solutions for design challenges in a multitude of environments.

While concrete has its advantages, it is heavy and requires substantial manpower to manoeuvre and install. This makes maintenance and inspections unnecessarily problematic. Steel requires a hot works permit and will not perform against the test of time and exposure to the environment. Timber is becoming hard to get and costly for high grades to give a reasonable life.

Being lightweight, quick to install and requiring minimal maintenance, FRP products have been a welcome solution across the majority of industries today. The long design life of FRP provides the asset owner with reliability, sustainability, and peace of mind.

FRP composites are the future, and the future is now.

Features & Benefits of FRP

Corrosion, Rust & Rot Proof

Treadwell's superior resin systems offer exceptional resistance to acids, salts and alkalis. At the same time, our FRP systems are rot and termite proof.

No Protective Coating Required

Treadwell's unique surface finishing system ensures UV stability in exposed applications, directly eliminating the need for costly surface treatment.

Long Term Cost Benefits

Long service life, minimal maintenance costs and low installation costs all combine to provide a very competitive solution over time.

Virtually Maintenance Free

Given the nature of FRP, any system utilising it is virtually maintenance free, thus keeping maintenance costs as low as possible.

Design Flexibility

The unique capabilities of conforming partial functionality to the use or application, ease to manufacture and to personalise shapes and aesthetics are just some of the key benefits that draw designers, engineers and architects to composite materials.

Light Weight, High Strength & Easy Installation

Treadwell 's FRP products and systems are lightweight and very manageable. FRP has specific gravity one quarter that of steel and two thirds of aluminium.

No Hot Work or Welding Required

FRP is very simply modified or fabricated on site with easy to use hand tools. These can be done without the hassle of first needing to obtain hot work permits.

Non-Conductive & RF Transmission Transparent

FRP is transparent to radio frequency transmission and is non-conductive in nature. This makes the material ideal for applications that need to avoid electrical currents and radio frequency.

Competitive Vs Traditional Materials

FRP is manufactured from a more economically sound raw material base than metallic alternatives, and is far more structurally sound when compared to timber and plastic materials.

Environmentally Sound

Related to the lightweight, low need for maintenance and long design life of FRP, the reduced lifecycle cost and environmental footprint are highly sought after characteristics in the modern world. Continual resin formulation fine tuning and development can further raise this environmental profile of composites.

EX-Series® Resin Selection Guide

Resin Systems

When choosing a resin type for your application, we highly recommend you consult with us in relation to the application to ensure the correct resin is specified. Considerations such as corrosion, environment, temperature, fire resistance, smoke and smoke toxicity requirements must be taken into account, and will dictate which resin system should be utilised for optimum performance over time. Below is an overview of the resin systems offered in the ArchitEX™ range.

O-Series® is an architectural grade polyester resin system with an intermediate level of chemical resistance, and is a good choice for commercial or light industrial applications, especially in areas where moisture is prevalent. O-Series® is often utilised for public infrastructure applications where it has been proven to outperform traditional timber decking products. This system is available with or without fire retardant additives.

I-Series® is a premium isopthalic resin system. This system provides an intermediate level of chemical resistance and is the correct choice for areas subjected to splash and spill contact with harsh chemicals. This system is an excellent general purpose resin and is a more favourably priced alternative to the vinyl ester system. This system has a flame spread of 25 (approximately 15) or less.

V-Series® Vinyl ester resin is the most high quality chemical resistant system offered in the industry and has been developed for use in environments where FRP products are subject to frequent and direct contact with the harshest of chemical, including a broad range of acids and caustics. This system has a flame spread of 25 (approximately 15) or less.

P-Series® The phenolic resin system is a system designed specifically for use where fire resistance, low smoke and low toxic fumes are critical. P-Series® is typically used in offshore applications and confined spaces where such criteria are an absolute necessity. This system is tested in accordance with ASTM E-84. Various products also conforming to US Coast Guard Approvals, Level 2 and 3, are also offered by Treadwell. This particular resin system has a flame spread rating of 5 and a smoke density rating of 5.

Standards Resin Systems Comparison Chart

	Chemical Resistance	Fire Retardance	Low Smoke	Halogen Free	Temperature Performance
O-Series® Polyester	● ● ●	● ● ● ●	—	—	● ● ●
I-Series® Isopthalic	● ● ● ● ●	● ● ● ● ●	—	—	● ● ● ●
V-Series® Vinyl Ester	● ● ● ● ●	● ● ● ● ●	—	—	● ● ● ● ●
P-Series® Phenolic	● ● ● ●	● ● ● ● ●	● ● ● ●	● ● ● ● ●	● ● ● ● ●

ArchitEX™ Features and Benefits vs. Traditional Alternatives

	ArchitEX™	Stainless Steel	Galvanised Steel	Aluminium	Polyurethane
Chemical Resistance	● ● ● ● ●	● ● ● ●	●	● ● ●	● ● ● ●
Strength	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ●
Lightweight	● ● ● ● ●	●	●	● ● ● ● ●	● ● ●
Electrical Resistance	● ● ● ● ●	●	●	●	● ● ● ● ●
Cost Effectiveness	● ● ● ● ●	● ● ●	● ● ● ●	● ●	● ● ● ● ●

TREADWELL

SecurEX® FRP Fencing & Screening Overview

As both a local and global expert partner, Treadwell provides the highest levels of support to keep your projects running as smoothly as possible.

We tackle complexity by coordinating and consolidating requirements. Our advanced service management assures the consistent global delivery of services and products, along with transparent reporting for project continuity and reduced downtime.

Wherever your staff are in the world, our responsive service desk is always there to provide the support you need.

SecurEX® Overview

Treadwell's SecurEX® FRP Fencing System is suited for a wide range of applications including substations, switch yards, rail corridor, overhead support mast, chemical storage/process, ports and marine, airports, defence, mining and much more. SecurEX® is an excellent investment suited to a large range of sectors, spanning from industrial to architectural.

SecurEX® FRP Fencing System is non-conductive and non-corrosive, making it suitable in electrically sensitive environments. It is ideal around railway signalling equipment, and applications where power, magnetic fields and radio frequency (RF) transmission are critical considerations. With areas along the coast in mind, SecurEX® FRP Fencing System can be also applied in areas with high salt & moisture content.

Treadwell's composite fencing solution is the perfect choice due to the adaptable designs. Easily bolted down or embedded, it can be fabricated to suit any requirement. Based on the required quantities and specifications, the resin system is easily adapted to meet requirements. The ease of installation, along with incredibly low maintenance, makes SecurEX® FRP Fencing an ideal choice.

The Treadwell Advantage:

- Non-conductive
- Corrosion resistant
- Radio frequency transparent

Compliance & Testing

We develop our products and systems based on rigorous standards. Our products go through Quality Assurance testing and are compliant with relevant international and AS/NZ standards. With SecurEX®, Treadwell has developed and tested the range according to AS/NZS 1170.2.

RailEX® FRP Handrail

The RailEX® FRP handrail system is a patented industrial rated product that is noted for its durability, strength, and versatility. Further, Treadwell's FRP handrail system has multiple uses in many industries and markets, and can be tailored to meet the requirements of our clients. Treadwell can deliver RailEX® as components or as prefabricated systems for immediate installation.

Treadwell's FRP handrails are available both in square and round configurations.

What is SecurEX® Fencing & Screening Solutions?

Treadwell's SecurEX® solution consists of our signature FRP grating panels and ArchitEX™ structural profiles. Constructed from premium resin systems, Treadwell's FRP fencing and screening solutions are ideal across a diverse range of industries. Designed with anti-climb features, along with security benefits like low conductivity and addressing safety concerns, SecurEX® can be fitted with razor hoops and barbwires for added security, to give you added peace of mind.

Design Life

Minimum 50 years design life in case proven and also accelerated UV testing to ASTM G154-06.

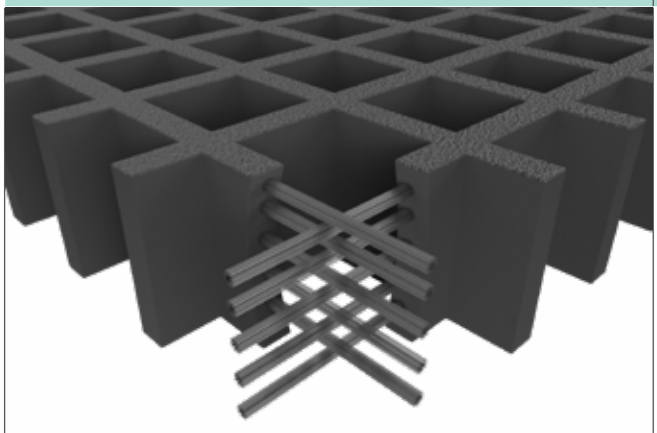
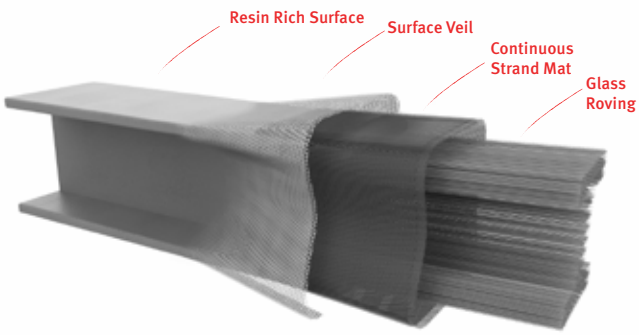
Suitability

Our analysis shows that the capacities of the FRP members used for fence system are adequate to support shear and bending.

Deflection Note

The deflection at mid-height under serviceability wind condition is 90mm. The deflection limit recommended by Table C1 of AS/NZS 1170.0 for wall elements (Walls- General (face loaded)) is Height/150 at mid-height under serviceability wind conditions. This is equal to 25mm. The fence structure would deflect for a short time at the highest wind gust only.

Materials of Construction

SecurEX® (GratEX®) FRP Screening Mesh	SecurEX® (ArchitEX™) FRP Pultrusions
	
Screening is constructed using this method of manufacturing.	Palisade pickets posts & rails are all constructed

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SecurEX® FRP Introduction

Treadwell is proud to present our SecurEX® range of security fences, screens and gates. Choosing the right type of fence is simple when you know what you are looking for. If you are unsure about which is the best solution for your needs, feel free to contact us at sales@treadwellgroup.com.au or 1800 246 800 and our team will be glad to assist you in making the right decision.

FRP fencing is a complete solution to address security concerns in industrial environments. Durable and able to withstand environmental conditions, Treadwell's FRP products are constructed with specially formulated resins with fire retardant additives and UV inhibitors, making it ideal for the outdoor environment. FRP fencing can be installed without the need to be earthed or painted, therefore reducing costs.

Benefits include:

- Colours are customisable
- Non-conductive
- Corrosion resistant
- Long-lasting and durable
- Fire retardant with a high smoke point
- Termite proof

Material Properties	
Density	1.8 1.9 g/cm3
Flexural Strength	705 MPa
Flexural Modulus	23000 MPa
Tensile Strength	581 MPa

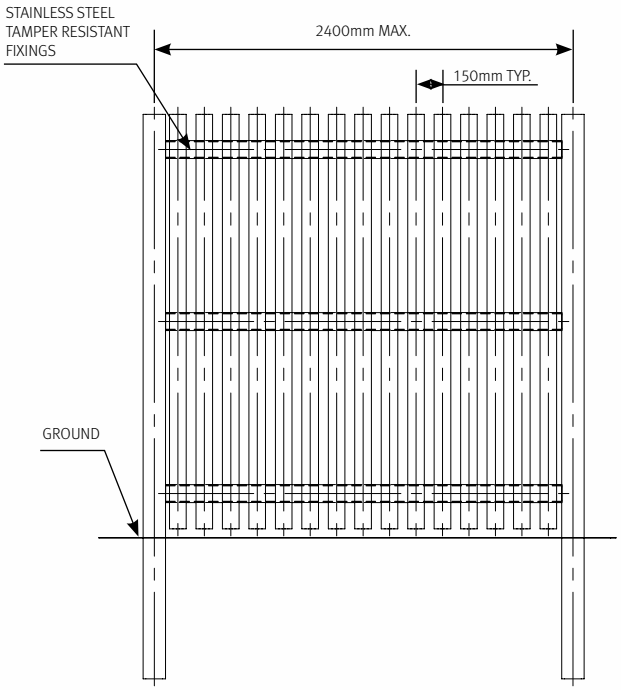
Electrical properties
Arc Resistance, LW 120 seconds (ASTM D-495)
Dielectric Strength, LW 1.37 kv/mm (ASTM D-149)
Dielectric Strength, PF 200 volts/mm (ASTM D-149)

Fire properties	
Surface Burning	Flame Spread 15, Smoke developed classification 550 (ASTM E84)
Flooring Reaction	Mean Critical Radiant flux 10.9 kw/m², Smoke development o (AS9239.1)
Ignitability	Nil/min (AS1530.3)
Flame Propagation	Nil/sec (AS1530.3)
Heat Release	Nil/kJ (AS1530.3)
Smoke release	0.0288/mtr optical density (AS1530.3)

Wind force parameters based on AS/NZS 1170.2:2011	
Region	A 5
Average Recurrence Interval (R)	25 years
Terrain category	2
Height (z)	3.8 m
Topographic Multiplier (Mt)	1.0
Cfig: Perpendicular to Fence	1.45
Parallel to Fence	1.0

In addition, an impact load of 11.5 kN was considered for both strength and serviceability conditions based on AS/NZS 1170.1:2002. This load was calculated for a 2500 Kg vehicle travelling at 10 KMPH speed when hitting the fence.

SecurEX® FRP Palisade Panel



Panels with a 90mm wide vertical picket with up to 50mm openings. This provides security as well as an architectural element. Anti-climb and high strength with the option to space the pickers to allow for greater visibility and reduced wind load.

Treadwell's FRP Palisades fencing is available at heights of 1800mm to 2400mm, with a width of up to 2400mm per panel. Support positions are installed according to height, length and wind loading considerations. Palisade fencing is easily installed on slopes, minimising gaps.

Individual panels can be replaced or repaired without having to remove the whole section, if needed.

Sturdy foundation includes deep posts underground that provide resistance against ramming and attempts to bend, dislocate or remove the fence.

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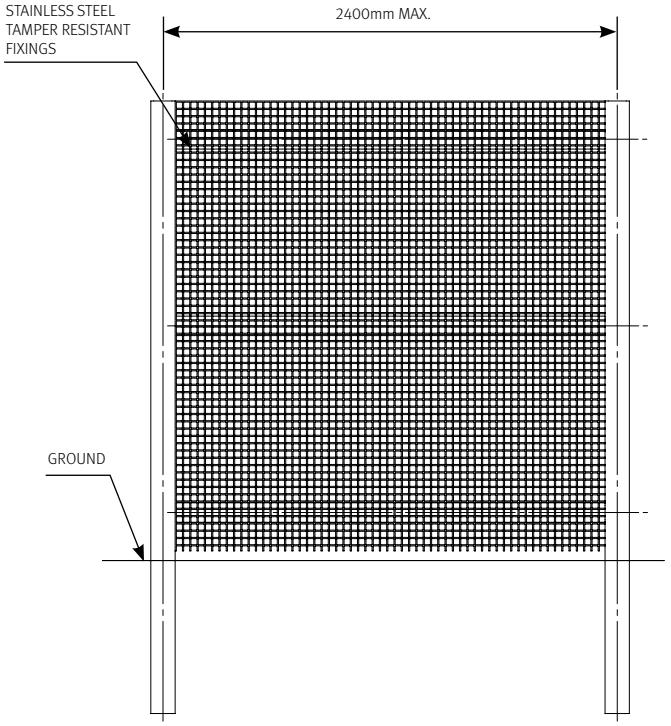
SecurEX® FRP Standard Mesh Panel



Panels with a 42 x 42mm or 32 x 32mm aperture mesh or opening. Ideal for where high visibility is required and a cost-effective lower wind load option is required.

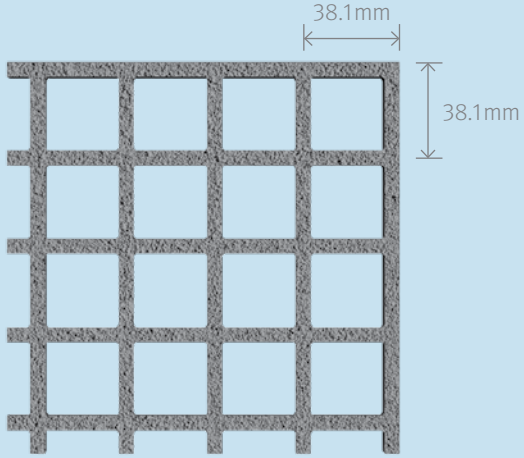
Treadwell's FRP Square Mesh fencing is available at heights of 1800mm to 2400mm, with a width of up to 2400mm per panel. Support positions are installed according to height, length and wind loading considerations. Square mesh fencing is ideal in applications where high visibility is beneficial.

Individual panels can be replaced or repaired without having to remove the whole section, if needed.

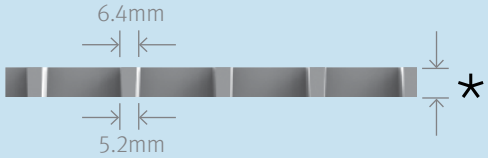
Sturdy foundation includes deep posts underground that provide resistance against strong winds with minimal deflection.

SecurEX® FRP Standard Mesh Typical Details

Plan View



Elevation View



* Varying thickness available.

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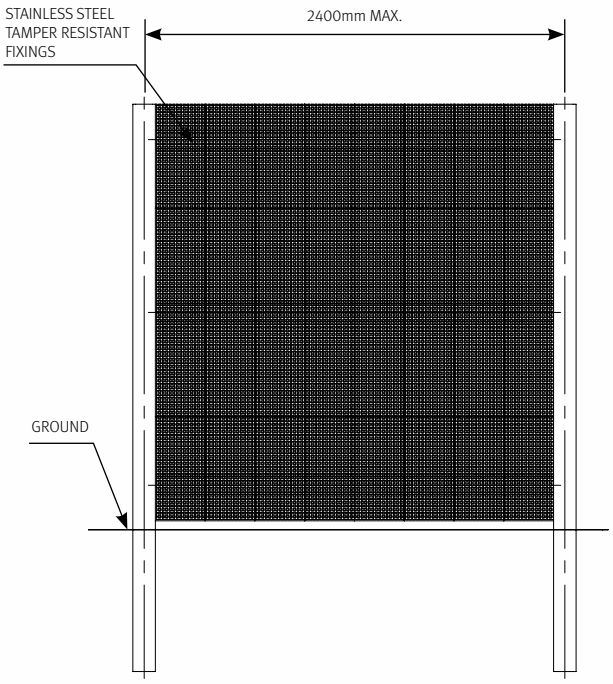
SecurEX® FRP Mini Mesh Panel



Panels with a 12 x 12mm aperture mesh or opening. Ideal for reducing visibility and the added protection of smaller apertures reduces the risk of objects passing through in sensitive environments.

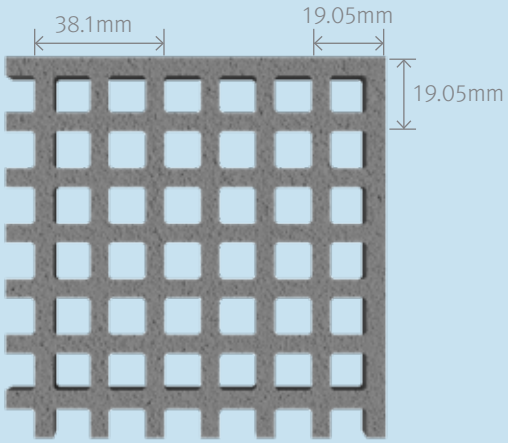
Treadwell's FRP Mini Mesh fencing is available at heights of 1800mm to 2400mm, with a width of up to 2400mm per panel. Support positions are installed according to height, length and wind loading considerations. Mini mesh fencing is ideal in applications where some visibility is required.

Individual panels can be replaced or repaired without having to remove the whole section.

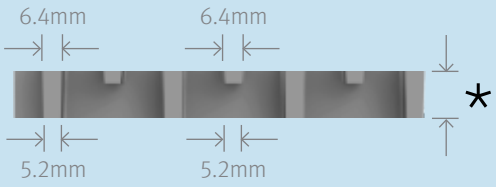
Sturdy foundation includes deep posts underground that provide resistance.

SecurEX® FRP Mini Mesh Typical Details

Plan View

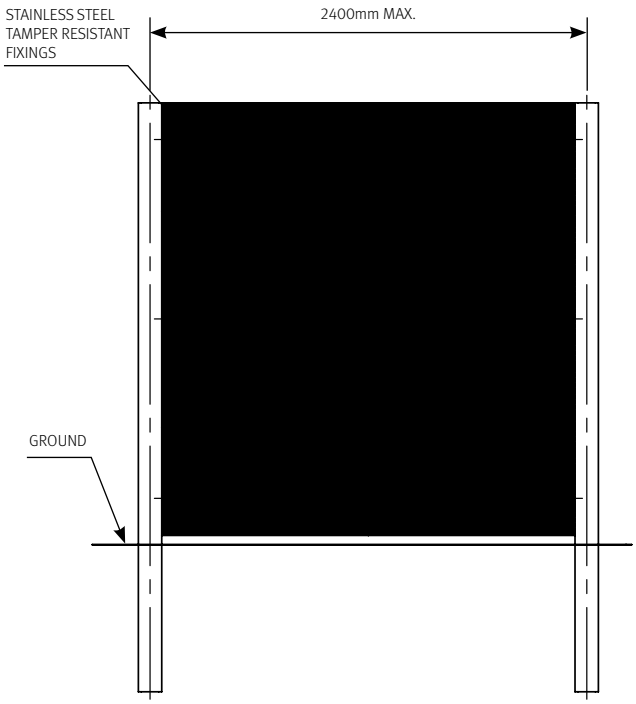


Elevation View



* Varying thickness available.

SecurEX® FRP Micro Panel



Panels with 7 x 7mm aperture mesh or opening. Ideal for high risk isolation areas with the benefit of some visibility.

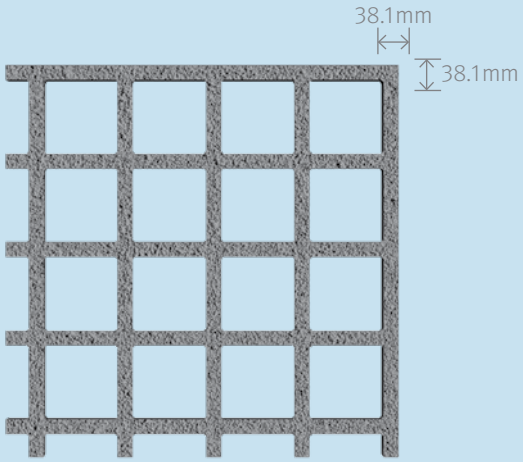
Treadwell's FRP Micro Mesh fencing is available at heights of 1800mm to 2400mm, with a width of up to 2400mm per panel. Support positions are installed according to height, length and wind loading considerations. Micro mesh fencing is ideal in applications where minimal visibility is desired.

Individual panels can be replaced or repaired without having to remove the whole section.

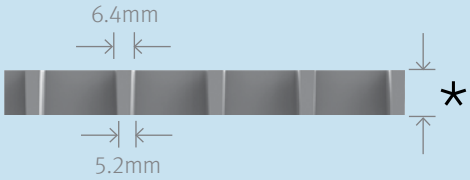
Sturdy foundation includes deep posts underground that provide resistance.

SecurEX® FRP Micro Mesh Typical Details

Plan View



Elevation View



* Varying thickness available.

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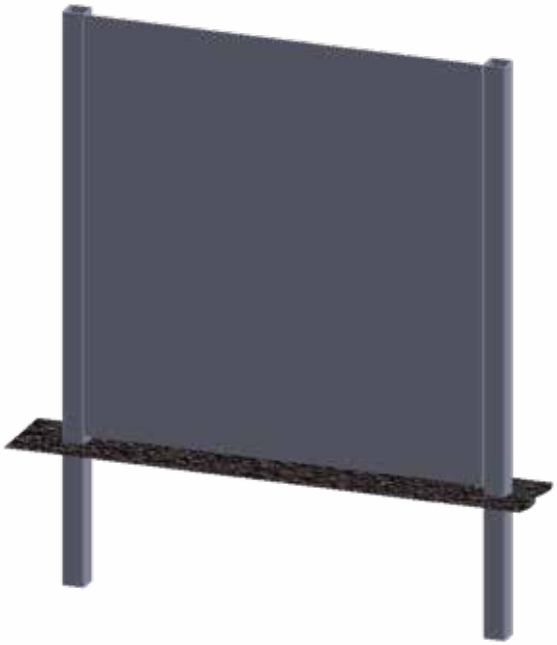
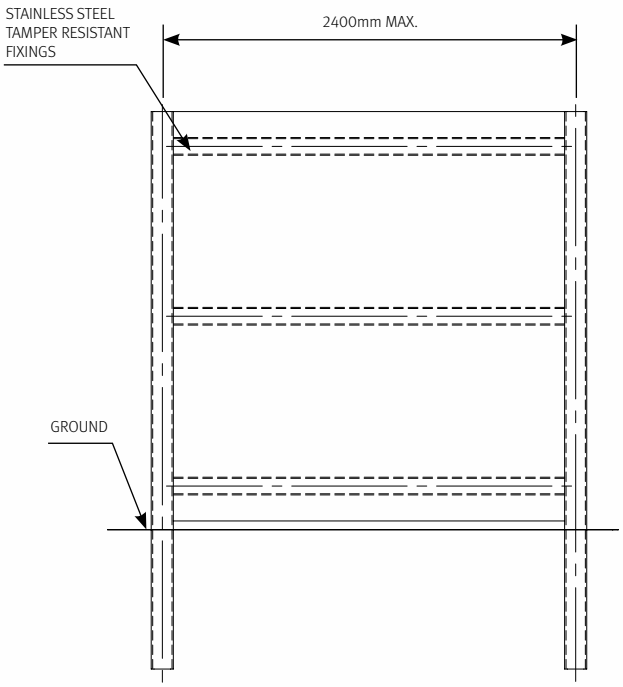
SecurEX® FRP Solid Panel





Panels with no apertures or openings. Maintains total block out for zero visibility. High strength, solid FRP panels provide excellent impact resistance.

Treadwell's FRP Solid Panel fencing is available at heights of 1800mm to 2400mm, with a width of up to 2400mm per panel. Support positions are installed according to height, length and wind loading considerations. Solid panel fencing is ideal in applications where zero visibility is desired.

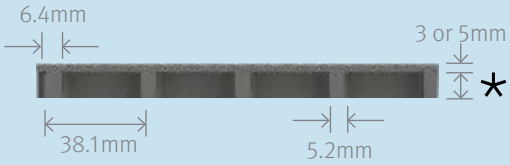
Individual panels can be replaced or repaired without having to remove the whole section.

Sturdy foundation includes deep posts underground that provide resistance.

SecurEX® FRP Solid Panel Typical Details

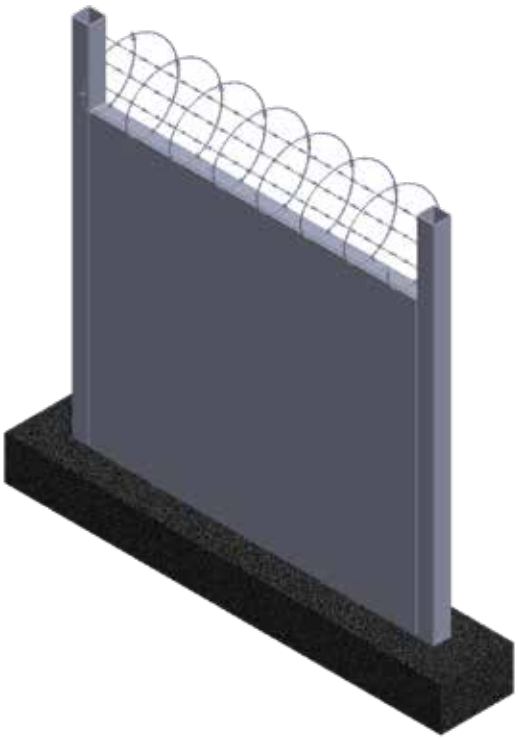
Plan View

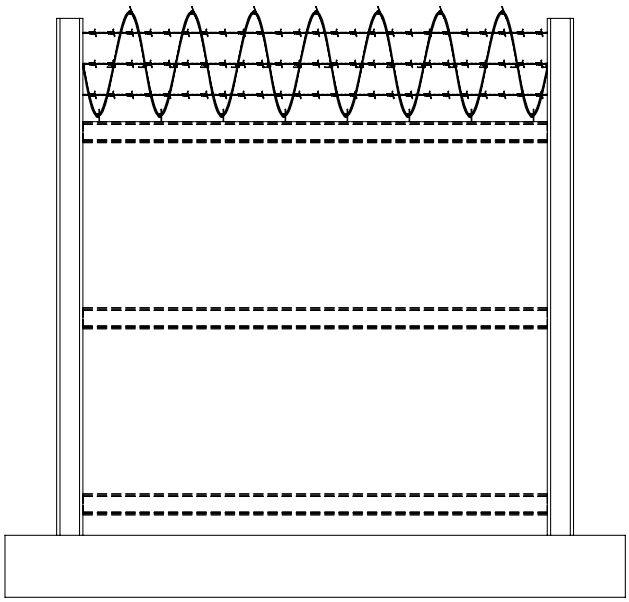
Elevation View



* Varying thickness available.

SecurEX® FRP Razor Hoop and Barbwire

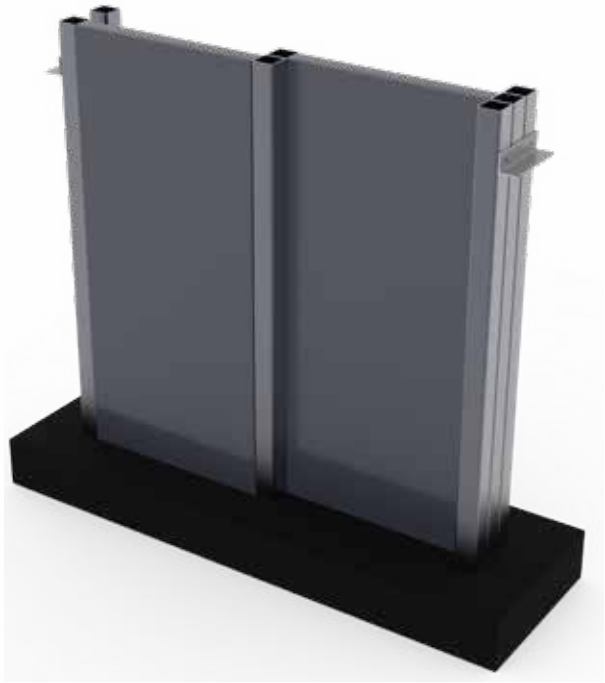


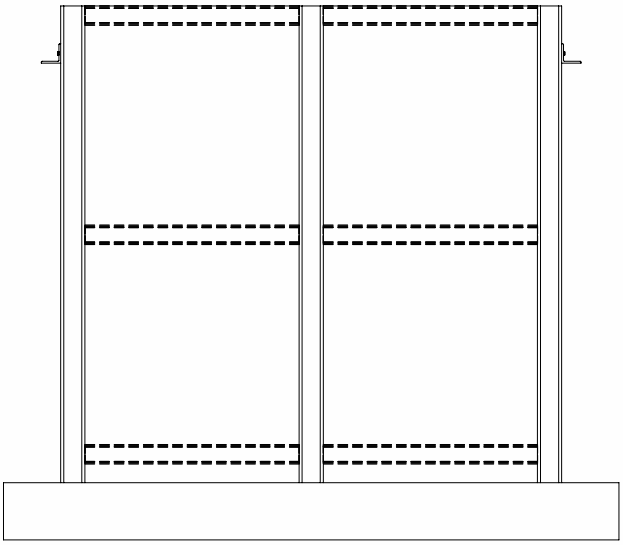


Razor and barbed wire can be added to the top of any panel type. Using the FRP structural support, barbwire strands, with the addition of razor hoops can be designed to provide an extra layer of security.

This security option is commonly installed in rail industry applications around train stations and power substations.

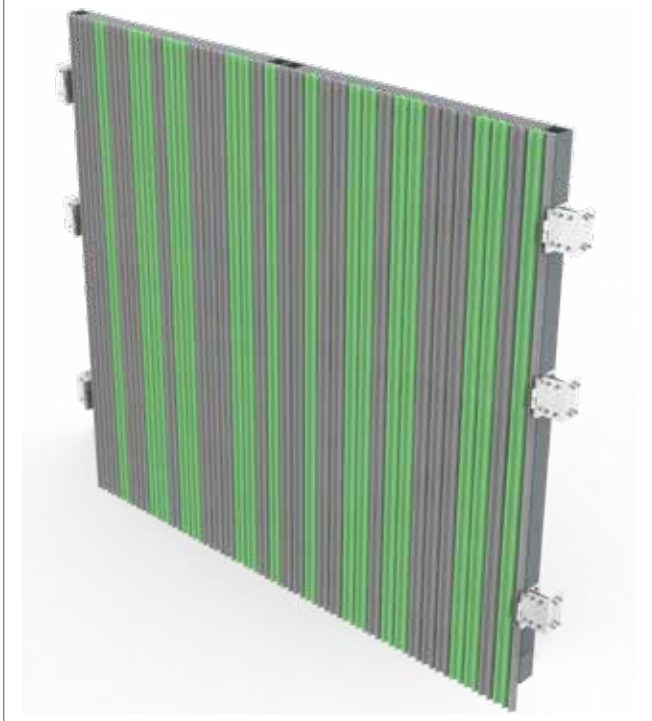
SecurEX® FRP Sliding Gates





Treadwell's fully FRP sliding SecurEX® gates, which are ideal in areas where space is a concern, are constructed from premium FRP composite structural products. This means that the entire solution is corrosion resistant, completely non-conductive and can withstand permanent exposure to the environment it was built for. Gates of traditional materials are generally only surface coated with weather resistant paint or protective coatings which break down over time due to exposure and friction from use.

SecurEX® FRP Swing Gates

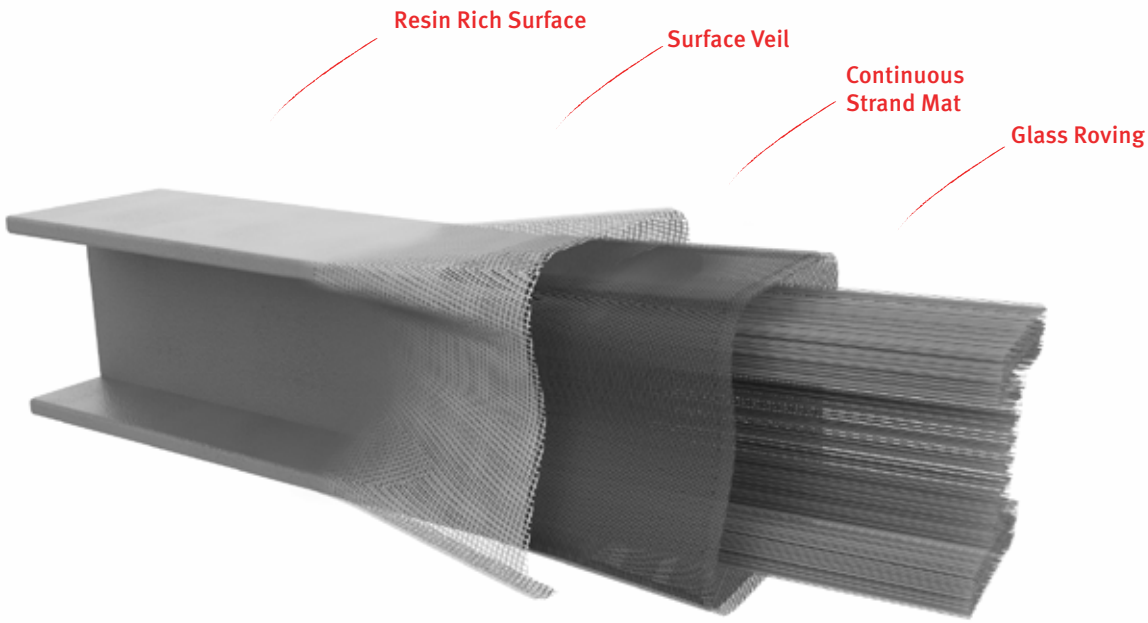


Treadwell's fully FRP SecurEX® swing gates offer all the benefits of our exclusive range of SecurEX® Fencing and Screening. Depending on the application, and taking into consideration factors like loading, purpose and space concerns, swing gates present as an ideal choice. These can be installed as main entrances in all manner of applications, including for sub-stations, wastewater treatment plants, coastal compounds and chemical plants, and we also offer a range of personnel access (PA) gates for the commonplace applications where easy accessibility for authorised personnel is required.

What are SecurEX® Post & Rails?

SecurEX® Fencing and Screening typically requires a structural frame, and what better to utilise than Treadwell's FRP composite solution developed from our exclusive range of ArchitEX™ FRP structural sections. These structural FRP products provide excellent durability suited to a varied range of sectors where corrosion and conductivity present challenges. For these reasons SecurEX® Post and Rails are widely used in the transport and electrical sectors due to their requirement for materials with substantial electrical insulation properties. The non-conductive nature of FRP also makes it ideal for applications where power, magnetic fields and RF transmissions are sensitive considerations.

Cross Section of Pultrusion



ArchitEX™ Pultrusions Introduction

Treadwell is arguably the largest stockist of FRP pultrusion products in Australia. We always stock a comprehensive range of I-Beam, C Section, Hollow Section and Angle products which are commonly in high demand. Due to the consistent and rapid evolution of the fibreglass pultrusion market, we are continually revaluating our range of stocked products to ensure that our holdings accurately reflect customer demand.

We utilise efficient transport networks across Australia to ensure rapid delivery to remote locations and stock products in most capital cities.

Our complete range of products available is listed in the Section Properties tables. To obtain price and availability or find out if the product you require is a stock item, call Treadwell on 1800 246 800.

How the Pultrusion Machine Works

Pultruding is the process that is used to form continuous structural profiles out of fibreglass and resin composites. The process is performed by a pultrusion machine. The first pultrusion process was developed in the mid-1940s with further major development and greater recognition in the mid-1950s.

The term pultrusion was derived from a combination of the word pull and extrusion. There are some parallels between the two processes given that they both produce continuous profiles and involve some sort of forming die. The main difference being that the pultrusion process utilises a series of pullers, which draw the product through the entire process as compared to extruding, which uses pressure or a pushing force.

The pultrusion process commences with fibreglass roving being pulled off rolls, through a guide and then being combined with the continuous strand mat. It is this fibreglass component that provides the resistance to tension that is necessary in the pultrusion process. The raw fibre is pulled through a series of guides or rollers and then enters a resin impregnation bath. The resin is usually a thermo-setting resin.

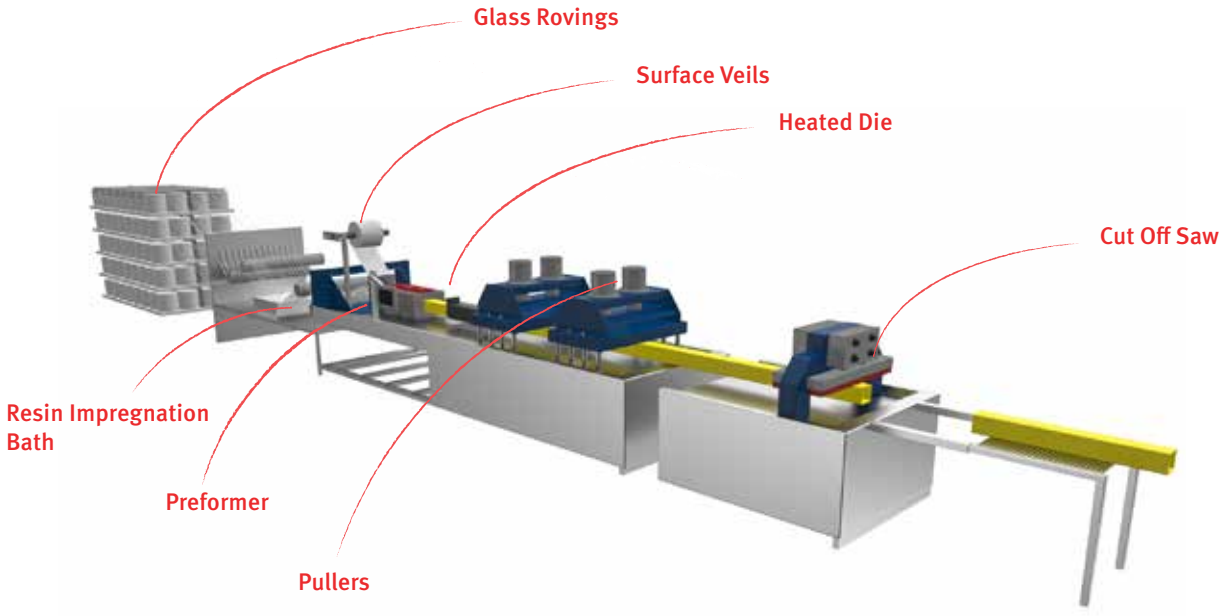
Now that the fibres are thoroughly 'wetted out' with the resin, they pass through a series of tooling which arranges the fibres correctly and removes excesses of resin. This set of tooling and guides is referred to as the pre-former. At this stage, the surface veil is added.

The uncured composite is then pulled into a heated die which commonly consists of 2-3 differing stages of temperature which initiate the curing of the resin component. The profile that exits the die is now a cured pultruded fibreglass reinforced plastic composite.

It is this rigid profile that is gripped further down the line by the pulling mechanism which provides steady and continuous tractive effort. After passing through the pullers, the FRP profile reaches a cut-off saw. The saw cuts the pultrusion to the desired length without slowing or halting the process.

This way high strength and lightweight profiles can be created from fibreglass reinforced plastic to virtually any length required.

Pultrusion Machine



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SecurEX® Square Hollow Section

Sectional Properties - Square Hollow Section

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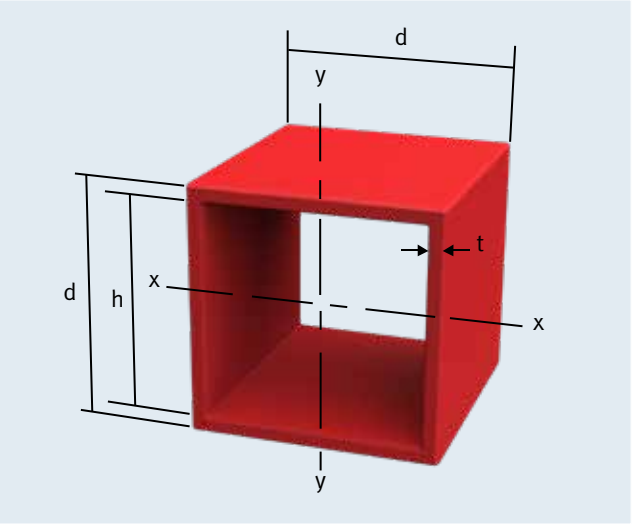

Square Hollow Section		Section Dimensions		
Part	Part Number	d mm	t mm	h mm
50.8 x 6.4mm	ARX-SH05106	50.8	6.4	38.1
76.2 x 6.4mm	ARX-SH07606	76.2	6.4	63.5
101.6 x 6.4mm	ARX-SH10206	101.6	6.4	89.9
101.6 x 8mm	ARX-SH10208	101.6	8	85.6
127 x 8mm	ARX-SH12708	127	8	111.0
152.4 x 9.5mm	ARX-SH15210	152.4	9.5	133.4

Square Hollow Section		Section Properties						
Part	Part Number	I mm^4	S mm^3	r mm	J mm^4	A_w mm^2	Area mm^2	Weight Kg./m
50.8 x 6.4mm	ARX-SH05106	379377	14936	18.3	618023	483.8	1128.8	2.0
76.2 x 6.4mm	ARX-SH07606	1454641	38179	28.6	2290000	806.3	1773.8	3.2
101.6 x 6.4mm	ARX-SH10206	3674539	72333	39.0	5850000	1128.8	2418.8	4.4
101.6 x 8mm	ARX-SH10208	4405420	86721	38.4	7010000	1369.6	2995.2	5.3
127 x 8mm	ARX-SH12708	9028133	142175	48.7	14100000	1776.0	3808.0	6.5
152.4 x 9.5mm	ARX-SH15210	18602355	244125	58.5	28700000	2539.7	5442.2	9.8

SecurEX® Rectangular Hollow Section

Sectional Properties – Rectangular Hollow Section

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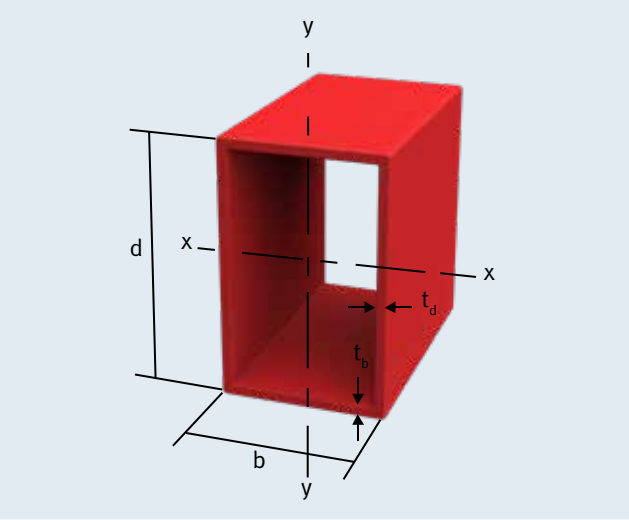

Rectangular Hollow Section		Section Dimensions			
Part	Part Number	d mm	b mm	t_d mm	t_b mm
100 x 75 x 6.4	ARX-RH10007506	100	75	6.4	6.4
101.6 x 3.2 x 50.8 x 6.4mm	ARX-RH10205106	101.6	50.8	3.2	6.4
152.4 x 101.6 x 6.4mm	ARX-RH15210206	152.4	101.6	6.4	6.4

Rectangular Hollow Section		Section Properties										
Part	Part Number	x-x				y-y						
		I mm^4	S mm^3	r mm	A_w mm^2	I mm^4	S mm^3	r mm	J mm^4	A_w mm^2	Area mm^2	Weight Kg./m
100 x 75 x 6.4	ARX-H10007506	2854389	57088	36.9	558.1	1786067	47628	29.2	4640456	439.0	2102.5	3.9
101.6 x 3.2 x 50.8 x 6.4mm	ARX-RH10205106	1837272	36167	39.0	564.5	459318	18083	19.5	1097485	609.3	1209.4	2.2
152.4 x 101.6 x 6.4mm	ARX-RH15210206	9770599	128223	56.5	1129.0	5140025	101182	41.0	10185433	1786.9	3063.8	5.5

SecurEX® WF Section

Sectional Properties - WF Section

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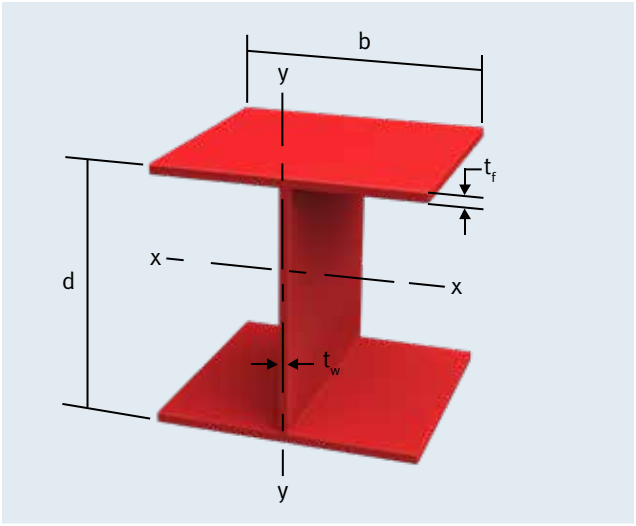


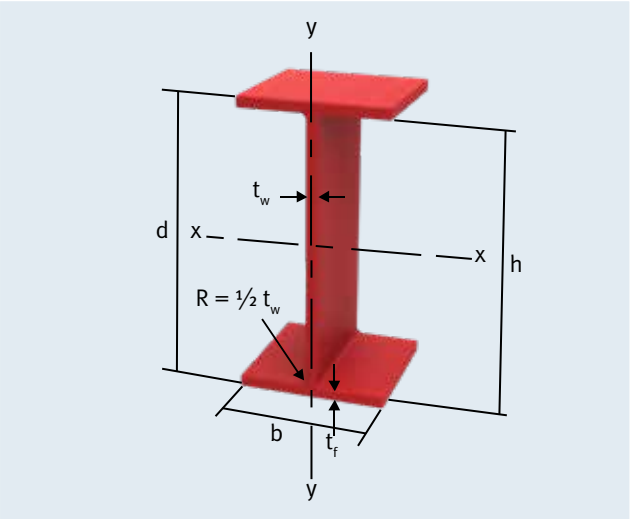
WF Section		Section Dimensions						Section Properties					
Part	Part Number	d mm	b mm	t_w mm	t_f mm	Area mm²	Weight Kg./m	x-x			y-y		
		Web	Flange					I mm⁴	S mm³	r mm	I mm⁴	S mm³	r mm
101.6 x 6.4mm	ARX-WF10206	101.6	101.6	6.4	6.4	1864.5	3.20	3304878	65057	42.2	1111338	21959	24.4
152.4 x 6.4mm	ARX-WF15206	152.4	152.4	6.4	6.4	2832.3	5.06	11771025	154530	64.5	3750245	49161	36.3
152.4 x 9.5mm	ARX-WF15210	152.4	152.4	9.5	9.5	4180.6	7.29	16720016	219423	63.2	5627449	73906	36.6
203.2 x 9.5mm	ARX-WF20310	203.2	203.2	9.5	9.5	5632.2	9.66	41285995	406399	85.6	13331893	131260	48.8
203.2 x 12.7mm	ARX-WF20313	203.2	203.2	12.7	12.7	7425.8	12.95	52844742	520125	84.3	17789731	175178	49.0
254 x 12.7mm	ARX-WF25413	254.0	254.0	12.7	12.7	9361.3	16.22	106638491	839673	106.9	34722026	273336	61.1
304.8 x 12.7mm	ARX-WF30513	304.8	304.8	12.7	12.7	11296.8	19.64	188323909	1236404	129.0	59983111	393617	72.9

SecurEX® I Section

Sectional Properties – I Section

The section values shown on this page have been calculated from the nominal dimensions of the profile. All the shapes listed in the table are available but not all are stocked. For information on availability and price, contact Treadwell Group on 1800 246 800.

*457.20 I Section - Web = 9.53mm Flange = 12.70mm
*609.60 I Section - Web = 9.53mm Flange = 19.05mm



I Section		Sectional Dimensions				
Part	Part Number	d mm	b mm	t_w mm	t_f mm	h mm
		Web	Flange			
101.6 x 50.8 x 6.4mm	ARX-IS10205106	101.6	50.8	6.4	6.4	88.9
152.4 x 76.2 x 9.5mm	ARX-IS15207610	152.4	76.2	9.5	9.5	133.4
203.2 x 101.6 x 9.5mm	ARX-IS20310210	203.2	101.6	9.5	9.5	184.2
203.2 x 101.6 x 12.7mm	ARX-IS20310213	203.2	101.6	12.7	12.7	177.8
254 x 127 x 9.5mm	ARX-IS25412710	254	127	9.5	9.5	235.0
254 x 127 x 12.7mm	ARX-IS25412713	254	127	12.7	12.7	228.6
304.8 x 152.4 x 12.7mm	ARX-IS30515213	304.8	152.4	12.7	12.7	279.4
457.2 x 9.5 x 114.3 x 12.7mm	ARX-IS45711413	457.2	114.3	9.5	12.7	431.8
609.6 x 9.5 x 190.5 x 19.1mm	ARX-IS61019119	609.6	190.5	9.5	19.1	571.5

SecurEX® I Section

I Section		Section Properties									
Part	Part Number	x-x			y-y						
		I mm^4	S mm^3	r mm	I mm^4	S mm^3	r mm	J mm^4	A_w mm^2	Area mm^2	Weight Kg./m
101.6 x 50.8 x 6.4mm	ARX-IS10205106	1837272	36167	39.0	140641	5537	10.8	17664	564.5	1209.4	2.2
152.4 x 76.2 x 9.5mm	ARX-IS15207610	9301187	122063	58.5	711994	18687	16.2	86106	1270.2	2721.1	4.9
203.2 x 101.6 x 9.5mm	ARX-IS20310210	23121371	227573	79.2	1678187	33035	21.3	116564	1754.0	3688.6	6.7
203.2 x 101.6 x 12.7mm	ARX-IS20310213	29396344	289334	77.9	2250251	44296	21.6	275449	2258.1	4837.5	8.7
254 x 127 x 9.5mm	ARX-IS25412710	46462849	365849	99.9	3268728	51476	26.5	146271	2237.9	4656.1	8.4
254 x 127 x 12.7mm	ARX-IS25412713	59642495	469626	98.7	4374766	68894	26.7	346832	2903.2	6127.5	11.0
304.8 x 152.4 x 12.7mm	ARX-IS30515213	105705439	693605	119.4	7539839	98948	31.9	417940	3548.4	7417.5	13.4
457.2 x 9.5 x 114.3 x 12.7mm	ARX-IS45711413	207348286	907035	171.9	3191852	55850	21.3	288053	4112.9	7014.4	12.6
609.6 x 9.5 x 190.5 x 19.1mm	ARX-IS61019119	781189968	2562959	248.0	21990860	230878	41.6	1060000	5443.5	12698.4	22.9

SecurEX® C Section

Sectional Properties - C Section

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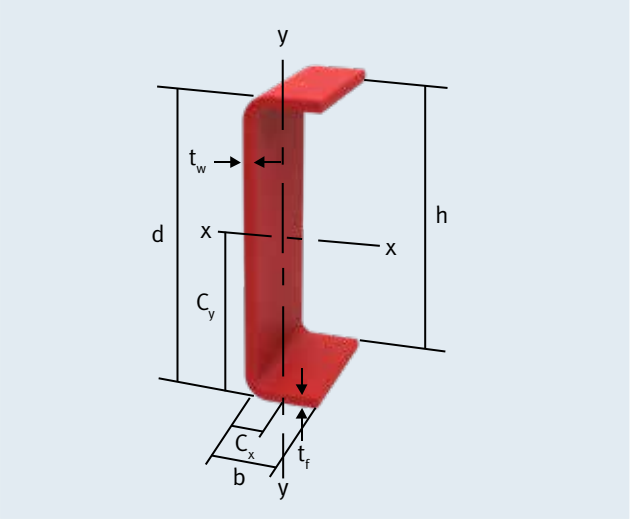

C Section		Sectional Dimensions						
Part	Part Number	d mm	b mm	t_w mm	t_f mm	h mm	C_x mm	C_y mm
		Web	Flange					
101.6 x 28.6 x 6.4mm	ARX-CS1022906	101.6	28.6	6.4	6.4	88.9	7.5	50.8
152.4 x 41.3 x 6.4mm	ARX-CS1524106	152.4	41.3	6.4	6.4	139.7	9.7	76.2
203.2 x 55.6 x 9.5mm	ARX-CS2035610	203.2	55.6	9.5	9.5	184.2	13.4	101.6
254 x 69.9 x 12.7mm	ARX-CS2547013	254	69.9	12.7	12.7	228.6	17.2	127.0
304.8 x 76.2 x 12.7mm	ARX-CS3057613	304.8	76.2	12.7	12.7	279.4	17.6	152.4

C Section		Section Properties									
Part	Part Number	x-x			y-y						
		I mm^4	S mm^3	r mm	I mm^4	S mm^3	r mm	J mm^4	A_w mm^2	Area mm^2	Weight Kg./m
101.6 x 28.6 x 6.4mm	ARX-CS1022906	1196122	23546	35.9	53868	2559	7.6	12998	564.5	927.4	1.7
152.4 x 41.3 x 6.4mm	ARX-CS1524106	4239811	55640	54.8	177875	5626	11.2	19550	887.1	1411.3	2.5
203.2 x 55.6 x 9.5mm	ARX-CS2035610	14890522	146560	72.8	635340	15078	15.0	26711	1754.0	2812.5	5.1
254 x 69.9 x 12.7mm	ARX-CS2547013	38492696	303091	90.7	1659560	31514	18.8	254501	2903.2	4677.4	8.4
304.8 x 76.2 x 12.7mm	ARX-CS3057613	64394404	422534	108.4	2246678	38310	20.2	297902	3548.4	5483.9	9.9

Surrey Hills Substation

Public Transport Victoria were in the process of building new substations to increase the power capacity on the network so that more trains could run with more reliability. These network upgrades are needed to allow High Capacity Metro Trains to run across Melbourne's busy train network.

Treadwell was approached to provide a durable, non-corrosive fence solution that was electrically non-conductive as well as non-disruptive to the radio frequencies around the network.

In response, Treadwell provided SecurEX®, our line of FRP fencing from our structural profile range.

Project Challenges

- Major concern on electrical conductivity of the fence due to the proximity to the electrified railway line.
- Required material that was transparent to radio frequency.
- Corrosion issues due to the exposed nature of the site.
- Reduce the need for maintenance.

PROJECT INFORMATION	
Project Category:	Substation / Utilities Infrastructure
Scope of Work:	Design and supply of SecurEX® FRP fence and gate solution
Treadwell Products:	SecurEX® FRP Palisade Pickets ArchitEX™ FRP Structural Post and Rail Profiles

Treadwell Solution:

1. SecurEX® FRP fence systems are categorically chosen to suit the environments in which they will be installed in to counter corrosion.
2. Due to the nature of FRP, SecurEX® FRP fence systems are electrically non-conductive which suits this application extremely well.
3. SecurEX® FRP fence systems are radio frequency transparent, allowing smoother communications.
4. Being lightweight and easy to install, FRP is very manageable during construction.
5. Given the nature of FRP, any system utilising it is virtually maintenance free.

TREADWELL

Case Study

Murrumbeena Substation

The Murrumbeena Road level crossing was removed in 2018 as part of the Caulfield to Dandenong Level Crossing Removal project. This project saw the removal of nine level crossings and the construction of five new stations. By building an elevated rail line, this project opened up 22.5 hectares of open space and parkland for the community. This also helped to ease traffic congestion and reduced train travel times.

The Murrumbeena substation is an integral part of the train network that houses electrical equipment that provides the current supply to operate trains, signals and communications equipment. Treadwell was engaged to design and supply the security fencing for the perimeter of this substation.

Project Challenges

- The material had to have low electrical conductivity, especially in the event of stray electrical currents.
- Being the security perimeter for a substation, the product had to be anti-climb to address safety concerns.
- Selected material had to withstand exposure to outdoor conditions.

PROJECT INFORMATION	
Project Category:	Substation / Utilities Infrastructure
Scope of Work:	Design and supply of SecurEX® FRP fence and gate solution
Treadwell Products:	SecurEX® FRP Palisade Pickets ArchitEX™ FRP Structural Post and Rail Profiles

Treadwell Solution:

1. Treadwell's SecurEX® FRP panels are constructed with non-conductivity properties, ensuring safety from electrical currents.
2. These FRP panels were designed to be anti-climb to minimise the risk of theft and vandalism.
3. SecurEX® FRP panels are termite- and rot-proof. With built in corrosion-resistant properties, it is the ideal solution for this outdoor application.
4. SecurEX® FRP panels were customised to meet the aesthetic and practical requirements of the structure.
5. Given the nature of FRP, any system utilising it is virtually maintenance free, keeping maintenance costs to a minimum.

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Noble Park Substation

Noble Park station is one of five stations that were completely rebuilt as part of the Caulfield to Dandenong Level Crossing Removal project. This included the replacement of nine crossings by using an elevated rail design. With more available public space, new amenities like a cycle route, parks, fitness areas and games courts, the urban design has improved traffic congestion, and has created a unified feel across neighbourhoods previously separated by a train line.

As part of the construction for the new Noble Park station, the power substation was relocated to the west of the station carpark. This new location was designed to create a new space for commuters as well as improve access to the street shops. Treadwell was engaged to provide the secure fencing for this substation.

Project Challenges

- The material had to have low electrical conductivity, especially in the event of stray electrical currents.
- The selected material had to be corrosion resistant and able to withstand the outdoor environment.
- Colour had to be customised to meet the required aesthetics.

PROJECT INFORMATION	
Project Category:	Substation / Utilities Infrastructure
Scope of Work:	Design and supply of SecurEX® FRP fence and gate solution
Treadwell Products:	SecurEX® FRP Palisade Pickets ArchitEX™ FRP Structural Post and Rail Profiles

Treadwell Solution:

1. Treadwell's SecurEX® FRP panels are constructed with non-conductivity properties, ensuring safety from potential stray electrical currents.
2. These FRP panels are termite- and rot-proof, and constructed with corrosion-resistant properties, making it an ideal solution for this outdoor application.
3. SecurEX® FRP panels are an anti-climb design that provides an additional layer of security.
4. SecurEX® FRP panels were customised to meet the aesthetic and practical requirements of the structure.
5. Given the nature of FRP, any system utilising it is virtually maintenance free, keeping maintenance costs to a minimum.

TREADWELL

Case Study

Melbourne Substation

In order to maximise space and prepare for high capacity metro trains, a multi-storey substation was custom designed to be installed in Melbourne's CBD. This would be situated on a narrow strip of land, and had to be constructed within a tight timeframe. Prefabrication technology allowed the substation to be built off site at the same time as the foundation being installed; this saved time and eliminated the potential for weather delays. Consisting of a team of contractors, communication and action had to be precise.

Treadwell was engaged to supply the FRP products for the structure and security perimeter.

Project Challenges

- It was a key consideration that the product be non-conductive. This was to ensure maximum safety for staff and public.
- Posts, rails and barrier mesh needed to be designed to withstand the wind load requirements of AS1170.
- The selected product had to be able to form a secure perimeter around the structure, proving a safe barrier against trespassing and various security concerns.

PROJECT INFORMATION	
Project Category:	Substation / Utilities Infrastructure
Scope of Work:	Design and supply of SecurEX® FRP screen solution
Treadwell Products:	ArchitEX™ Structural Profiles ArchitEX™ FRP Structural Post and Rail Profiles GratEX® FRP Micro Mesh Grating

Treadwell Solution:

1. Treadwell's SecurEX® FRP fencing is suited to a wide range of rail applications, especially in areas where stray electrical currents are concerns.
2. SecurEX® FRP Picket Fence is an anti-climb design, providing an added layer of security around the structure it protects. Easily installed on even and uneven ground.
3. GratEX® FRP Micro Mesh grating was selected as it accommodates wind loading concerns while providing a barrier against debris or foreign objects.
4. Being lightweight and easy to install, FRP is very manageable during construction.
5. Given the nature of FRP, any system utilising it is virtually maintenance free, keeping maintenance costs to a minimum.

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EX-Series® Resin Systems Overview

When choosing a resin type for your application, we highly recommend you consult us to ensure important details such as corrosion, environment, temperature and requirements are taken into account. Dependent on these particulars, we will determine which resin system should be utilised for optimum performance over time.

V-Series® Vinylester Resin System is a high quality and is the most chemical resistant system offered in the industry and has been developed for use in environments where fibreglass/ FRP products are subject to frequent and direct contact with the harshest of chemicals: including a broad range of acids and caustics. This system has a flame spread of 25 or less.

I-Series® is a premium Isopthalic Resin System. This system provides an intermediate level of chemical resistance and is the correct choice for areas subjected to splash and spill contact with harsh chemicals. This system is an excellent general-purpose resin and is a more favourably priced alternative to the vinyl ester system. This system has a flame spread of 25 or less.

O-Series® is an architectural grade Polyester Resin System with a moderate chemical resistance. O-Series® is a good choice for commercial or light industrial applications, especially in areas where moisture is prevalent. O-Series® is often utilized for public infrastructure applications were it has been proven to outperform tradition timber decking products. It should be noted that Treadwell does not recommend O-Series for water and waste water treatment applications.
Treadwell also offers resin systems that are suitable for use in contact with potable drinking water and compliant with AS4020.

Chemical Resistance Guide

Information contained in this guide is based on data collected from several years of actual industrial applications. Recommendations are based on conservative evaluations of the changes which occur in certain properties of replicate laminates after exposures of one year or longer, both in the laboratory and the field.

Temperatures are neither the minimum nor the maximum but represent standard test conditions (Room Temperature & 70˚C). The products may be suitable at higher temperatures but individual test data should be required to establish such suitability. Contact Treadwell for any special applications that you may have.

The recommendations (• : resistant: – :not resistant) contained in this specification sheet are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laboratory oractual field trial prior to use. Our responsibility for claims arising from breach of warranty, negligence, or otherwise is limited to the purchase price of the material.

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Acetaldehyde	–	–	–	–
Acetic Acid 0-25%	•	•	•	•
Acetic Acid 25-50%	•	•	•	–
Acetic Anhydride	–	–	–	–
Acetone	–	–	–	–
Acrylonitrile	–	–	–	–
Alcohol, Butyl	•	–	–	–
Alcohol, Ethyl 10%	•	66	–	–
Alcohol, Ethyl 100%	•	–	–	–
Alcohol, Isopropyl 10%	•	66	–	–
Alcohol, Isopropyl 100%	•	–	–	–
Alcohol, Methyl 10%	•	66	–	–
Alcohol, Methyl 100%	–	–	–	–
Alcohol, Methyl Isobutyl	•	66	–	–
Alcohol, Secondary Butyl	•	66	–	–
Aluminium	•	•	•	•
Aluminium Chloride	•	•	•	•
Aluminium Hydroxide	•	49	•	–
Aluminium Nitrate	•	•	•	•

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Aluminium Potassium Sulfate	•	•	•	•
Ammonia, Aqueous 0-10%	•	38	–	–
Ammonia, Gas	•	38	–	–
Ammonium Bicarbonate	•	49	•	–
Ammonium Bisulfite	•	49	–	–
Ammonium Carbonate	•	49	–	–
Ammonium Citrate	•	49	•	–
Ammonium Fluoride	•	49	–	–
Ammonium Hydroxide 5%	•	49	•	–
Ammonium Hydroxide 10%	•	49	•	–
Ammonium Hydroxide 20%	•	49	–	–
Ammonium Nitrate	•	49	•	•
Ammonium Persulfate	•	49	–	–
Ammonium Phosphate	•	49	–	–
Ammonium Sulfate	•	•	•	•
Arsenious Sulfate	•	•	•	–
O-Benzoyl Benzoic Acid	•	•	–	–
Barium Carbonate	•	•	•	–
Barium Chloride	•	•	•	–

Chemical Resistance Guide

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Barium Hydroxide	•	49	—	—
Barium Sulfate	•	•	•	•
Barium Sulfide	•	•	—	—
Beer	•	49	•	—
Benzene	—	—	—	—
5% Benzene in Kerosene	•	•	•	—
Benzene Sulfonic Acid	•	•	•	•
Benzoic Acid	•	•	•	—
Benzyl Alcohol	•	—	—	—
Benzyl Chloride	—	—	—	—
Brass Plating Solution:				
– 3% Copper Cyanide	•	•	—	—
– 6% Sodium Cyanide	•	•	—	—
– 1% Zinc Cyanide	•	•	—	—
– 3% Sodium Carbonate	•	•	—	—
Butyl Acetate	—	—	—	—
Butyric Acid 0-50%	•	•	•	—
Butylene Glycol	•	•	•	•
Cadmium Chloride	•	•	•	—
Cadmium Cyanide Plating Soln:				
– 3% Cadmium Oxide	•	49	—	—
– 6% Sodium Cyanide	•	49	—	—
– 1% Caustic Soda	•	49	—	—
Calcium Bisulfate	•	•	•	•
Calcium Carbonate	•	•	•	—
Calcium Chlorate	•	•	•	•
Calcium Chloride	•	•	•	•
Calcium Hydroxide	•	49	•	—
Calcium Hypochlorite	•	49	•	—
Calcium Nitrate	•	•	•	•
Calcium Sulfate	•	•	•	•
Calcium Sulfite	•	•	•	•
Caprylic Acid	•	•	•	—
Carbon Dioxide	•	•	•	•
Carbon Disulfide	—	—	—	—
Carbon Monoxide	•	•	•	•
Carbon Tetrachloride	•	38	—	—
Carbon Acid	•	•	•	—
Castor Oil	•	•	•	•
Carbon Methyl Cellulose	•	49	—	—
Chlorinated Wax	•	•	—	—
Chlorine Doixide/Air	•	•	•	—
Chlorine Dioxide, Wet Gas	•	•	—	—
Chlorine, Dry Gas	•	•	—	—
Chlorine, Wet Gas	•	•	—	—
Chlorine, Liquid	—	—	—	—

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Chlorine, Water	•	•	—	—
Chloroacetic Acid 0-50%	•	38	—	—
Chlorobenzene	—	—	—	—
Chloroform	—	—	—	—
Chlorosulfonic Acid	—	—	—	—
Chromic Acid 20%	•	49	—	—
Chromic Acid 30%	—	—	—	—
Chromium Sulfate	•	•	•	•
Citric Acid	•	•	•	•
Coconut Oil	•	•	•	—
Copper Chloride	•	•	•	•
Copper Cyanide	•	•	—	—
Copper Fluoride	•	•	—	—
Copper Nitrate	•	•	•	•
Copper Plating Solution:				
– Copper Cyanide	•	•	—	—
– 10.5% Copper	•	•	—	—
– 4% Copper Cyanide	•	•	—	—
– 6% Rochelle Salts	•	•	—	—
Copper Brite Plating:				
– Caustic Cyanide	•	38	—	—
Copper Plating Solution:				
– 45% Copper Fluorobrate	•	•	—	—
– 19% Copper Sulfate	•	•	—	—
– 8% Sulfuric Acid	•	•	—	—
Copper Matte Dipping Bath:				
– 30% Ferric Chloride	•	•	—	—
– 19% Hydrochloric	•	•	—	—
Copper Pickling Bath:				
– 10% Ferric Sulfate	•	•	—	—
– 10% Sulfuric Acid	•	•	—	—
Copper Sulfate	•	•	•	•
Corn Oil	•	•	•	—
Corn Starch-Slurry	•	•	•	—
Corn Sugar	•	•	•	—
Cottonseed Oil	•	•	•	—
Crude Oil, Sour	•	•	•	—
Crude Oil, Sweet	•	•	•	—
Cyclohexane	•	49	•	—
Detergents, Sulfonated	•	•	•	—
Di-Ammonium Phosphate	•	•	•	—
Dibromophenol	—	—	—	—
Dibutyl Ether	•	49	—	—
Dichloro Benzene	—	—	—	—
Dichloroethylene	—	—	—	—
Diesel Fuel	•	•	•	—

Chemical Resistance Guide

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Diethylene Glycol	•	•	•	–
Dimenthyl Phthalate	•	•	–	–
Dioctyl Phthalate	•	•	–	–
Diprophylene Gylcol	•	•	•	–
Dodecyl Alcohol	•	•	–	–
Esters, Fatty Acids	•	•	•	•
Ethyl Acetate	–	–	–	–
Ethyl Benzene	–	–	–	–
Ethyl Ether	–	–	–	–
Ethylene Gylcol	•	•	•	•
Ethylene Dichloride	–	–	–	–
Fatty Acids	•	•	•	•
Ferric Chloride	•	•	•	•
Ferric Nitrate	•	•	•	•
Ferric Sulfate	•	•	•	•
Ferrous Chloride	•	•	•	•
Ferrous Nitrate	•	•	•	•
Ferrous Sulfate	•	•	•	•
8-8-8 Fertiliser	•	49	•	–
Fertiliser:				
– Urea Ammoium Nitrate	•	49	–	–
Fuel Gas	•	•	–	–
Fluoboric Acid	•	49	–	–
Fluosilicic Acid 0-20%	•	•	–	–
Formaldehyde	•	•	•	–
Formic Acid	•	•	•	–
Fuel Oil	•	•	•	–
Gas Natural	•	•	•	–
Gasoline, Auto	•	•	•	–
Gasoline, Aviation	•	•	•	–
Gasoline, Ethyl	•	•	•	–
Gluconic Acid	•	•	•	–
Gasoline, Sour	•	•	•	–
Glucose	•	•	•	•
Glycerine	•	•	•	•
Glycol, Ethylene	•	•	•	•
Glycol, Propylene	•	•	•	•
Glycolic Acid	•	•	•	–
Gold Plating Solution:				
– 63% Potassium Ferrocyanide	•	•	–	–
– 2% Potassium Gold Cyanide	•	•	–	–
– 8% Sodium Cyanide	•	•	–	–
Heptane	•	•	•	–
Hexane	•	•	•	–
Hexylene Glycol	•	•	•	•
Hydraulic Fluid	•	•	•	–

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Hydrobromic Acid 0-25%	•	•	•	–
Hydrochloric Acid 0-37%	•	•	•	–
Hydrocyanic Acid	•	•	•	–
Hydrofluoric Acid 10%	•	–	–	–
Hydrofluosilicic Acid, 10%	•	•	–	–
Hydrogen Bromide, Wet Gas	•	•	–	–
Hydrogen Chloride, Dry Gas	•	•	–	–
Hydrogen Chloride, Wet Gas	•	•	–	–
Hydrogen Peroxide	•	49	–	–
Hydrogen Sulfide, Dry	•	•	•	–
Hydrogen Sulfide, Aqueous	–	•	•	–
Hydrogen Fluoride, Vapour	•	•	–	–
Hydrosulfite Bleach	•	49	–	–
Hydrochlorus Acid 0-10%	–	–	–	–
Iron Plating Solution:				
– 45% Fecl: 15% Cacl	•	•	–	–
– 20% Fecl: 11% (Nh4)2 So4	•	•	–	–
Iron And Steel Claeaning Bath:				
–9% Hydrochloric: 23% Sulfuric	•	•	–	–
Isopropyl Amine	•	38	–	–
Isopropyl Palmitate	•	•	•	•
Jet Fuel	•	•	•	–
Kerosene	•	•	•	–
Lactic Acid	•	•	•	–
Lauroryl Chloride	•	•	–	–
Lauric Acid	•	•	•	–
Lead Acetate	•	•	•	–
Lead Chloride	•	•	•	–
Lead Nitrate	•	•	•	–
Lead Plating Solution:				
–.8% Fluoboric, 0.4% Boric Acid	•	•	–	–
Levulinic Acid	•	•	•	–
Linseed Oil	•	•	•	•
Lithium Bromide	•	•	•	•
Lithium Sulfate	•	•	•	•
Magnesium Bisulfite	•	•	•	–
Magnesium Carbonate	•	•	•	–
Magnesium Chloride	•	•	•	•
Magnesium Hydroxide	•	60	–	–
Magnesium Nitrate	•	•	•	–
Magnesium Sulfate	•	•	•	•
Maleic Acid	•	•	•	•
Mercuric Chloride	•	•	•	–
Mercurous Chloride	•	•	•	–
Methylene Chloride	–	–	–	–
Methyl Ethyl Ketone	–	–	–	–

Chemical Resistance Guide

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Methyl Isobutyl Carbitol	—	—	—	—
Methanol (See Alcohol)	•	•	•	—
Methyl Isobutyl Ketone	—	—	—	—
Methyl Styrene	—	—	—	—
Mineral Oils	•	•	•	•
Molybdenum Disulfide	•	•	•	—
Monochloro Acetic Acid	—	—	—	—
Monoethyanolamine	—	—	—	—
Motor Oil	•	•	•	•
Myristic Acid	•	•	—	—
Naptha	•	•	•	•
Napthalene	•	•	•	—
Nickel Chloride	•	•	•	•
Nickel Nitrate	•	•	•	•
Nickel Plating:				
– 8% Lead, 0.8% Flouboric Acid	•	•	—	—
– 0.4% Boric Acid	•	•	—	—
Nickel Plating:				
– 11% Nickel Sulfate	•	•	•	—
– 2% Nickel Chloride	•	•	•	—
– 1% Boric Acid	•	•	•	—
Nickel Plating:				
– 44% Nickel Sulfate	•	•	•	—
– 4% Ammonium Chloride	•	•	•	—
– 4% Boric Acid	•	•	•	—
Nickel Sulfate	•	•	•	•
Nitric Acid 0-5%	•	•	•	•
Nitric Acid 20%	•	49	—	—
Nitric Acid Fumes	—	—	—	—
Nibrobenzene	—	—	—	—
Octanoci Acid	•	•	•	—
Oil, Sour Crude	•	•	•	•
Oil, Sweet Crude	•	•	•	•
Oleic Acid	•	•	•	•
Oleum (Fuming Sulfuric)	—	—	—	—
Olive Oil	•	•	•	•
Oxalic Acid	•	•	•	•
Peroxide Bleach:				
– 25% Peroxide 95%	•	•	•	•
– 0.025% Epsom Salts	•	•	•	•
– 5% Sodium Silicate 42.Be	•	•	•	•
– 1.4% Sulfuric Acid 66.Be	•	•	•	•
Phenol	—	—	—	—
Phenol Sulfonic Acid	—	—	—	—
Phosphoric Acid	•	•	•	•
Phosphoric Acid Fumes	•	•	•	•

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Phosphorous Pentoxide	•	•	•	•
Phosphorous Trichloride	—	—	—	—
Phthalic Acid	•	•	•	•
Pickling Acids (Sulfuric & Hydrochloric)	•	•	•	•
Picric Acid, Alcoholic	—	—	—	—
Polyvinyl Acetate Latex	•	•	•	—
Polyvinyl Alcohol	•	38	•	—
Polyvinyl Chloride Latex W/35 (Parts Dop)	•	49	—	—
Potassium Aluminium Sulfate	•	•	•	•
Potassium Bicarbonate	•	60	•	—
Potassium Bromide	•	38	•	—
Potassium Carbonate	•	60	•	—
Potassium Chloride	•	•	•	•
Potassium Dichromate	•	60	•	—
Potassium Ferricyanide	•	•	•	•
Potassium Ferrocyanide	•	•	•	•
Potassium Hydroxide	•	66	—	—
Potassium Nitrate	•	•	•	•
Potassium Permanganate	•	60	•	—
Potassium Persulfate	•	•	•	—
Potassium Sulfate	•	•	•	•
Propionic Acid 1-50%	•	49	—	—
Propionic Acid 50-100%	—	—	—	—
Propylene Glycol	•	•	•	•
Pulp Paper Mill Effluent	•	•	•	—
Pyridine	—	—	—	—
Salicylic Acid	•	60	—	—
Sebacic Acid	•	•	—	—
Selenious Acid	•	•	—	—
Silver Nitrate	•	•	•	•
Silver Plating Solution:				
– 44% Silver Cyanide	•	•	—	—
– 7% Potassium Cyanide	•	•	—	—
– 5% Sodium Cyanide	•	•	—	—
– 2% Potassium Carbonate	•	•	—	—
Soaps	•	•	•	—
Sodium Acetate	•	•	•	—
Sodium Benzoate	•	•	•	—
Sodium Bicarbonate	•	•	•	•
Sodium Bifluoride	•	49	•	—
Sodium Bisulfate	•	•	•	•
Sodium Bisulfite	•	•	•	•
Sodium Bromate	•	60	•	•
Sodium Bromide	•	•	•	•
Sodium Carbonate 0-25%	•	•	•	—

Chemical Resistance Guide

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Sodium Chlorate	•	•	•	–
Sodium Chloride	•	•	•	•
Sodium Chlorite	•	•	•	–
Sodium Chromite	•	•	•	•
Sodium Cyanide	•	•	•	–
Sodium Dichromate	•	•	•	•
Sodium Di-Phosphate	•	•	•	•
Sodium Ferricyanide	•	•	•	•
Sodium Fluoride	•	49	•	–
Sodium Fluoro Silicate	•	49	–	–
Sodium Hexametaphosphates	•	38	–	–
Sodium Hydroxide 0-5%	•	66	–	–
Sodium Hydroxide 5-25%	•	66	–	–
Sodium Hydroxide 50%	•	66	–	–
Sodium Hydrosulfide	•	•	•	–
Sodium Hypochlorite	•	66	•	–
Sodium Lauryl Sulfate	•	•	•	•
Sodium Mono-Phosphate	•	•	•	•
Sodium Nitrate	•	•	•	•
Sodium Silicate	•	•	•	–
Sodium Sulfate	•	•	•	•
Sodium Sulfide	•	•	•	–
Sodium Sulfite	•	•	•	–
Sodium Tetra Borate	•	•	•	•
Sodium Thiocyanate	•	•	–	–
Sodium Thiosulfate	•	•	•	–
Sodium Tripolyphosphate	•	•	•	–
Sodium Xylene Sulfonate	•	•	•	–
Sodium Solutions	•	•	•	–
Sodium Crude Oil	•	•	•	•
Soya Oil	•	•	•	•
Stannic Chloride	•	•	•	•
Stannous Chloride	•	•	•	•
Stearic Acid	•	•	•	•
Styrene	–	–	–	–
Sugar, Beet And Cane Liquor	•	•	•	–
Sugar, Sucrose	•	•	•	•
Sulfamic Acid	•	•	•	–
Sulfanilic Acid	•	•	•	–
Sulfated Detergents	•	•	•	–
Sulfur Dioxide, Dry Or Wet	•	•	–	–
Sulfur Trioxide/Air	•	•	–	–
Sulfuric Acid 0-30%	•	•	•	•
Sulfuric Acid 30-50%	•	•	–	–
Sulfuric Acid 50-70%	•	49	–	–
Sulfurous Acid	•	38	–	–

Chemical	V-Series®		I-Series®	
	Room Temp	70°C	Room Temp	70°C
Superphosphoric Acid (76% P2 05)	•	•	•	–
Tall Oil	•	60	•	–
Tannic Acid	•	66	•	–
Tartaric Acid	•	•	•	•
Thionyl Chloride	–	–	–	–
Tin Plating:				
– 18% Stannous Fluorborate	•	•	–	–
– 7% Tin	•	•	–	–
– 9% Fluoroboric Acid	•	•	–	–
– 2% Boric Acid	•	•	–	–
Toluene	–	–	–	–
Toluene Sulfonic Acid	•	•	–	–
Transformer Oils:				
– Mineral Oil Types	•	•	•	•
– Chloro-Phenyl Types)	•	•	•	•
Trichlor Acetic Acid	•	•	•	–
Trichlorethylene	–	–	–	–
Trichloropenol	–	–	–	–
Tricresyl Phosphate	•	49	–	–
Tridecylbenzene Sulfonate	•	•	•	–
Trisodium Phosphate	•	•	•	–
Turpentine	•	38	–	–
Urea	•	38	–	–
Vegetable Oils	•	•	•	•
Vinegar	•	•	•	•
Vinyl Acetate	–	–	–	–
Water:				
– Deionised	–	–	–	–
– Demineralised	•	•	•	•
– Distilled	•	•	•	•
– Fresh	•	•	•	•
– Salt	•	•	•	•
– Sea	•	•	•	•
White Liquor (Pulp Mill)	•	•	•	–
Xylene	–	–	–	–
Zinc Chlorate	•	•	•	•
Zinc Nitrate	•	•	•	•
Zinc Plating Solution:				
– 9% Zinc Cyanide	•	49	–	–
– 4% Sodium Cyanide	•	49	–	–
–9% Sodium Hydroxide	•	49	–	–
Zinc Plating Solution:				
– (49% Zinc Fluoroborate	•	•	•	–
– 5% Ammonium Chloride	•	•	•	–
– 6% Ammonium Fluoroborate	•	•	•	–
Zinc Sulfate	•	•	•	•

Notes

TREADWELL

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