EX-Series®
RailEX® ROUND

Handrail Product Guide

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

We are pleased to be able to bring to you the most extensive range of FRP Handrail Products released yet - welcome to the RailEX® System.

Treadwell's RailEX® Ergonomic Tubular Handrail System is an industrial rated composite handrail product which combines strength, durability and versatility, meaning the system is ideal for use in numerous applications in many industries.

With the flexibility to supply handrail as either components modulised panels to suit your exact requirements, Treadwell and the brand names EX-Series® and RailEX® are the names you can rely on.

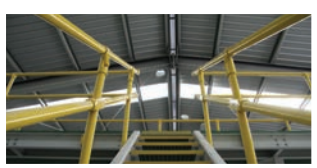
A BRIEF HISTORY

Treadwell Group is one of the most established names in the supply of Access Systems throughout Australia.

Our centrally located Adelaide fabrication facility, coupled with our second to none distribution network across Australia and 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 industrial process plants, mining applications, marine and costal environments as well as public infrastructure, Treadwell has the experience to help you specify the right resin systems and products every time.

If you have any unique design problems, chances are we've encountered something similar before. Get in contact today - Freecall 1800 246 800.



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TREADWELL™
ACCESS SYSTEMS

Contents

Quality Policy

Quality is at the forefront of Treadwell's working practices. With over 15 years 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.

TREADWELL
ACCESS SYSTEMS

FRP Handrail Selection Guide

Our Commitment to Testing

Structural integrity is paramount with access safety products. With this in mind, Treadwell has subjected all EX-Series® systems to a stringent series of tests by approved international testing agencies. This stringent tesing and test data allows engineers to review how the performance of this system exceeds the high standards demanded.

At the time of testing Treadwell's RailEX® systems were the first completely FRP handrail system to have been tested by a NATA accredited laboratory to Australian Standards AS1657 and conform.

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

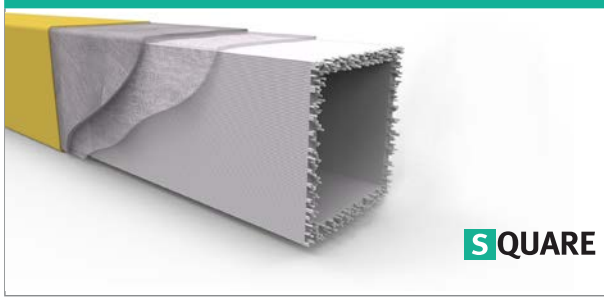
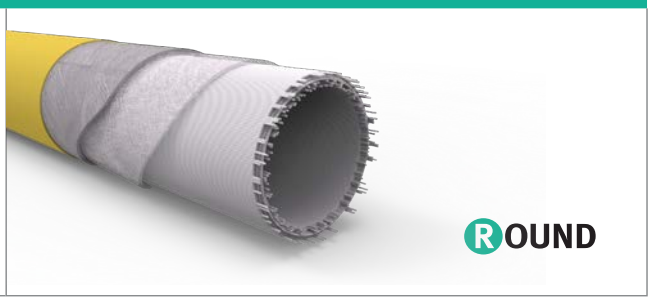
FRP is manufactured from a more economically sound raw material base than metallic alternatives, and is far more structurally sound when compared to timber and plastic materials.

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.

Materials of Construction

RailEX® FRP handrail is constructed from fibreglass rovings combined with a blend of thermosetting resin systems. All of the resins used in the production of EX-Series® products contain UV inhibitors and fire retardant additives.

SQUARE RAIL	ROUND RAIL
	

What is RailEX® ROUND Tubular Handrail?

Treadwell's RailEX® ROUND Tubular Handrail is an industrial rated composite handrail system which combines strength, durability and versatility meaning the system is ideal for use in numerous applications in a vast range of industries. Treadwell can supply RailEX® as either components or as fabricated handrail panels ready for installation.

Smart Transposable Designs

Unlike traditionally welded alternatives, Treadwell FRP handrail system disposes the need for drafting, engineering and onsite fabrication while minimising installation costs. Treadwell's safety handrail systems can be adapted or extended with additional components, or cut to size on-site. Pre-engineered kits are supplied as a series of components with simple assembly instructions. With our clients in mind, Treadwell aims to minimise the cost of maintenance and repairs, and damaged components with easily with spare parts, available ex-stock.

Simple Zero Weld Assembly

As an added benefit, fibreglass handrail kits are assembled via a simple, zero weld construction method; reducing the chances for corrosion activation. Treadwell's RailEX® designs and fittings effectively eliminate the need for specialist trades, hot works permits, fire spotters and welding protection to finished surfaces. Our selection of FRP increases safety conditions for installers by eliminating toxic fumes, welding in wet areas and fire risk hazards.

Developed by Treadwell with the input of designers, and of course plan operators, at last this system offers you all benefits of traditional guardrail systems without the inherent problems - corrosion, welding and hot works permits for onsite modifications. Furthermore, this unique system is a first to be tested and conform with Australian Standards. AS 1657 RailEX® is the 'fit and forget' handrail system.

NATA Approved

AS 1657 This product conforms to AS1657

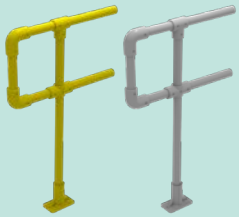
RailEX® Features and Benefits vs. Traditional Alternatives

	RailEX®	Stainless Steel	Galvanised Steel	Aluminium	Timber
Chemical Resistance	●●●●●	●●●●	●	●●●	●●●●
Strength	●●●●●	●●●●●	●●●●●	●●●●●	●●
Lightweight	●●●●●	●	●	●●●●●	●●
Electrical Resistance	●●●●●	●	●	●●●●●	●●●●●

EX-Series® Standard Colours

Treadwell's Standard Colours are Safety Yellow and Light Grey.

Contact Customer Service on 1800 246 800 or email us at sales@treadwellgroup.com.au for custom requirements – custom colours are available on request.



Did You Know?

Treadwell has the resource and expertise to fabricate handrail to your exact requirements and furthermore, we specialize in drafting to save you the bother. See page 18 for more details.

RailEX® ROUND System Overview

FAQ's

Dubious about the actual strength of FRP handrail?

Q: Are RailEX® handrails are the strongest type of non-metallic handrail available?

A: They are, based on equal product weights comparisons.- For higher strength and stiffness, RailEX® handrail panels incorporate glass reinforcing which no other plastic handrail features; for example, polypropylene handrails, which can be simply welded and are light-weight, will be affected by a much smaller temperature range than FRP and will not retain their structural integrity, especially on hot days outdoors. - Likewise, for additional strength, RailEX® panels typically contain 15-20% more reinforcing content (glass) in comparison to alternative FRP handrail systems on the market.

You're perhaps au fait with metal, but not FRP?

Q: How simply can I modify RailEX® handrail on site or even once it is installed?

A: Very simply. All that will be required is the correct tools to undertake the job, which consist mainly of simple carpenters' tools. All fittings are mechanically fastened and can be simply released by undoing fixings.

FRP handrail - why, when the frame must be metal?

Q: Is there a lot of point utilising RailEX® handrails, even though we are working in a corrosive environment, if frame work will be being built out of mild steel due to stainless steel not being viable?

A: Certainly there is. For industrial applications, Treadwell offers a family of FRP building products including structural shapes, grating, cladding and roofing, louvres, ridge vents & many other non-corrosive solutions, and our expertise includes in-house design and fabrication services.

How can you guarantee RailEX® will last outdoors?

Q: Does RailEX® offer better UV protection that alternative FRP materials?

A: Yes, RailEX® has additional means of UV protection. - Railex®, which is only ever produced with premium EX-Series® Resin Systems, incorporates an optimum amount of UV inhibitors and stabilisers within the material. - For longevity of surface serviceability, RailEX® surface veils are pre-finished with a factory applied two pack surface coating.

One of the most common questions asked is about the cost of Treadwell products.

Q: How does RailEX® compare to stainless steel in price?

A: Treadwell's FRP materials are normally less than the cost of stainless steel.

Q: How does RailEX® compare to carbon steel in price?

A: Treadwell's FRP materials are generally more expensive than carbon steel when comparing material costs. However, when factoring in installation, handling, transportation and other associated expenses, the total installed cost of FRP is therefore more competitive.

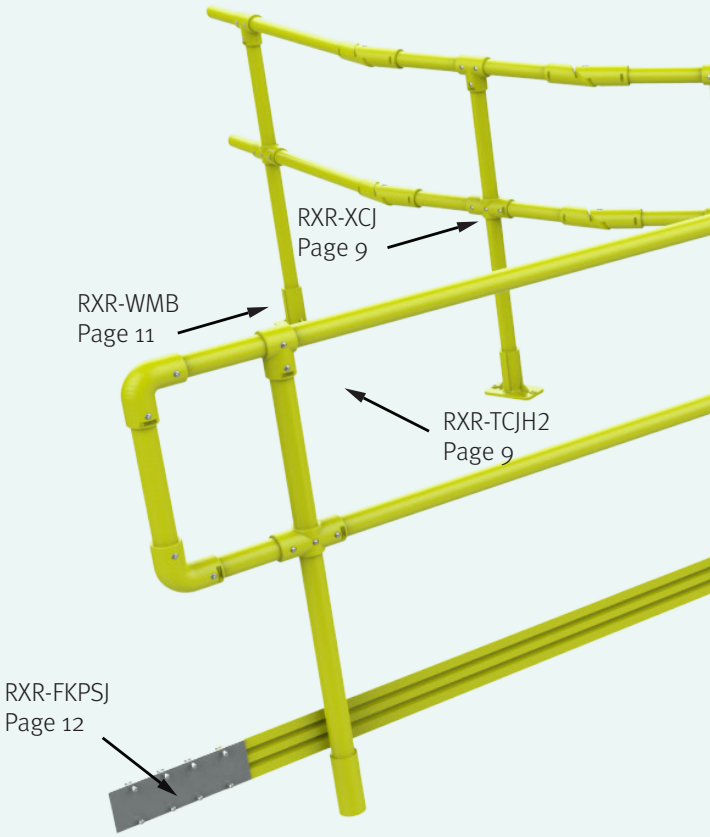
Q: How does RailEX® compare to aluminium in price?

A: Treadwell's FRP materials are usually priced competitively with aluminium and the total installed cost generally makes FRP a more price competitive choice than aluminium.

Q: How does RailEX® compare to wood in price?

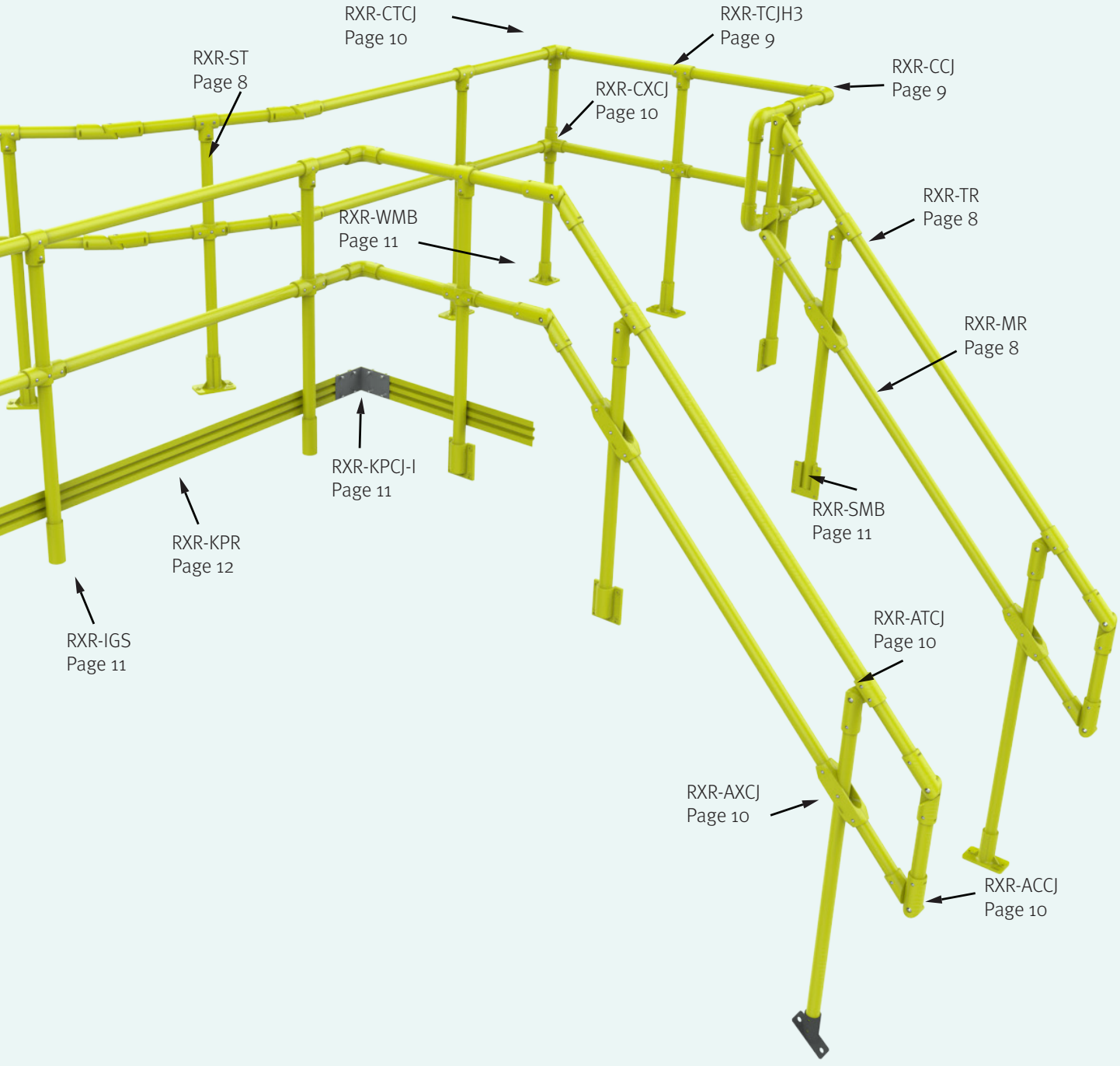
A: Treadwell's FRP materials cannot compete with wood on price alone. Customers considering using FRP in place of wood should evaluate the strength, not the resistance and over all performance requirements for the application and choose the best material accordingly.

RailEX® Rou



This illustration is for parts visualization only and does not represent an actual layout.

ND Overview


RXR-CTCJ
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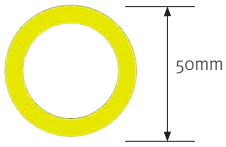
RailEX® ROUND Componentry

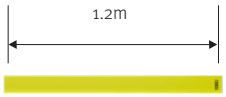
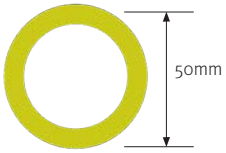
RailEX® ROUND Componentry

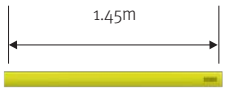
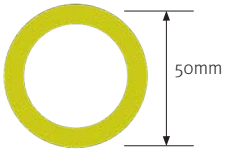
Developed to compliment Treadwell's range of corrosion resistant structural solutions, RailEX® offers you the ideal solution for the harshest of destructive, chemical, laden environments, both inside and out.

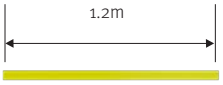
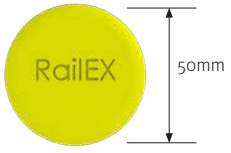
All of the RailEX® components are completely constructed from fibreglass reinforced plastic (FRP) and are coated with a two pack UV resistant coating to provide the peace of mind that premature breakdown of the product will not result from exposure to elements.

Standard Rail & Post Componentry

RXR-TR	3D	PLAN	ELEVATION
Description: Standard ROUND Fibreglass Top Rail **Length**: 3 metres			

RXR-ST	3D	PLAN	ELEVATION
Description: Standard ROUND Fibreglass Stanchion **Length**: 1.2 metres			

RXR-MR	3D	PLAN	ELEVATION
Description: Standard ROUND Fibreglass Mid Rail **Length**: 1.45 metres			

RXR-ST-S	3D	PLAN	ELEVATION
Description: Solid ROUND Fibreglass Stanchion Closed End **Height**: 1.2 metres			

Standard Componentry

RXR-CCJ

3D	ELEVATION	CROSS SECTION

Description:
Standard ROUND Fibreglass 90° Corner Connection Joint
Fixings Required:
2 x RXR-SFK06TL
Parts/Unit: Two



RXR-XCJ

3D	ELEVATION	CROSS SECTION

Description:
Standard ROUND Fibreglass Cross Connection Joint
Fixings Required:
3 x RXR-SFK06TL
Parts/Unit: Two



RXR-TCJH2

3D	ELEVATION	CROSS SECTION

Description:
Standard ROUND Vertical Fibreglass Connection Joint
Fixings Required:
2 x RXR-SFK06TL
Parts/Unit: Two



RXR-TCJH3

3D	ELEVATION	CROSS SECTION

Description:
Standard ROUND Horizontal Fibreglass Tee Connection Joint (three holes)
Fixings Required:
3 x RXR-SFK06TL
Parts/Unit: Two

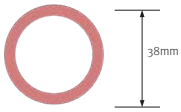


RXR-TRJ

3D	ELEVATION	CROSS SECTION

Description:
Standard ROUND Fibreglass Top Rail Joiner (to be used in conjunction with the RXR-TCJH3 and RXR-TRC)
Parts/Unit: One





Fasteners are available separately. Please refer to page 13 & 14 for more information.

RailEX® ROUND Componentry

Standard Componentry

RXR-TRC

3D	ELEVATION	CROSS SECTION
		

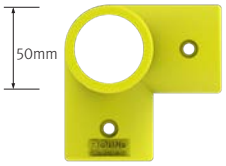
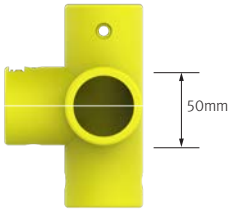
Description:
Standard ROUND Fibreglass Straight Connector
Fixings Required:
2 x RXR-SFK06TL
Parts/Unit: Two

RXR-CTCJ

3D	ELEVATION	PLAN
		

Description:
Standard ROUND Fibreglass Corner Tee Connection Joint
Fixings Required:
3 x RXR-SFK06TL
Parts/Unit: Two

RXR-CXCJ

3D	ELEVATION	PLAN
		

Description:
Standard ROUND Fibreglass Corner Cross Connection Joint
Fixings Required:
4 x RXR-SFK06TL
Parts/Unit: Two

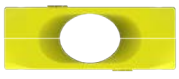
Adjustable Componentry

RXR-ACCJ

3D	ELEVATION	PLAN
		

Description:
Adjustable ROUND Fibreglass Corner Joint
Fixings Required:
2 x RXR-SFK06TL
1 x RXR-SFK10
Parts/Unit: Two

RXR-AXCJ

3D	ELEVATION	PLAN
		

Description:
Adjustable ROUND Fibreglass Cross Connection Joint
Fixings Required:
3 x RXR-SFK06TL
Parts/Unit: Two

Fasteners are available separately. Please refer to page 13 & 14 for more information.

Mounting Componentry

RXR-ATCJ	3D	ELEVATION	PLAN
Description: Adjustable ROUND Fibreglass Tee Connection Joint **Fixings Required:** 3 x RXR-SFK06TL 1 x RXR-SFK10 **Parts/Unit**: Three			

RXR-SMB	3D	ELEVATION	PLAN
Description: Standard ROUND Fibreglass Side Mounting Bracket **Parts/Unit**: One			

RXR-NMB	3D	ELEVATION	PLAN
Description: Standard ROUND Fibreglass Narrow Mounting Bracket **Parts/Unit**: One			

RXR-WMB	3D	ELEVATION	PLAN
Description: Standard Fibreglass Wide Base Mounting Bracket **Parts/Unit**: One			

RXR-IGS	3D	ELEVATION	PLAN
Description: Standard ROUND In-Ground Sleave Mounting Bracket **Parts/Unit**: One			

Fasteners depend on use. Please speak to us for more information.

RailEX® ROUND Componentry

Mounting Componentry

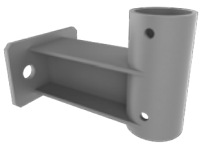
RXR-ATMB

Description:
Angled ROUND Fibreglass Corner Cross Connection Joint
Fixings Type: SS316 M8 Hex Head
Parts/Unit: One

3D	ELEVATION	PLAN
		

RXR-SMB-SS316

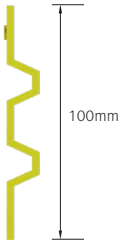
Description: ROUND Side Mounting Bracket 316 Stainless SFK10 offset: to be nominated
Fixings Type: SS316 M8 Hex Head
Parts/Unit: One

3D	ELEVATION	PLAN
		

Kick Plate Componentry

RXR-KPR

Description:
Standard Fibreglass Kick Plate Regular. Affix to Stanchion with RXR-KSF or RXR-RF
Fixings Required: RXR-KSF
Parts/Unit: One

3D	ELEVATION	PLAN
		

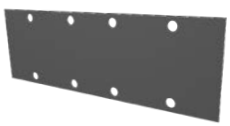
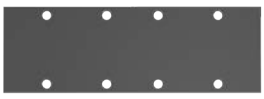
RXR-FKPCJ

Description:
Standard Fibreglass Kick Corner Joiner
Fixings Required: RXR-RF
Parts/Unit: One

3D	ELEVATION	PLAN
		

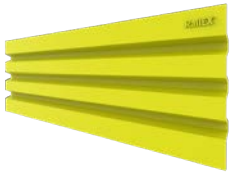
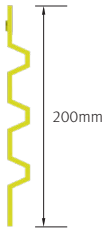
RXR-FKPSJ

Description:
Standard Fibreglass Kick Plate Straight Joiner
Fixings Required: RXR-RF
Parts/Unit: One

3D	ELEVATION	PLAN
		

Fasteners are available separately. Please refer to page 13 & 14 for more information.

Kick Plate Componentry

RXR-KPH	3D	ELEVATION	PLAN
Description: Standard Fibreglass Kick Plate High. Affix to Stanchion with RXR-KSF or RXR-RF **Fixings Required:** RXR-KSF **Parts/Unit**: One			

Fixing Componentry

RXR-SFK10	3D	ELEVATION	PLAN
Description: Standard Kick Plate Straight Joiner with Trilobular Head (stock item) **Fixings Required:** N/A **Parts/Unit**:Three			

RXR-SFK06TL	3D	ELEVATION	PLAN
Description: Standard Kick Plate Straight Joiner with Trilobular Head (stock item) **Fixings Required:** N/A **Parts/Unit**:Three			

RXR-SFK06ST	3D	ELEVATION	PLAN
Description: Standard Kick Plate Straight Joiner with Socket Head (on request) **Fixings Required:** N/A **Parts/Unit**:Three			

RXR-RF	3D	ELEVATION	PLAN
Description: Standard Stainless Steel Rivet Fastener **Fixings Required:** N/A **Parts/Unit**: One			

RailEX® ROUND Componentry

Fixing Componentry

RXR-KSF	3D	ELEVATION	PLAN
Description: Standard Stainless Kick Plate to Stanchion Fastener Kit **Fixings Required:** N/A **Parts/Unit**: Four			

Fixing Componentry

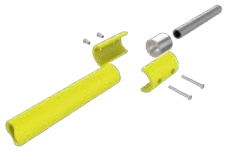
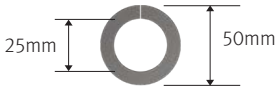
	3D	ELEVATION	PLAN
Description: Standard Stainless Steel Driver Kit M6 type **Fixings Required:** N/A **Parts/Unit**: One			

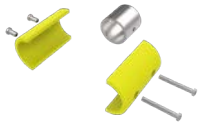
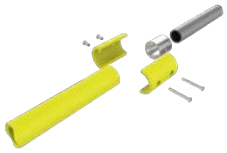
RXR-SFK06-STID	3D	ELEVATION	PLAN
Description: Standard Stainless Steel Socket Head Impact Drill Head **Fixings Required:** N/A **Parts/Unit**: One			

RXR-SFK06-TLD	3D	ELEVATION	PLAN
Description: Standard Stainless Steel Driver Kit M6 Type **Fixings Required:** N/A **Parts/Unit**: One			

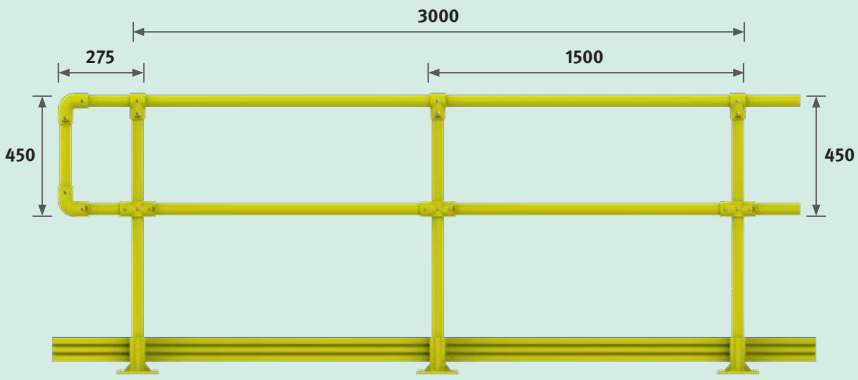
RXR-SFK06-TLID	3D	ELEVATION	PLAN
Description: Standard Stainless Steel Impact Drill Head **Fixings Required:** N/A **Parts/Unit**: One			

RailEX® ROUND Typical Sections

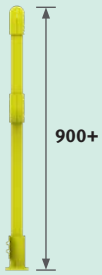
RXR-RCJ-VY-25NBMKIT	3D	ELEVATION	PLAN
Description: RailEX® ROUND Standard Rail Fibreglass Rail Joiner/Coupler Kit, Safety yellow with sleeve for 25NB Rail **Fixings Required:** N/A **Parts/Unit**: Seven			

RXR-RCJ-VY-32NBMKIT	3D	ELEVATION	PLAN
Description: RailEX® ROUND Standard Rail Fibreglass Rail Joiner/Coupler Kit, Safety yellow with sleeve for 32NB Rail **Fixings Required:** N/A **Parts/Unit**: Seven			

Top Mounted Section

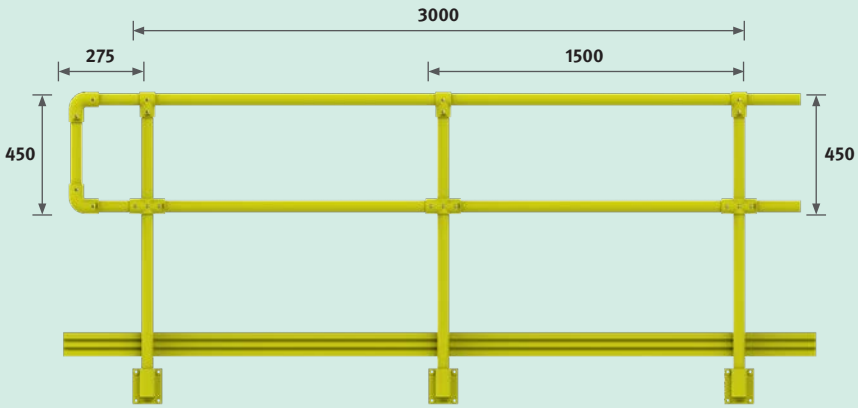


SIDE VIEW

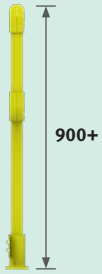


END VIEW

Side Mounted Section

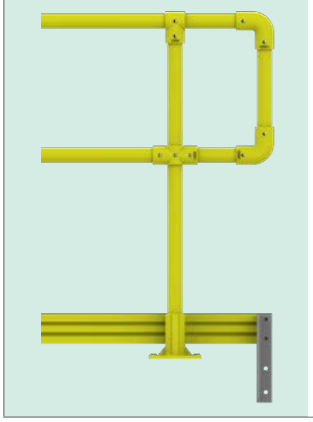
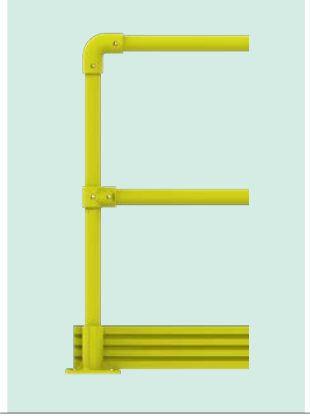
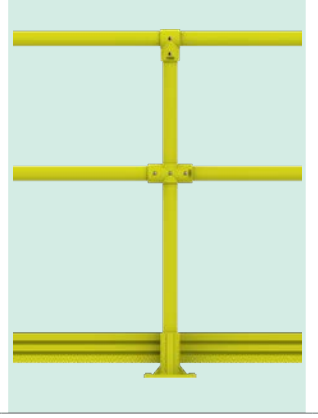
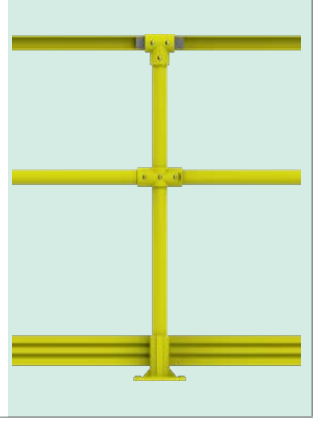


SIDE VIEW

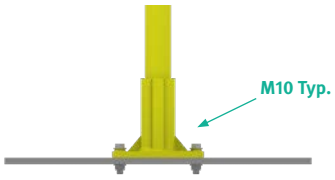


END VIEW

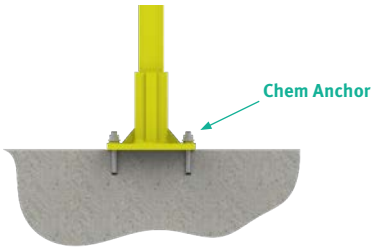
Engineering & Design Assistance

Closure Bend section	End Stanchion Section	Continual Top Rail Section	Top Rail Join Section
			

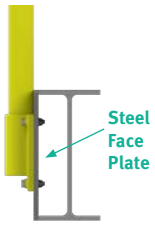
Surface Mounted to Steel Section



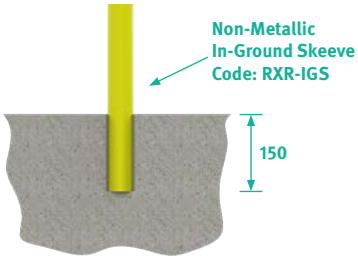
Surface Mounted to Concrete



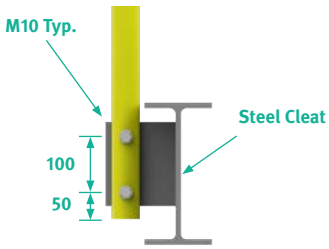
Side Mounted to Steel



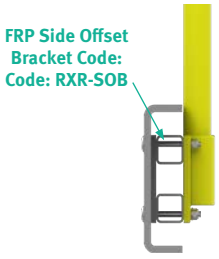
Removable Mounting to Concrete



Off-Set Mounting to Steel section



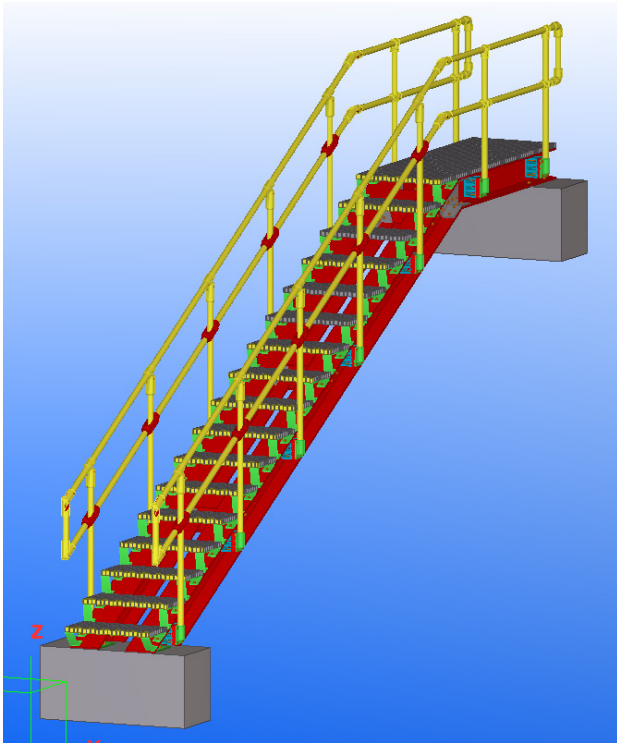
Side Off-Set Mounting to FRP/Steel



RailEX® Self Closing Gates

CAD

Because Treadwell is ever conscious that designers are a key stakeholder in our business, we have made the entire RailEX® componentry range available in several electronic file configurations. Contact us on 1800 246 800 to request your copy immediately.



Engineering Design & Assistance

Treadwell specialises in supplying handrail panels manufactured to suit your exact requirements.

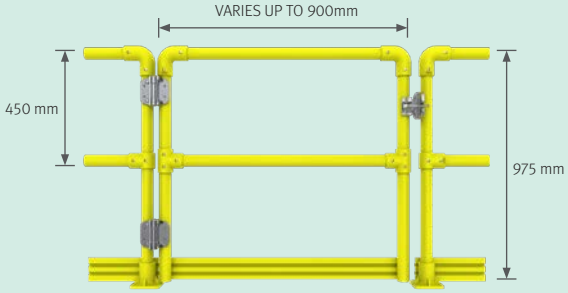
From initial design through to site delivery, Treadwell has the expertise and capacity to provide a turnkey handrail solution. From drafting or design, through to fabrication of handrail panels or modules and delivery as well. Treadwell can organise the lot for you.

All Treadwell requires in order to undertake this service is the outline of parameters from you to which the handrail needs to be manufactured and our experienced design team can produce a detailed set of design drawings. These will then be submitted for client review and approval prior to being released to the Treadwell manufacturing department for actual fabrication.

Consider the benefits seriously! This saves you excessive site labour costs, makes for fast and efficient onsite installation and ensures you will end up with a satisfactory and professional finished product.

Treadwell's RailEX® gates are self-closing and are designed to attach to RailEX® stanchions. Both Economy and Premium gates can also be simply fitted to LadderEX® ROUND & SQUARE Grab Stiles. Single gates should not exceed 900mm.

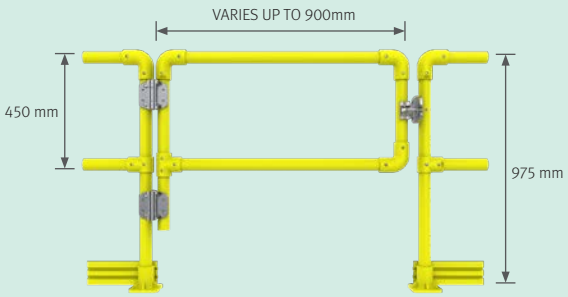
RailEX® Premium Gate



Brief:
Premium RailEX® gates are supplied with kick plates for added safety and awareness around sites.

RailEX® ROUND Specification Guide

RailEX® Economy Gate



Brief:
A solid industrial safety gate, the economy RailEX® self-closing gate features a spring-loaded mechanism which increases safety in any environment by automatically closing behind after use.

Appendix 2; Chemical Resistance Guide

General

1.0 Scope

1.1 The handrail/guard rail shall conform to the material and fabrications requirements as per this specification

2.0 Standards/Related Documents

2.1 The handrail/guard rail system shall conform to the applicable sections of:

2.1.1 ASTM E 84 Surface Burning Characteristics of Building Materials.

2.1.2 ASTM D 635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

2.1.3 AS1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation

3.0 Design Criteria

3.1 The design criteria of the fibreglass products (FRP) shall be in accordance with governing building codes and generally accepted standards in the FRP industry.

3.2 Design live loads shall not exceed those set out in AS1657, to which Treadwell's RailEX® systems has been tested by a NATA approved testing laboratory & conforms to the standard.

4.0 Submittals

4.1 Shop drawings of all fabricated guard rail/ handrail modules shall be submitted by Treadwell (unless provided by the client) displaying clearly material sizes, types, styles, product codes and including types and sizes of fasteners as well as a layout if required.

4.2 Technical data and sample pieces can also be submitted if required.

5.0 Quality Assurance

6.0 Product Delivery Storage

6.1 All handrail/guard rail and components or ancillary items shall be fabricated as per the design and piece marked to design drawings.

6.2 All manufactured materials shall be delivered in unbroken packages.

Product System

7.0 Manufacturing Process

7.1 All fiberglass (FRP) items listed under this section shall be constructed from fiberglass reinforcement and resin of the quality necessary to meet the design requirements and dimensions as specified.

7.2 Fibreglass reinforcement shall be continuous roving and shall be in sufficient quantities as required for the application.

7.3 Resins shall be (refer to page 19) with chemical formulations as necessary to provide the corrosion resistance, strength and any other physical properties as required.

7.4 All finished surfaces are to be smooth, resin-rich free of voids and without dry spots, cracks reinforced areas and all fiberglass reinforced shall be well covered with resin to protect against exposure due to weather or wear.

7.5 All fiberglass (FRP) items shall be EITHER non-fire retardant OR have a tested flame spread rating of 25 or less when tested in accordance with the ASTM E-84 Tunnel Test.

7.6 All metallic accessories shall be manufactured from 316 stainless steel OR galvanized steel OR Monel. (OR refer to specific uncommon customer requests.)

7.7 All fittings will be fastened together utilizing Treadwell's unique and registered range of approved 316 Stainless Steel Fixing Systems which must be tightened using the full force with a standard Allen Key.

7.8 Handrail/guard rail parts shall then be coated with a two pack paint system to further enhance longevity of this product.

7.9 The fiberglass reinforcement content shall be maintained at acceptable levels for a) pultruded items and b) SMC moulded items so as to ensure excellent resilience and performance over time.

7.10 All fibreglass material shall have an ultraviolet light inhibiting chemical additive to resist UV degradation.

7.11 Colour shall be any Treadwell standard colours (Safety Yellow, Light Grey or a custom color)

7.12 RailEX handrails should not be used as direct supports of other items i.e. light poles. Failure to adhere to this might void the warranty.

8.0 Acceptable Manufacture

The fibreglass (FRP) ROUND Tubular Handrail System shall be manufactured by Treadwell Group pty Ltd of Australia.

Appendix 2; 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	I-Series		V-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	•	•	•	•
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	•	–	•	•

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
Barium Chloride	•	–	•	•
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	•	•	•	•

CALL 1800 246 800 | sales@treadwellgroup.com.au

Appendix 2; Chemical Resistance Guide

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
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	•–	•–	•–	•–
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	•	–	•	•

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
Crude Oil, Sour	•	–	•	•
Crude Oil, Sweet	•	–	•	•
Cyclohexane	•	–	•	49
Detergents, Sulfonated	•	–	•	•
Di-Ammonium Phosphate	•	–	•	•
Dibromophenol	–	–	–	–
Dibutyl Ether	–	–	•	49
Dichloro Benzene	–	–	–	–
Dichloroethylene	–	–	–	–
Diesel Fuel	••	––	••	••
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	•	•	•	•

Appendix 2; Chemical Resistance Guide

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
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	•	–	•	•
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	•	•	•	•

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
Magnesium Bisulfite	•	–	•	•
Magnesium Carbonate	•	–	•	•
Magnesium Chloride	•	•	•	•
Magnesium Hydroxide	–	–	•	60
Magnesium Nitrate	•	–	•	•
Magnesium Sulfate	•	•	•	•
Maleic Acid	•	•	•	•
Mercuric Chloride	•	–	•	•
Mercurous Chloride	•	–	•	•
Methylene Chloride	–	–	–	–
Methyl Ethyl Ketone	–	–	–	–
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)	–	–	–	–

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Appendix 2; Chemical Resistance Guide

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
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	•	•	•	•
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	–	–	•	•

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
– 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%	•	–	•	•
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	–	–	–	–

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
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
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	–	–	–	–

Chemical	I-Series		V-Series	
	Room Temp	70°C	Room Temp	70°C
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

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