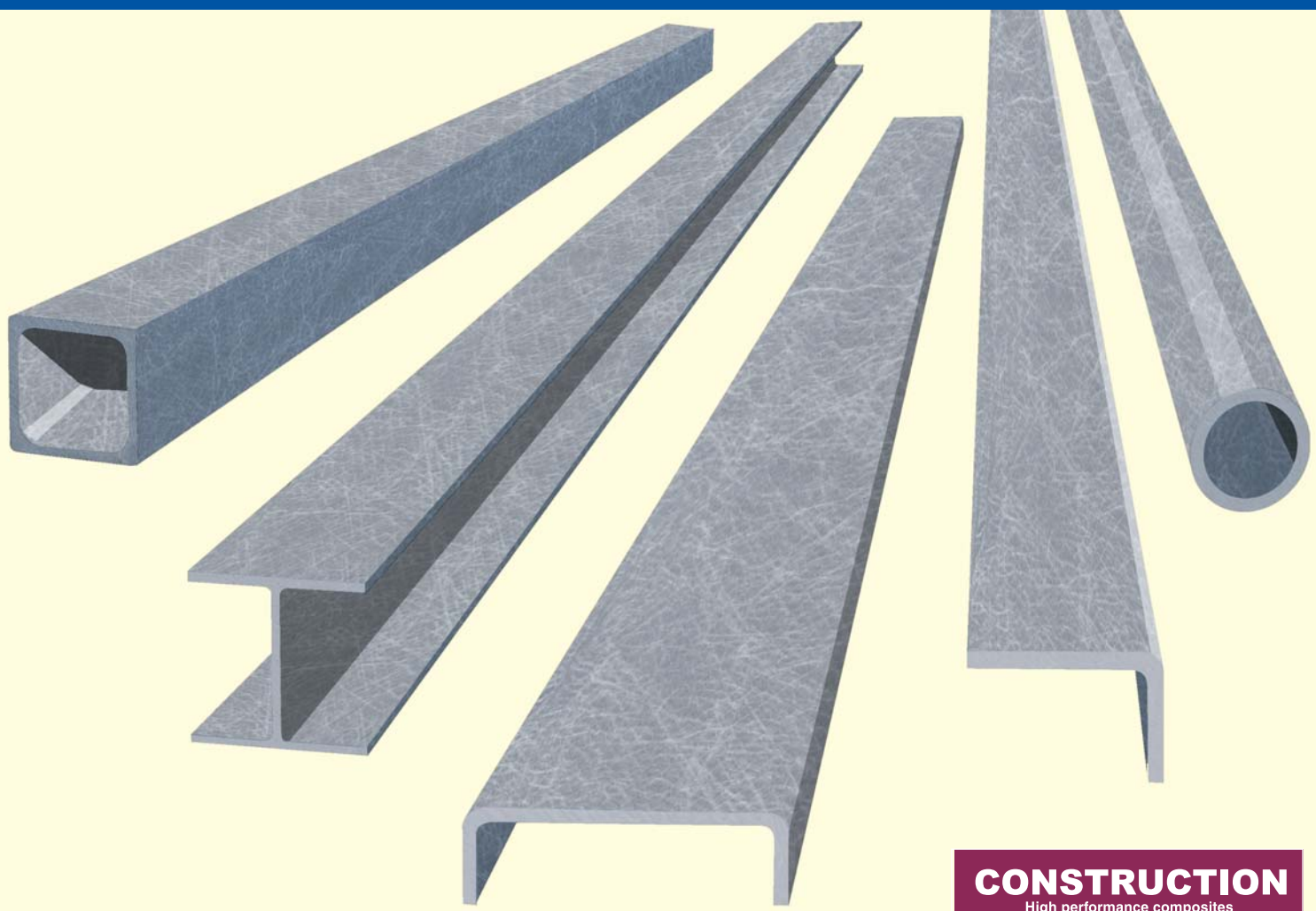
Fibreglass Pultruded Sections

Dura Profile



CONSTRUCTION
High performance composites

Applications:

Work Platforms
Bridge Decking
Ladders
Stair Cases
Cable Trays
Hand Railing
Flooring Supports
Scaffolding
Joists
Building Structures
Cooling Towers
Sub-floor Platforms
Fencing
Racking Systems
Off-shore Platforms
Staging

Benefits:

Corrosion Resistant
High Strength / Low Weight
Non-Conductive
Low Thermal Conductivity
Temperature Resistant
Custom Colours and Finishes
Electromagnetic Transparency
High Impact Tolerance
High Fire Resistance
Chemical Resistant
UV Resistant
Easy to Assemble
Long Life
Zero Maintenance
Effective Electrical Insulation
Anti-Static

Heavy Duty, Maintenance-free Corrosion Resistant Profiles for Industry

dura composites

DURA PROFILE

Introduction

We are one of the leading companies in composite technology in Europe, specialising in the production of pultruded profiles.

Pultruded composite sections are manufactured by combining various resins with pure glassfibre reinforcement. They are formed and cured in a continuous process creating a product of extraordinary strength and resilience. The resultant profile offers a combination of benefits and mechanical properties exceeding those of metal.

We have over 35 years experience in the Fibreglass composite industry and is the largest UK pultruded profile stockist in the UK.

Benefits of Pultrusion

The Fibreglass Pultrusion process provides exceptional strength, toughness and consistency. Pultrusions offer a number of advantages over traditional materials such as steel, aluminium and timber and their use is increasing across a wide range of applications and industries.

The almost infinite variety of possible profiles allows a high degree of design freedom. Tailored properties such as strength, stiffness, weight and colour can be engineered by product design at the early stages of development

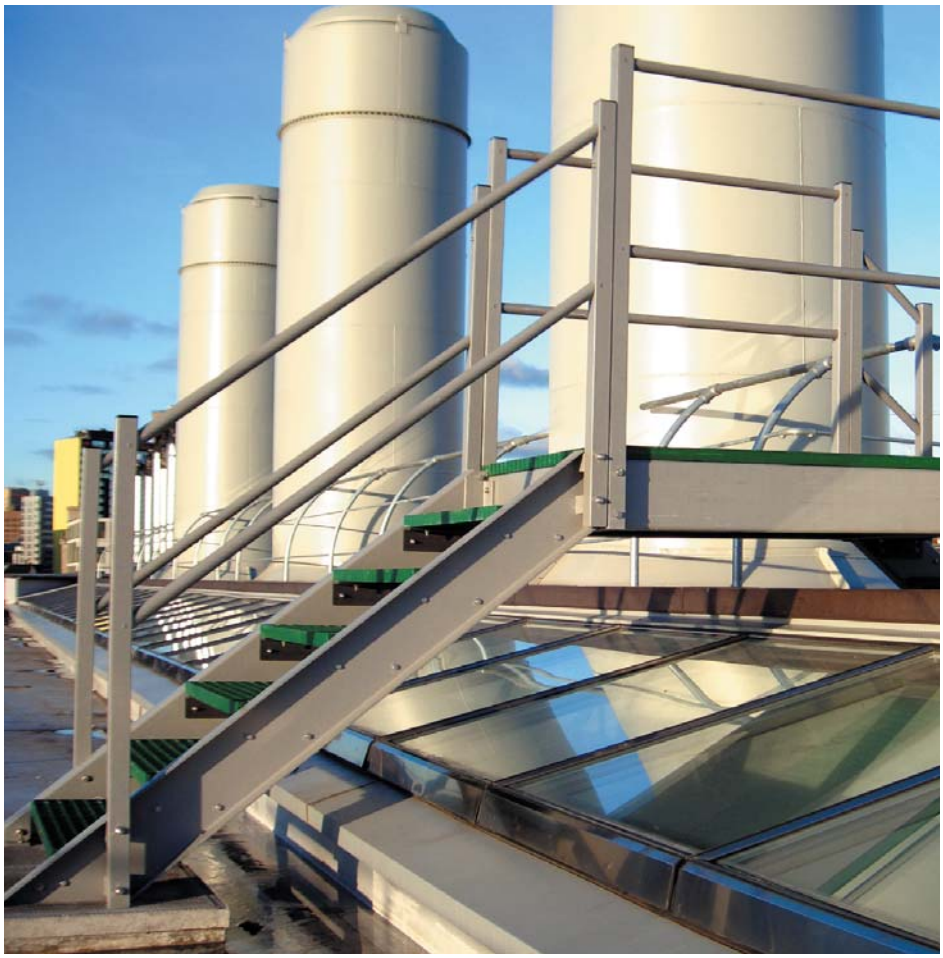
Exceptional Strength

On a weight to weight basis, pultrusions are stronger than structural steel. By varying the type and orientation of the reinforcements, various mechanical properties can be obtained and tensile strengths in excess of 1000 MPa are achievable. Considerable design freedom can be gained by the capability of adding extra strength in highly stressed areas. The excellent impact strength can reduce damage potential caused by accidental collisions.

Substantial Weight Advantage over Metal

Weighing up to 80% less than steel and 30% less than aluminium, Dura Profile offers equivalent performance for considerably less weight. This results in major weight savings and lower installed costs due to more economical transportation, handling and on site positioning.

The high strength to weight ratio has particular relevance for many applications including walkways, sub-floor platforms, bridges, aerospace components, structural applications, cooling towers, waste water treatment and oil and gas installations.



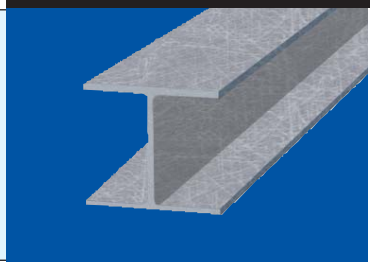
DURA PROFILE Standard Range

Dura Profiles are a practical proposition for more applications than ever before, thanks to the very wide range of standard profiles available.
We carry one of the largest stock holdings of profile, including standard Angle, Channel, Beam and Box, Tube, Bar and Rod sections.

We supply a cost effective solution for virtually every common application, with no tooling costs and minimal delivery lead time. All profiles can be produced in a vast number of dimensions and are available in five different resin systems depending on the application. Polyester is suitable for most industrial applications. Vinylester provides additional corrosion resistance. Epoxy offers superior thermal stability. Modar improves fire and smoke performance. Phenolic also maximises fire performance as an alternative to Modar.

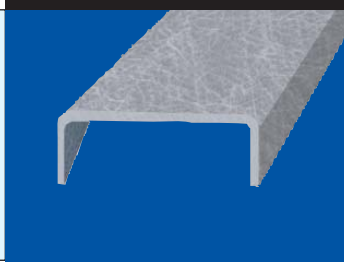
I and H Beam

Size (mm)	Weight (kg/m)
38 x 76 x 6.4	1.65
50 x 102 x 6.4	2.21
76 x 152 x 6.4	3.44
76 x 152 x 9.5	5.05
102 x 203 x 9.5	6.87
102 x 203 x 12.7	8.98
127 x 254 x 12.7	11.29
152 x 305 x 12.7	13.77



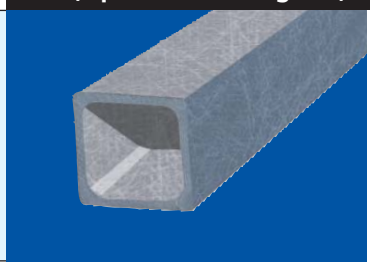
Channel

Size (mm)	Weight (kg/m)
76 x 38 x 6.4	1.53
102 x 44 x 4.8	1.73
127 x 35 x 6.4	1.65
152 x 41 x 6.4	2.50
203 x 56 x 9.5	5.08
254 x 70 x 12.7	8.20
610 x 76 x 6.4	8.36
610 x 102 x 12.7	16.23



Box (square & rectangular)

Size (mm)	Weight (kg/m)
25 x 25 x 3.0	0.48
38 x 38 x 5.0	1.19
38 x 38 x 6.4	1.46
44 x 44 x 6.4	1.77
50 x 50 x 3.0	1.00
50 x 50 x 6.4	2.09
51 x 51 x 3.2	1.10
51 x 51 x 6.8	2.10
64 x 64 x 6.4	2.67
76 x 76 x 6.4	3.28
102 x 102 x 6.4	4.59

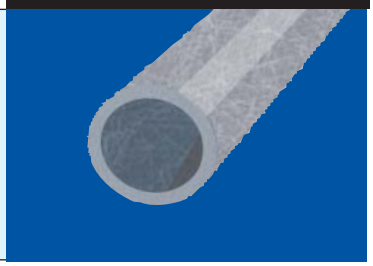


Angle (equal & unequal)

Size (mm)	Weight (kg/m)
25 x 25 x 3.0	0.25
25 x 25 x 6.4	0.48
38 x 38 x 6.4	0.75
50 x 50 x 3.0	0.55
50 x 50 x 6.0	1.08
60 x 60 x 8.0	1.61
75 x 75 x 10.0	2.40
100 x 100 x 8.0	2.76
102 x 102 x 9.5	3.44
102 x 102 x 12.7	4.26
152 x 152 x 12.7	6.91

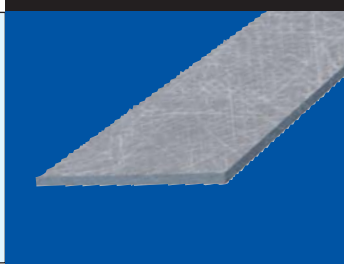
Tube

Size (mm)	Weight (kg/m)
17 x 13.2	0.28
25 x 18.5	0.40
25 x 21.8	0.40
38 x 25.0	1.20
38 x 31.6	1.20
50 x 38.0	1.70
50 x 43.6	1.70
76 x 71.2	2.50



Flat Bar

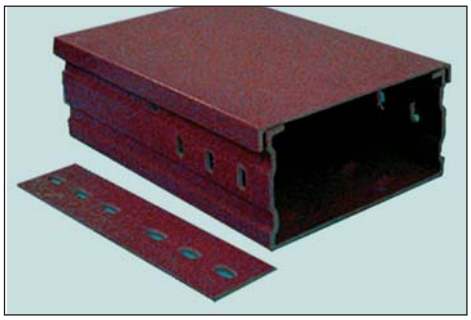
Size (mm)	Weight (kg/m)
30 x 3.0	0.16
80 x 3.0	0.43
80 x 8.0	1.15
150 x 3.0	1.13
150 x 6.3	2.37
305 x 4.0	3.06
600 x 3.0	4.52
600 x 12.0	18.08

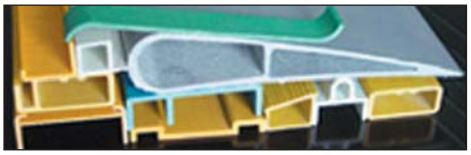


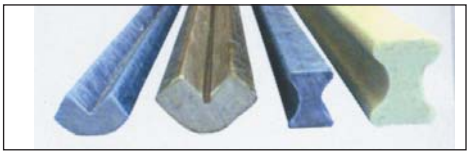
DURA PROFILE Custom Range

The versatility and accuracy of the pultrusion process offer tremendous possibilities for complex shapes or special properties. For extended production runs, it can be a highly cost-effective method of producing customised profiles, using special dies to form the material directly into the finished shape, with no need for extra machining operations.
Resin and reinforcement materials can be mixed and matched to create an almost limitless blend of colours and properties. Aramid or carbon fibres can be used instead of glass fibre and resin systems can be modified to meet special requirements. Pultrusions can be produced with extra flame retardancy or self extinguishing properties.

Pultrusion die sizes up to 600mm x 200mm can be accommodated.

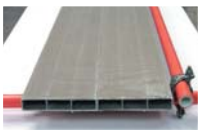




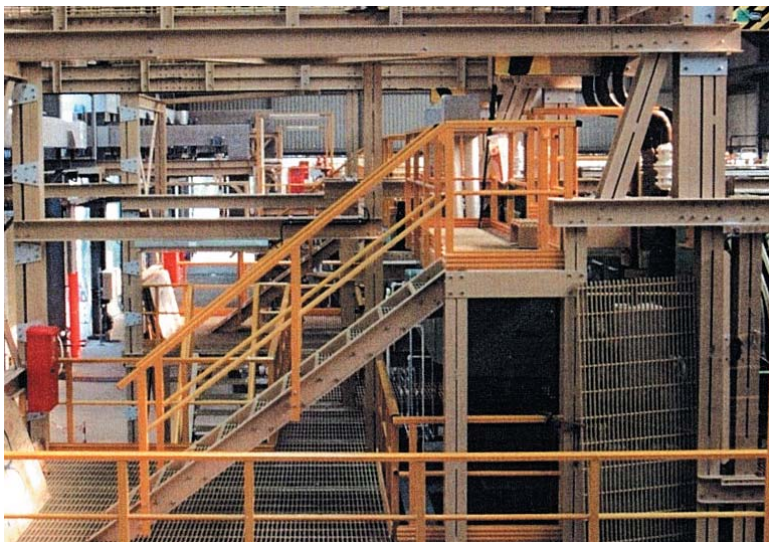


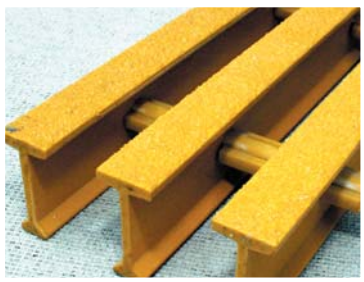
DURA PROFILE Examples of Completed

The pultrusion process used to manufacture Dura Profile provides exceptional strength, toughness and consistency. This provides Dura Profile with a number of advantages over traditional building materials such as steel, aluminium and timber meaning that it is suitable for a huge range of applications and industries:



Assemblies



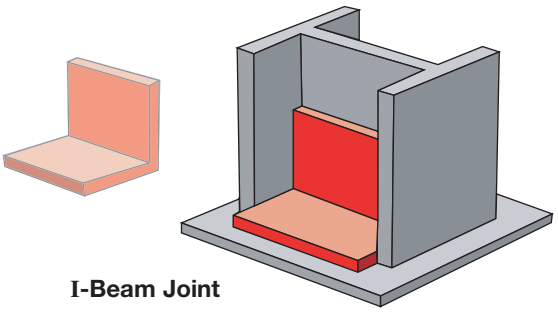


DURA PROFILE Assembly Guide

Assembly methods used with conventional materials can also be used with Dura Profile. The most common connections are made by using a combination of mechanical fasteners with high quality adhesives.

In almost all cases Dura Profile can be fabricated as easily as other materials. The selection of the appropriate method will depend on the:

- distribution of loads within the assembled structure.
- necessity to disassemble the structure at a later stage.
- construction of the Dura Profile and the environment in which the assembled structure will be used.

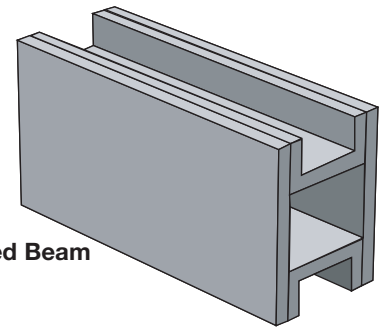


I-Beam Joint

Mechanical Fasteners

Bolting

This is the most common method of jointing Dura Profile. Stainless steel nuts and bolts are used, with washers larger than usual to reduce local compressive stresses. It is good practice for the bolt to be a tight fit in the hole as this substantially reduces local stresses. The minimum edge distance for bolt-holes is 3.33 x the bolt diameter. In certain circumstances fibreglass nuts, bolts & washers can be specified to suit some chemical environments.



Fabricated Beam

Screwed Connections

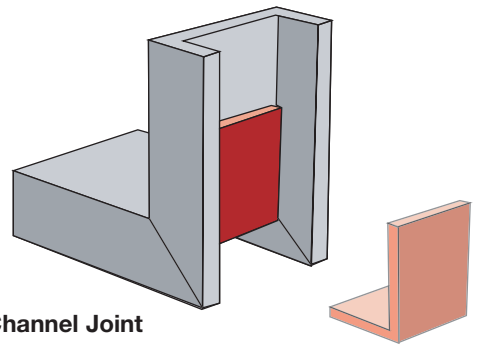
Stainless steel self tapping screws can also be used successfully in many applications involving mechanical connections when high-strength fasteners are not required. Self-tapping screws may also be used in combination with adhesives.

Riveted Connections

Stainless steel and aluminium riveting is a very effective method of joining Dura Profile. Pop-rivets are commonly used in conjunction with back washers to help distribute and minimise local stresses. The assembly should be designed so that the rivets are not in tension.

Captive Inserts

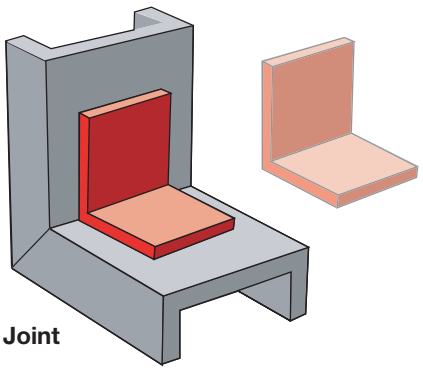
Captive inserts are a fast, blind-fixing system suitable for use with all materials. They are of particular use when there is no reverse access and can be installed at any stage of fabrication.



Channel Joint

Adhesives

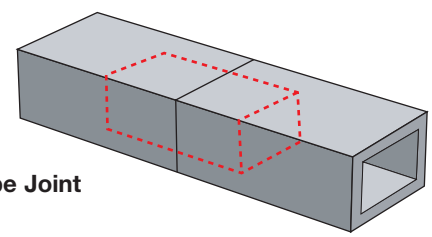
Adhesives distribute stress more evenly and are used successfully to join Dura Profile and for sealing joints and surfaces. Exceptional bonds can be obtained as long as the joint is designed to avoid excessive peeling stresses, the surfaces are properly prepared and the correct adhesive is used. Epoxies and toughened acrylics are suitable for use with Dura Profile.



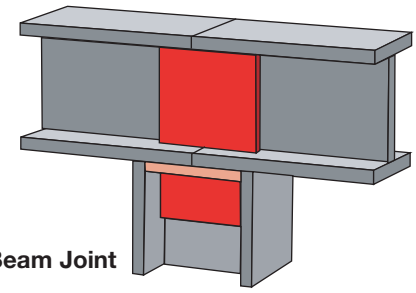
Channel Joint

Preparation

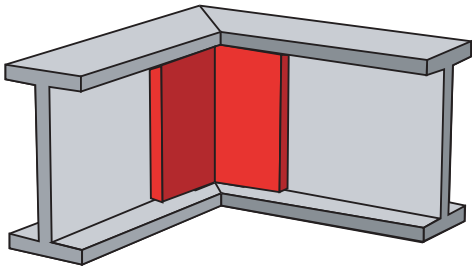
To achieve an optimum bond, the surfaces must be degreased with a suitable solvent. The bonding areas must be abraded until the surface gloss is removed, then cleaned of dust and degreased again. The adhesive should be mixed and applied according to the manufacturer's recommendations. The bond area should be clamped or mechanically fastened to maintain bond pressure and to ensure that there is no movement until the adhesive has fully cured.



Tube Joint



I-Beam Joint



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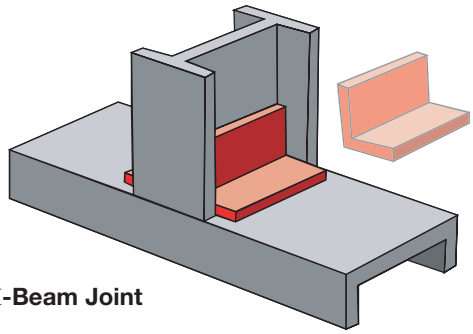
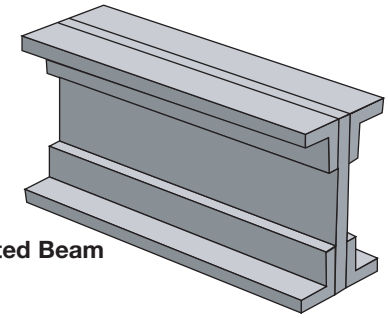
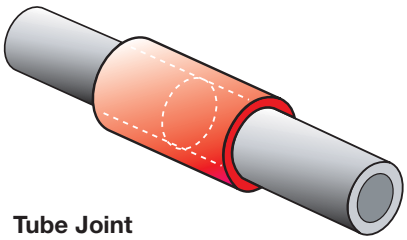


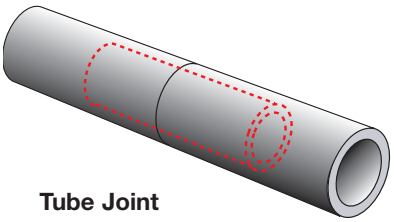
I-Beam Joint



Fabricated Beam



Tube Joint



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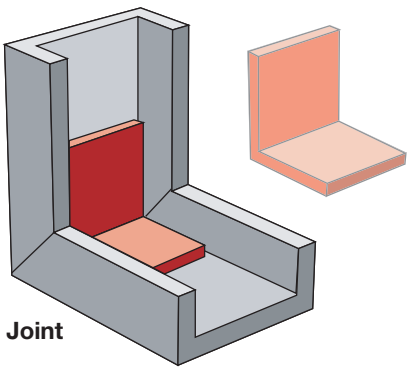

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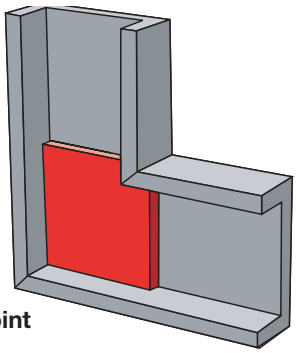

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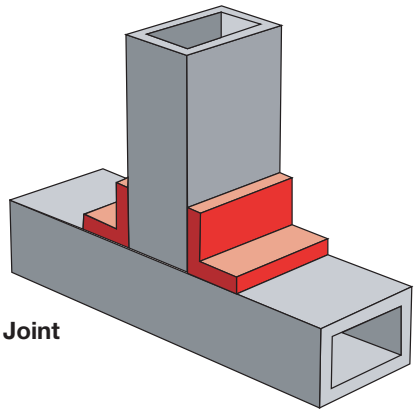

Box Joint

Assembly Methods

Almost all assembly methods used for wood, aluminium, steel or other materials can be adopted to assemble Dura Profile

The following techniques should be followed:

- Punches work better with a slight sheer edge
- Router bits should be diamond-coated
- Drilling speeds should take hole size and thickness into consideration
- Solvents, such as methylene chloride or acetone should be used to prepare surface for bonding or coating.
- Lag screws (lag bolts) are not recommended for fastening Dura Profile
- Counter support is necessary when drilling hollow profiles
- A medium coarse grinding wheel is preferable to the finer grades.

Mechanical Properties	
Tensile Strength	290 – 760 MPa
Tensile Modulus	18 – 38 GPa
Flexural Strength	250 – 750 MPa
Flexural Modulus	14 – 42 GPa
Compressive Strength	125 – 380 MPa
Impact Strength, Charpy	100 – 300 KJ/m^2

Physical Properties	
Relative Density	1.6 – 2.1
Water Absorption	0.5%
Barcol Hardness	46 – 60
Specific Heat	1.5 KJ (kgK)
Thermal Conductivity	0.37 W/(mk)
Coefficient of Thermal Expansion	1.3 x 10^{-5}/K

Electrical Properties	
Electrical Strength at 23°C	7 – 12 MV/m
Comparative Tracking Index	480
Insulation Resistance	5 x 10_6 Ω
Surface Resistivity	$10_{13.6}$ Ω
Volume Resistivity	$10_{14.1}$ Ωcm
Power factor at I MHz	0.0127
Permittivity at I MHz	3.99

Why use DURA PROFILE Pultruded Sections?

CORROSION RESISTANCE

The ability of Dura Profile to guard against deterioration from industrial chemicals and environmental factors makes it a logical and cost-effective alternative to carbon steel, aluminium, wood or other conventional materials. Dura Profile can be exposed to continuous submersion, splash, spills, fumes or gases, and will out perform all other mediums. A comprehensive chemical resistance guide is available on request.

FIRE RESISTANCE

Dura Profile is available in various resin systems, two of which meet the Class 1 flame spread rating of 25 or less, in accordance with ASTM E-84 Tunnel Test Method. If a flame spread of 10 or less is required, a custom phenolic resin system can be supplied.

NON-MAGNETIC

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

IMPACT RESISTANCE

The impact resistance of Dura Profile allows repeated deflection without permanent deformation. A certain amount of deflection can occur with loading. However, once the load is removed, the profile will return to its original shape, unlike metallic material, which will remain deformed and require costly repairs or replacement. Loading/deflection tables are available on request.

NON-SPARKING

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

MAINTENANCE FREE

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

LIGHTWEIGHT

Dura Profile weighs about one-quarter as much as steel, which means that often there is no need for hoists, pulleys or heavy lifting equipment. Therefore the lightweight material reduces installation and fabrication costs.

DESIGN

The design procedures associated with Dura Profile are unique in that there is allowable 'deflection' as opposed to ultimate 'loading' used with steel and aluminium. The reason for this is the inherent elasticity of fibreglass material, permitting a greater deflection than steel, without the danger of structural failure. Load and deflection tables are available on request.

COST SAVINGS - LONG LIFE

In a review of life cycle costs, Dura Profile showed significant savings over the use of traditional materials. This is due to a comparable purchase price and the significant savings derived from ease of installation, zero maintenance and a + 50 year life span.

NON-CONDUCTIVE

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

LOW INSTALLATION COSTS

Dura Profile weighs considerably less than conventional materials and are easier and less expensive to transport, install and remove. Only simple hand tools are required for installation, eliminating the need for costly equipment and labour costs associated with heavy lifting, cutting and welding.

SUPERIOR STRENGTH

On a weight to weight basis Dura Profile is stronger than structural steel. The high glass-to-resin ratio offers numerous advantages, including rigidity, shock-resistance and no permanent deformation if overloaded. These properties provide a generous safety factor while extra design freedom can be gained by adding extra strength in highly stressed areas.

TEMPERATURE PERFORMANCE

Continuous exposure to temperature up top 60 - 65°C possible which is well within the capacity of standard pultrusions. Custom design profiles incorporating vinylester can withstand higher temperatures up to 100°C. Phenolic Profiles can withstand temperatures up to 200°C.

ELECTROMAGNETIC TRANSPARENCY

Dura Profile are transparent to radio, microwaves and other electromagnetic frequencies, and are particularly suitable for use in aerial masts and in various radome applications.

ANTI-STATIC

Fibreglass is an excellent electrical insulator and it is possible to introduce a small degree of conductivity for the purpose of static dissipation. This would be useful for offshore applications, and can prevent sparking which is critical for underground applications in particular.

SUMMARY

Dura Profile provides the engineer a high degree of design freedom and offers exceptional material properties for a very wide range of applications.

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