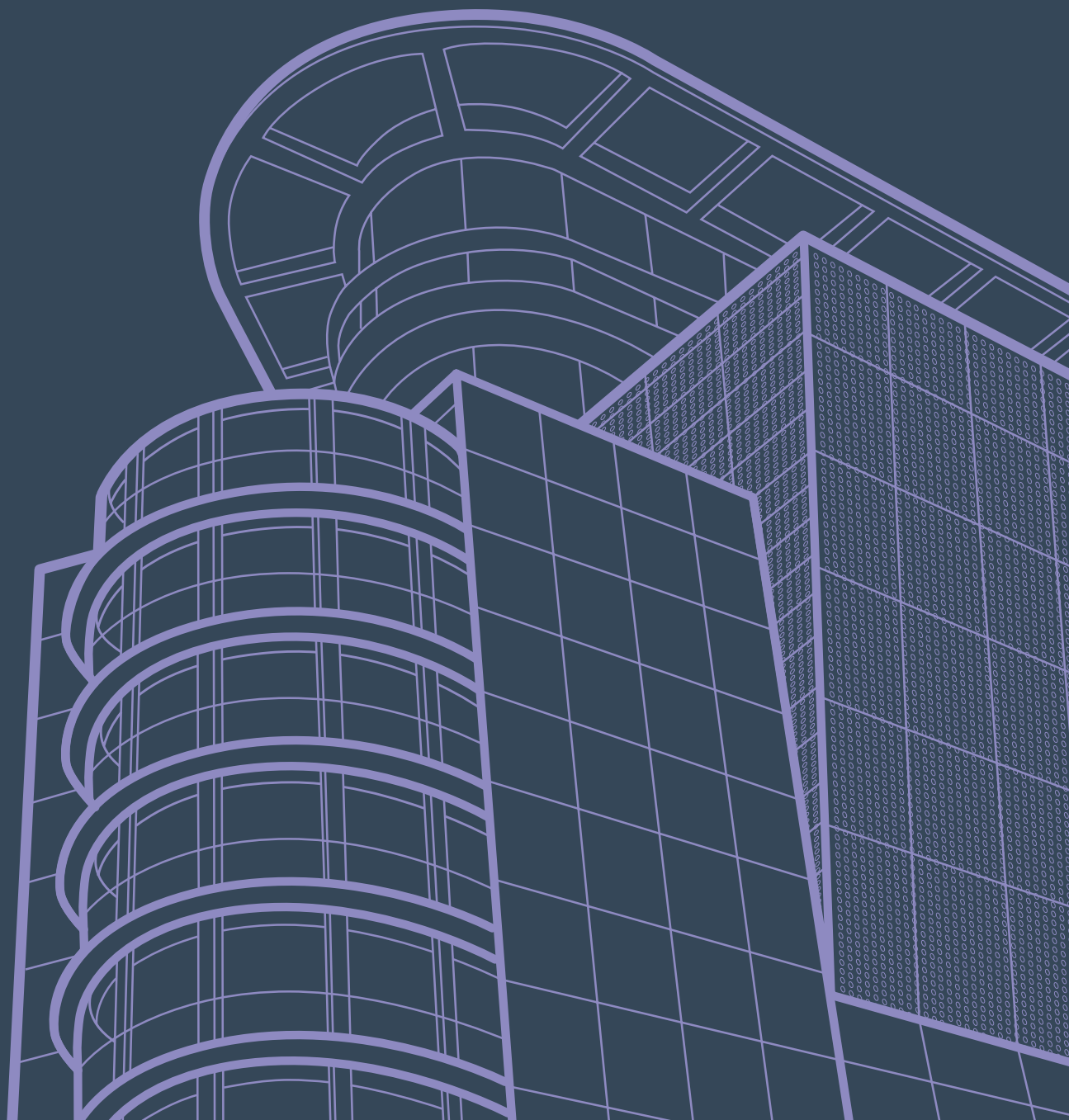
Façades & Cladding

lindapter®

Technical Innovation in
Steelwork Connections



Welcome

Safely securing steelwork since 1934

Established in 1934, Lindapter builds upon its proud history of developing innovative steel connections and applies its proven clamping concept to the building envelope. Today, Lindapter products are used around the world to connect a wide range of façade materials to supporting structures, including:

Glazing / Glass

Metals

Precast Concrete / GRC*

*Glass Reinforced Concrete

10 Reasons to use Lindapter connections

- Faster installation, lower labour costs
- Suitable for standard beams or hollow section
- No drilling or welding on-site
- Adjustable on-site for accurate positioning
- Compatible with a wide range of brackets
- Can be pre-assembled to minimise installation time
- No damage to steelwork or panels
- Only standard hand tools required
- Independently approved Safe Working Loads
- Available in a range of materials & protective coatings

Contents

GRCA

Several assemblies throughout this brochure are reproduced from the 'Practical Design Guide for Glass Reinforced Concrete' published by the International Glassfibre Reinforced Concrete Association (GRCA). These assemblies are shown with the GRCA logo. The guide is available from: www.grca.org.uk/publications

Whether securing precast concrete panels, glazing frames, GRC cladding or other architectural façades, Lindapter has a proven connection solution.

Established in 1934, Lindapter International is the world's pioneer of steelwork clamping systems, eliminating the need to drill or weld steel on-site. Lindapter connections can be temporary or permanent, adjusted on-site and do not damage steelwork; ideal for fixing elements of a building exterior to the structural steel frame.

This brochure provides examples of cladding fixing assemblies, designed for permanent applications. Lindapter offers a comprehensive design and support service to tailor its products to your specific application, including:

- Free design proposal
- ↓
- 2D / 3D drawings
- ↓
- Quotation
- ↓
- Supply & contractor training
- ↓
- Installation guidance
- ↓
- Ongoing support (e.g. post-installation survey)

Online Support

- Innovative Assembly Selector tool
- CAD downloads
- Specification data
- News and case studies
- Download or request a catalogue

Structural Steel Frames

Project: Parco Vittoria / Portello Project, Milan, Italy

Hot rolled structural sections are manufactured with inevitable variations in exact dimensions, while steel erection techniques will create unavoidable tolerances in straightness along beam length and other dimensions. Accurate adjustability during installation is therefore an essential prerequisite of the cladding support system.

Lindapter facilitates this requirement by allowing the cladding contractor to simply slide the bracket or other fixing assembly along a vertical or horizontal structural beam with precise alignment, before tightening the Lindapter components with a torque wrench. This method enables the rapid installation of large areas of cladding and significantly reduces the period of crane operation.

The following pages provide examples of connecting façade panels to structural sections. The illustrations highlight the many possibilities of securing panel brackets and threaded bar fixing assemblies. Please contact Lindapter's Technical Support Department to discuss your specific connection requirement.

Recommended products:


Type A


Type B


Type LR

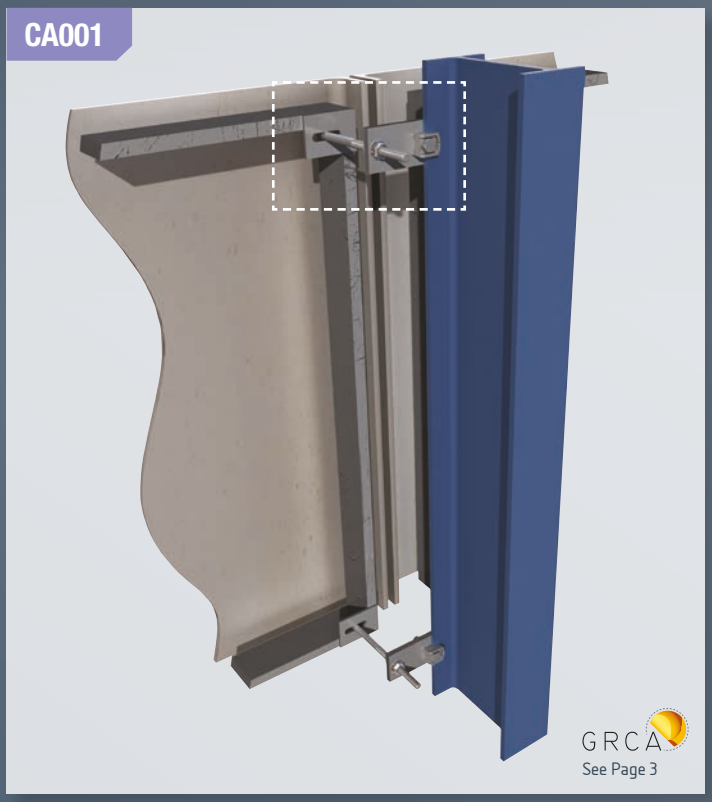

Type AF


Type CF


Type LS

Please refer to the Lindapter catalogue for product specification data including Safe Working Loads.

CA001



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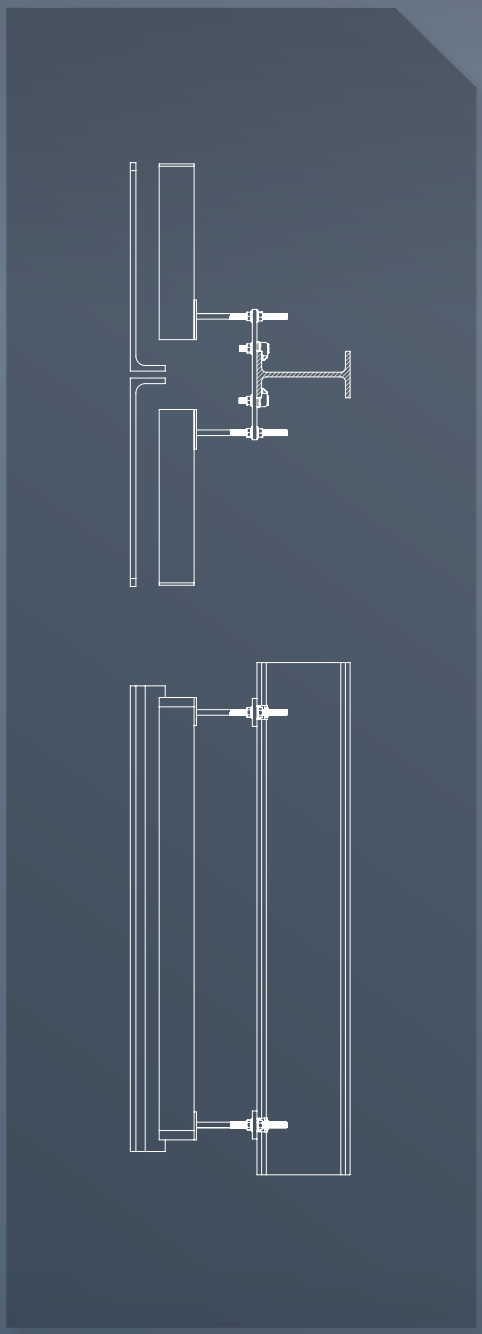
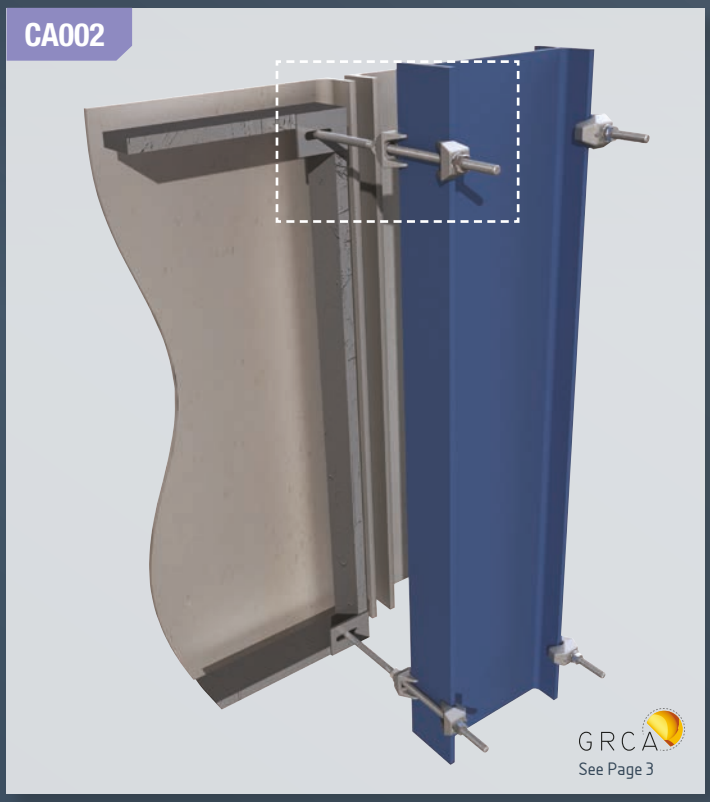


Lindapter Type A clamps connect the stud frame of glass reinforced concrete (GRC) panels to the structural steel. The clamping arrangement allows vertical and horizontal adjustment of the panels on-site.

Structural Steel Frames

CA002



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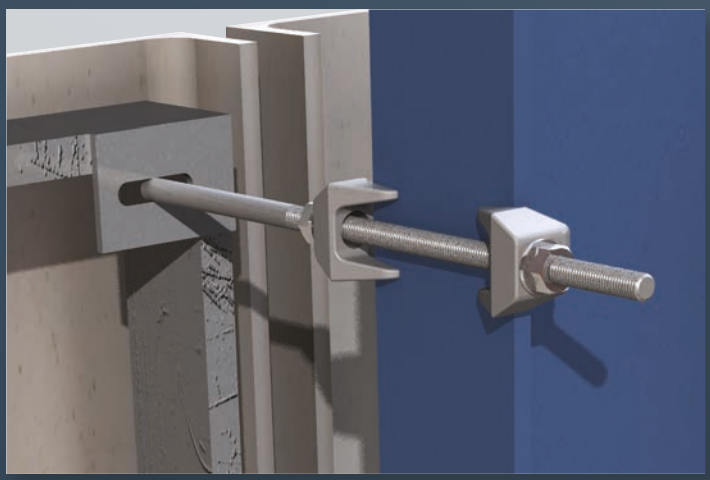
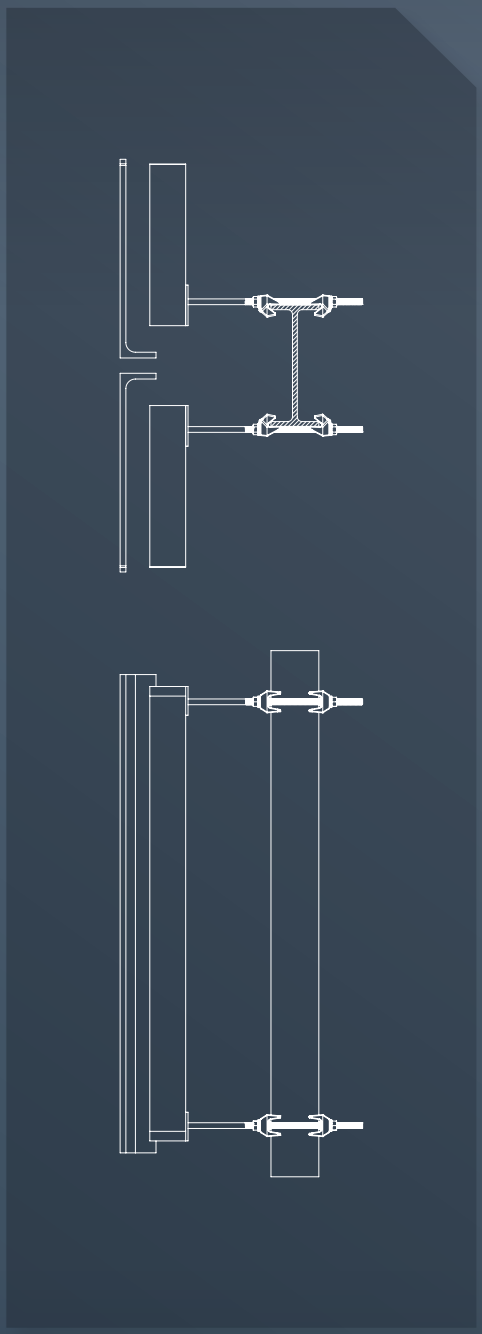
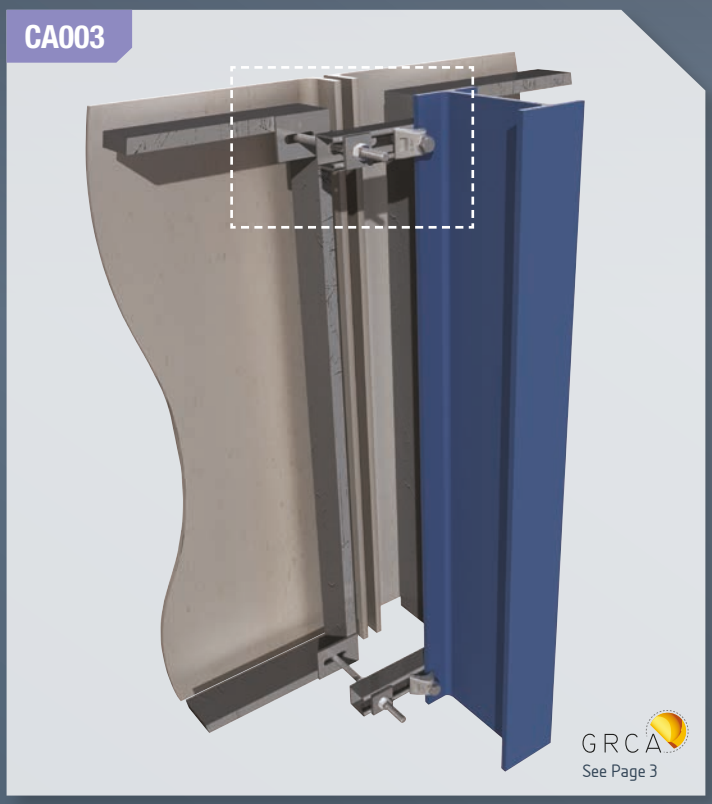




Type CF high friction clamps hook around the flanges of the vertical steel section to secure the stud frame of GRC panels. The fixing assembly allows vertical and horizontal adjustment of the panels on-site.

CA003



GRCA

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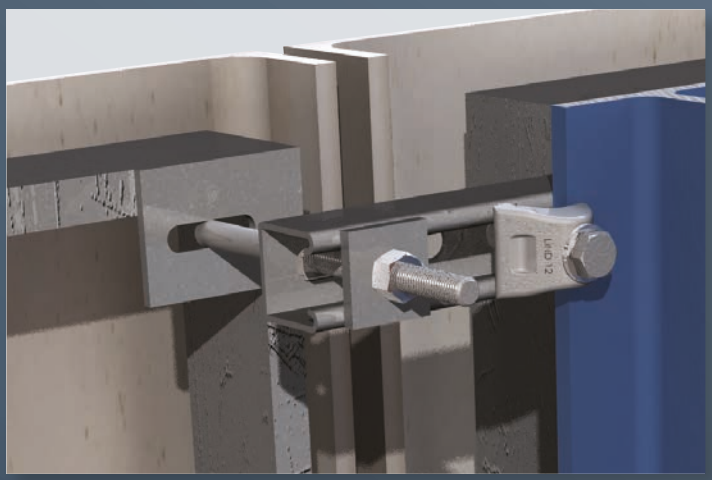
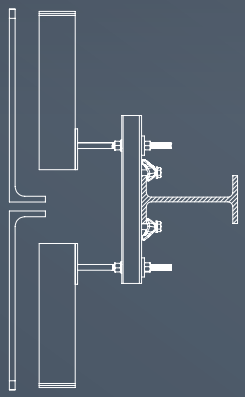
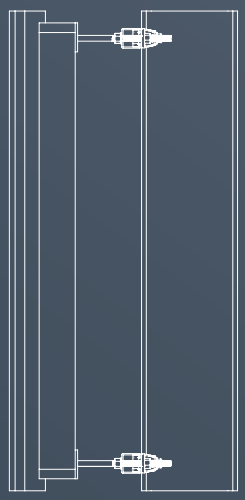


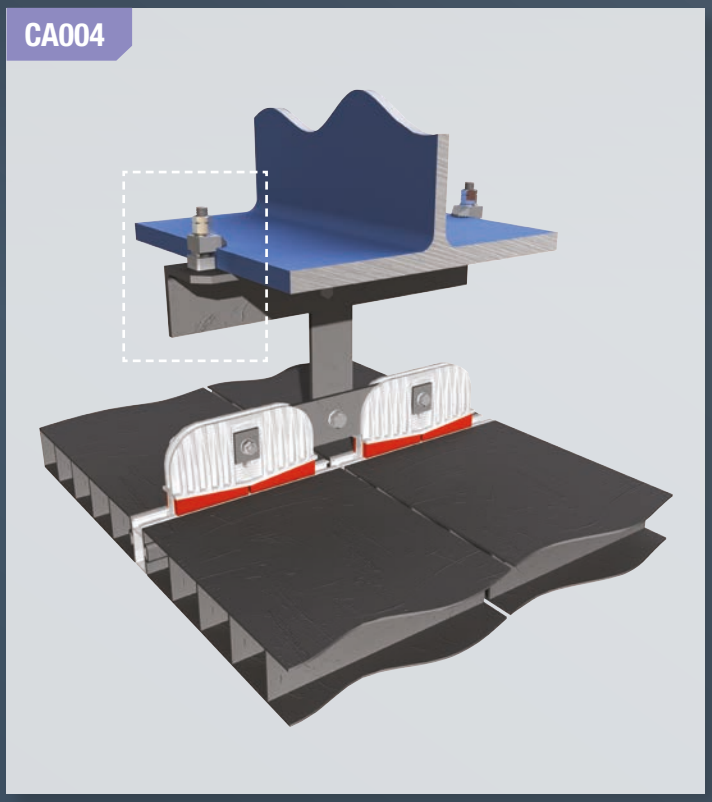


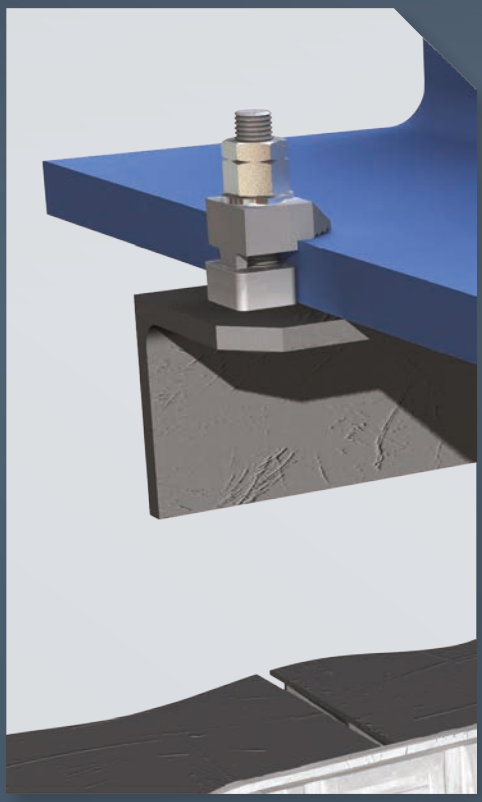


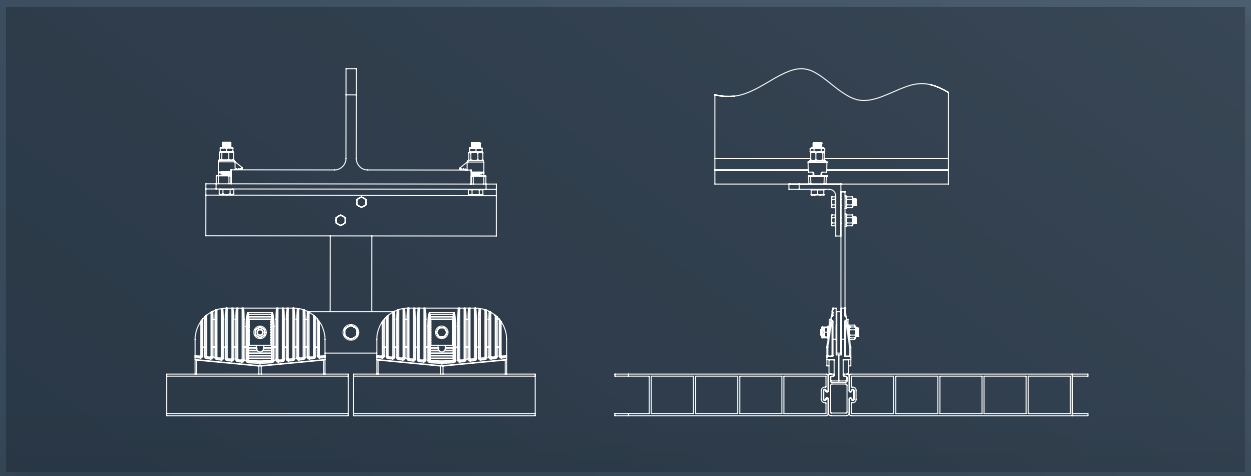
Lindapter's stainless steel Type LS secures a metal framing section in a friction application. The clamp is self-adjustable, allowing a single product to fit various beam thicknesses, with the tail spanning the recess of the strut to maximise the clamping range. This configuration facilitates adjustability on three axes.

Structural Steel Frames

CA004

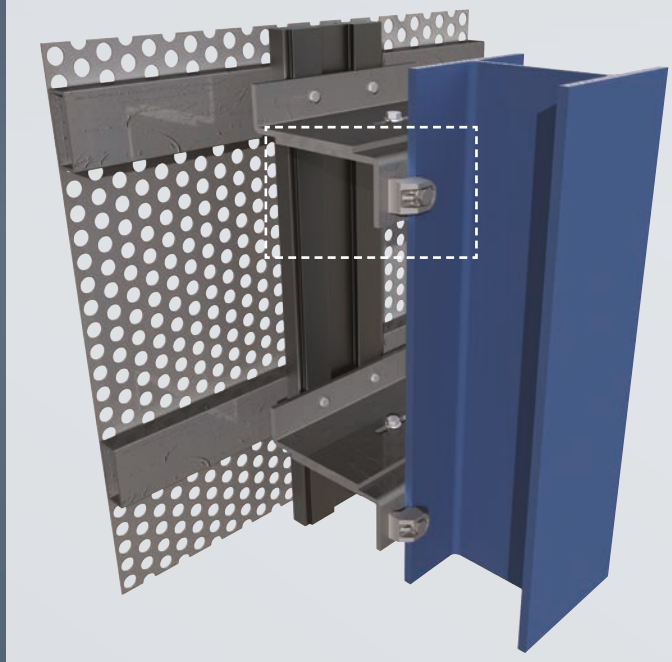


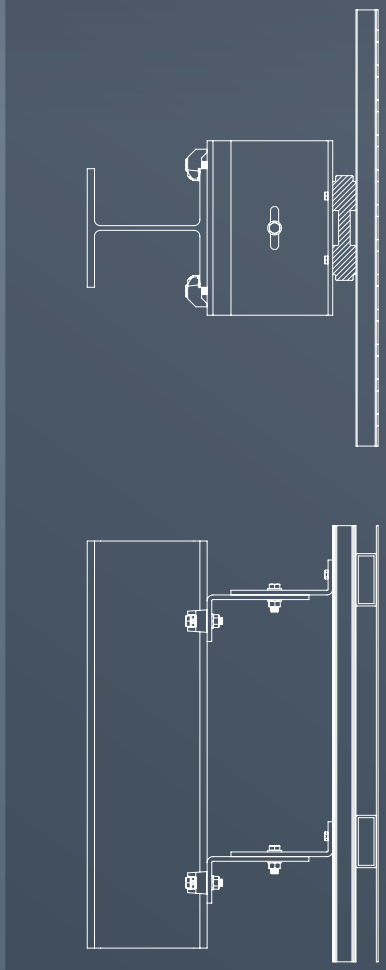




A glass reinforced plastic (GRP) enclosure system is suspended below a bridge soffit using Type B fixings. The connection simplifies lateral adjustment along the supporting steelwork (Queen Elizabeth II Bridge, River Thames, UK).

CA005

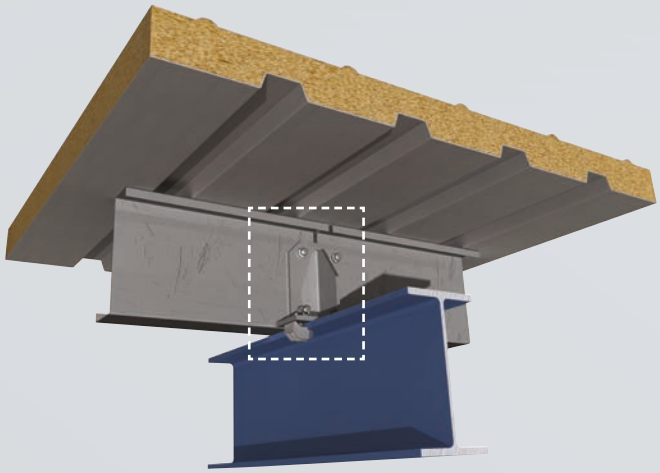


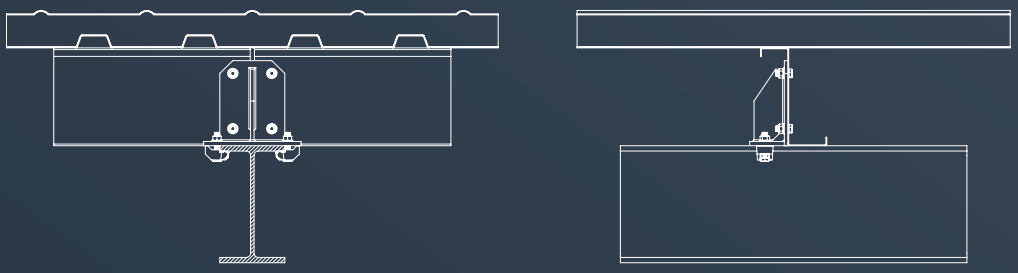


Lindapter's Type AF High Slip Resistance (HSR) clamp performs excellently in friction applications, for example, connecting perforated steel cladding to vertical columns. The bracket arrangement allows vertical and lateral adjustment (Parco Vittoria / Portello Project, Milan, Italy).

Structural Steel Frames

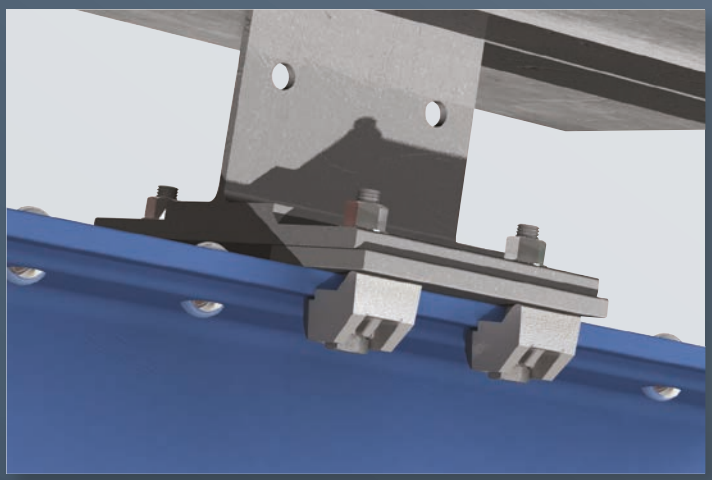
CA006

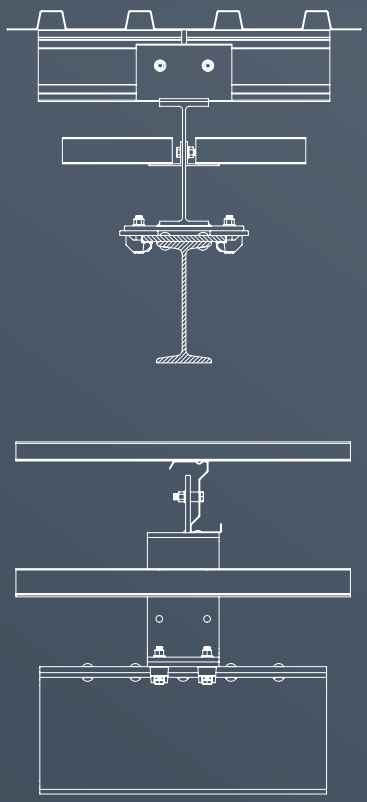




Roofing support cleats are connected to a structural steel frame with the Type AF clamps. The adjustable arrangement allows accurate positioning of the purlins.

CA007

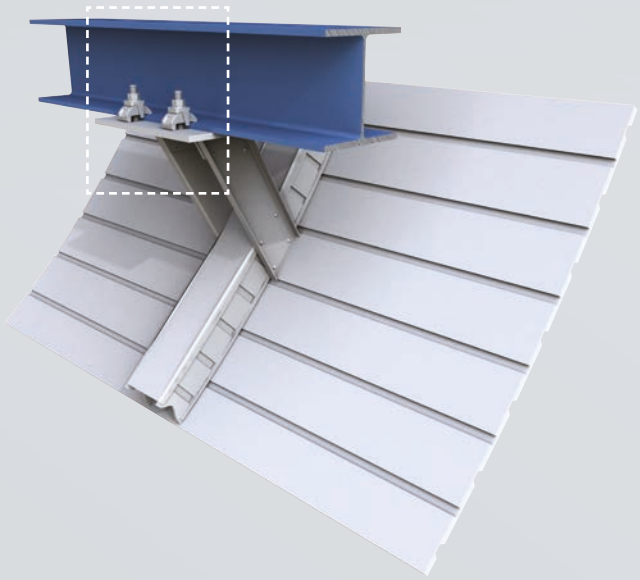


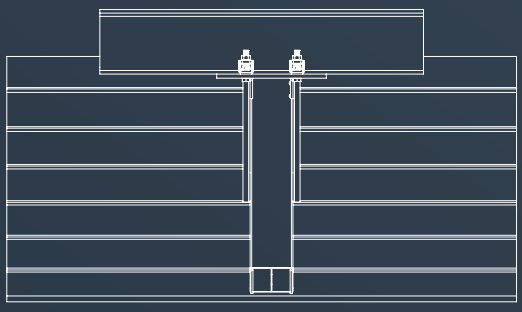


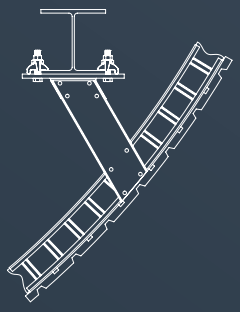
Lindapter's Type AF used to connect roofing supports to an existing structural steel frame. The fixing system permits lateral adjustment during installation and provides a high frictional Safe Working Load (St Pancras Station, London, UK - see page 25 for more information).

Structural Steel Frames

CA008

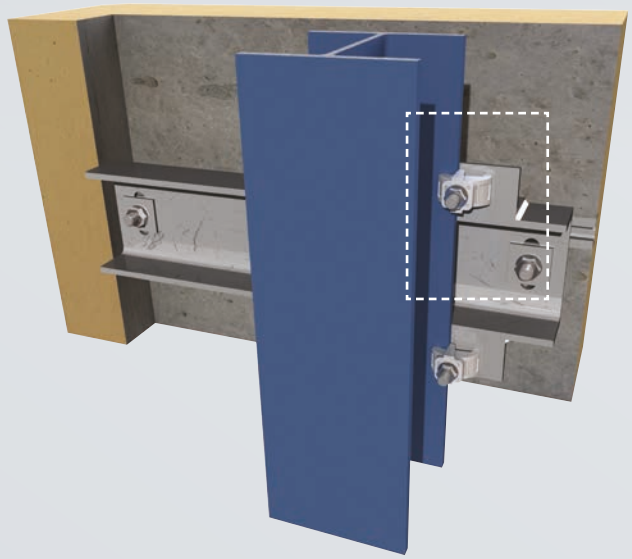


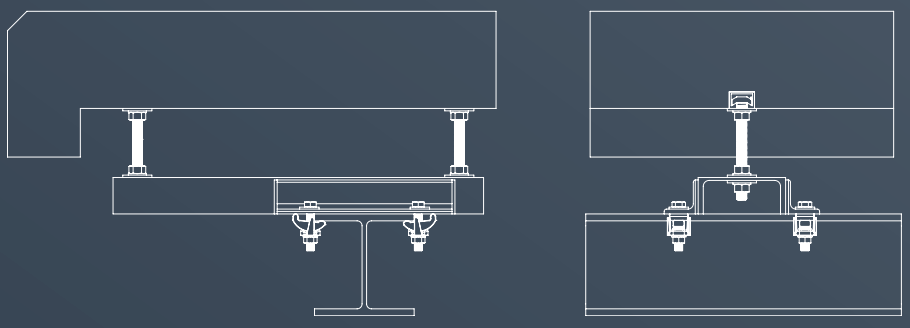




The roof canopy frame of a sports stadium is secured to primary structural steel with self-adjustable Type LR clamps. The fixings are compatible with a range of flange thicknesses and the use of slotted location plates allows easy alignment of the soffit panels (Target Field Ballpark, Minnesota, USA).

CA009-2





Precast concrete panels are connected to structural steel I-beams. The assembly uses Lindapter Type LR clamps, permitting simple vertical adjustment during installation (St David's Shopping Centre, Cardiff, UK - see page 24 for more information).

Structural Hollow Section

Project: Kimmel Center, Philadelphia, USA

Square / rectangular Structural Hollow Section (SHS) is a popular material amongst architects, with many contemporary designs making a feature of exposed structural steel profiles to enhance the aesthetics of a building.

Responding to industry demand for a faster alternative to welding or through-bolting, Lindapter invented the Hollo-Bolt®; a structural expansion bolt specifically designed for primary or secondary SHS connections. The Hollo-Bolt's discreet profile is particularly well suited to external or internal glazing support frames. Installation is carried out quickly and safely by inserting the product into pre-drilled holes and tightening to the recommended torque using simple hand tools.

This section of the brochure provides examples of cost efficient methods of connecting façade panels and curtain walls to SHS. The Hollo-Bolt can be used in a wide range of primary or secondary connections, including specialist applications such as blast resistance cladding. Please contact Lindapter's Technical Support Department to discuss your specific connection requirement.

CE The entire Hollo-Bolt range has achieved CE mark certification, independently verifying product performance in safety critical applications. Visit **www.lindapter.com/About/CE** for more information.

Recommended products:

Hollo-Bolt Hexagonal

Hollo-Bolt HCF*

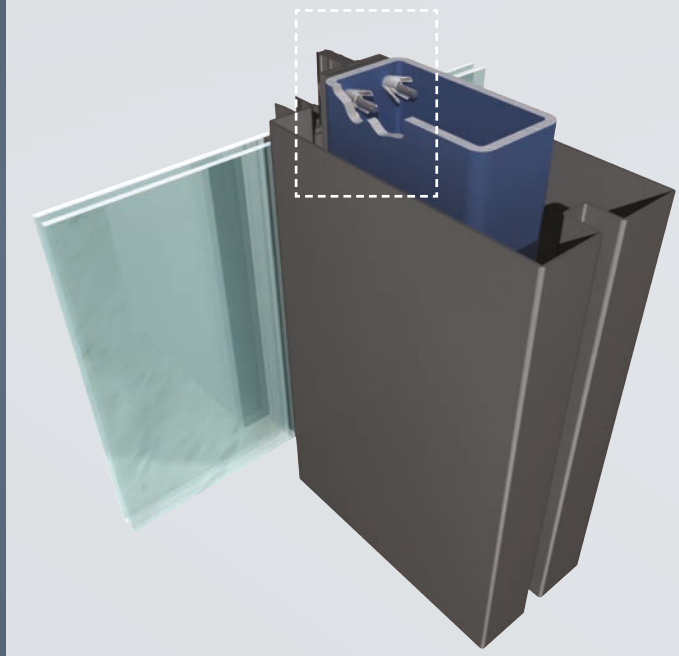
Hollo-Bolt CSK (Bolt Head)

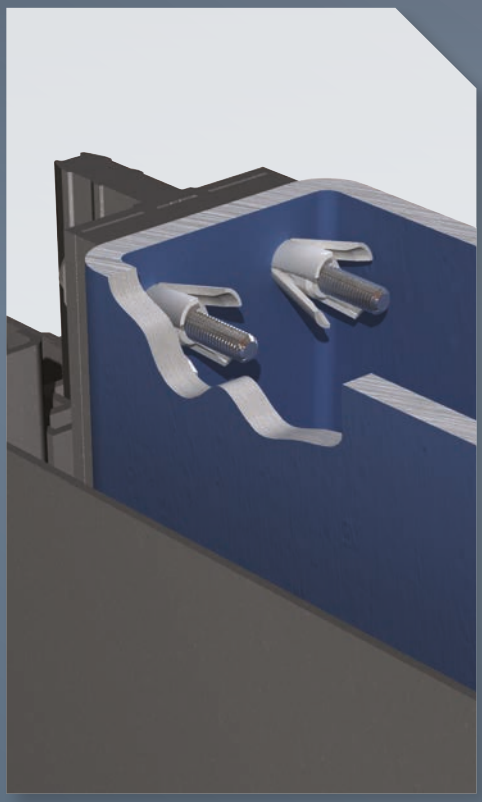
Hollo-Bolt Flush Fit

Please refer to the Lindapter catalogue for product specification data including Safe Working Loads.

*** High Clamping Force**

CA010

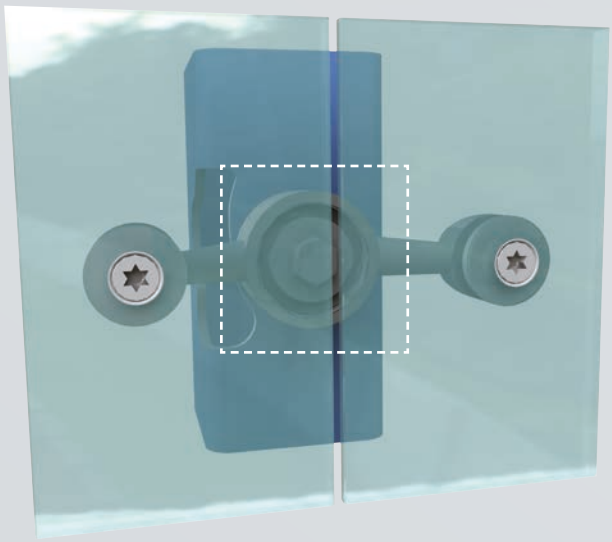


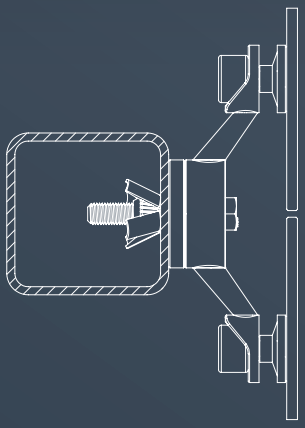


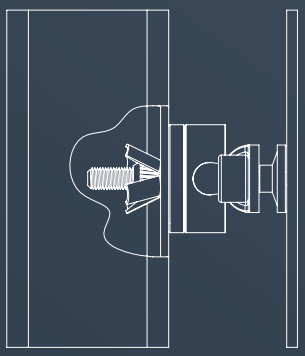
The Hollo-Bolt, Lindapter's flagship expansion bolt, is designed to connect to SHS. In this application, a glazing system is attached to vertical SHS columns.

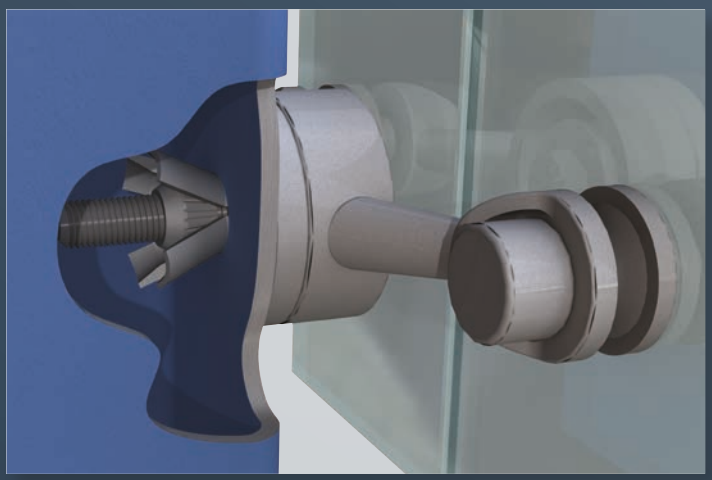
Structural Hollow Section

CA011



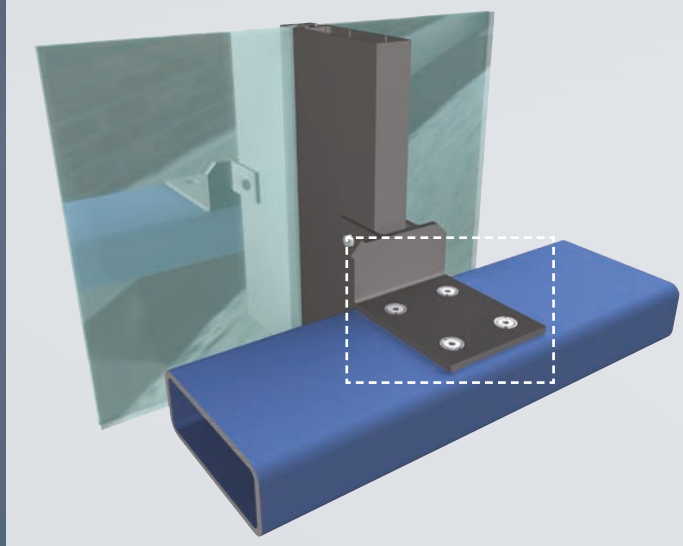


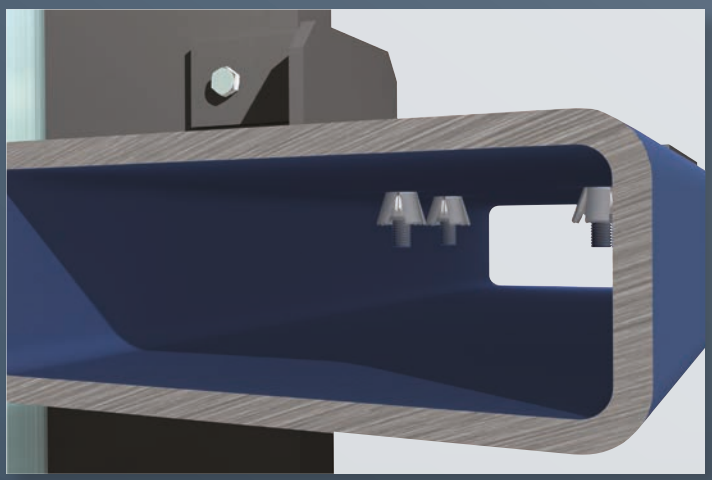


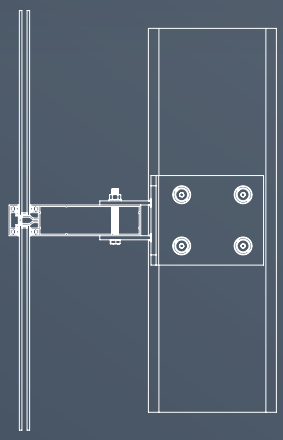


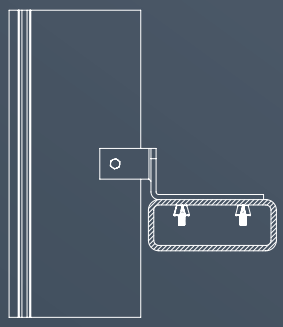
A two arm spider bracket is connected to SHS, allowing a frameless glazed atrium to be presented with style (West Midtown Ferry Terminal, New York, USA - see page 25 for more information).

CA012





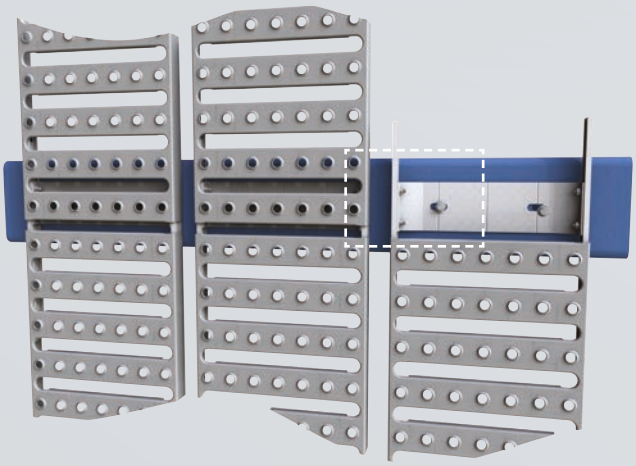


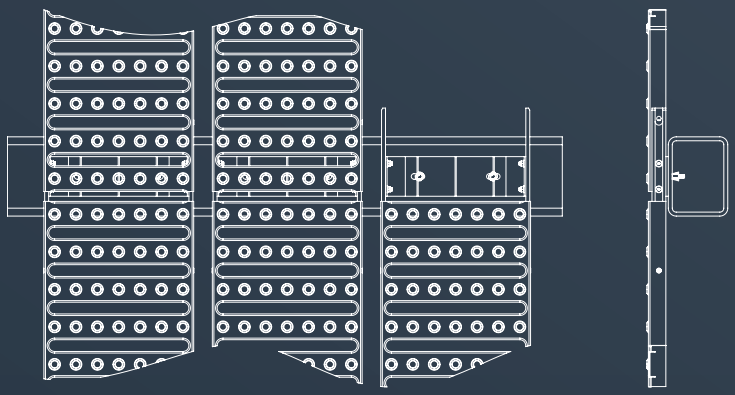


A curtain wall system is secured to horizontal SHS with the Hollo-Bolt Flush Fit. The discreet expansion bolt is concealed within the bracket and supporting steel for an aesthetically pleasing finish.

Structural Hollow Section

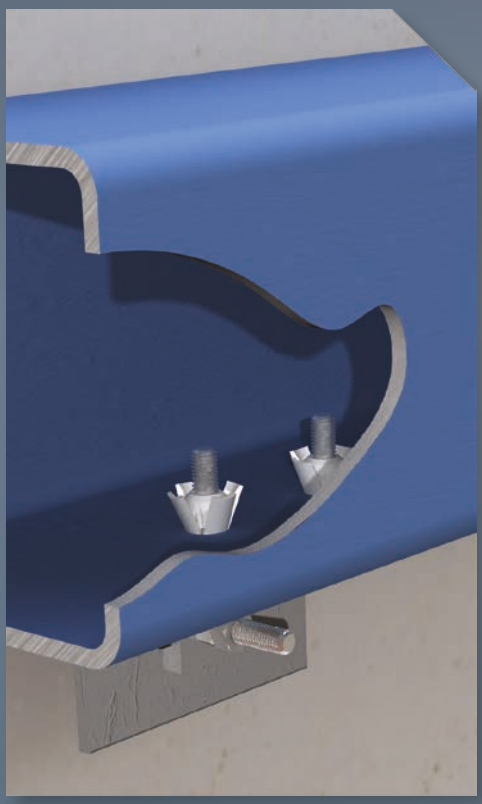
CA013

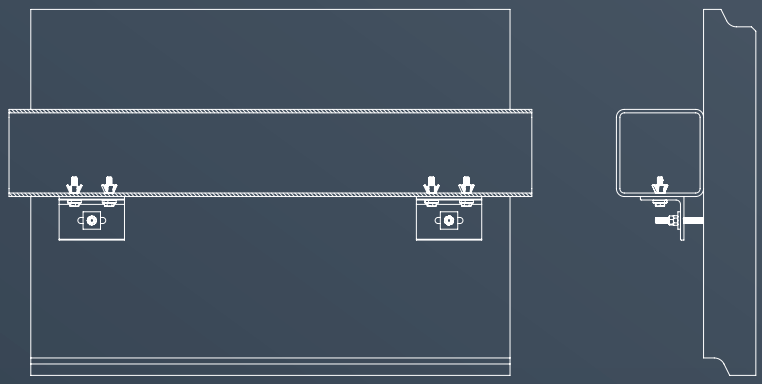




Lindapter's Hollo-Bolt connects perforated steel cladding to horizontal SHS. This arrangement allows simple vertical and lateral adjustment for precise alignment of the panels (Military History Museum, Dresden, Germany - see page 24 for more information).

CA014





Insulated wall panels are attached to SHS using a simple angle bracket and Lindapter Hollo-Bolts. This configuration allows a seamless finish with the connection entirely concealed from the building exterior.

Steel to Steel Connections

Project: Olympic Hill, Garmisch-Partenkirchen, Germany

Behind a structure's façade, there is often a supporting steel framework. Lindapter Girder Clamps provide a faster alternative to traditional connection methods, compatible with almost any shape and size of section, in a wide variety of applications.

The Girder Clamp symbolises Lindapter's philosophy perfectly; boldly challenging the need to drill or weld, when a safe, high strength connection can be quickly accomplished by clamping two steel sections together.

Although the concept is simple, Lindapter products undergo complex design and testing as the experienced Research & Development team constantly refine, improve and invent to achieve greater product performance, verified by independent product approvals.

The following pages show typical applications. Please refer to the Lindapter catalogue or website for further examples, or contact Lindapter's Technical Support department to discuss your connection requirement.

CE Lindapter Girder Clamp configurations using Type A and B products are CE Mark approved. Visit **www.lindapter.com/About/CE** for more information.

Recommended products:


Girder Clamp


Type A


Type B


Type LR

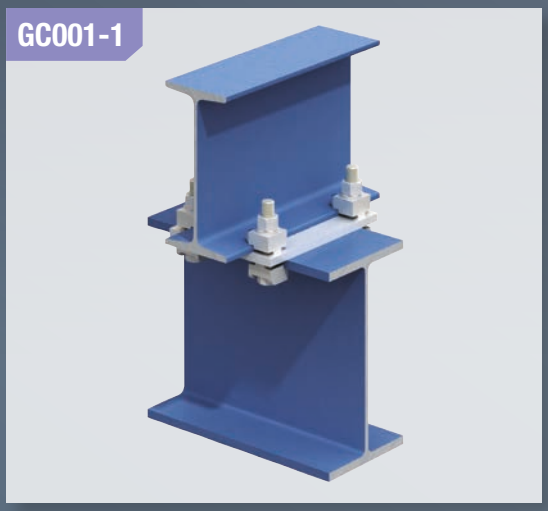

Type AF

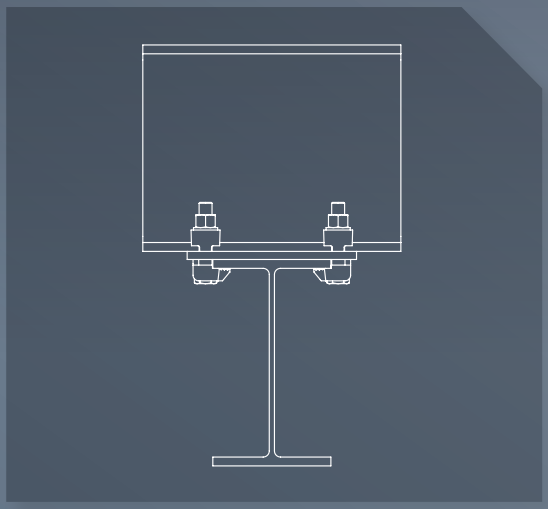

Type CF


Type LS

Please refer to the Lindapter catalogue for product specification data including Safe Working Loads.

GC001-1





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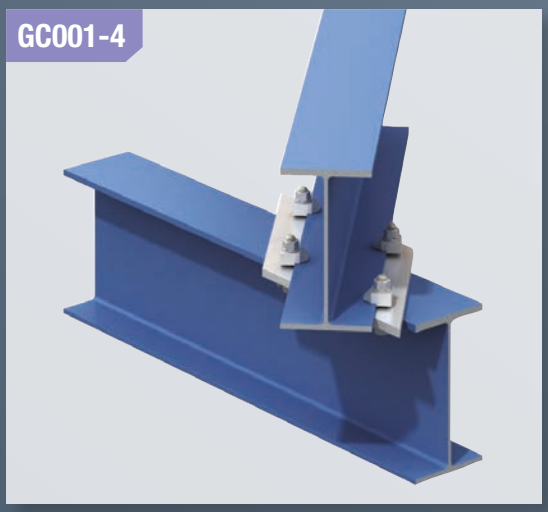
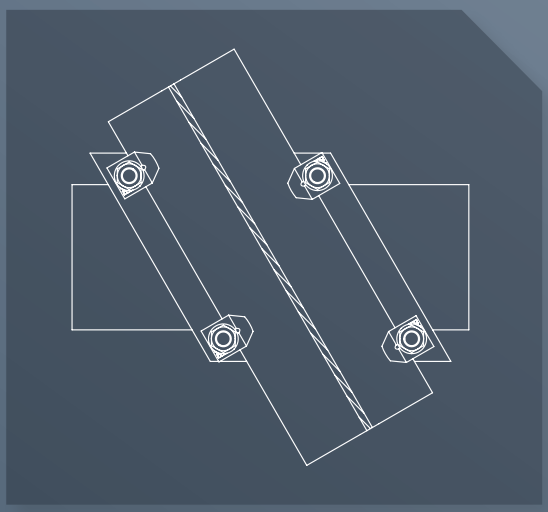
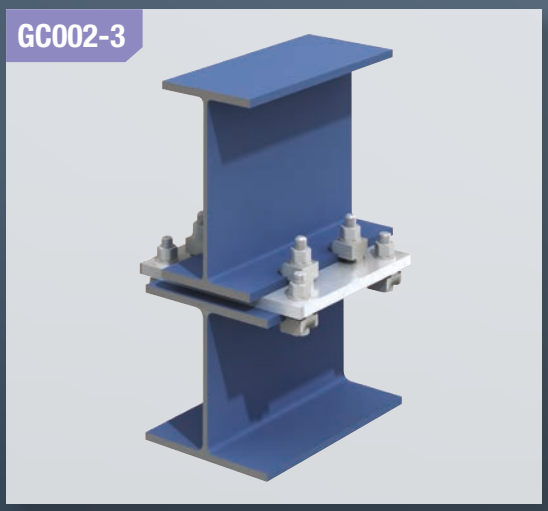
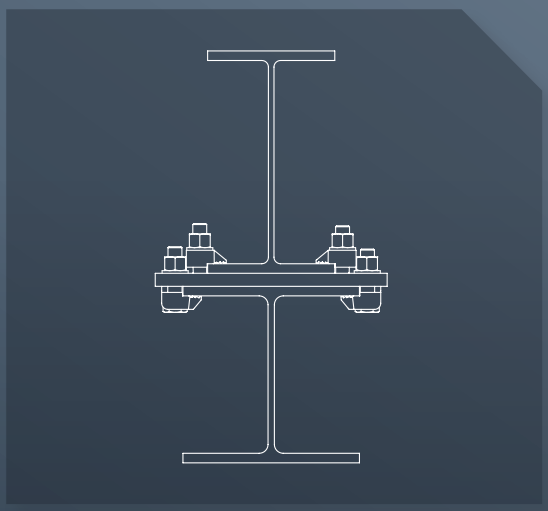




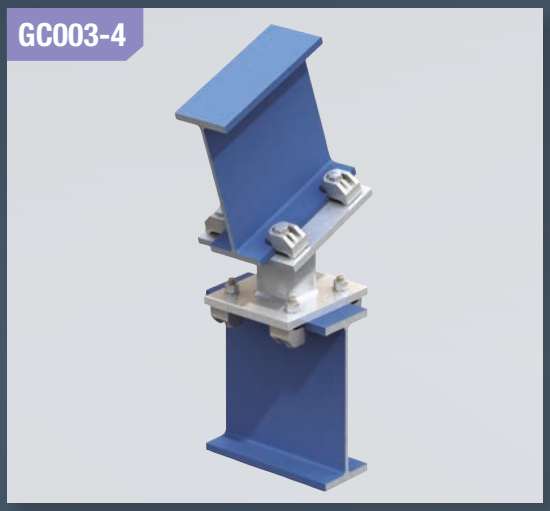
GC002-3

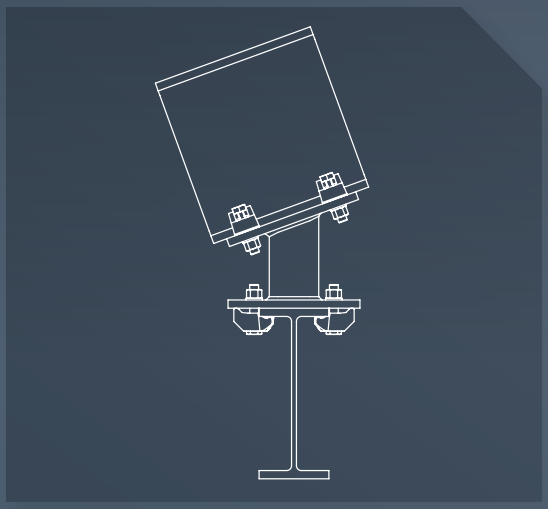




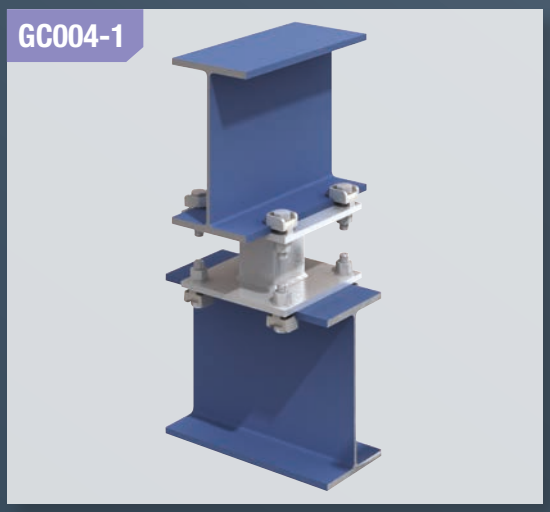
Steel to Steel Connections

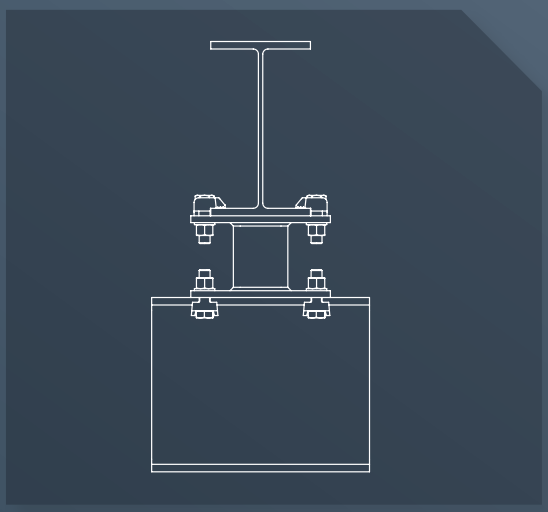
GC003-4





GC004-1





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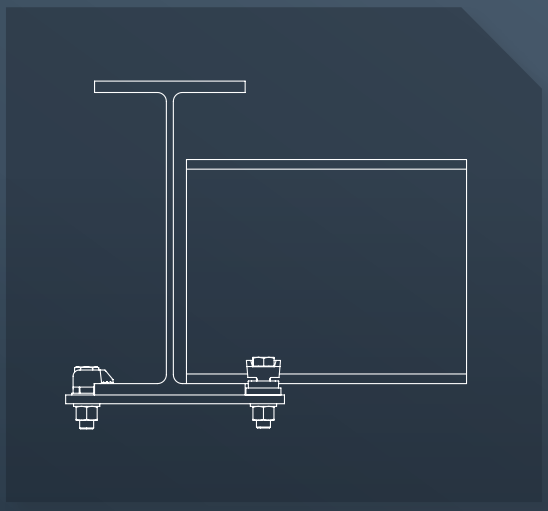

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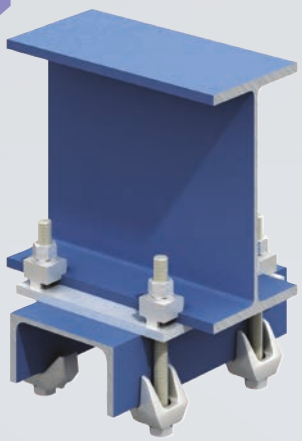

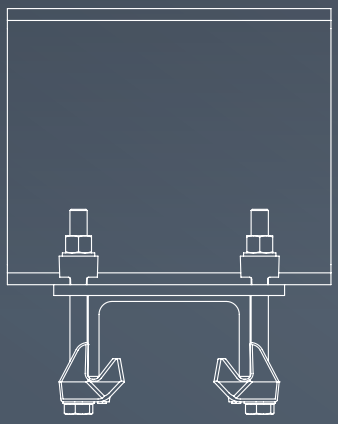

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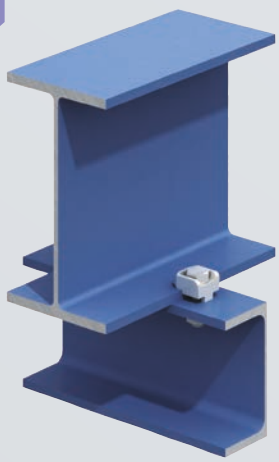

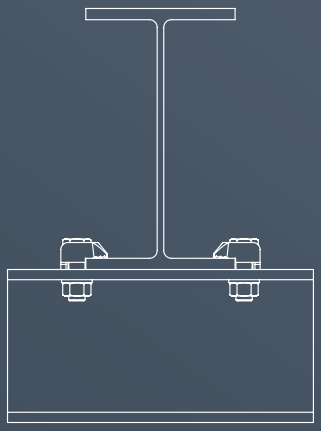

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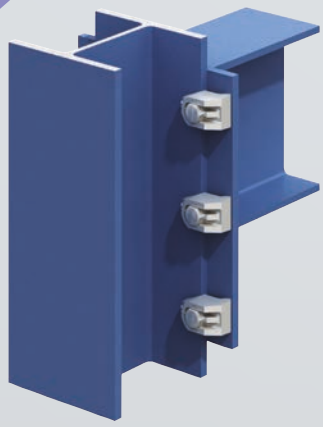
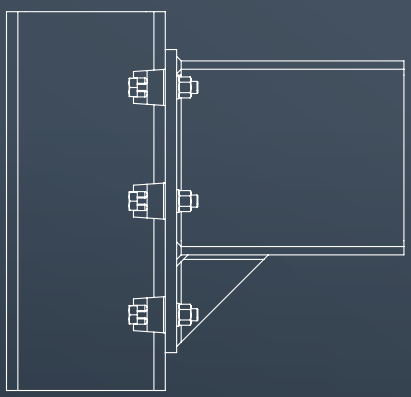




Project Experience

St David's Shopping Centre, Cardiff, UK

Product: Type LR

Application: Attaching the precast concrete cladding panels to primary steel columns.

Consulting Engineers on this £675m retail project invited Lindapter to design a bespoke adjustable connection system to facilitate the accurate positioning of a sandstone faced façade. Lindapter's proposed solution comprised a steel bracket with slotted holes that could be clamped to the structural members with Type LR clamps.

Stephen Maddalena, Chairman and Joint M.D. of the Marble Mosaic Company, who designed, manufactured and installed the precast cladding panels, highlights the benefits of specifying Lindapter:

"... the use of Lindapter's connectors provided an eminently practical means of attaching the precast cladding panels to its structural steel frame. Lindapter's support team proved to be especially valuable in developing this solution."

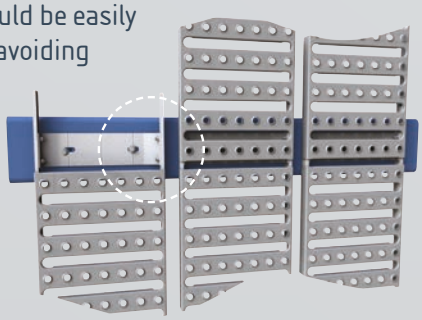
Military History Museum, Dresden, Germany

Product: Type HB (Stainless)

Application: Securing a perforated stainless steel cladding façade.

Lindapter Hollo-Bolt fixings secured perforated steel cladding panels to the structural steel hollow section in Daniel Libeskind's impressive five storey façade. The arrow shaped extension, made from glass, concrete and steel, intersects the original neo-classical arsenal building. The arrow's steel cladding was secured using over 2,000 M8 stainless steel Hollo-Bolts.

Lindapter's patented Hollo-Bolts provided the contractors with a connection solution that could be easily installed from just one side, avoiding welding and on-site drilling.



The discreet Hollo-Bolts were manufactured from Grade 316 stainless steel for enhanced corrosion resistance.

West Midtown Ferry Terminal, New York, USA

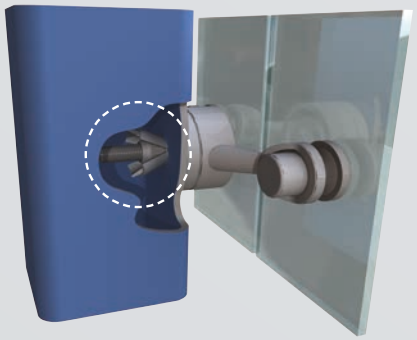
Product: Hollo-Bolt®

Application: Securing the glazed façade to the structural steel columns.

The principal terminal for passenger ferries operating between Midtown Manhattan and north eastern New Jersey features a distinct curved glass façade. Lindapter Hollo-Bolts were used to connect the glazing framework, consisting of fin supports and 'spider' brackets, to the arched tubular steel sections.

Pre-drilled hollow steel sections were delivered to site, allowing the contractors to simply insert the Hollo-Bolts into existing holes, before tightening to secure the glazing supports.

Once installed, only the bolt heads were visible, producing an aesthetically pleasing finish.



St Pancras Station, London, UK

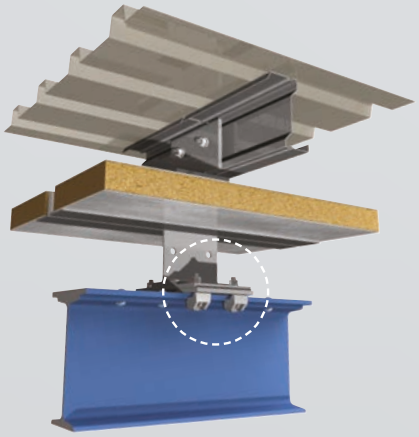
Product: Type AF

Application: Connecting the steel framework of a new roof to the station's existing structure.

In the most crucial part of the refurbishment of the Grade 1 listed 'Barlow Shed' at St Pancras Station, the Type AF clamp allowed a new steel framed roof to be connected to the Victorian arches without any damage to the original steel sections.

Lindapter's connection solution also provided height adjustability and the ability to be moved up and down the beams to optimise alignment.

The Type AF clamp's high resistance to frictional loads ensured a secure connection at all angles of the arched beams.



Approvals

Approvals

Lindapter has manufactured to the highest standard for over three quarters of a century, earning a multitude of independent approvals and a reputation synonymous with safety and reliability. Current accreditations include:

CE Marking For Lindapter products in compliance with the provisions of the EC Construction Product Regulation, please visit: **www.lindapter.com/About/CE**

Deutsches Institut für Bautechnik is a body that approves construction products for use in structural and civil engineering industries in Germany.

Lloyd's Register Type Approved products have been subjected to tensile, frictional, vibration and shock tests, witnessed and verified by Lloyd's Register.

TÜV NORD is the certifying authority for safety, quality and environmental protection in Germany.

Det Norske Veritas has approved the use of Lindapter products in lifting applications. This includes their use on both mobile and fixed offshore installations.

Factory Mutual, the American insurance organisation, offers an approval which is recognised by the fire protection industry worldwide.

Verband der Schadenversicherer e.V. is one of Germany's leading independent testing institutions for products used in fire protection applications.

Quality & Environment

ISO 9001
Accredited to ISO 9001 since 1986, Lindapter enforces a quality management system that includes vigorous product testing to ensure consistently high manufacturing standards.

ISO 14001
Lindapter also operates an ISO 14001 certified environmental management system, constantly monitoring and improving aspects of the business that may have an impact on the environment.

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EMS 546660

Associations

Lindapter is a member of the following organisations:

(From left to right) British Constructional Steelwork Association, The Steel Construction Institute, American Institute of Steel Construction and Southern African Institute of Steel Construction.

Technical Support

Technical Support

Experienced Engineers offer an unrivalled support service, including free design and bespoke product development. Lindapter's philosophy is to deliver the highest quality at every stage of the service, from initial connection design to installation guidance.

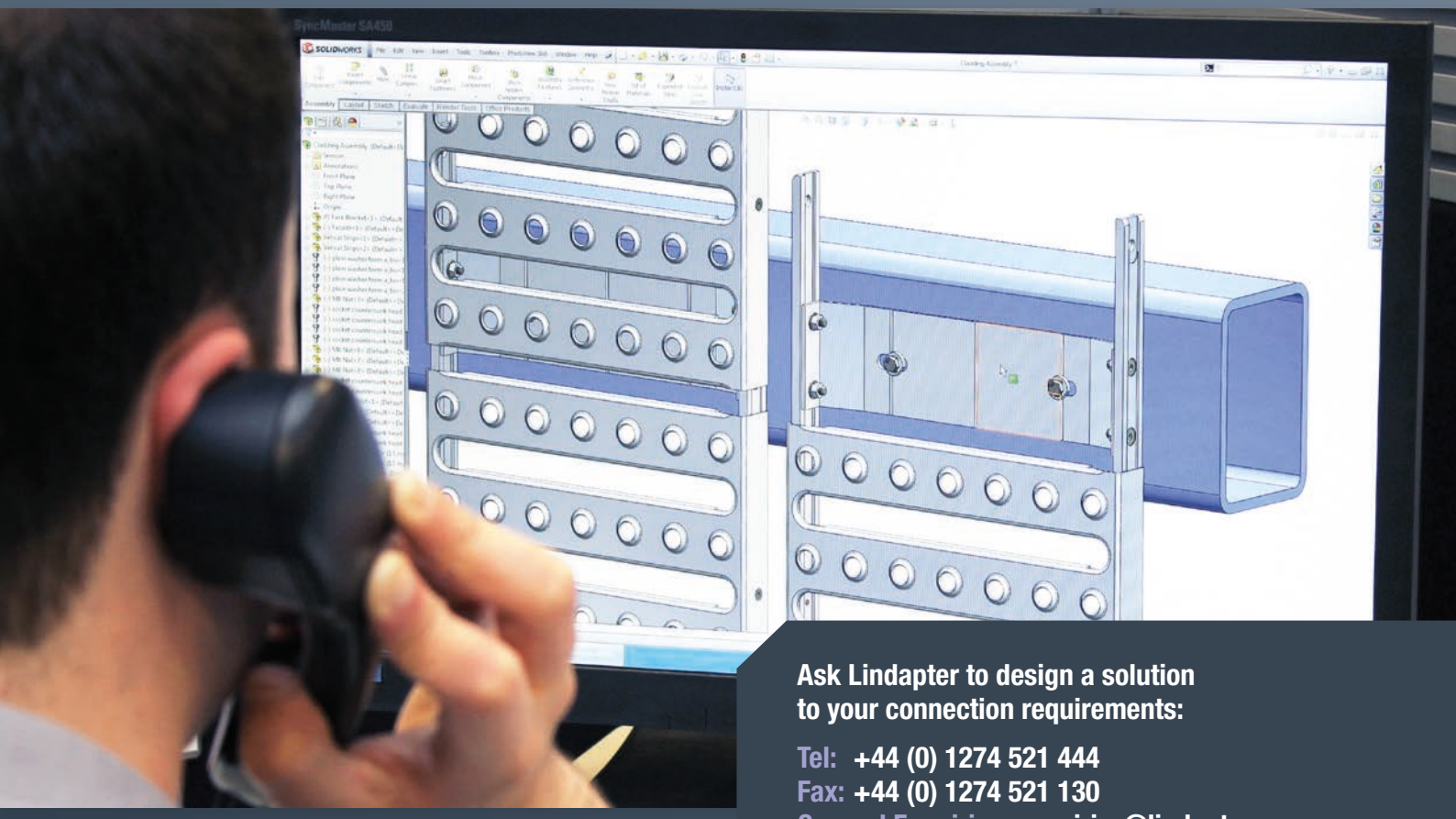
- Specialist advice from experienced Engineers
- Free connection design based on your requirements
- Bespoke drawings delivered in 2D and interactive 3D formats
- CAD files available to import into all major software applications
- Contractor training and on-site visits (where required)

Engineered Solutions

- Design and development of custom products, manufactured to Lindapter's exacting standards
- Thoroughly tested with detailed reports

(Above) *One of two 1,000 kN testing machines in Lindapter's Research & Development Facility*

(Left) *An example of Lindapter's bespoke interactive 3D drawings; just one part of the connection design service on offer*



Ask Lindapter to design a solution to your connection requirements:

Tel: +44 (0) 1274 521 444
Fax: +44 (0) 1274 521 130
General Enquiries: enquiries@lindapter.com
Technical Support: support@lindapter.com

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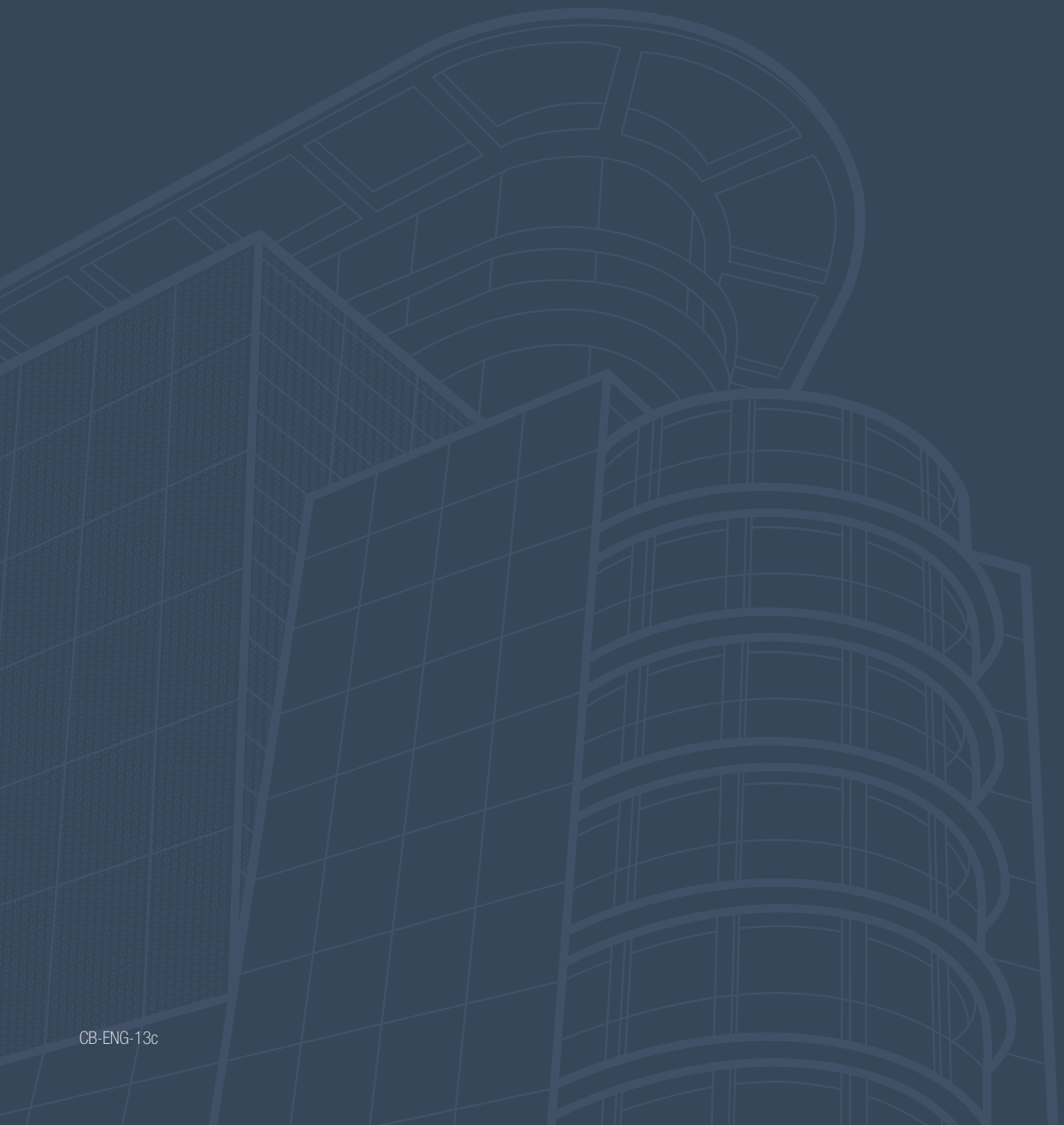

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