

BoxRail

51mm Box Section Modular Handrail System

The UK's Highest
Performance
GRP Handrail



Composites 
Trade Association
Member Company



BOXRAIL 51mm Box Section Modular Handrail System

Product Description

The ENGRAIL 51 mm Box Section Modular Handrail System is a new-generation GRP pultruded handrail engineered for the most demanding industrial, rail, marine, and infrastructure applications.

Engineered Composites' GRP modular handrail system sets a new standard for high performance non metallic safety barriers. Precision pultruded for strength and consistency, it delivers impressive load capacity while remaining significantly lighter than steel, allowing faster installation with reduced manual handling risk. Designed for demanding infrastructure environments, it provides dependable structural integrity across walkways, platforms, staircases, and roof perimeters.

Built to outperform traditional materials, this GRP handrail will not corrode, rust, or degrade in wet, coastal, chemical, or high humidity conditions. Its non conductive and non magnetic properties enhance safety around electrical infrastructure, while its fire retardant formulation and rigid bonded fittings ensure long term durability with minimal maintenance. The result is a stronger, safer, and longer lasting solution engineered for whole life performance.

Independently Tested

Independently tested to exceed all UK and international standards, the system delivers industry-leading load capacity of 1.657 kN/m at 25mm deflection whilst achieving complete 100% elastic recovery - outperforming both steel and all competing GRP systems in the market.



Stronger Than Steel. Zero Maintenance.

1

Overview

PRODUCT NAME

ENGRAIL 51 mm Box Section
Modular Handrail System

A high-performance GRP (Glass Reinforced Plastic) pultruded handrail system that exceeds all UK and international load standards while delivering 100% elastic recovery.

Critical Test Results

All figures independently verified by Commercial Standard Testing Lab, Burton on 29th January 2026.

Deflection mm	Load Achieved kN/m	Standard Exceeded kN/m	Safety Factor x	Exceeded %
25 (UK Standard)	1.657	1.5 Public Assembly	1.10	+10.5
50 (Nordic Standard)	3.233	3.0 Crowd Loading	1.08	+7.8
100 (Safety Test)	7.159	1.5 Public Assembly	4.77	+377

Elastic Recovery

- 100% elastic recovery achieved
- Unit returned to original starting position after load removal
- Zero permanent deformation at any load level
- Material remains fully within elastic range even at extreme loads



1.657 kN/m at
25mm deflection



Exceeds Public Assembly
requirements by 10.5%



3.233 kN/m at
50mm deflection



Exceeds Nordic Crowd Loading
requirements by 7.8%



7.159 kN/m
ultimate capacity



4.77x safety factor over
Public Assembly



Zero permanent
deformation



100% elastic recovery

Complete Safety Factor Table

3

Standard/ Code	Classification	Requirement kN/m	ENGI Result kN/m	Safety Factor x	Exceeded %
BS 6180:2011	Light Duty	0.36	1.657	4.60	+360
BS 6180:2011	General Duty	0.36	1.657	4.60	+360
BS 4592-0:2006+A1:2012	Light Duty	0.36	1.657	4.60	+360
BS 4592-0:2006+A1:2012	General Duty	0.36	1.657	4.60	+360
BS 4592-0:2006+A1:2012	Heavy Duty	0.74	1.657	2.24	+124
BS EN 1991-1-1	Residential	0.36	1.657	4.60	+360
BS EN 1991-1-1	Office Areas	0.5	1.657	3.31	+231
BS EN 1991-1-1	Public Assembly	1.5	1.657	1.10	+10.5
Nordic Standard	50mm Deflection	3.0	3.233	1.08	+7.8
Ultimate Capacity	Safety Factor Test	1.5 (P.A.)	7.159	4.77	+377



4.6x safety factor over Light/
General Duty requirements



2.24x safety factor over
Heavy Duty requirements

Profile Specifications

Parameter	Specification
Product Name	ENGRAIL 51 mm Box Section Modular Handrail
Profile Geometry	51 mm x 51 mm Box Section
Manufacturing Process	Pultrusion
Material	GRP (Glass Reinforced Plastic)
Reinforcement	E-glass fibre roving
Resin System	Isophthalic polyester
Glass Content	Up to 70% by weight
Surface Finish	Polyester surface veil (UV protection)
EN 13706 Grade	E23 (Highest Performance Grade)

Mechanical Properties (E23 Grade)

Property	Minimum Value
Flexural Modulus	23 GPa
Tensile Modulus	23 GPa
Tensile Strength	240 MPa

Available Colours

Colour	RAL Code	Application
Safety Colour	RAL 1023	High visibility, rail, construction
Custom Colours	On Request	Project-specific requirements

Physical Characteristics

Property	Value
Weight	Approximately 25% of equivalent steel
Electrical Conductivity	Non-conductive
Thermal Conductivity	Low (warm to touch)
Corrosion Resistance	Excellent - inherently corrosion-free
UV Resistance	Excellent - polyester veil protection
Fire Performance	Self-extinguishing options available



More than double the capacity of typical GRP systems (0.36-0.74 kN/m)



Exceeds steel system performance whilst eliminating corrosion

Full Compliance Achieved

Standard	Description	Status
BS 6180:2011	Barriers in and about buildings	EXCEEDS
BS 4592-0:2006+A1:2012	Industrial flooring and handrails	EXCEEDS
BS EN 13706-3:2002	Pultruded profiles - E23 Grade	COMPLIANT
BS EN 1991-1-1	Eurocode - Actions on structures	EXCEEDS
BS EN ISO 14122-3	Safety of machinery - Guardrails	COMPLIANT
Approved Document K	Building Regulations (England)	COMPLIANT
Nordic Standards	50mm deflection requirements	EXCEEDS

The BOXRAIL 51mm Box System meets or exceeds all requirements...

The BOXRAIL 51mm Box System is designed to meet and exceed key UK and European safety standards for barrier and handrail applications. It complies with BS 6180:2011 for barriers in buildings and BS 4592-0:2006+A1:2012 for industrial handrails, while being manufactured to BS EN 13706-3:2002 E23 grade for pultruded structural profiles.

It is also engineered in accordance with BS EN 1991-1-1 Eurocode structural load requirements and BS EN ISO 14122-3 for machinery guardrails. Compliance with Approved Document K ensures suitability for building regulation applications, giving specifiers confidence in both safety and structural performance.

vs Typical Systems

Feature	ENGRail 51mm Box	Typical GRP Round Tube
Load at 25mm	1.657 kN/m	0.36-0.74 kN/m
Highest Classification	Public Assembly	Heavy Duty maximum
Elastic Recovery	100%	85-95%
Profile Geometry	Box section (superior stiffness)	Round tube
Permanent Deformation	Zero	Minor set possible

vs Steel Systems

Feature	ENGRail 51mm Box	Steel Handrails
Load Capacity	1.657 kN/m	0.74-1.5 kN/m typical
Elastic Recovery	100%	Deformation at high loads
Corrosion	None - maintenance free	Requires coating/ treatment
Weight	~25% of steel	Heavy
Electrical	Non-conductive	Conductive
Thermal	Warm to touch	Cold in winter
Maintenance	None required	Regular coating required

Key Differentiators

- Only GRP system to achieve Public Assembly rating - competitors max out at Heavy Duty
- 100% elastic recovery - steel deforms permanently, other GRP recovers 85-95%
- Box section geometry - superior stiffness vs round tube profiles
- 4.77x safety factor - massive reserve capacity demonstrated
- Zero permanent deformation - even at 7.159 kN/m
- Meets Nordic 50mm standard - opens Scandinavian market opportunities

Primary Sectors

Sector	Key Applications	Key Benefits
Rail	Platforms, footbridges, trackside access, stations, depots	Non-conductive, exceeds Network Rail requirements, lightweight
Marine/Offshore	Jetties, pontoons, offshore platforms, vessels	Corrosion-free, zero maintenance in salt environment
Water/ Utilities	Treatment works, pumping stations, reservoirs	Chemical resistant, non-conductive, corrosion-free
Nuclear	Access platforms, containment areas, safety barriers	Non-conductive, non-sparking, high performance
Chemical/ Pharma	Processing plants, laboratories, clean rooms	Chemical resistant, easy to clean, non-contaminating
Construction	Site barriers, temporary works, scaffold access	Lightweight, easy to install, reusable
Public Assembly	Retail, restaurants, theatres, sports venues, stations	Meets 1.5 kN/m requirement, warm to touch
Renewables	Solar farms, wind installations, substations	Non-conductive, maintenance-free, long life

Geographic Markets

Region	Deflection Standard	ENGI Compliance
UK	25mm (BS 6180)	1.657 kN/m - EXCEEDS
Europe	25mm (EN 1991)	1.657 kN/m - EXCEEDS
Nordic/ Scandinavia	50mm	3.233 kN/m - EXCEEDS
International	Varies	Contact technical team

Test Certificate Details

Item	Detail
Test Facility	Commercial Standard Testing Lab
Location	Burton, UK
Test Date	29th January 2026
Test Type	Static load and deflection with elastic recovery analysis
Test Duration	346.8 seconds (346 data points)
Report Reference	ENG RAIL 01-51BOX-TR-2026

Independently tested by Commercial Standard Testing Lab, Burton,
in accordance with BS 6180:2011 test methodology.

Full test report available on request.

Company Details

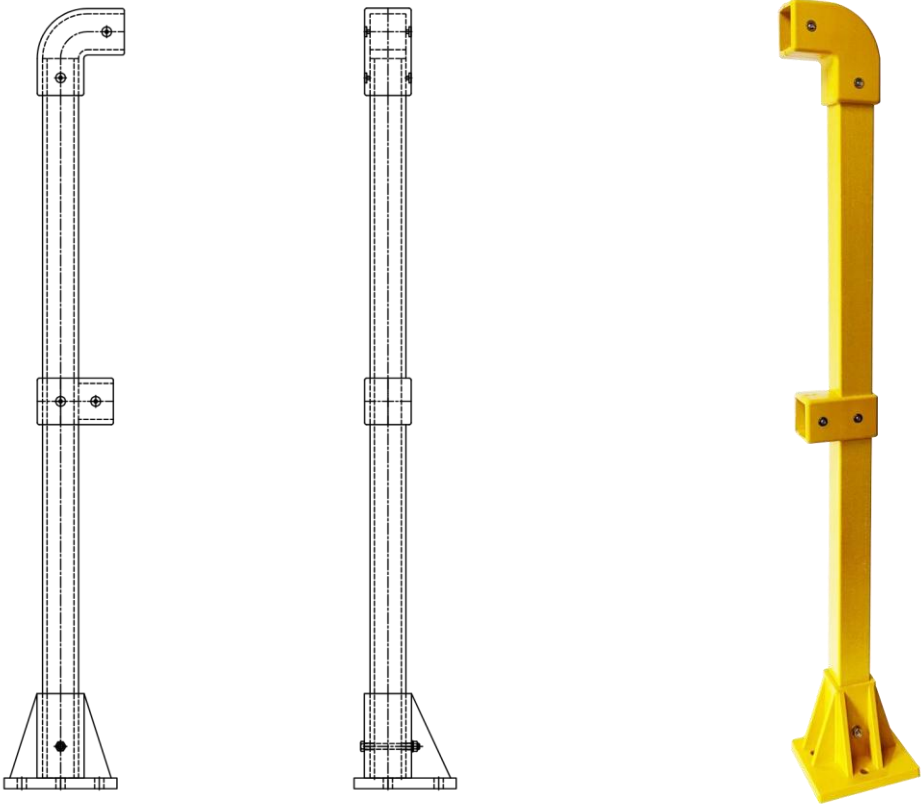
Item	Detail
Company Name	Captrad Limited
Location	Skelmersdale, United Kingdom
Established	1999
Certification	ISO 9001

Captrad Composites Limited is a leading UK manufacturer of GRP Glass Reinforced Plastic composite products, established in 1999 and headquartered in Chester. The company specialises in pultruded structural profiles, GRP grating, handrails, fencing, rebar, and bespoke fabrication solutions, supporting a wide range of demanding infrastructure and industrial applications.

Serving the rail, marine, utilities, nuclear, defence, and construction sectors, Captrad Composites combines nearly three decades of expertise with ISO 9001 certified quality management



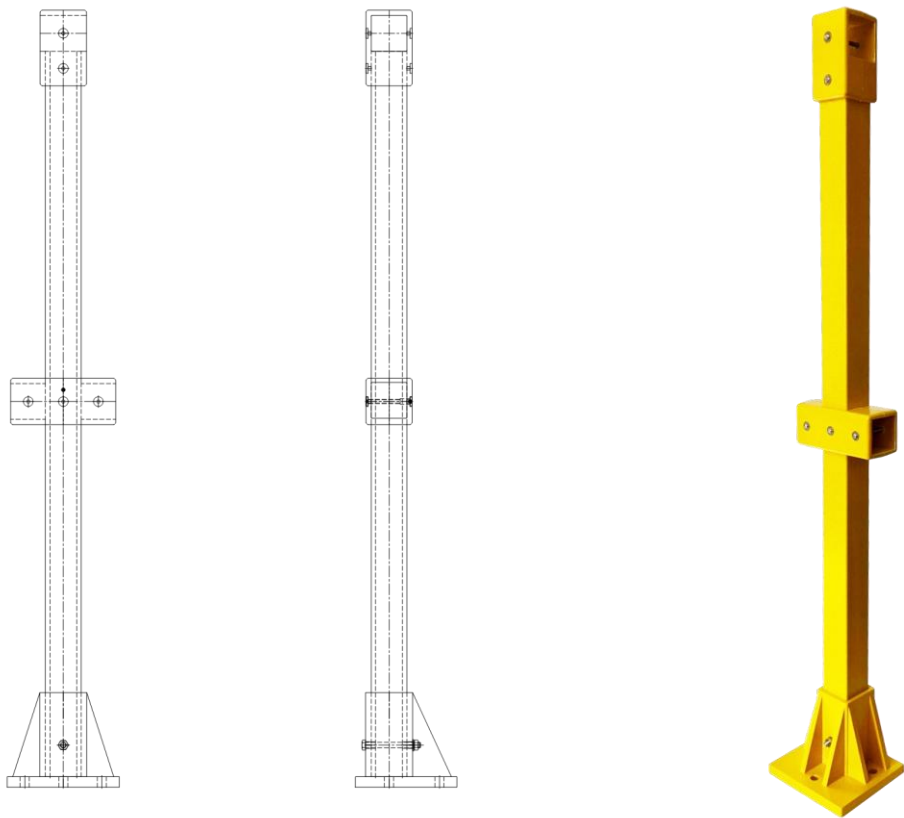
End Stanchion



No	Description	Qty	Material	Note
1	Base Foot for Box 51 x 51	1	FRP	3 Holes
2	Box 51 x 51 6.35	1	FRP	
3	3 Way for Box 51 x 51	1	FRP	
4	Elbow for Box 51 x 51	1	FRP	
5	Hex Bolt Set M8 x 80	1	304	
6	Pan Head Screw M6 x 65	4	304	
7	Square Neck Lock Nut M6	4	304	



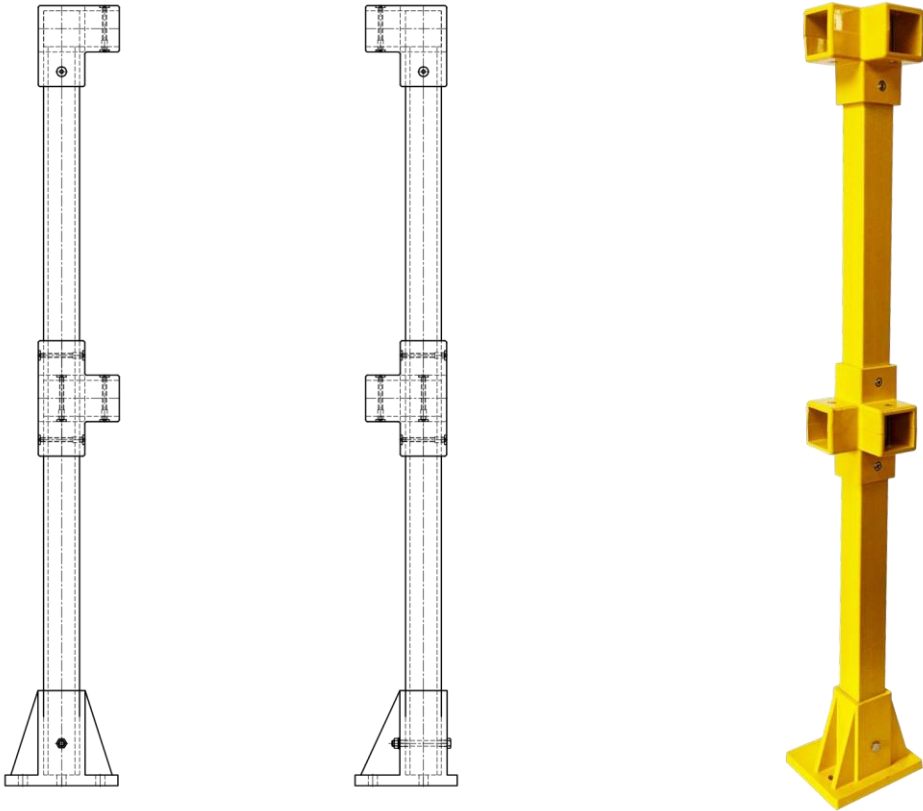
Mid Stanchion



No	Description	Qty	Material	Note
1	Base Foot for Box 51 x 51	1	FRP	3 Holes
2	Box 51 x 51 6.35	1	FRP	
3	3 Way for Box 51 x 51	1	FRP	
4	4 Way Box 51 x 51	1	FRP	
5	Hex Bolt Set M8 x 80	1	304	
6	Pan Head Screw M6 x 65	5	304	
7	Square Neck Lock Nut M6	5	304	

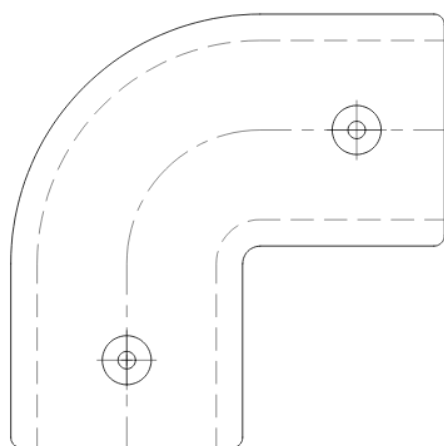
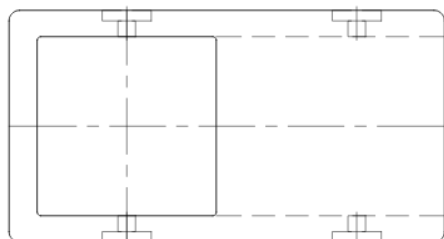


Corner Stanchion



No	Description	Qty	Material	Note
1	Base Foot for Box 51 x 51	1	FRP	3 Holes
2	Box 51 x 51 6.35	1	FRP	
3	3 Way Corner for Box 51 x 51	1	FRP	
4	4 Way Corner Box 51 x 51	1	FRP	
5	Hex Bolt Set M8 x 80	1	304	
6	Pan Head Screw M6 x 65	7	304	
7	Square Neck Lock Nut M6	7	304	

Elbow



System Components

GRP BOX SECTION

51 x 51mm pultruded GRP
box section with 6.35mm
wall thickness

MODULAR FITTINGS

90° elbows, 3-way and 4-way joints,
internal corners, base feet,
side feet, covers and end caps

STANCHION POSTS

Pre-fabricated end, mid and corner
posts supplied ready for installation

FIXINGS

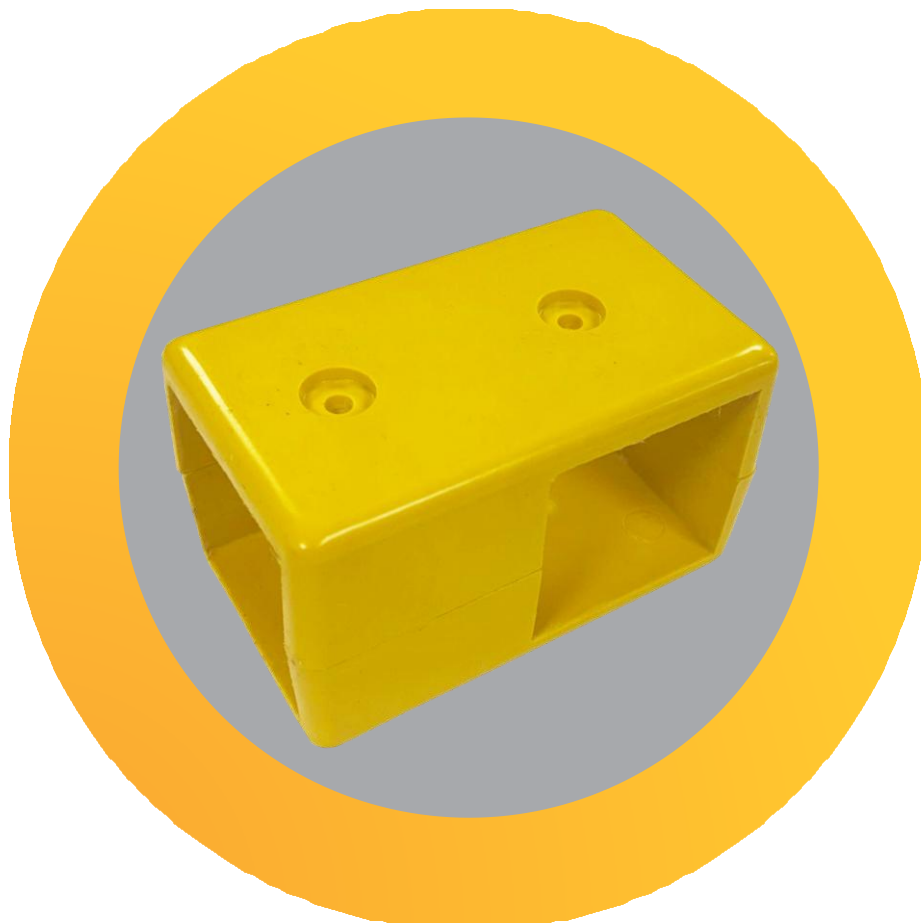
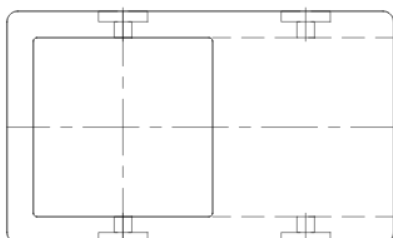
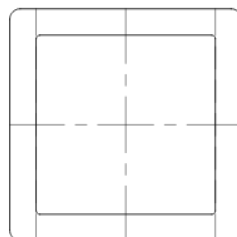
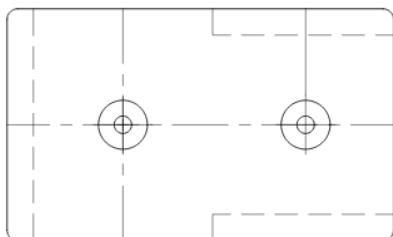
Stainless steel fixings supplied as
standard (Grade 304)

COLOURS

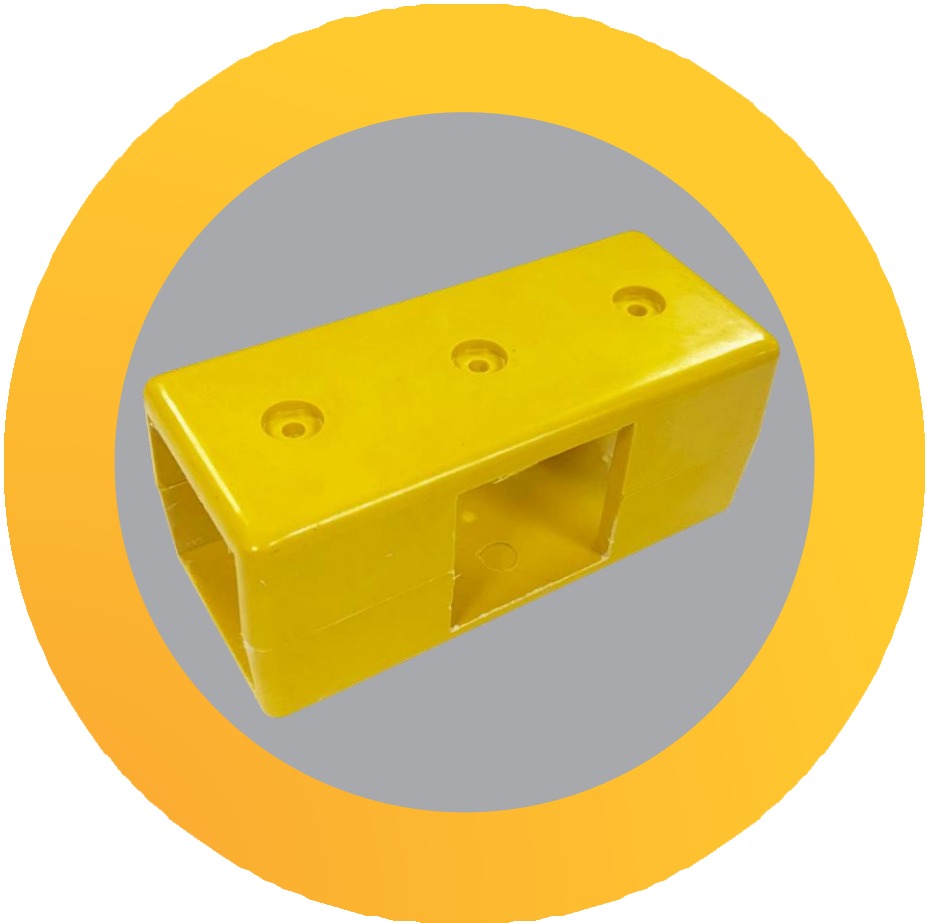
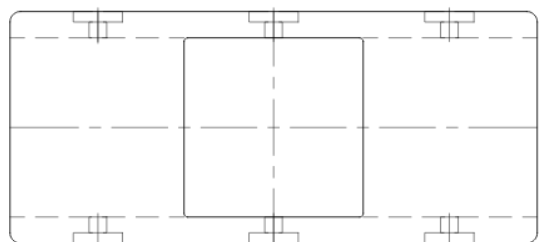
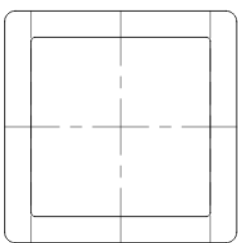
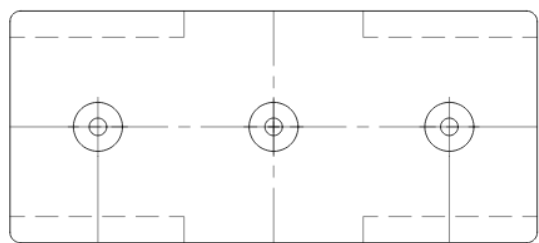
Grey (RAL 7001) or Yellow (RAL 1023)



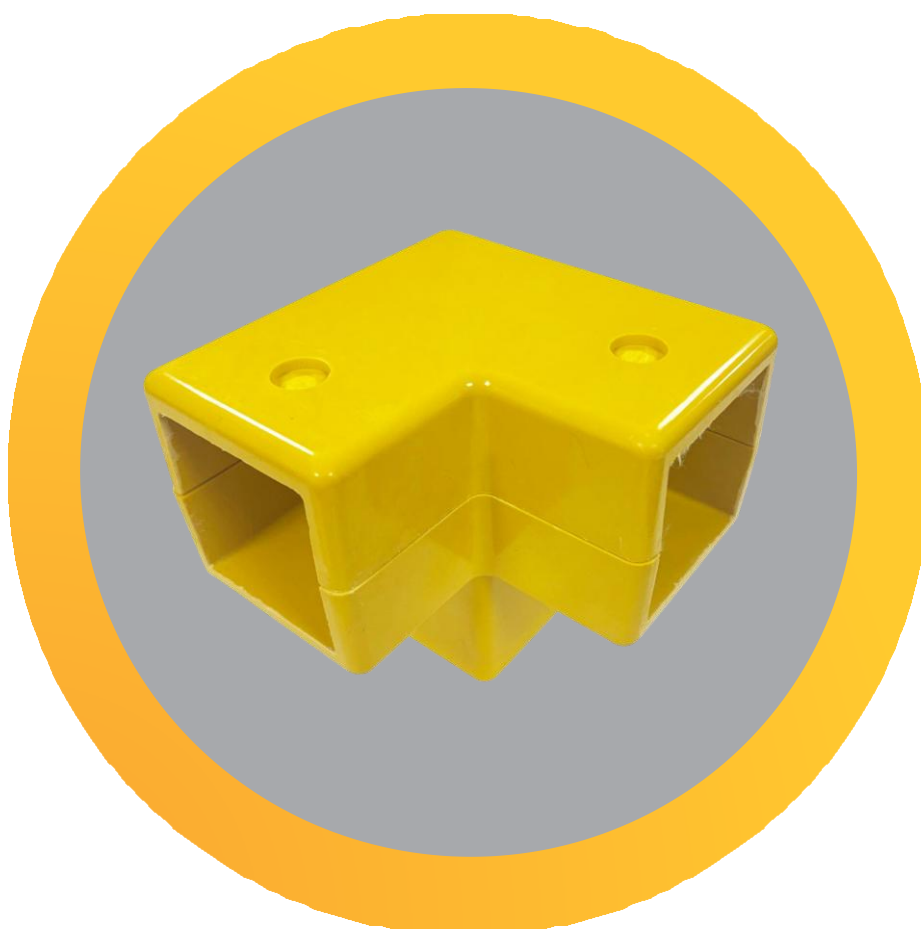
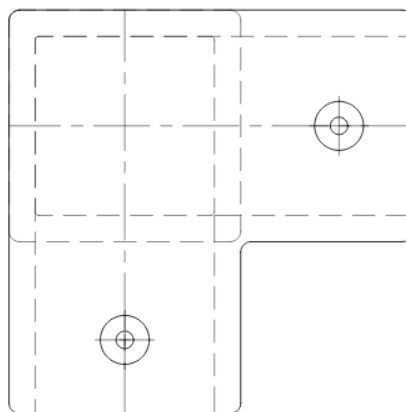
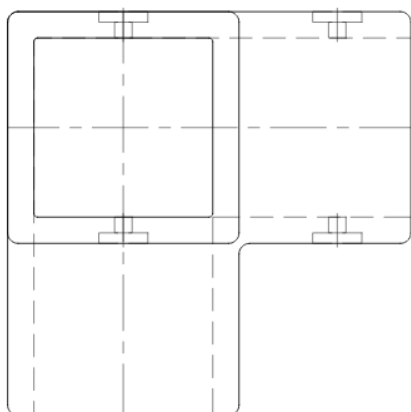
3 Way



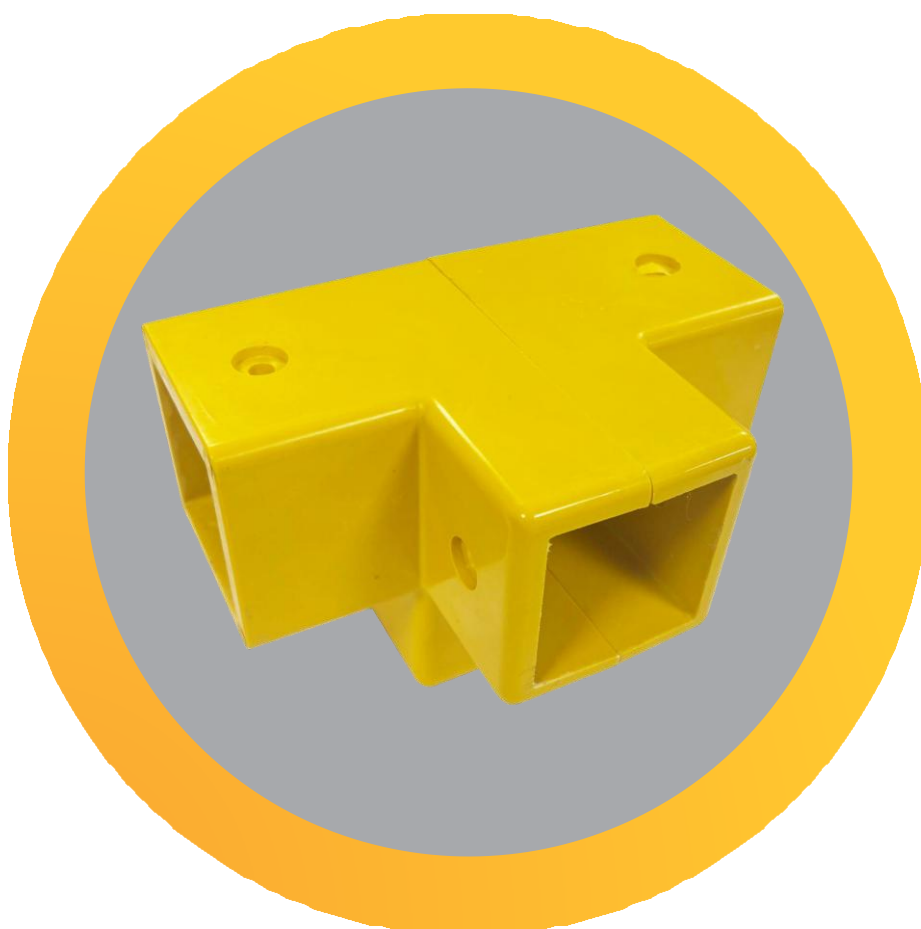
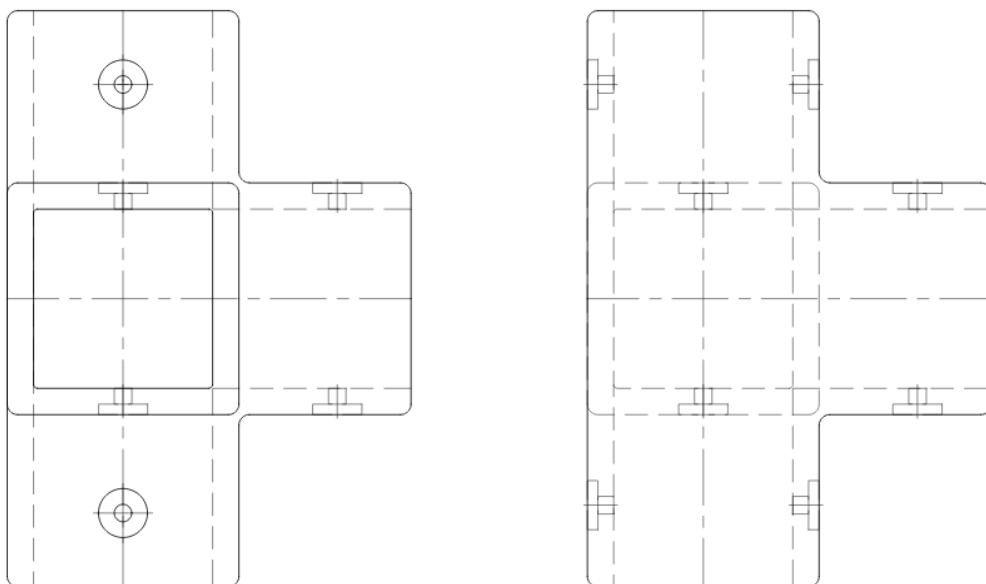
4 Way



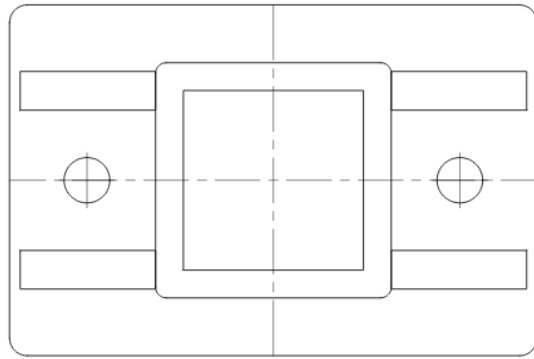
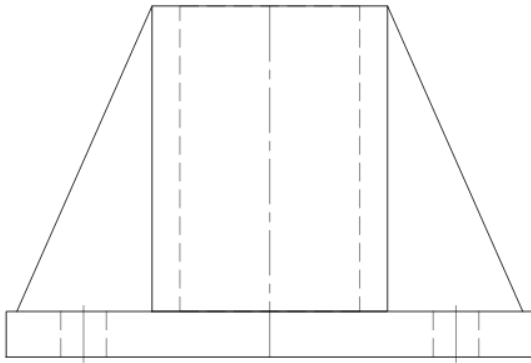
3 Way Corner



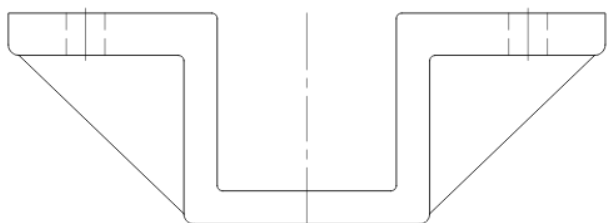
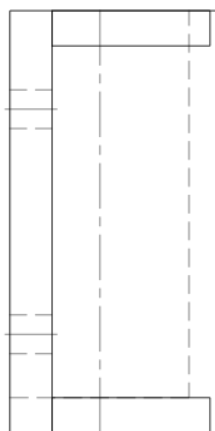
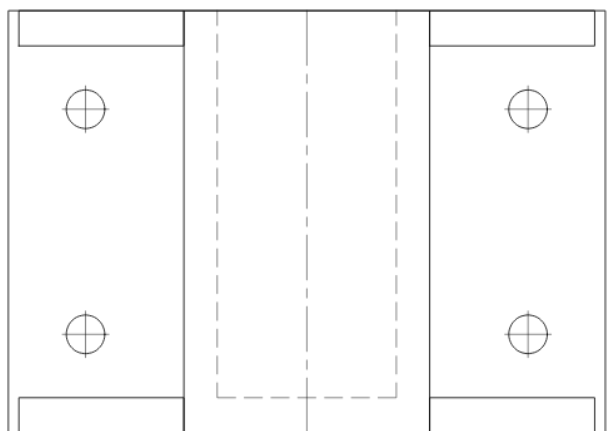
4 Way Corner



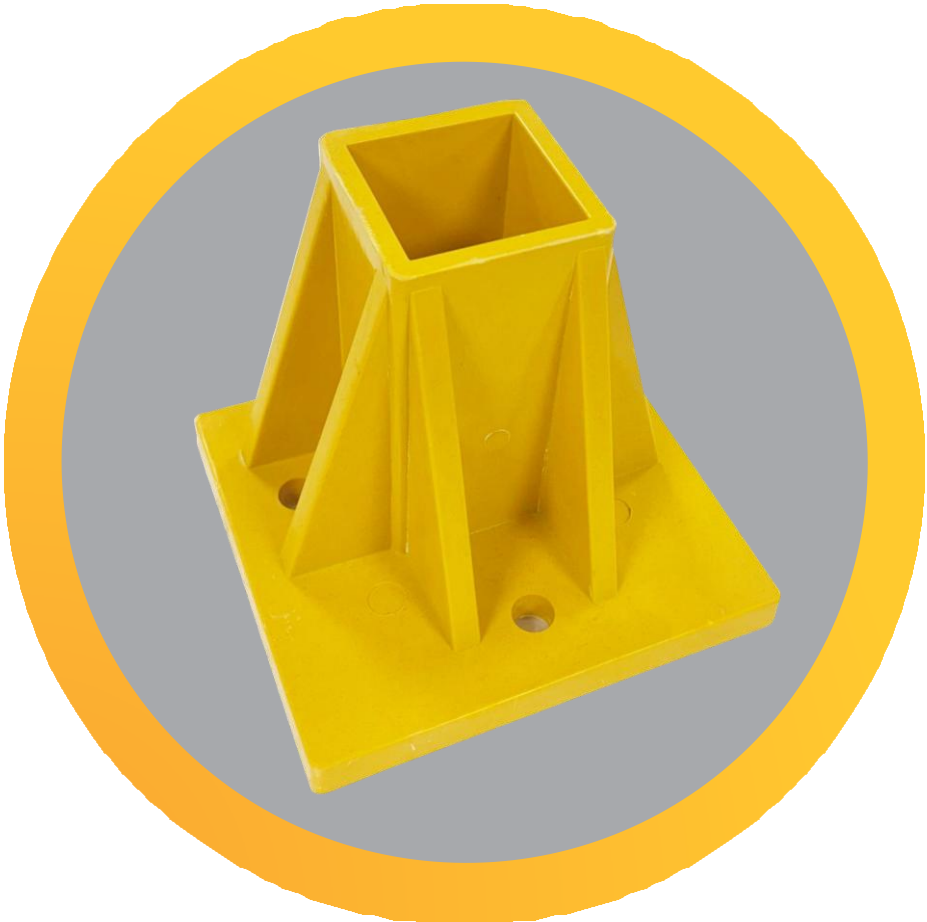
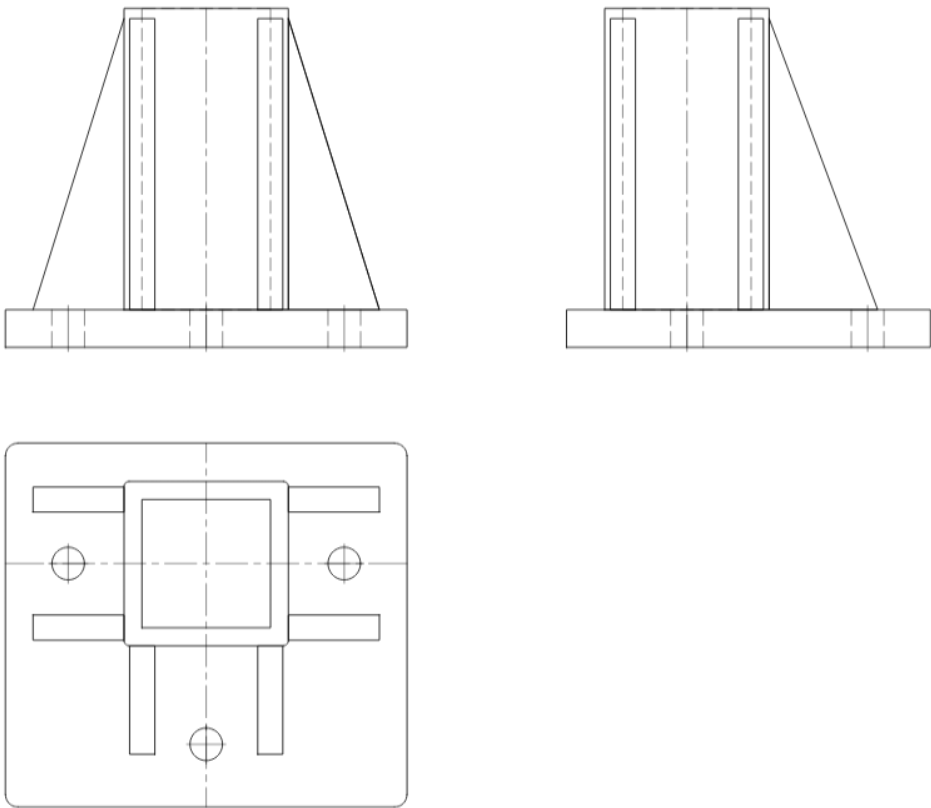
Base Foot 2 Holes



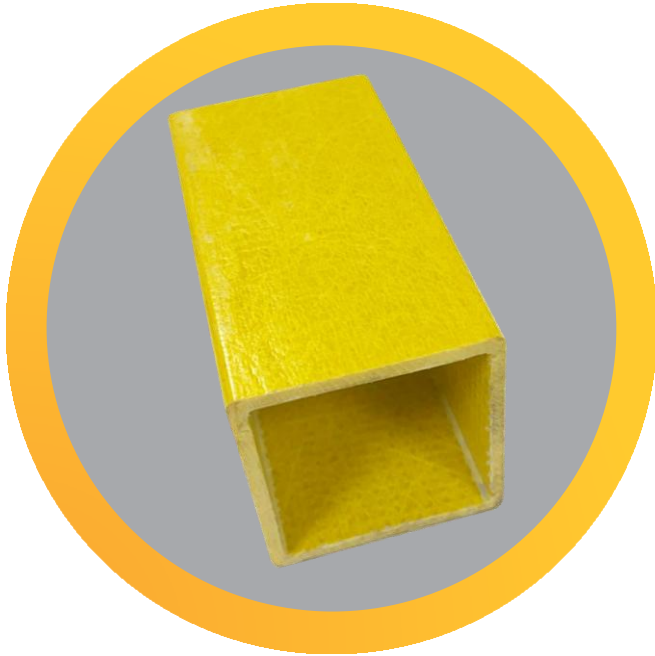
Side Foot



Base Foot 3 Holes



Box 51 x 51



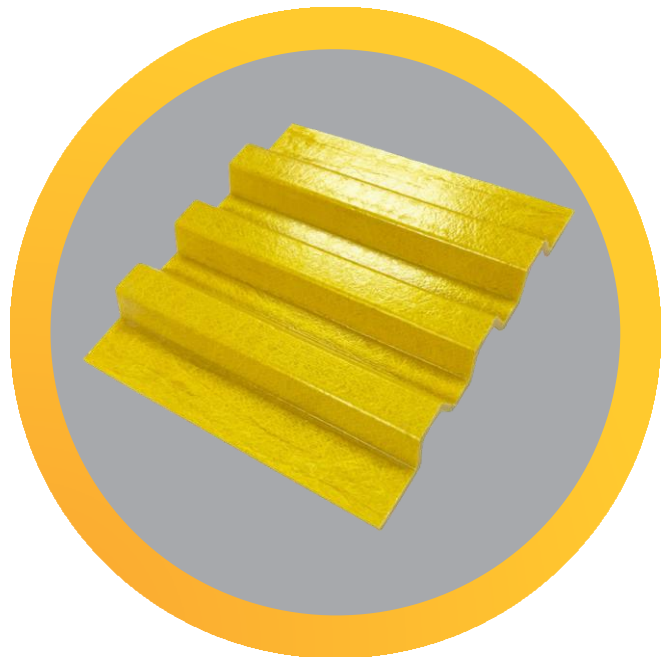
Multi Angle Connector

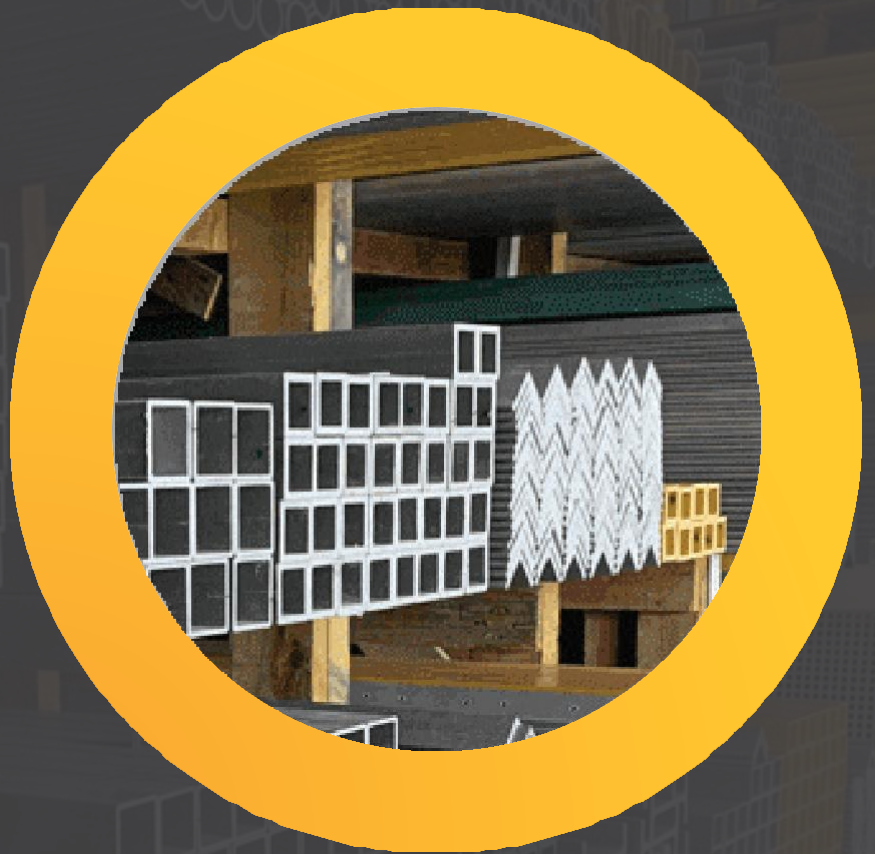


Bolts



Kick Plate





Contact Us



+44 (0) 01695 280510



Reach out today for expert advice and bespoke GRP solutions tailored to meet your specific project requirements and industry standards.



sales@captrad.com



Captrad.com



6a Gratton Place, Skelmersdale
WN8 9UE

