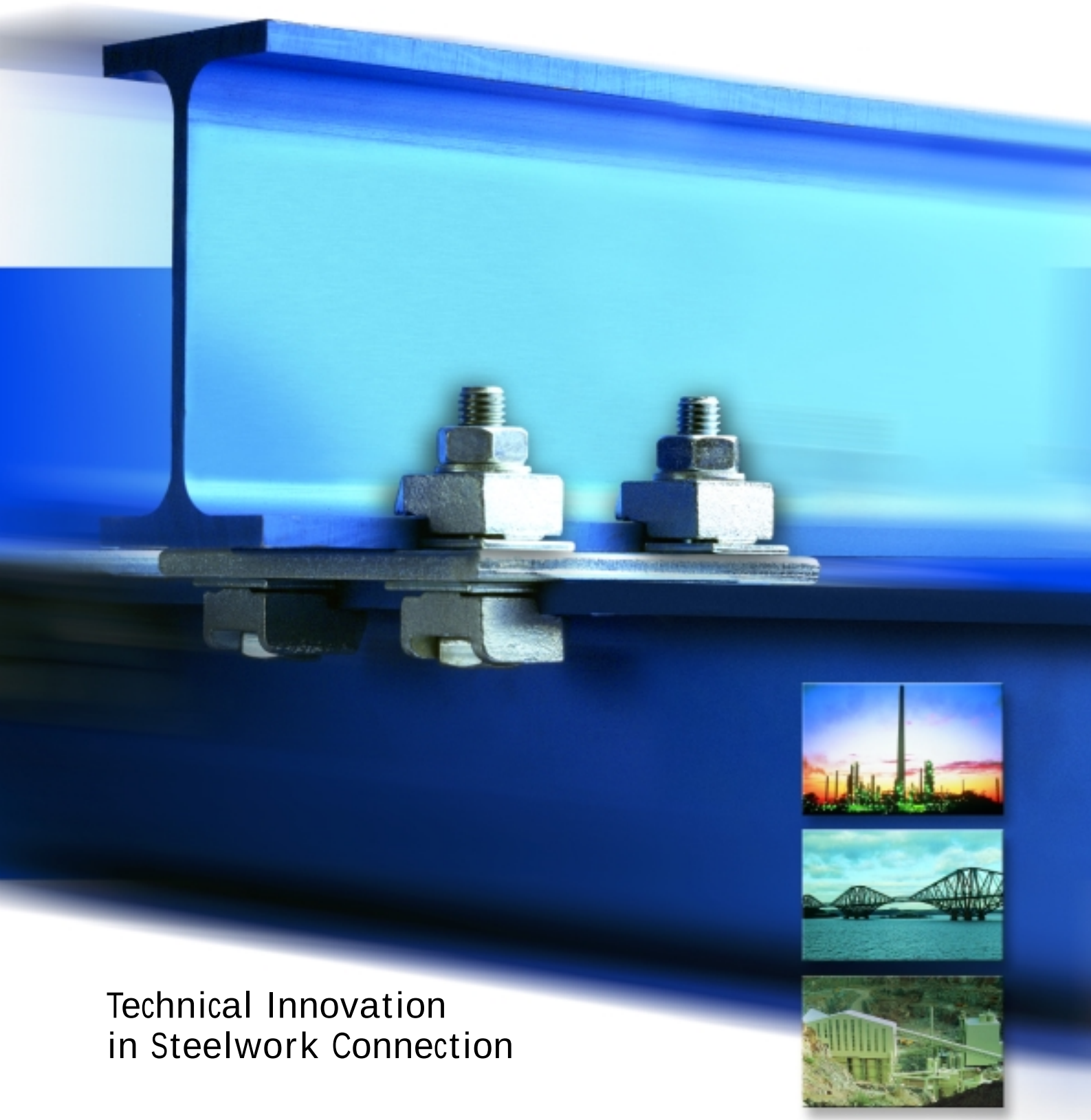
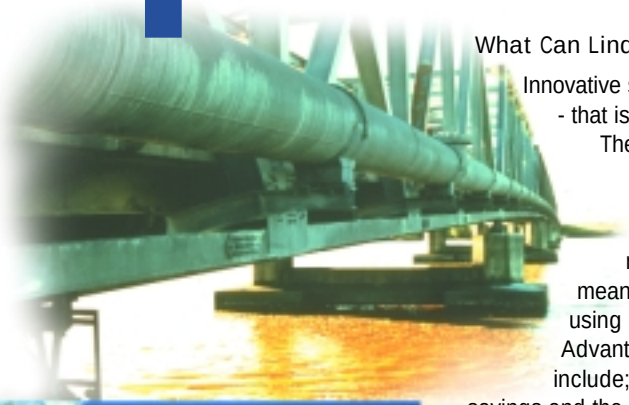


Technical Innovation
in Steelwork Connection

lindapter®

Contents

Lindapter 2002 Catalogue E.+0.E. Reprinted October 2003



What Can Lindapter Do For Your Business?

Innovative solutions to your connection requirements - that is what is to be found within this catalogue.
The applications of the products in connections are limitless. The cost savings through installation times being reduced, no specialised labour required and no special tool requirements mean your business benefits immediately from using Lindapter fixings.
Advantages over traditional fixing methods include; a quick turnaround of a project, cost savings and the additional peace of mind experienced when using Lindapter products through the rigorous testing and the guaranteed loadings we can offer.

Who is Lindapter?

Lindapter have been in existence for over sixty years, beginning as a small engineering business designing and manufacturing bolt adapters (products similar in design to Lindapter Type A's and B's shown on pages 12 and 13.) Continuous additions to the range over the years and the experience we've gained have led to Lindapter becoming the world leader in the steelwork connections market.

How We Support You the Customer

Our aim is to provide innovative alternatives to traditional connection methods, using our vast experience, strong technical and engineering skills and the latest methods, including computer aided design and finite element analysis.
We offer our customers far more than simply a catalogue of products - we offer service, advice and support.

The Very Best In Technical Support

Our team of internal Lindapter engineers is able to offer a comprehensive Technical Support package to back up our products, so considered and competent advice on your fixing needs is simply a telephone call away - from everyday product applications, to non-standard applications, to bespoke product design.
This support is outlined in more detail in the catalogue, in Section 7 - Bespoke/Fabrication.
Alternatively, our regional sales engineers (or our territory distributors) are available to visit your premises to discuss your application in further detail, or make comprehensive group presentations.

New Products

It is our ongoing policy to continually launch new, innovative and cost reducing alternatives to traditional connection methods. As such, there are always products and ideas available from Lindapter which may not be shown in this catalogue. If you have an application where you need assistance, contact us and we may be able to help you.

Bespoke Product Design

Lindapter offers a wide range of standard fixings to suit a tremendous variety of applications. However, we also realise that the complex nature of the markets in which we operate sometimes demands bespoke solutions. Our team of design engineers is always available to examine your application in depth and, if we don't have a product to hand that will fulfil your requirements, the design of special fixings to meet your needs will be investigated.
Section 7 outlines some of those fixings we have specifically designed for new applications.

Materials and Special Finishes

Outlined in the table are the materials and finishes we are currently utilising for Lindapter products, however, alternative finishes are always available on request for use in aggressive or other unusual environments (subject to quantity).

	Material
A	Malleable Iron to BS EN 1562:1997
B	SG Iron to BS EN 1563:1997
C	M.S. Flat Black to BS EN 10025:1993
D	Bright Mild Steel Bar to BS 10087:1999
E	High Corrosion Resistance Stainless Steel to BS EN 10088-1
F	Forged Steel to BS EN 10083-1:1991+ A1:1996
G	Steel Strip to BS EN 10132-4: 2000 Grade C70
H	Continuously Hot Dip Zinc Coated Steel Strip to BS EN 10142: 2000
I	High Grade Alloy Steel
J	Steel Strip to BS EN 10111:1998
K	Cold Rolled Carbon Steel to BS 5770: Part 2:1981 (1995)
L	Mild Steel Strip to BS EN 10025:1993 Grade S275
M	Galvanised Steel Strip to BS EN 10147: 2000
N	Mild Steel to BS EN 10027-1 DD 11
O	Commercial Stainless Steel Strip to BS EN 10088-2
P	Investment Cast Stainless Steel to BS 3146:1974 (1993) Grade ANC 4A/4B
Q	Stainless Steel Fastener to BS EN ISO 3506: 1998 Grade A4/70
R	Cold Rolled Steel Sheet to BS EN 10130: 1991+ A1: 1998 Grade DC 01

	Finish
1	Electro Zinc Plated to BS EN 12329: 2000 Grade Fe//Zn5//A (Clear)
2	Hot Dip Spun Galvanised to BS EN ISO 1461: 1999
3	As required
4	Sheradized to BS 4921: 1988 (1994) Class 1 plus additional secondary corrosion protection 500 Hours salt spray capability
5	Continuously Hot Dip Zinc Coated
6	Electro Zinc Plated to BS EN 12329: 2000 Grade Fe//Zn5//C (Yellow)
7	Electro Zinc Plated to BS EN 12329: 2000 Grade Fe//Zn8//C plus JS 500 Leach and Seal
8	Mechanical Galvanised to ASTM B695 Class 50

The letter and number of the material and finish are shown on each product and where there are a number of alternatives available these have all been highlighted. ie.

A1 = Malleable Iron to BS EN 1562:1997
Electro-Zinc Plated to BS EN 12329:2000
Grade Fe//Zn5//A (Clear)

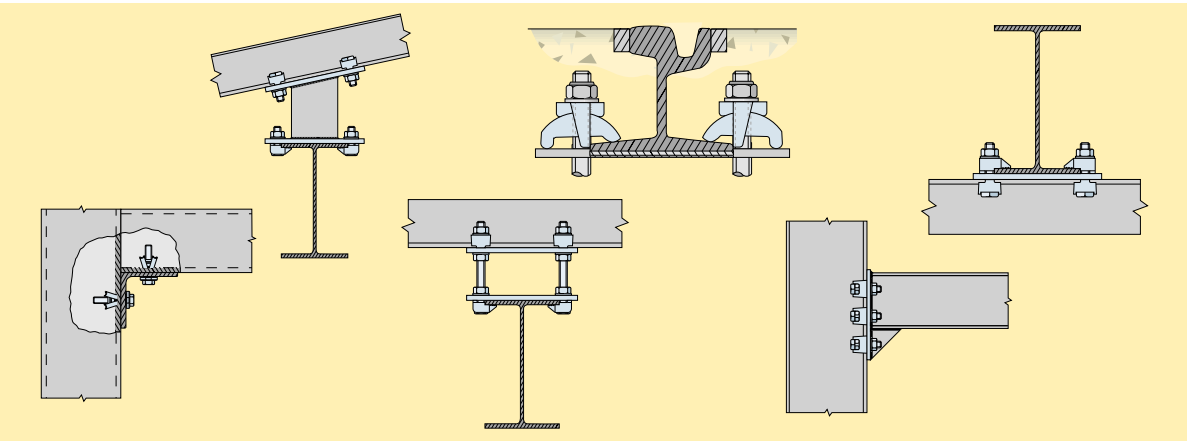
Specific industries bring with them specific problems - Lindapter can assist in finding solutions to these problems. Expensive hot work permits on offshore and process projects create problems with maintenance and restrict modifications to plant - benefits of not having to drill or weld eliminate these preclusions. Advantages of on-site adjustability without coatings being harmed, mean additional costs of re-painting or repairing damaged coatings will not be accrued.

Lindapter is Committed to Customer Service

Lindapter operates with a company-wide focus on providing the utmost in customer service and we believe that you will find us accommodating, supportive and providing guidance for all your connection needs. We are always delighted to hear your comments, both positive and negative, on the service which we offer. Please address your communications for the attention of the Marketing Manager. A copy of our customer service policy is available on request.

Application Examples

Just a few of the many applications where Lindapter have been utilised, many more exist, but these are a few to highlight the opportunities:



Markets

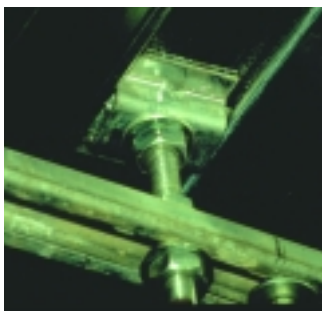
The versatility of our product range is underlined by the diversity of the markets in which Lindapter is present. The main industries are outlined here, although there are applications for Lindapter products in additional markets.


Structural Engineering

Lindapter fixings for steelwork are used in construction and refurbishment projects world-wide, providing both permanent and temporary fixings without weakening existing structures. The high quality products offer an innovative and cost effective alternative to traditional connection methods, and all offer guaranteed load bearing capabilities. Applications include fixing of cladding, steel flooring and temporary access runway beams as well as secondary steelwork installation.

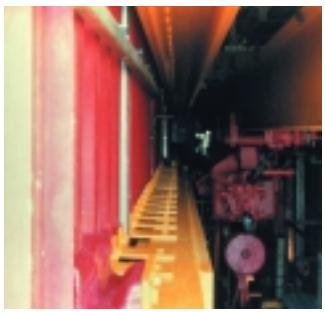

Civil Engineering

Lindapter applications include the construction or repair of bridges, usually for road or rail purposes. There are also many uses for the full product range within power stations, water treatment plants, and tunnelling projects.

Building Services

Whether fixing to I beams, purlins, hollow section, steel cavities or hollow concrete, Lindapter has the support fixing to suit. The range is fully tested and has been designed to offer savings in installation time and costs. Applications include the installation of pipework, HVAC systems, sprinkler systems, electrical equipment and cable trays, ladder racking and suspended ceilings.

Process / Plant Engineering

The full range of Lindapter products is invaluable within the process environment including petrochemicals, industrial or agrochemicals, and the offshore oil and gas industry. They permit connections to be made without hot work permits and without damaging protective coatings. Applications include pipe and cable supports, walkway supports, sprinkler installations and secondary steelwork connections.


Materials Handling

Lindapter products have a range of applications within the materials handling industry which include conveyor supports, monorail supports, header steelwork connections and lift installations. Because there is no need for drilling or welding, temporary or permanent connections can be made which enable conveyor installations to be re-routed or removed without difficulty.


Transportation

The Lindapter range has numerous applications within the transportation industry. Fast and convenient fixings are available for overhead catenary systems, trackwork cable troughs, electrification bracketry, station monitors, and vehicle trailer sideguards. Lindapter rail fixings are ideal for holding down rails in low speed applications.

Project Successes

Lindapter has a long history of major project successes. Involvement with projects as diverse as Sydney Harbour Bridge and Mauna Kea, Hawaii have demonstrated that Lindapter is ideally placed to offer the highest standards of service – internationally. Below is a small selection of our involvement in hundreds of major projects – for further details please contact us.

Sydney Harbour Bridge, Australia

Sixty years after its construction, Sydney Harbour Bridge remains an outstanding landmark combining architectural aesthetics with modern, practical engineering. To maintain the structure efficiently and effectively Sydney's region of the Roads and Traffic Authority upgraded the monorail beam which supports the maintenance platforms. Lindapter girder clamps were selected as they provide dependable connection without drilling or welding, which are not permitted on the bridge. Standard and adjustable drop girder clamps reinforced the beam to take greater loads and prevent lateral movement of the 639 metre monorail.

Halley 5 Research Station, Antarctica

Building a research station in one of the most inhospitable and isolated places in the world was a challenge facing the British Antarctic Survey every 8 years until the successful completion of the latest Halley 5 Research Station. Previous structures had been destroyed by drifting snow; to prevent this, the new structure was supported by steel platforms with extendible legs. Lindapter designed a special skeleton clamp for connecting the structural beams without drilling or welding, which are difficult to carry out under hostile antarctic conditions. Blackheart malleable iron was utilised for low temperature use and the large M20 size enabled work to be carried out wearing essential gloves.

Mauna Kea, Hawaii

The summit of a volcano may seem an unlikely place to find Lindapter products but high on Mauna Kea in Hawaii they were used in constructing the James Clerk Maxwell Telescope. The telescope, with its 15m diameter dish, is housed in a 400 tonne enclosure which rotates as the telescope tracks across the sky. Several thousand Floorfast were used to secure all the chequerplate flooring in maintenance walkways and platforms. They were chosen for their ease of installation in the difficult conditions in which the telescope was reconstructed - The 4,200, altitude means that ice, snow and high winds make for difficult working conditions.

Rail Depot, Taipei

Support Systems from Lindapter enabled electrical and sprinkler services to be fitted during the construction of a mass rail transit depot construction project in Taipei. where consultants had specified a no drilling or welding rule on the structure. Type FL flange clamps were utilised for the suspension of sprinklers and associated pipework, whilst F3 flange clamps fixed electrical equipment to vertical columns. The Lindapter fixings not only proved ideal for the suspension of services, but enabled connections to be made quickly and easily.

Telecommunications Towers, UK

T-Mobile, formerly One 2 One are part of Deutsche Telekom replacing their old lattice tower structures with new slim-line, steel hollow section masts which take just 6 hours to erect - compared with two days using the old system which involved extensive and costly on-site welding. The new masts are transported to site in convenient sections with connection points pre-drilled to eliminate the need for on-site power. These are then craned into position and secured with Lindapter Hollo-Bolts. Hollo-Bolts were selected for their high load-bearing capacity, and strength to withstand the dynamic forces exerted on the connecting point during erection. They are also easily demountable, unlike welded structures, allowing for future developments in the telecoms industry.

London Underground, UK

Over 20,000 M16 type BR Rail fixings from Lindapter saved time and money when specified by the Aoki Corporation for use in Jubilee Line Contract 105. Used to fix temporary rails onto steel sleepers, the connections enabled tunnelling equipment to progress. Type BR proved less time consuming and easier to fit than other types of clip which required welding, whilst providing the strength to withstand the locomotives' substantial load.

Kimmel Centre for the Performing Arts, Philadelphia, USA.

Lindapter provided the solution for the splicing of structural tube sections used in the arched trusses of the Kimmel Centre for the Performing Arts, Philadelphia, USA. The solution was achieved by using the Lindapter Hollo-Bolt. Over 35,000 M12 Hollo-Bolts were specified for the 8,800 splice connections of this expansive tube truss. The centre, capped by a transparent folded plate-glass barrel vault is supported by structural tube, which extends the length of the structure.

Manhattan Bridge, USA.

Services Supports from Lindapter simplified a major pipework installation along the 1668m span of Manhattan Bridge, USA. The 100mm diameter pipe was connected to the bridge truss to enable fibre-optic cable to reach adjacent boroughs. Manhattan Bridge, which links the island of Manhattan with Brooklyn, has a main span of 448m and approaches of an additional 610m on either side. A total of 1200 Lindapter assemblies enabled the pipework installation to be completed without the need for power at the point of connection, as drilling or welding was not required.

Steelwork Fixings

The Lindapter method of fixing to or from steelwork is the most adaptable system you will encounter. The principle - which can be applied to any profile of steelwork - has been utilised in almost every country in the world since it's conception in 1934.

Steelwork fixings are purpose-made malleable iron hook-bolt adapters that can securely grip the flange of most standard steel sections. With no need to drill or weld on site because standard components can be assembled simply by the use of spanners, cost of installation is kept to a minimum - a plus point with any project. Primarily for secondary steelwork, the fixings enable beam to beam connections to be made quickly and easily on site.

The diversity of project applications that can utilise Lindapter steelwork fixings is immense and the following pages illustrate some of the permutations that are possible. This should give you a comprehension of the wide variety of uses these applications could have within your projects. The total adjustability and versatility of the complete range of standard products which is available means that the possibilities are endless and only compromised by the scope of the designers imagination.

However, the main message should be that Lindapter is versatile, with our own design service and a product development team at your disposal, your connection obstacles can be overcome.

Steelwork Fixings Contents

Girder Clamp

The Lindapter Girder Clamp is a unique method of securing secondary steelwork to structural members without the need to drill or weld either section.

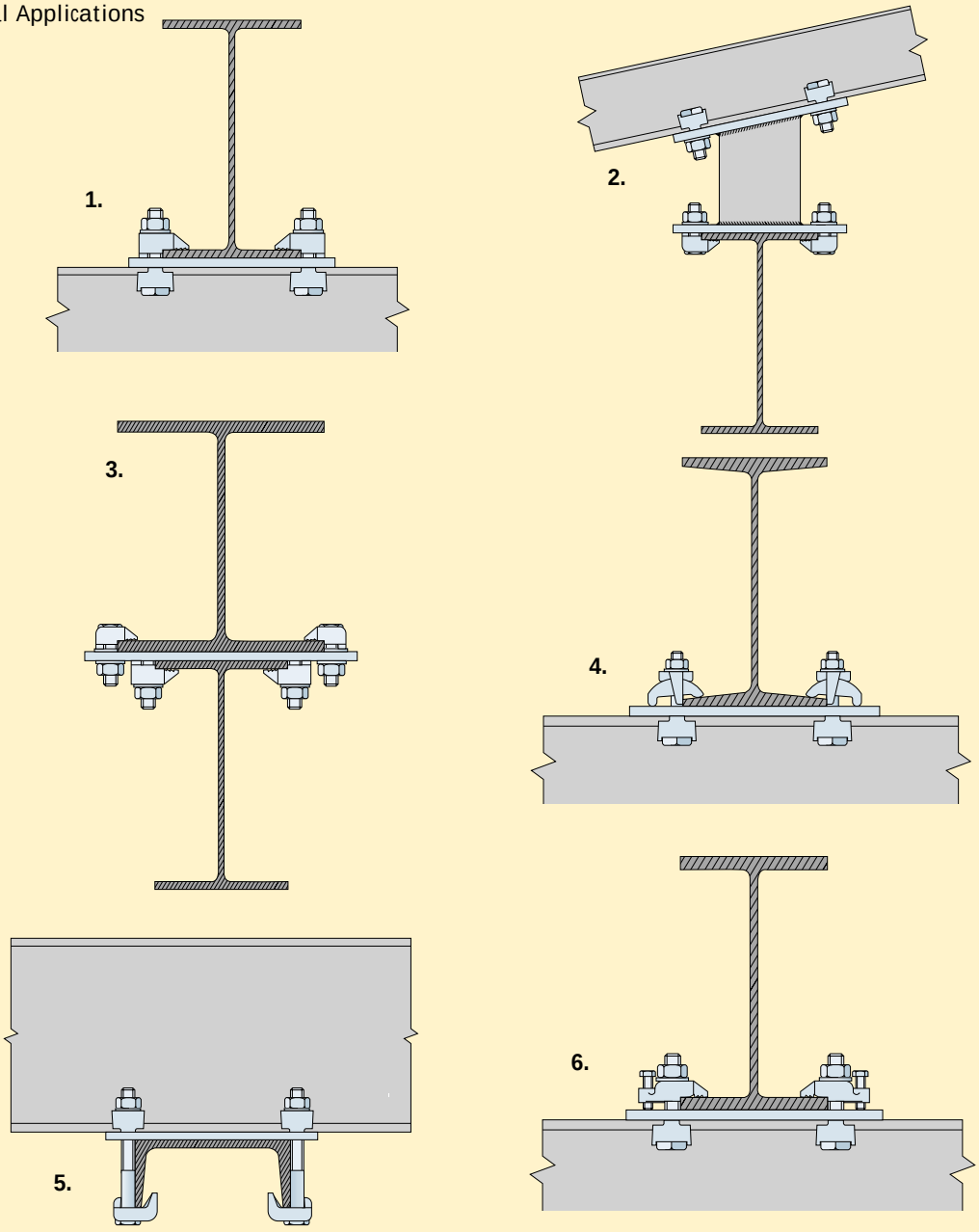
This offers several advantages:

- Reduction in installation cost
- Reduction in installation time
- Ability to relocate if needed
- No damage to protective steelwork coatings
- No hot work permit necessary
- No special tools or labour required

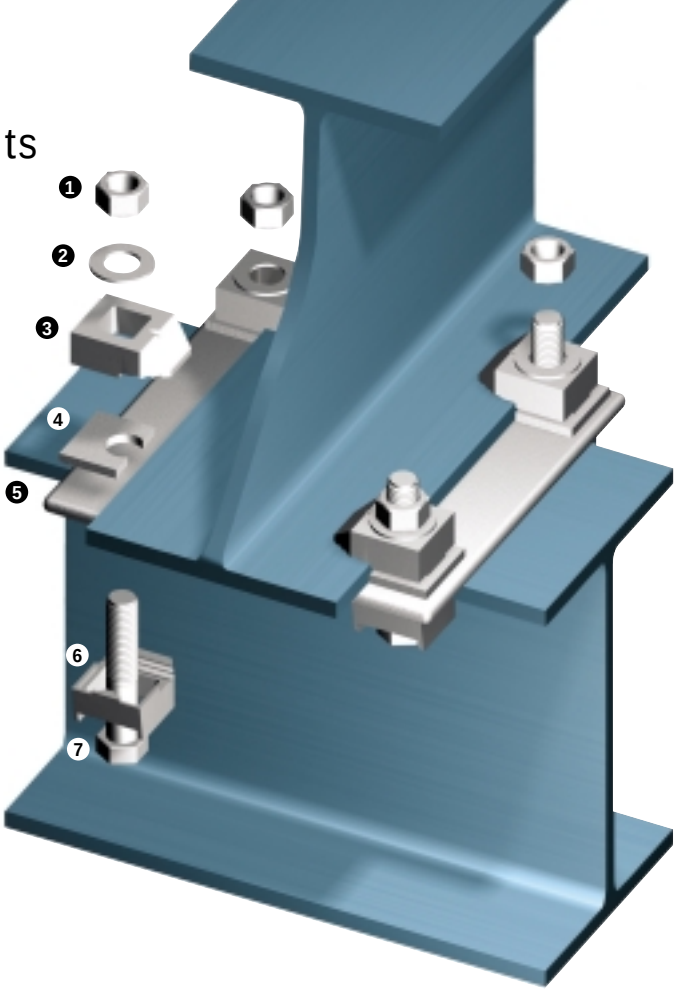
Girder clamps are manufactured specially to order and can be supplied to accommodate any size or type of steelwork. Variations in height and/or angular displacement between the two steel members can also be catered for.

Each standard girder clamp assembly generally consists of eight Lindapter steelwork fixings, four grade 8.8 bolts, nuts, washers and a pre-drilled location plate.

Typical Applications



A Breakdown of the Components of a Girder Clamp



1. **Standard Grade 8 Hex Nut**
2. **Standard Hardened Washer**
3. **Lindapter Clamp.** This component could be one of several products dependent on the application itself. For example: A, B, AF, BR, LR, D2, and D3.
4. **Packing Piece.**These are used when the clamp requires packing to enable it to sit correctly on the beam.
5. **Location Plate.** This is an essential part of the girder clamp assembly that enables all the component parts to be located in the correct position. This is unique to every assembly as the hole centres and plate thickness are calculated to suit the application. (See note).
6. **Lindapter Clamp.** This can be of a similar type as 3, although certain products are designed to specifically work together. i.e. A + B.
7. **Standard Grade 8.8 Hex Bolt**

NB. When Lindapter supply a full Girder Clamp assembly it comes complete with all of the required, components and has a guaranteed Safe Working Load, however calculation sheets for Location Plates and bolt lengths can be supplied if required.

Loads / Specification

The table beneath shows **tensile and frictional load capabilities for a standard four bolt Girder Clamp** using types A and B, at 90° crossover. Lindapter is only too pleased to carry out all design work for your connection, free of charge.

In most cases, all we need from you are the following details:

- Load per connection
- Size and type of both beams
- Angle of crossover.

Bolt Size 8.8	M12	M16	M20	M24	M30	M36
Tensile Loads (kN)	23.2	29.2	59.0	78.8	150.0	250.0
Torque (Nm)	69	147	285	491	940	1715
Frictional Loads (kN)**	1.4	3	6	9	11.6	14.6
Minimum Location Plate Thickness*(mm)	8	10	12	15	20	40

** When using type LR the location plate thickness should be increased by a minimum of 50%.*

*** Frictional details for Type A, B, D2, D3 + LR only.*

All Lindapter Girder Clamps are supplied to site ready for immediate assembly, including a full assembly diagram, and are performance guaranteed with a **5:1 factor of safety**.

Use of any lower safety factor is at the customer's discretion.

A fax back form for the Girder Clamp that outlines all the information we require in order for Lindapter to be able to design an appropriate Girder Clamp for your requirements can be found on page 27.

NB. The location plate is an essential component of the Girder Clamp and must not be omitted.
Packing pieces may also be included to allow for variations in flange thickness of the beams being connected. These packings are outlined in detail further on in this section.

Corrosion Protection

Standard finish on Lindapter steelwork fixings is electro-zinc plating, although other coatings are available if required. Other components of the Girder Clamp can be supplied with a finish to meet your requirements.

Approvals

The Lindapter Girder Clamp assembly is covered by three rigorous product approvals:

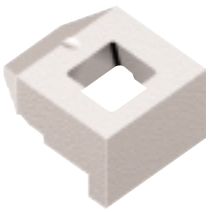
The DIBt approval applies to Girder Clamps using types A and B only, in sizes from M12 to M24.
Further information is available upon request.

The diagram opposite shows a typical Girder Clamp assembly. The individual parts are labelled and described for your convenience.
Depending on the application various versions of the Girder Clamp can be produced, this is determined by the different clamps (Items 3 and 6 on page 10) which are suited to the diverse applications.
See the details below which outline the various clamping options:

The types A and B are used when the top and bottom beam flanges of the sections are of a known thickness. The type A is used to captivate the bolt head and stop it rotating whereas the type B has a flat top to allow a nut to be tightened onto it. See pages 12 and 13.

The High Friction Clamp, type AF, is for applications where high frictional loads are encountered. To be used specifically with special packing pieces and a high strength location plate. See page 15.

The type BR is a version of the traditional type B, it features an angled nose which enables the product to accommodate tapered beam flanges of up to 8° slope whilst still remaining at 90° to the bolt shank. See page 37.



A manually adjusting clamp, the D2 and D3 type clamps incorporate a set screw to accommodate a wide range of flange thicknesses. The difference between them being similar to the type A and B i.e. the D2 has a recessed head and the D3 has a flat top in order to rotate the nut or bolt head in order to tighten the assembly. See pages 18 and 19.

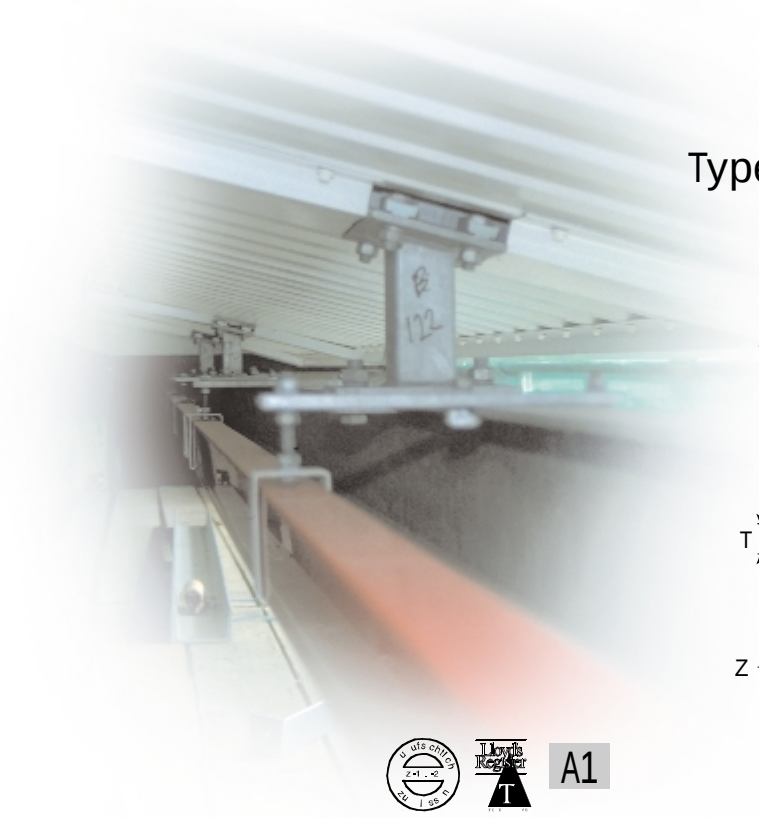
The self adjusting clamp, type LR, is suitable particularly where the flange thickness cannot be easily measured prior to installation or where a range of different thicknesses are to be encountered. It has a greater range of thicknesses covered than the manually adjusted clamps.
See page 16.

The hook nosed adapters, types C1 (recessed) and C2 (flat top), are designed for going over the edges of angles or the flanges of rolled steel sections. And for thick flanges the rib inside the nose of the type C can be removed. **Neither of these clamps is recommended for frictional load conditions.** See page 17.

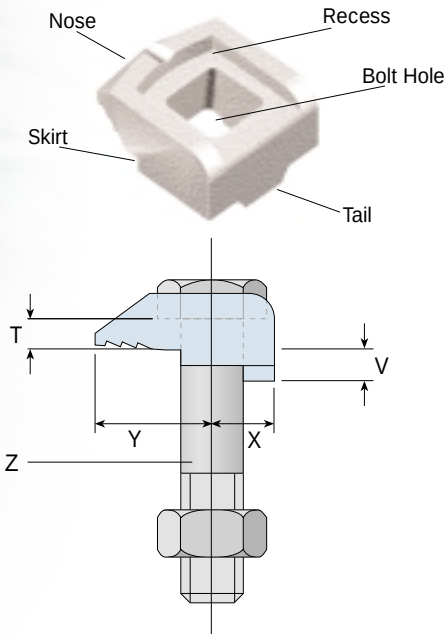
The following table gives a breakdown of which accessory or packing is applicable to which clamp.

Type	A	B	LR	D1	D2	D3	C1	C2	E	BS	BS Long
CW	•	•	X	X	X	X	X	X	•	•	•
P/Short	•	•	X	X	X	X	X	X	•	•	•
P/Long	■	■	•	•	•	•	X	X	■	■	■
W	•	X	X	•	•	X	•	X	X	X	X
T	•	•	X	•	•	•	X	X	X	X	X

•=Suitable X=Not Suitable ■=Usable but not recommended



Type A - Recessed Fixing

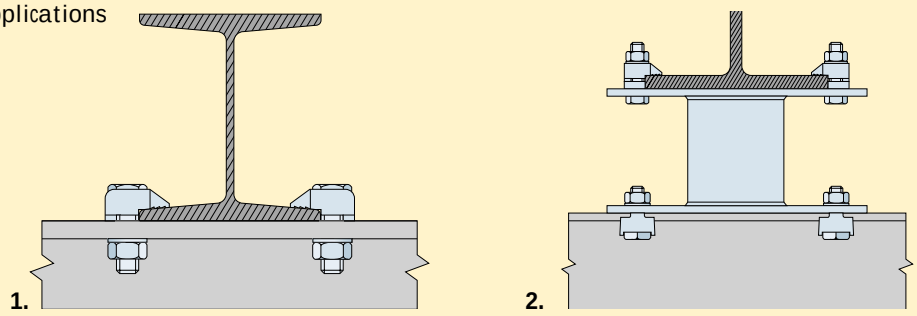


A1

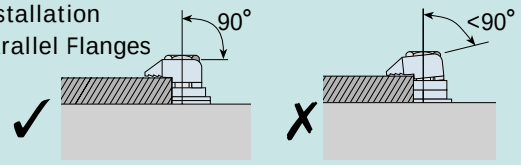
Type A steelwork fixings are designed to be used with a grade 8.8 bolt, the product features a tail, the length of which, V must be chosen to suit the thickness of the flange being gripped. Type A has a recessed top to hold the bolt head captive whilst the nut is tightened.
Packing pieces are available to meet different flange thicknesses.
Further details on the choice of tail length and packing can be found in Tail Length and Packing Combinations on page 28.

Product Code		Safe Working Loads (5:1 Factor of Safety)			Dimensions (mm)						
Add suffix S, M or L to product code to denote tail length required	Bolt Size Grade 8.8 Z	Tensile (kN) (Per bolt)	Frictional (kN) (Per Pair)	Torque (Nm)	Y	X	Tail Length V Short	Medium	Long	T	Width
A08	M8	1.0	-	6	16	8	-	4.0	-	4.0	20
A10	M10	1.5	-	20	20	11	4.0	5.0	7.0	5.0	26
A12	M12	5.8	0.7	69	26	13	4.5	6.0	9.5	6.0	29
A16	M16	7.3	1.5	147	30	16	5.5	8.0	11.0	8.0	35
A20	M20	14.7	3.0	285	36	19	7.0	10.0	12.5	10.0	42
A24	M24	19.7	4.5	491	48	25	9.0	12.0	16.0	12.0	54
A30	M30	37.5	5.8	940	54	29	10.0	15.0	18.0	15.0	62
A36	M36	62.5	7.3	1715	64	36	12.0	18.0	22.0	18.0	80

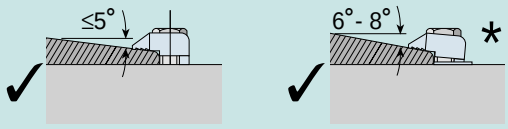
Typical Applications



Installation Parallel Flanges

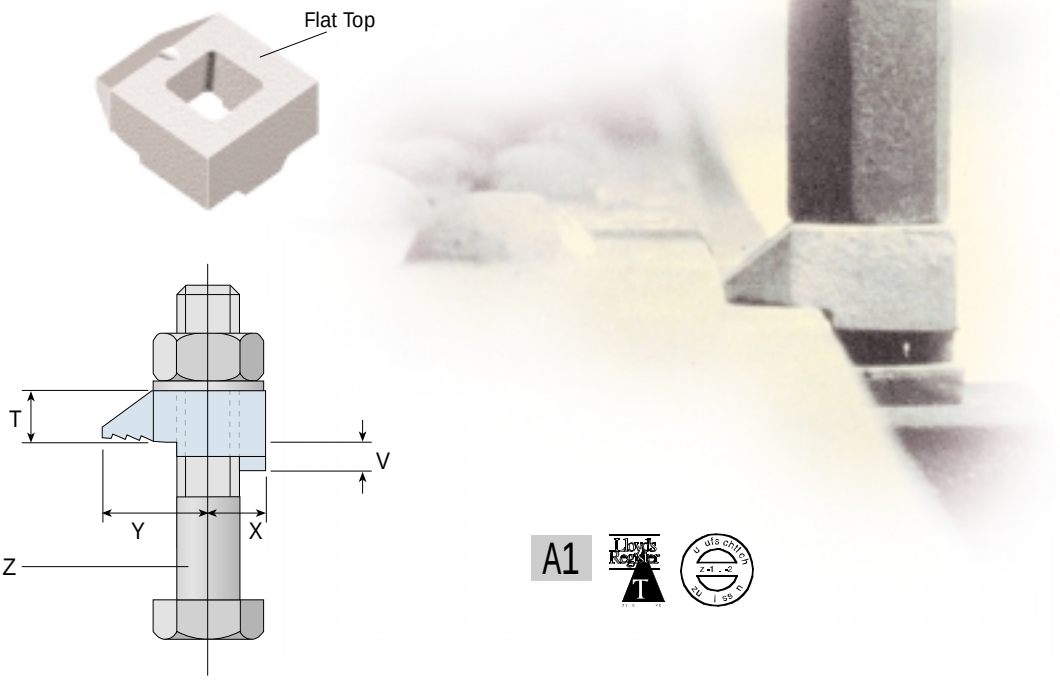


Tapered Flanges



*Between 6° and 8° slope types A & B Steelwork Fixings require a special tail length/packing combination which will allow the clamp to tilt back slightly.
For applications above 8°, please see type LR on page 16.

Type B - Flat Top Fixing

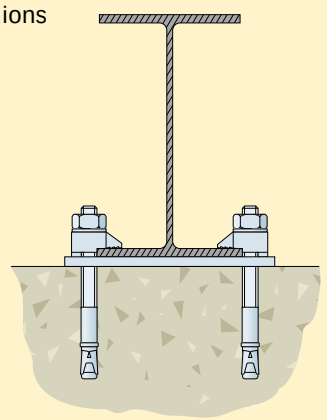


A1

Type B steelwork fixings are designed to be used with a grade 8.8 bolt. The product features a tail, the length of which, V must be chosen to suit the thickness of the flange being gripped. Type B has a flat top which allows the bolt head or nut to be rotated and is suitable for use with all bolts, studs, tie rods and J bolts.
Packing pieces are available to meet different flange thicknesses.
Further details on the choice of tail length and packing can be found in Tail Lengths/Packing Combinations on page 28.

Product Code		Safe Work Loads (5:1 Factor of Safety)			Dimensions (mm)						
Add suffix S, M or L to product code to denote tail length required	Bolt Size Grade 8.8 Z	Tensile (kN) (Per bolt)	Frictional (kN) (Per Pair)	Torque (Nm)	Y	X	Tail Length V			T	Width
							Short	Medium	Long		
B08	M8	1.0	-	6	16	8	-	4.0	-	8.0	20
B10	M10	1.5	-	20	20	11	4.0	5.0	7.0	10.0	26
B12	M12	5.8	0.7	69	26	13	4.5	6.0	9.5	12.0	29
B16	M16	7.3	1.5	147	30	16	5.5	8.0	11.0	16.0	35
B20	M20	14.7	3.0	285	36	19	7.0	10.0	12.5	20.0	42
B24	M24	19.7	4.5	491	48	25	9.0	12.0	16.0	24.0	54
B30	M30	37.5	5.8	940	54	29	10.0	15.0	18.0	30.0	62
B36	M36	62.5	7.3	1715	64	36	12.0	18.0	22.0	36.0	80

Typical Applications



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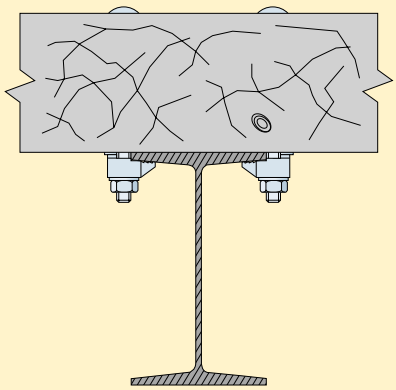
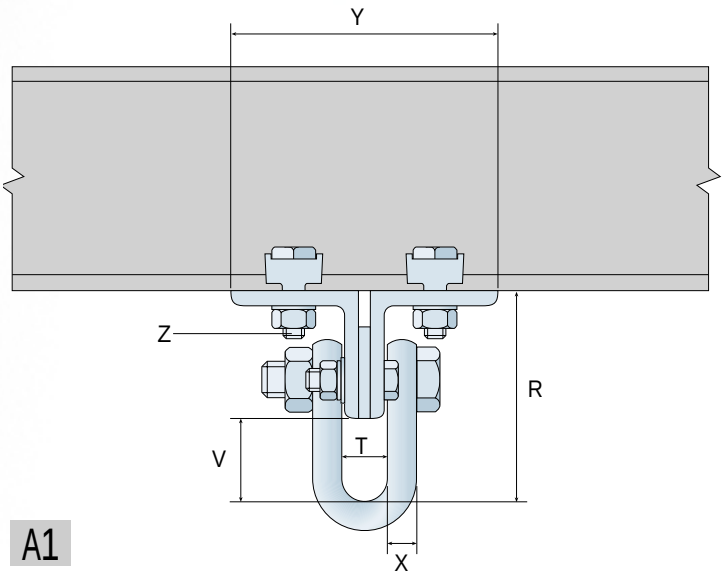


2.

NB. For installation please see page 12.

Type SC - Shackle Clamp



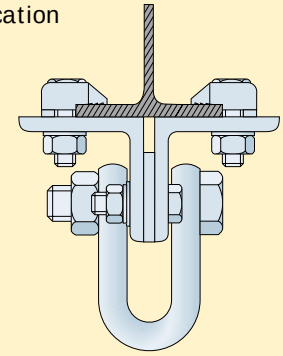
A1

L1

The Shackle Clamp is a means of suspending lifting tackle from beams without drilling the supporting member. Each clamp is suitable for one particular width of flange. The SC can, however, be moved from one beam to another of the same width and thickness. It can be fixed to girders, Tee sections, pairs of angles or channels back-to-back. When ordering please specify beam size, use of angular loads and test certificate requirements.

Bolt Size Grade 8.8 Z	Tensile Safe Working Load (kN) Per assembly (5:1 Factor of safety)	Torque (Nm)	Number of bolts	Dimensions (mm)				
				X	V	T	R	Y
M12	5	69	4	9.5	27	16	79	100
M16	10	147	4	16	47	25	117	146
M20	20	285	4	19	57	32	136	170
M24	30	491	4	25	75	38	153	190
M30	45	940	4	32	94	48	195	210
M24	60	491	8	35	103	54	254	315
M30	75	940	8	38	111	60	264	324
M36	100	1715	8	41	119	64	319	420

Typical Application



Type AF - High Friction Clamp

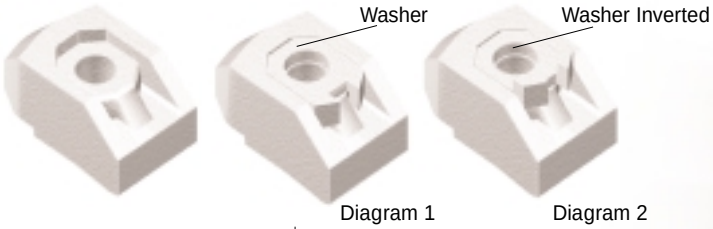
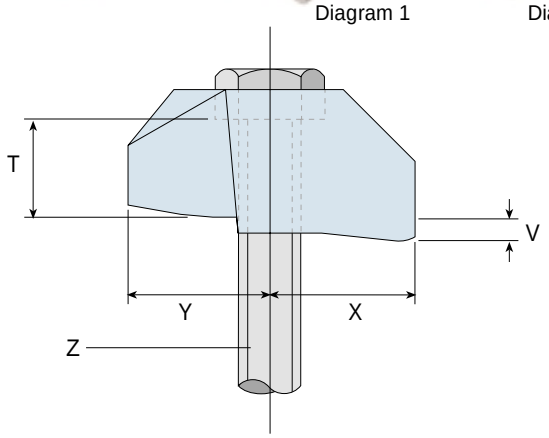


Diagram 1 Diagram 2



B2

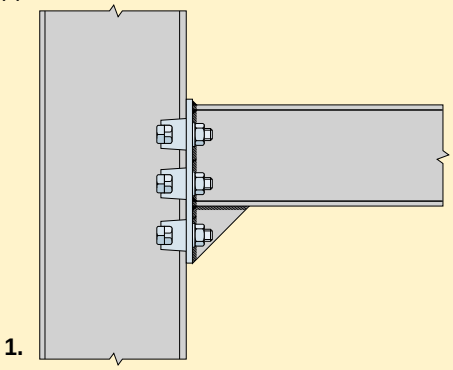
For applications where high frictional loads are encountered and cast from SG iron, the AF is designed to be used with grade 8.8 or 10.9/HSFG bolts if required, and allows significantly increased torques to be applied.
With the use of the type AFW adapter washer, the product can be adapted to suit two differing conditions. Firstly, using the washer as shown in diagram 1 above, the AF's recessed head can be filled in to act in the same way as the type B Lindapter. With the washer inverted as shown in diagram 2 , larger head size strength friction grip bolts as per BS4395 pt 2 can be captivated. The increased torques necessary to achieve the AF's elevated performance require the use of a high strength location plate and to increase the products frictional performance even further, Lindapter is able to manufacture a special high friction location plate. The profile nose of Type AF enables various tapers of beam flange to be accommodated (Max 10˚). Please contact us for further details.
Special packing pieces are required with the AF. Please see page 23 for further details.

Product Code*	Bolt Size (Z)	Bolt Grade	Torque (Nm)	Safe Working Loads (5:1 Factor of Safety)			Dimensions (mm)						
				Frictional (kN)** Shot blast & painted Steelwork	Frictional (kN)** Galvanised Steelwork	Tensile (kN)	Y	X	Tail Length V		T		Width
									Short	Medium	Type AF	Type AF with AFW	
				Per Pair		Per Bolt							
AF12	M12	8.8	90	3.4	3.9	8.5	29	27	5	12.5	17	22	39
AF12	M12	10.9	130	4	5.2	***	29	27	5	12.5	17	22	39
AF16	M16	8.8	240	8	10	16	35	37	8	15	22	27	48.5
AF16	M16	10.9	300	11	12	***	35	37	8	15	22	27	48.5
AF20	M20	8.8	470	13	16	26.25	39.5	39	10	18	25	31	56
AF20	M20	10.9	647	20	25	***	39.5	39	10	18	25	31	56

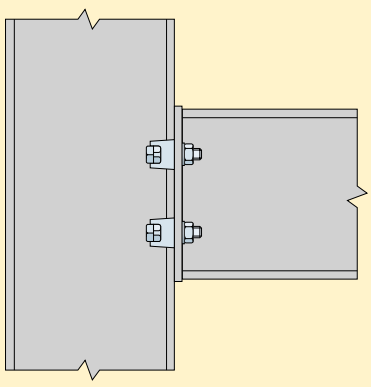
**Add suffix S or M to product code to denote tail length required.*

** Frictional load figures are based on type AF and Location Plates in hot dip galvanised finish to BS EN ISO 1461:1999. *** Where torques for grade 10.9 bolts are applied, a through hardened washer must be used to BS 4395 Part 2. In tensile loading the limiting factor is the bolt capacity. Combined frictional and tensile loads must satisfy BS 5950 Part 1 1990 Section 6.3.6.3. See also Section 6.4.4 to 6.4.5 and BS 4604 Part 2.

Typical Applications

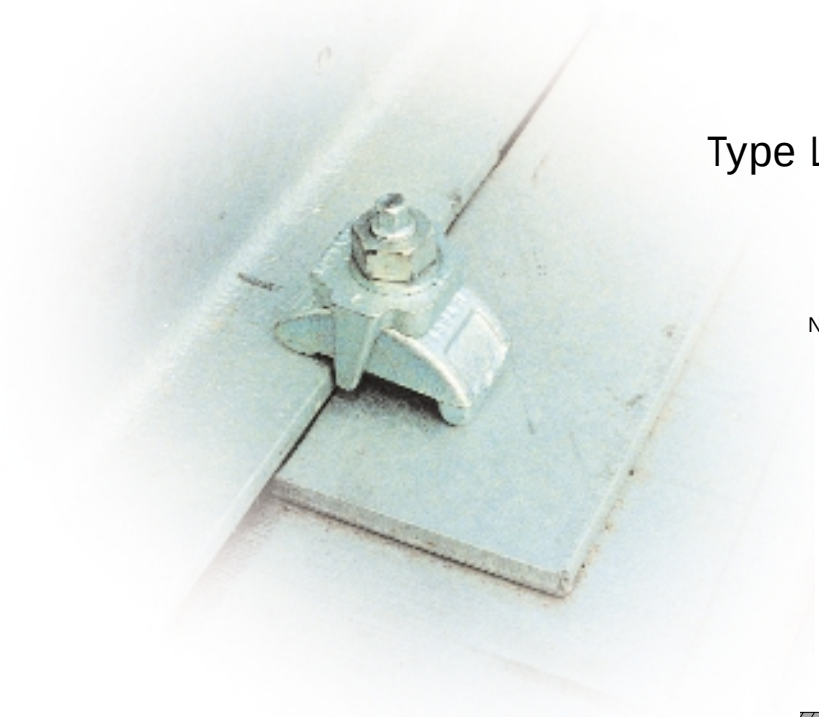


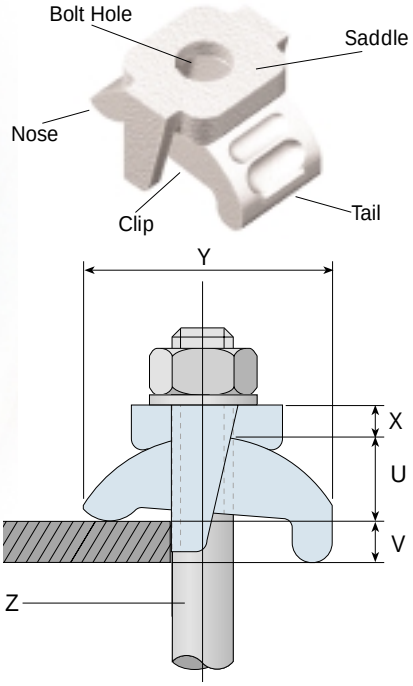
1.



2.

Type LR - Self Adjusting Clamp



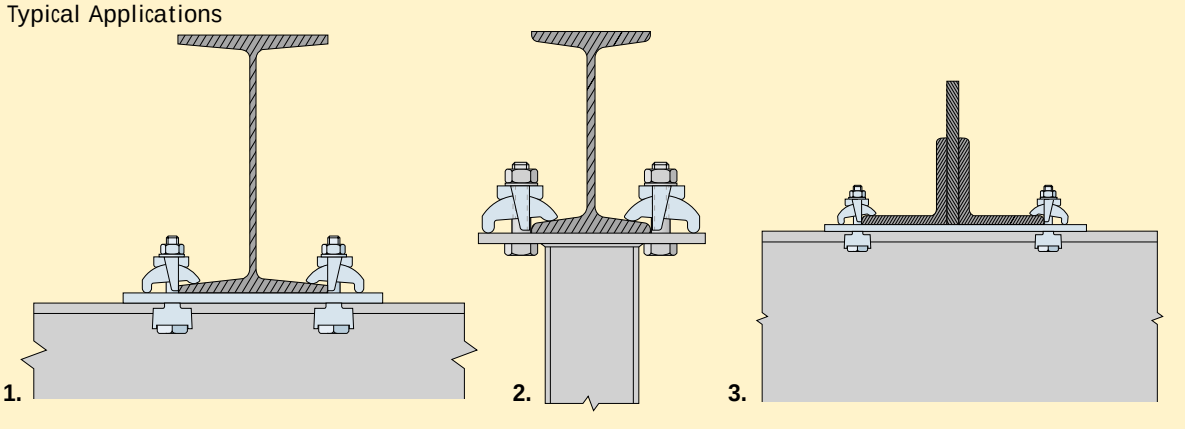


An ingenious fixing which is able to adjust itself to meet the flange thickness of the steel beam being connected. Consisting of two parts, the LR is particularly suitable for applications where the flange thickness cannot be easily measured prior to installation, or where a range of different thicknesses will be encountered.
The product's saddle adjusts to provide a flat location point for the bolt head or nut. A further advantage of the LR is its suitability for use with sloping flanges on steelwork or rails up to **15°**. For flange thicknesses beyond the range of adjustment, long packings can be used to make up the difference.
NB. The nose of the LR must sit on the flange of the section being secured. Ensure that the straight and not the tapered leg of the saddle is in contact with the edge of the flange.

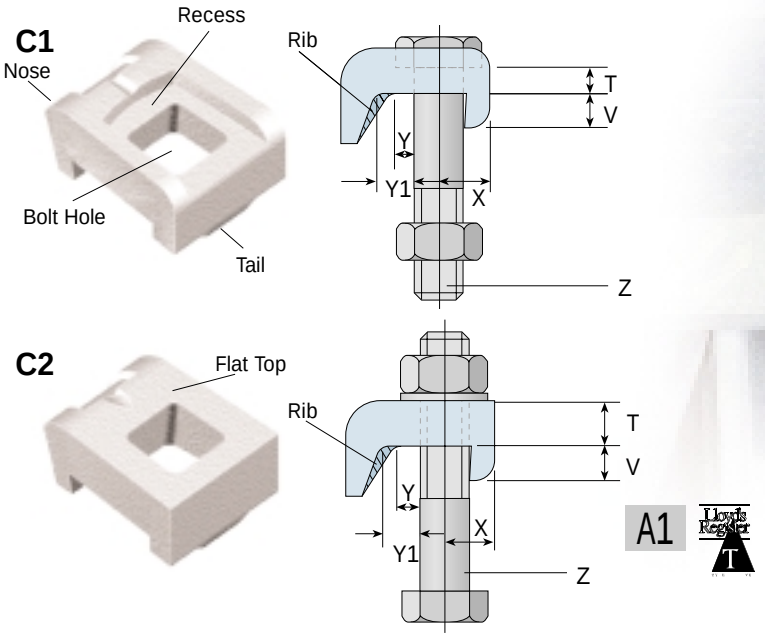
Product Code	Bolt Size Grade 8.8 Z	Safe Working Load (5:1 Factor of Safety) Tensile (kN) (Per bolt)	Frictional (kN) (Per Pair)	Torque (Nm)	Dimensions (mm) Y	U	X	V	Width
LR10	M10	1.5	-	20	46	15	6	3-10	33
LR12	M12	5.8	0.7	69	56	18.5	7	3-12	39
LR16	M16	7.3	1.5	147	67	22.5	8	3-16	46
LR20	M20	14.7	3.0	285	80	27	10	3-20	57
LR24	M24	19.7	4.5	491	106	35	12	3-24	76

NB. When using type LR the location plate thickness must be increased by 50%

Typical Applications



Type C1 - Hook Nose Adapter / Recessed
Type C2 - Hook Nose Adapter / Flat Top

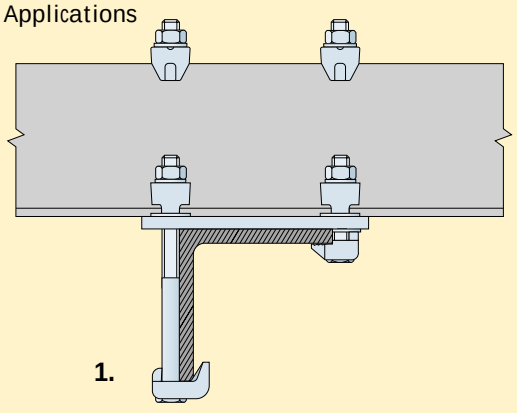


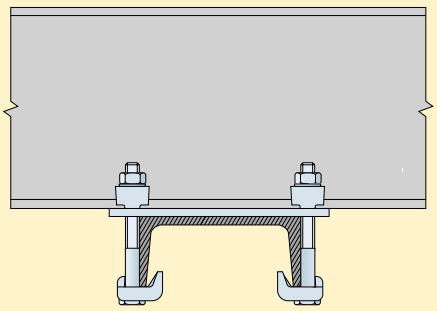
A hook-over design for going over the edges of angles or the flanges of rolled steel sections. For thick flanges the rib inside the nose of the type C can be removed. The top is recessed to receive the head of standard hexagon bolts. Type C2 is similar to type C1, but with a flat top. Generally placed under the nut of the bolt, type C2 is suitable for use with screwed rods, tie rods and cranked bars.

Neither C1 nor C2 are recommended for frictional load conditions.

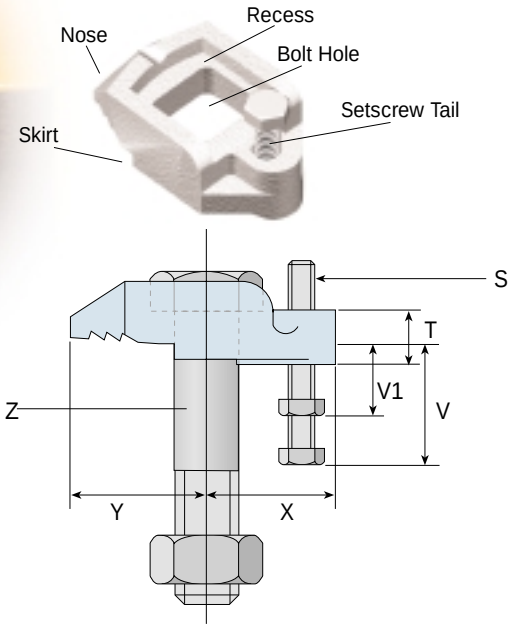
Product Code **C1**	Product Code **C2**	Bolt Size Grade 8.8 Z	Safe Working Load 5:1 Factor of Safety Tensile (kN) (Per bolt)	Torque (Nm)	Dimensions (mm)						
					Y	Y1	X	V	T Type C1	T Type C2	Width
-	C208	M8	1.0	6	5.0	7.5	8	5.5	4.0	8.0	20.0
C110	C210	M10	1.5	10	4.0	9.5	11	7.0	5.0	9.5	25.5
C112	C212	M12	5.8	34.5	6.5	13.0	13	9.0	6.5	13.0	29.0
C116	C216	M16	7.3	73.5	8.0	12.5	16	11.0	8.0	16.0	35.0
C120	C220	M20	14.7	142.5	9.0	14.0	19	13.0	9.5	19.0	42.0
-	C224	M24	19.7	245.5	13.0	18.0	26	17.0	-	25.5	54.0

Typical Applications





Type D2 - Adjustable Tail Length Fixing / Recessed



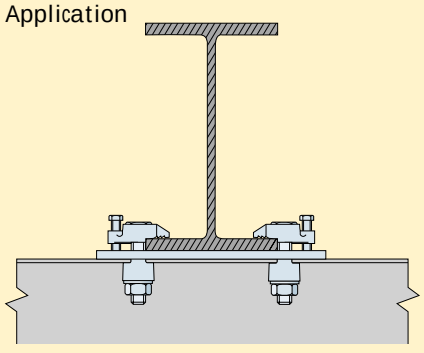
A1

The use of a setscrew tail allows the type D2 to accommodate a wide range of flange thicknesses without the use of packings (see figures V and V1 in table below) although packings can be used to increase its range. Otherwise, the clamp is used in the same way as the recessed fixing (A). Type D2 is suitable for both parallel and sloping flanges up to 5°.

Product Code	Bolt Size	Safe Working Load 5:1 Factor of Safety		Torque (Nm)	Dimensions (mm)							Minimum Flange thickness*
	Grade 8.8 Z	Tensile (kN) (Per bolt)	Frictional (Per Pair)(kN)		Y	X	V	V1	S	T	Width	
D210	M10	1.5	-	20	20	20	20	10	M6	5	26	5
D212	M12	5.8	0.7	69	26	25	22	10	M6	6	29	5
D216	M16	7.3	1.5	147	30	30	20	13	M8	8	35	6.5
D220	M20	14.7	3.0	285	36	35	24	17	M10	10	42	8.5
D224	M24	19.7	4.5	491	48	49	30	19	M12	12	54	10

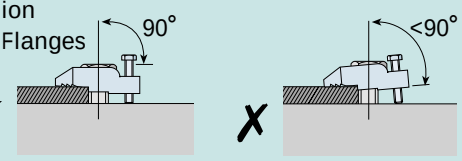
**On thin flanges it is necessary to invert the tail adjustment setscrew*

Typical Application



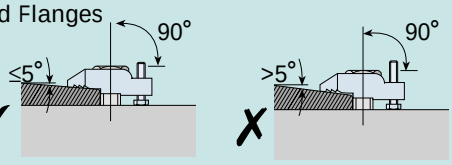
NB. The following installation instructions apply to both D2 and D3

Installation
Parallel Flanges



1.

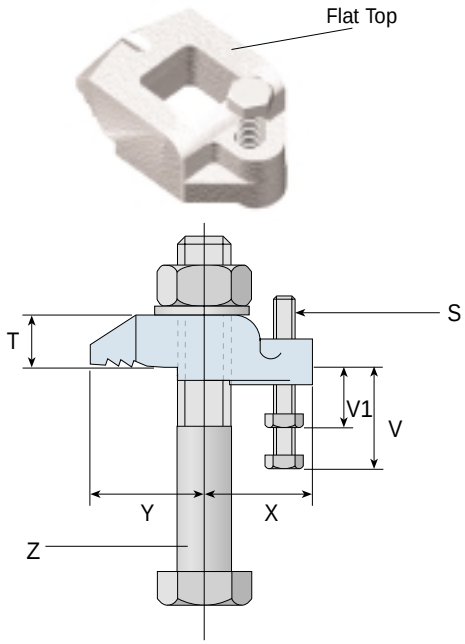
Tapered Flanges



2.

1. The tail screw on both products must be set to 1mm less than the length required before tightening the bolt, then rotated until the top edge of the Lindapter is at approx. 90˚ to the bolt shank.
2. Types D2 and D3 are suitable for flanges up to 5˚ taper only

Type D3 - Adjustable Tail Length Fixing / Flat Top



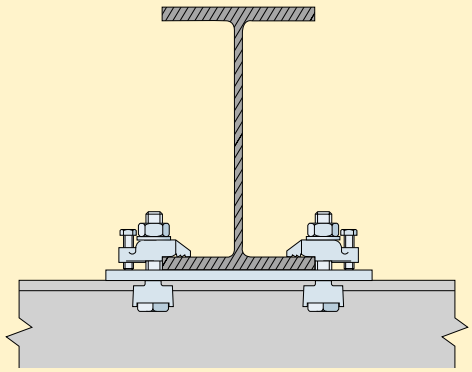
A1

Similar to the Adjustable Fixing (D2), the D3 version has a flat top so that nuts or bolt heads may be rotated to tighten the assembly bolts. Type D3 is also suitable for both parallel and sloping flanges up to 5° and is available in M12 and M16 sizes only.

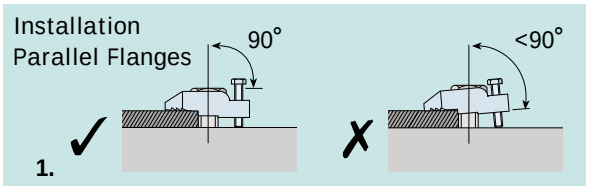
Product Code	Bolt Size	Safe Working Load 5:1 Factor of Safety		Torque (Nm)	Dimensions (mm)							Minimum Flange thickness*
	Grade 8.8 Z	Tensile (kN) (Per bolt)	Frictional (Per pair)(kN)		Y	X	V	V1	S	T	Width	
D312	M12	5.8	0.7	69	26	25	22	9.0	M6	12	29	4
D316	M16	7.3	1.5	147	30	30	20	11.5	M8	16	35	5

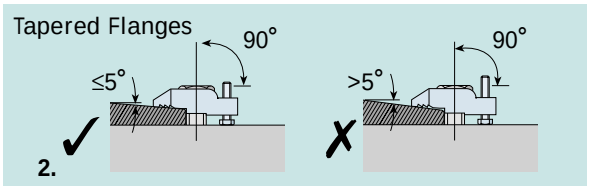
**On thin flanges it is necessary to invert the tail adjustment setscrew*

Typical Application



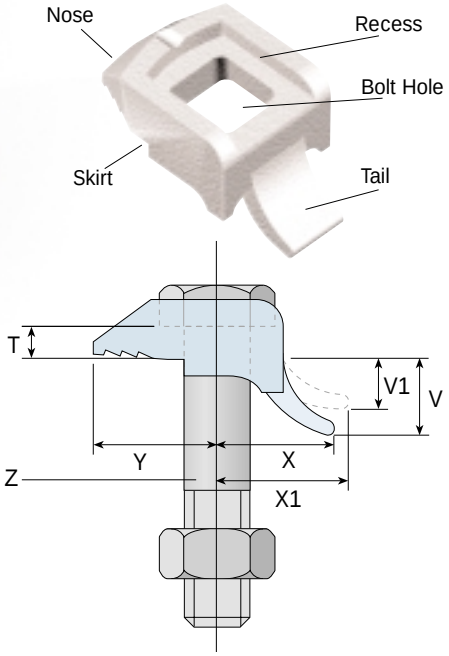
NB. The following installation instructions apply to both D2 and D3





1. The tail screw on both products must be set to 1mm less than the length required before tightening the bolt, then rotated until the top edge of the Lindapter is at approx. 90˚ to the bolt shank.
2. Types D2 and D3 are suitable for flanges up to 5˚ taper only

Type D1 - Flexible Tail Fixing



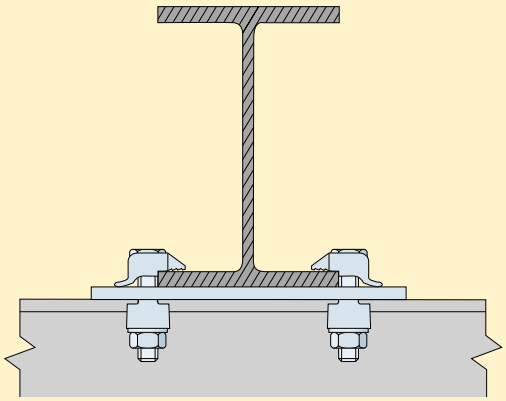
A1

Based on the type A product, the D1 features a recess to captivate the bolt head, but has the added feature of a flexible tail, which offers some adjustability to different flange thicknesses, although over less of a range than the LR, D2 and D3 Lindapter's. Type D1 is suitable for both parallel and tapered flanges up to 5° in slope.

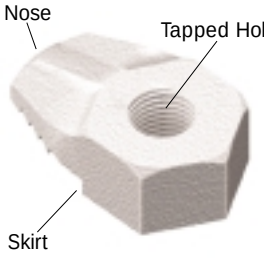
NB. **The D1 is not recommended for structural applications, or for connections where frictional loads are involved. To increase clamping thickness Type P1 Long and P2 Long may be used.**

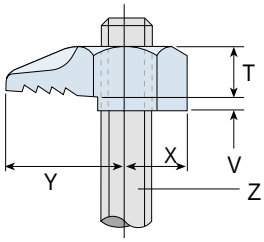
Product Code	Bolt Size Grade 8.8 Z	Safe Working Load (5:1 Factor of Safety) Tensile (kN) (Per bolt)	Torque (Nm)	Dimensions (mm)						
				Y	X	X1	V	V1	T	Width
D108	M8	1.0	6	16	15	18	9.5	6	4	20
D110	M10	1.5	10	20	19	22	11	8	5	26
D112	M12	5.8	34.5	26	24	27	14.5	10	6	29
D116	M16	7.3	73.5	30	29	32	17.5	12	8	35
D120	M20	14.7	142.5	36	34	40	22	14	10	42

Typical Application



Type E - Threaded Fixing



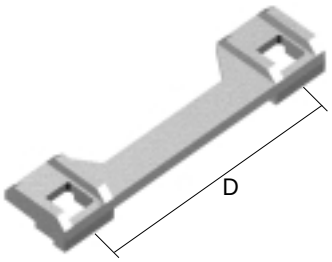


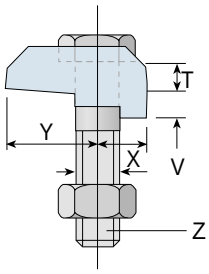
A1

The type E adapter has a tapped hole for use with bolts/setscrews and can be countersunk if specified. It is ideally suited for securing timber to steelwork. Any standard thread can be supplied to order. A combination of tail-length and packing thickness should be selected to suit the exact thickness of the flange being clamped.

Product Code	Bolt Size Grade 8.8 Z	Safe Working Load Tensile (kN) (5:1 Factor of Safety) (Per bolt)	Torque (Nm)	Dimensions (mm)				
				Y	X	V	T	Width
E10	M10	1.3	20	22	10	3.0	8.5	19
E12	M12	2.3	39	26	13	3.0	11.0	23
E16	M16	3.7	93	30	16	4.0	14.5	28

Type TRL - TRL Clamp



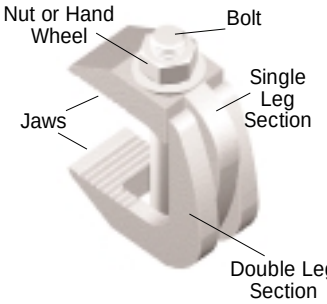


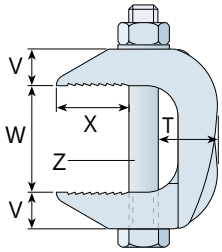
A2

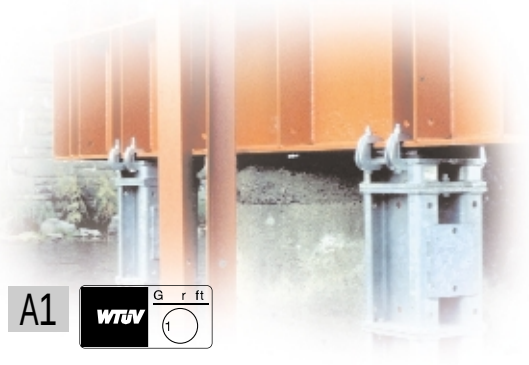
Designed for the Transport Research Laboratory the TRL clamp is used to secure environmental barriers to a safety fence. It is a part of the 'Highway Construction Details' issued by the UK Department of Transport Local Government and Regions.

Product Code	Bolt Size Z Grade 4.6	Torque (Nm)	Dimensions (mm)					
			T(Tail Length)	Overall Length	Hole Centres D	Y	X	V
TRL	M12	39	7	180	150	26	14	10

Type F9 - Flange Clamp





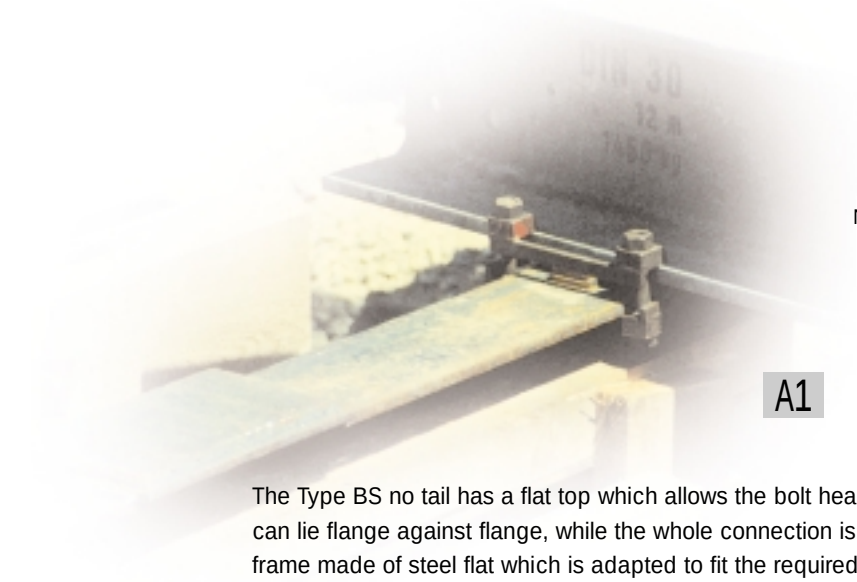


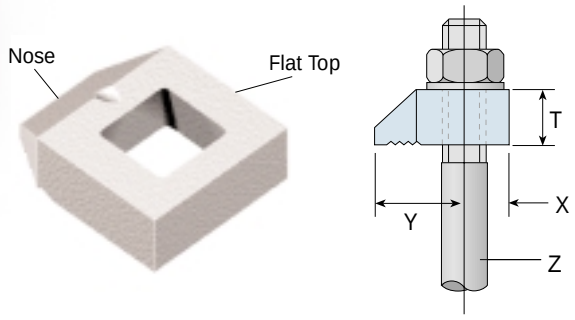
A1

An extremely useful general purpose clamp which can be used to clamp steel beams directly together without the need for a location plate. Suitable for connecting all types of parallel flanged steelwork, as well as the covers of vessels, tanks etc., but not for connecting taper flanged steels.
The F9 performs at its best when the bolt is as close as possible to the steelwork being secured.

Product Code	Bolt Size Grade 4.6 Z	Safe Working Load Tensile (kN) (5:1 Factor of Safety) (Per bolt)	Torque (Nm)	Dimensions (mm)				
				X	W	V	T	Width
F910	M10	1.96	20	25	19-42	13	19	24
F912	M12	2.8	39	35	26-60	17	24	30
F916	M16	5.6	93	43	29-69	21	28	35
F920	M20	8.4	177	51	32-82	25	35	44
F924	M24	14.0	235	76	45-95	38	55	63

Type BS - Flat Top no Tail



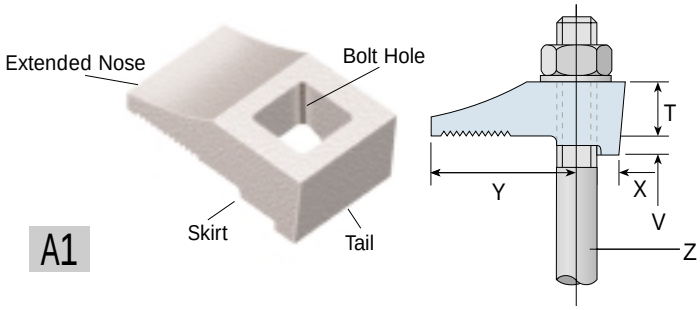


A1

The Type BS no tail has a flat top which allows the bolt head or nut to be rotated. Its main advantage is that beams can lie flange against flange, while the whole connection is made up of only a few components using a connecting frame made of steel flat which is adapted to fit the required flange thickness.

Product Code	Bolt Size Grade 8.8 Z	Safe Working Load (5:1 Factor of Safety) Tensile (kN) (Per bolt)	Torque (Nm)	Dimensions (mm)			
				Y	X	T	Width
B12P4109	M12	5.8	69	26	13	16	29
B16P3560	M16	7.3	147	30	16	20	35
B20P3208	M20	14.7	285	36	19	24	42
B24P3870	M24	19.7	491	48	25	32	54

Type BS - Long Nose

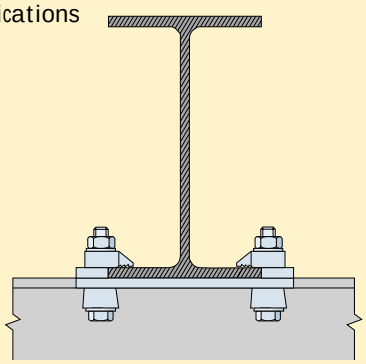


A1

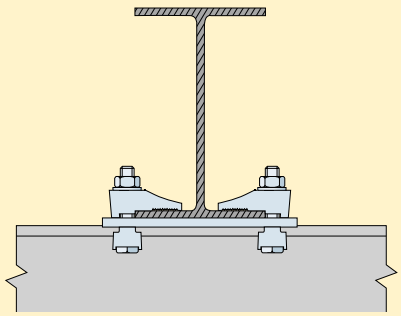
The Type BS Long Nosed is especially designed for fixing to parallel flanges. Its main advantage is the large contact area with the steel section it grips

Product Code	Bolt Size Grade 8.8 Z	Safe Working Load (5:1 Factor of Safety) Tensile (kN) (Per bolt)	Torque (Nm)	Dimensions (mm)				
				Y	X	V	T	Width
B12P3777	M12	5.8	69	45.5	15.5	6	17	28
B16P2929	M16	7.3	147	44	17	11	16	32

Typical Applications



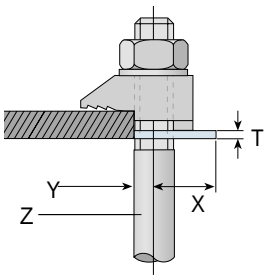
1. Type BS - Flat Top no Tail



2. Type BS - Long Nosed

ACCESSORIES

Type CW - Clipped Washer

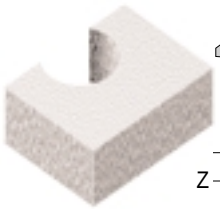


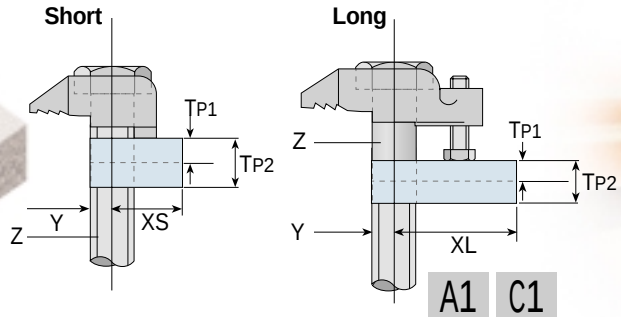
C1

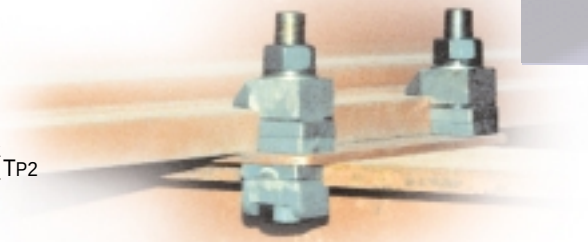
This product is used with steelwork fixings to adjust the assembly to meet differing beam flange thicknesses. The type CW fits on the bolt between the fixing and location plate and is used with types A, B, BR, BS or E fixed tail length steelwork fixings.

Product Code	Bolt Size	Dimensions (mm)			
	Z	Y	X	T	Width
CW08	M8	4	9.5	2	19
CW10	M10	5	14	2	25
CW12	M12	6	19.5	2.5	31
CW16	M16	8	17.5	3	38
CW20	M20	10	22	4	44
CW24	M24	12	29	4	57
CW30	M30	15	36	5	70
CW36	M36	18	45.5	5	89

Type P1 and P2 - Packings





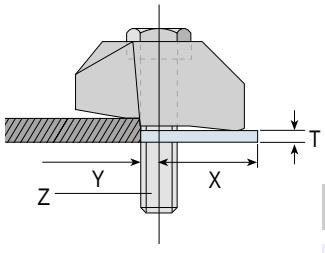


A1 C1

These products are used with steelwork fixings to adjust the assembly to meet differing beam flange thicknesses. Both products fit on the bolt between the fixing and location plate. P1 is deeper than the CW, with P2 the deepest piece, twice P1. Available in two different lengths, 'short' and 'long'. P1 short and P2 short are used with types A, B, BR, BS or E fixed tail length fixings. P1 long and P2 long are for use with adjustable tail length fixings LR, D1, D2 or D3, where the flanges to be clamped to are even thicker than the fixings' maximum range. For full details of the correct combinations please see page 28.

Product Code				Bolt Size	Dimensions (mm)					
Short		Long						T		
P1	P2	P1	P2	Z	Y	XS	XL	P1	P2	Width
P1S08	P2S08	P1L08	P2L08	M8	4	10	20	4	8	21
P1S10	P2S10	P1L10	P2L10	M10	5	13	24	5	10	24
P1S12	P2S12	P1L12	P2L12	M12	6	16	32	6	12	30
P1S16	P2S16	P1L16	P2L16	M16	8	21	40	8	16	35
P1S20	P2S20	P1L20	P2L20	M20	10	23	47	10	20	43
P1S24	P2S24	P1L24	P2L24	M24	12	32	64	12	24	54
P1S30	P2S30	-	-	M30	15	35	-	15	30	62
P1S36	P2S36	-	-	M36	18	42	-	18	36	80

Type AF High Friction Clamp Packings



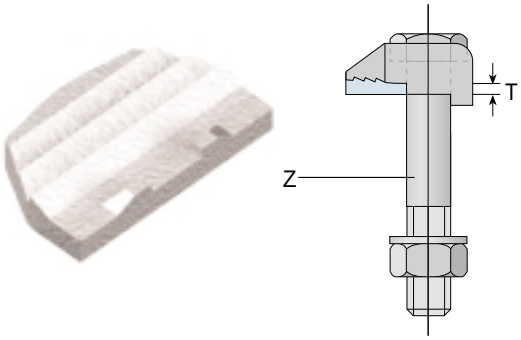
C2

These special Packings are designed for use with the Type AF High Friction Clamp **only**, to adjust the clamp to meet differing flange thicknesses.

Product Code	Bolt Size	Dimensions (mm)			
	Z	Y	X	T	Width
AF12CW	M12	7	33	2	40
AF16CW	M16	8	40	2	50
AF20CW	M20	9.5	40.5	2	55
AF12P1	M12	7	33	5	40
AF16P1	M16	8	42	5	52
AF20P1	M20	9.5	45.5	5	56
AF12P2	M12	7	33	10	40
AF16P2	M16	8	42	10	52
AF20P2	M20	9.5	45.5	10	56

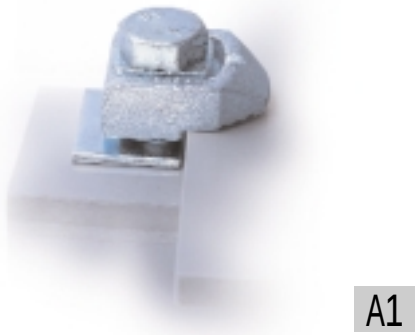
A1

Type T - Tip



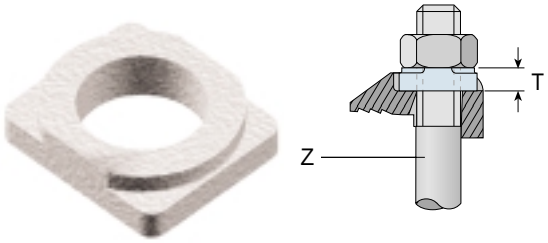
Product Code	Bolt Size Z	Dimensions (mm) T
T12	M12	3
T16	M16	4
T20	M20	5
T24	M24	6.5
T30	M30	7
T36	M36	8

The Tip enables the nose of types A, B, D1, D2 and D3 to be filled making it horizontal and flat. Available for M12 and upwards only. When used, the flange thickness is effectively increased by the thickness 'T'. The combination of the Lindapter tail-length (and packings) should be increased by this amount.



A1

Type W - Deep Washer

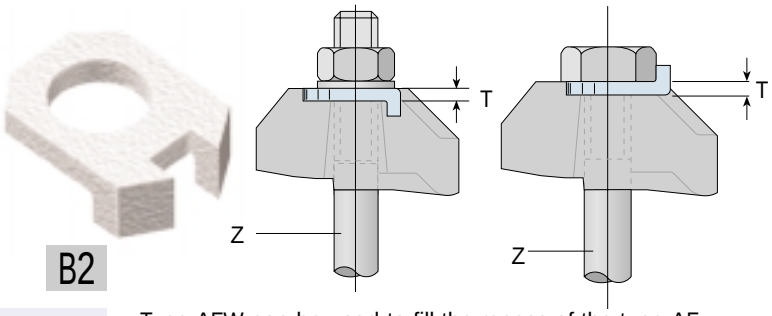


Product Code	Bolt Size Z	Dimensions (mm) T
W08	M8	4
W10	M10	5.5
W12	M12	6.5
W16	M16	8
W20	M20	9.5
W24	M24	13
W30	M30	15
W36	M36	18

The Washer is used to fill the recess in types A, C1, D1 and D2, whenever the nut comes next to the Lindapter. It is needed with coach screws, tie rods, studs or the nut of an ordinary bolt. Where any two recessed Lindapters are on one bolt, a type W is required under the nut. The thickness 'T' should be added for bolt length calculations.

B2

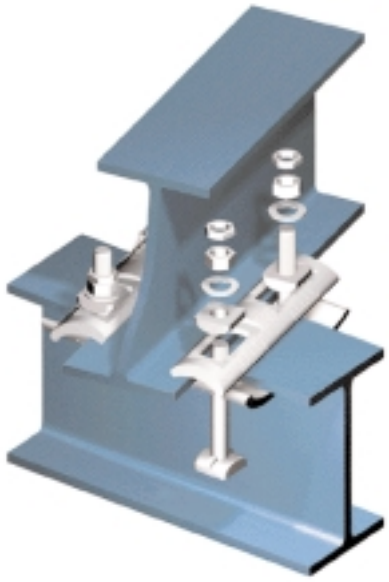
Type AFW - Adapter Washer for High Friction Clamp

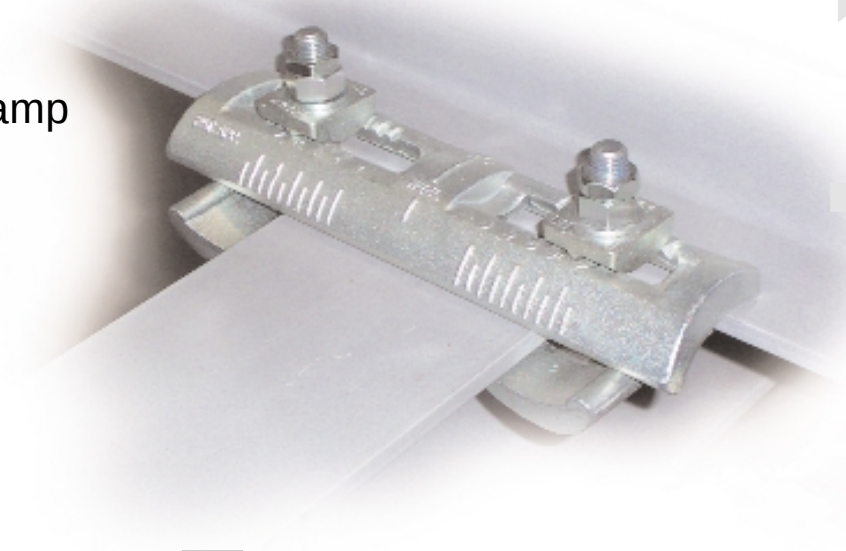


Product Code	Bolt Size Z	Dimensions (mm) T	Hexagon A/F
AFW12	M12	5	22
AFW16	M16	5	27
AFW20	M20	6	32

Type AFW can be used to fill the recess of the type AF to form a flat surface so that the nut can be tightened. Additionally it features two projections which when inverted will captivate the larger hexagons of BS 4395 Pt 2 HSFG Bolts.

Type FC - Flush Clamp





F7

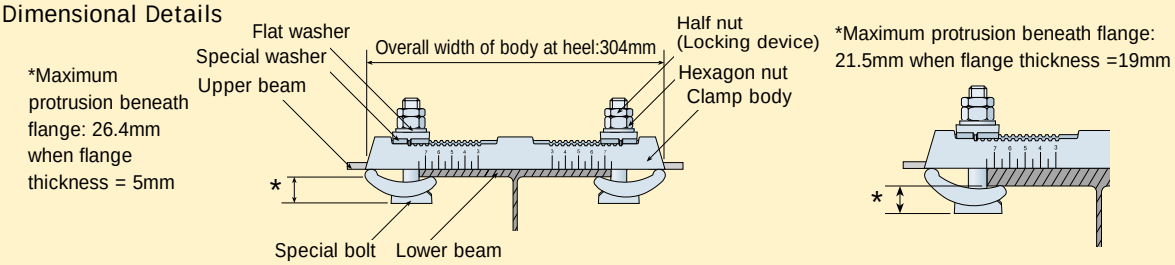
The Flush Clamp is an adjustable steelwork connection that clamps the flanges of two steel beams together without the use of a location plate. This assembly forms a clamp that is suitable for connecting beams of varying flange widths and thicknesses.

Specifications

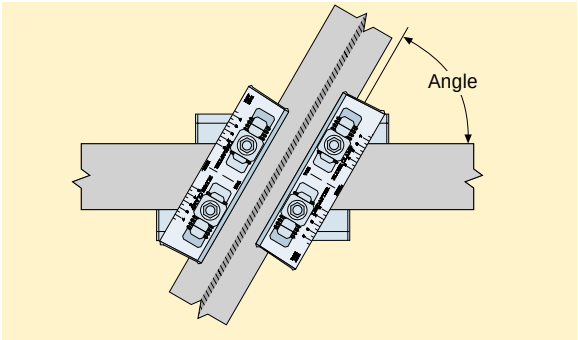
Safe Working Load: 30kN*	**Minimum Flange Width:** 75mm
Factor of Safety: 5:1	**Maximum Flange Width:** 180mm
Bolt Size: M16	**Minimum Flange Thickness:** 5mm
Tightening Torque: 147Nm	**Maximum Flange Thickness:** 19mm

** Whilst the Flush clamp has 30kN safe working load, it may not always be possible to suspend this full load from more slender beam sections. Always refer to the appropriate steel design guide for beam loadings.*

Dimensional Details



Illustrations featured show the Flush Clamp in use when the two beams connected are touching and oriented in the same plane. For non-standard applications please contact Lindapter.



Minimum Possible Beam Connection Angles

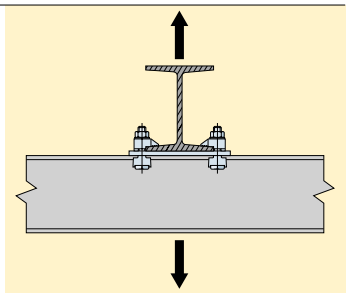
	Top Beam				
Bottom Beam	76.2 mm	101.6 mm	127 mm	152.4 mm	177.8 mm
76.2mm	45°	50°	55°	65°	75°
101.6mm	50°	50°	55°	65°	75°
127mm	55°	55°	55°	65°	75°
152.4mm	65°	65°	65°	65°	75°
177.8mm	75°	75°	75°	75°	80°

Loads and Specifications

Reference is made throughout this catalogue to loads related to our product applications. Given loads are for bolt grade 8.8 unless otherwise stated. These are defined below (all Lindapter quoted loads have been obtained from full scale physical tests)
Should you have any difficulty in selecting the correct product for your needs, please contact us.

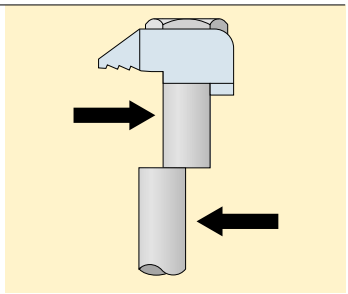
Tensile Loading

In tensile applications the load transmits a force parallel to the centre line of the bolt shank, hence applying a load to the contact point of the Lindapter. See product data tables for allowable tensile loads at varying bolt sizes.



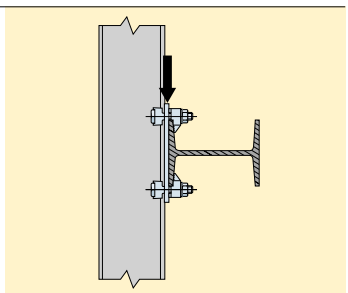
Shear Loading

Here, the Safe Working Load of the assembly is determined by the bolt grade and diameter as the force is resisted by the cross sectional area of the bolt shanks. It is recommended that reference be made to the bolt manufacturers' technical literature or the relevant structural steel design code to ascertain a Safe Working Load per bolt.



Frictional Loading

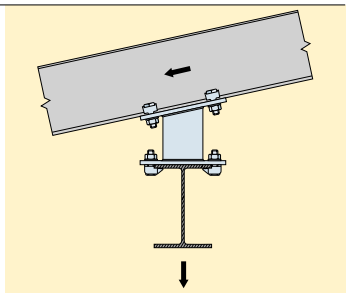
The force is applied at 90° to the bolt shank. The point at which slip occurs depends upon the condition and finish of the steelwork, the coating of the Lindapter and the grade of bolt used. Slip is defined as the constant load at which relative movement between clamped components exceeds 0.1mm.



Published frictional loads are based on electro-zinc plated products clamping onto painted steelwork, which gives the lowest coefficient of friction.
These loads are also based on a two-bolt connection, the lowest allowable for a frictional assembly. This should be multiplied for the number of bolts used as appropriate.
For further details on any frictional application, please contact Lindapter - we are only too pleased to help.
For specific high friction applications please see page 15.

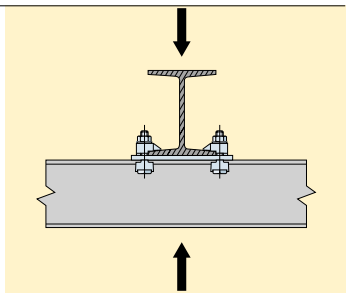
Combined Loads

When the fixings are subject to more than one load condition, the resulting forces must be calculated to determine the product and bolt sizes required. Please contact Lindapter with your application.



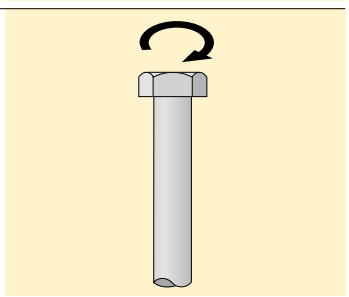
Compression Loading

Force here is applied direct to the supporting section rather than the Lindapter products. If, however, there is a gap between the surfaces being connected, the buckling strength of the supporting fabrication must be considered.



Torque

The recommended torque values stated in the product sections must be applied in order to achieve the stated Safe Working Loads. Any reduction in torques applied will lower the product Safe Working Load.



Specifying your Steelwork Fixings

At Lindapter we pride ourselves in the level of technical advice and customer service which we provide. Below you will find a form to help you when submitting your enquiry for girder clamp products by fax. If you would prefer to contact us by another method, full details are given on the back cover of this catalogue.

You may also find it interesting to know this enquiry forms are available on-line as part of our internet site at http://www.lindapter.com

Response Required

(please tick appropriate boxes)

❑ Information only ❑ CAD Assembly ❑ Quotation

To: Customer Support Department, Lindapter International. Fax +44 (0) 1274 521130

Date:

From: Position:

Company:

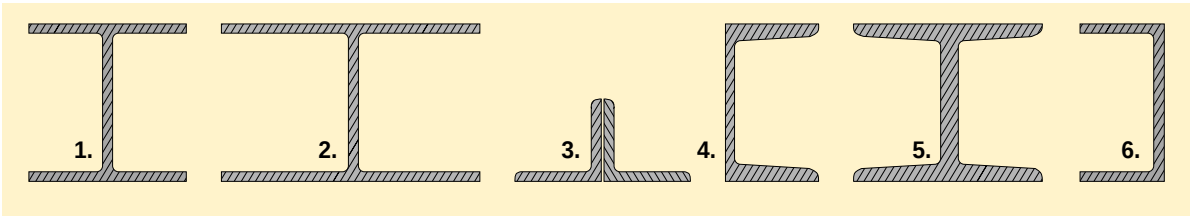
Address:

Town: County:

Postcode: Country:

Tel: Fax:

e-mail:



Load

1. Load to be carried (per connection, kN) kN

If load condition other than purely tensile, please see 10 below

Give Details of the Beam Types and Sizes

		Beam Type	Serial Size or Actual Dimensions	*Mass per metre (kg)
2.	Upper			
3.	Lower			

**If unknown, give details of flange thickness at edge*

4. Angle of cross-over ❑ degrees

Quantity

5. No. of clamps required to this specification

Additional Information

6. Do beams run vertically? If yes, please give details

7. Is either beam at an inclined angle? If yes, please send details, including a detail drawing if possible

8. Is there a height difference between the beam/steelwork? If yes, please give distance in mm

9. Please state any special load conditions

10. Vibration Conditions (if any)

Tail Length / Packing Combinations for beams up to and including 5˚ slope

For example UB, UC, IPE, HE-A etc

Flange	M10			M12			M16			M20			M24		
Thickness	A & B	D2	LR	A & B	D2 & D3	LR	A & B	D2 & D3	LR	A & B	D2	LR	A & B	D2	LR
5mm	M	▲	•	S	▲	•	S	X	•	X	X	•	X	X	•
6mm	S+CW	▲	•	M	▲	•	S	X	•	S	X	•	X	X	•
7mm	L	▲	•	S+CW	▲	•	S	▲	•	S	X	•	X	X	•
8mm	S+2CW	▲	•	M+CW	▲	•	M	▲	•	S	X	•	S	X	•
9mm	S+P1S	▲	•	M+CW	▲	•	S+CW	▲	•	M	▲	•	S	X	•
10mm	M+P1S	•	•	L	•	•	S+CW	▲	•	M	▲	•	S	X	•
11mm	L+2CW	•	+P1L	M+2CW	•	•	L	▲	•	S+CW	▲	•	M	▲	•
12mm	L+P1S	•	+P1L	L+CW	•	•	S+2CW	▲	•	L	▲	•	M	▲	•
13mm	L+3CW	•	+P1L	S+CW+P1S	•	+P1L	S+P1	•	•	L	▲	•	S+CW	▲	•
14mm	S+P2S	•	+P1L	L+2CW	•	+P1L	L+CW	•	•	M+CW	▲	•	S+CW	▲	•
15mm	M+P2S	•	+P1L	L+2CW	•	+P1L	S+3CW	•	•	S+2CW	▲	•	L	▲	•
16mm	S+CW+P2S	•	+P2L	L+P1S	•	+P1L	M+P1S	•	•	L+CW	▲	•	L	▲	•
17mm	L+P2S	•	+P2L	M+2CW+P1S	•	+P1L	L+2CW	•	+P1L	S+P1S	•	•	S+2CW	▲	•
18mm	S+2CW+P2S	•	+P2L	M+P2S	•	+P1L	L+2CW	•	+P1L	M+2CW	•	•	S+2CW	▲	•
19mm	S+P1S+P2S	•	+P2L	S+CW+P2S	•	+P2L	L+P1S	•	+P1L	S+3CW	•	•	L+CW	•	•
20mm	M+P1S+P2S	•	+P2L	S+CW+P2S	•	+P2L	L+3CW	•	+P1L	M+P1S	•	•	L+CW	•	•
21mm	L+2CW+P2S	+P1L	+P1L+P2L	L+P2S	•	+P2L	L+3CW	+P1L	+P1L	S+CW+P1S	•	+P1L	S+P1	•	•
22mm	L+P1S+P2S	+P1L	+P1L+P2L	L+P2S	•	+P2L	L+CW+P1S	+P1L	+P1L	M+3CW	•	+P1L	S+P1S	•	•
23mm	L+P1S+P2S	+P1L	+P1L+P2L	M+P1S+P2S	+P1L	+P2L	L+CW+P1S	+P1L	+P1L	L+P1S	•	+P1L	M+P1S	•	•
24mm	S+2P2S	+P1L	+P1L+P2L	M+P1S+P2S	+P1L	+P2L	M+P2S	+P1L	+P1L	M+CW+P1S	•	+P1L	M+P1S	•	•
26mm	S+CW+2P2S	+P2L	+2P2L	L+2CW+P2S	+P1L	+P1L+P2L	L+2CW+P1S	+P1L	+P2L	S+2CW+P1S	+P1L	+P1L	S+CW+P1S	•	+P1L
28mm	L+2P2S	+P2L	+2P2L	L+P1S+P2S	+P1L	+P1L+P2L	S+2CW+P2S	+P1L	+P2L	M+2CW+P1S	+P1L	+P1L	L+P1S	•	+P1L
*30mm	M+P1S+2P2S	+P2L	+2P2L	M+2P2S	+P2L	+P1L+P2L	L+CW+P2S	+P2L	+P2L	M+P2S	+P1L	+P1L	L+P1S	•	+P1L

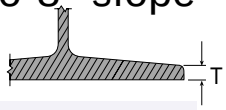
S = Short Tail *L = Long Tail* *X = Type not applicable*

M = Medium *• = Recommended Type* *▲ = Types D2 and D3 can be used on these flanges if the setscrew is inverted*

*** If flange thickness is greater than 30mm, please contact Lindapter for details.**

Tail Length Packing Combinations for beams with 6˚ to 8˚ slope

For example INP



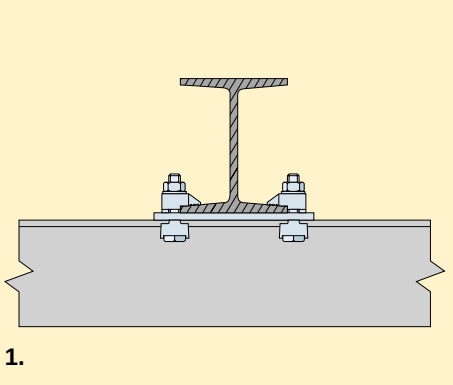
Flange Thickness	M10		M12		M16		M20		M24	
T	A & B	LR	A & B	LR	A & B	LR	A & B	LR	A & B	LR
5mm	S	•	X	•	X	•	X	•	X	•
6mm	M	•	S	•	X	•	X	•	X	•
7mm	S+CW	•	M	•	S	•	X	•	X	•
8mm	L	•	S+CW	•	S	•	X	•	X	•
9mm	S+2CW	•	M+CW	•	M	•	S	•	X	•
10mm	L+CW	•	M+CW	•	S+CW	•	S	•	S	•
11mm	M+P1S	+P1L	L	•	S+CW	•	M	•	S	•
12mm	L+2CW	+P1L	M+2CW	•	L	•	M	•	S	•
13mm	L+P1S	+P1L	L+CW	+P1L	S+2CW	•	S+CW	•	S	•
14mm	L+3CW	+P1L	L+CW	+P1L	S+2CW	•	L	•	M	•
15mm	S+P2S	+P1L	L+2CW	+P1L	S+P1S	•	L	•	M	•
16mm	M+P2S	+P2L	L+2CW	+P1L	S+3CW	•	M+CW	•	S+CW	•
17mm	S+P2S+CW	+P2L	S+2PS	+P1L	S+3CW	+P1L	S+2CW	•	S+CW	•
18mm	L+P2S	+P2L	M+2CW+P1S	+P1L	S+CW+P1S	+P1L	L+CW	•	L	•
19mm	S+P2S+2CW	+P2L	M+P2S	+P2L	L+2CW	+P1L	S+P1S	•	L	•
20mm	L+P2S+CW	+P2L	S+CW+P2S	+P2L	L+2CW	+P1L	M+2CW	•	S+2CW	•
21mm	M+P1S+P2S	+P1L+P2L	S+CW+P2S	+P2L	S+2CW+P1S	+P1L	S+3CW	+P1L	S+2CW	•
22mm	L+P2S+CW	+P1L+P2L	M+CW+P2S	+P2L	L+3CW	+P1L	M+P1S	+P1L	L+CW	•
23mm	L+P1S+P2S	+P1L+P2L	L+P2S	+P2L	S+P2S	+P1L	S+CW+P1S	+P1L	L+CW	•
24mm	S+2CW+P1S+P2S	+P1L+P2L	M+2CW+P2S	+P2L	L+CW+P1S	+P1L	M+3CW	+P1L	L+CW	•
26mm	M+2P2S	+2P2L	S+CW+P1S+P2S	+P1L+P2L	S+CW+P2S	+P2L	M+CW+P1S	+P1L	M+P1S	+P1L
28mm	L+2P2S	+2P2L	L+2CW+P2S	+P1L+P2L	L+2CW+P1S	+P2L	S+2CW+P1S	+P1L	S+CW+P1S	+P1L
*30mm	L+2P2S+CW	+2P2L	L+3CW+P2S	+P1L+P2L	L+2CW+P2S	+P2L	M+2CW+P1S	+P1L	L+P1S	+P1L

S = Short Tail *L = Long Tail* *X = Type not applicable*

M = Medium *• = Recommended Type*

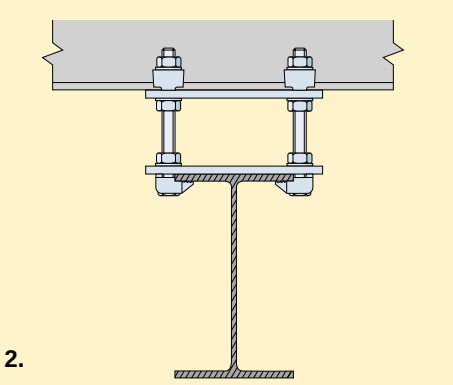
*** If flange thickness is greater than 30mm, please contact Lindapter for details.**

Additional Steelwork Applications



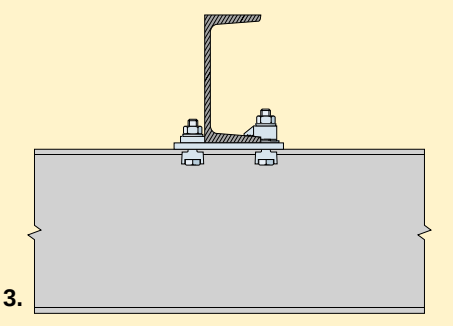
1.

UB to RSJ



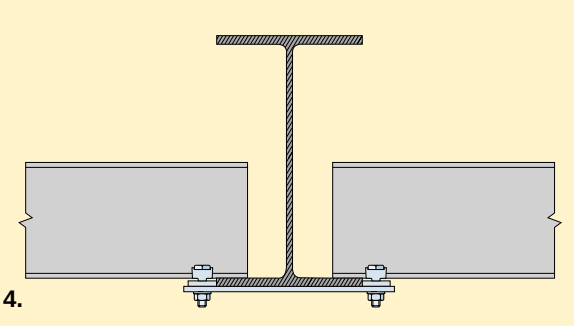
2.

UB to UB with drop



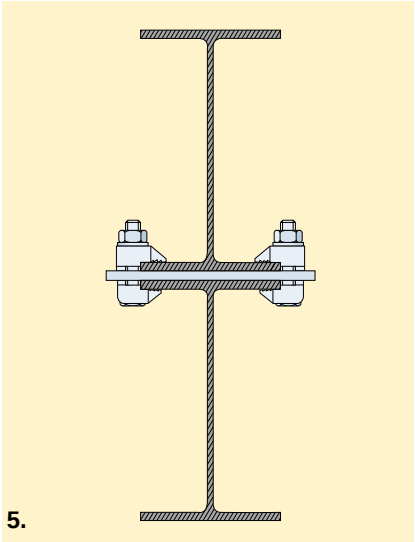
3.

RSC on top of UB (positional fixing only)



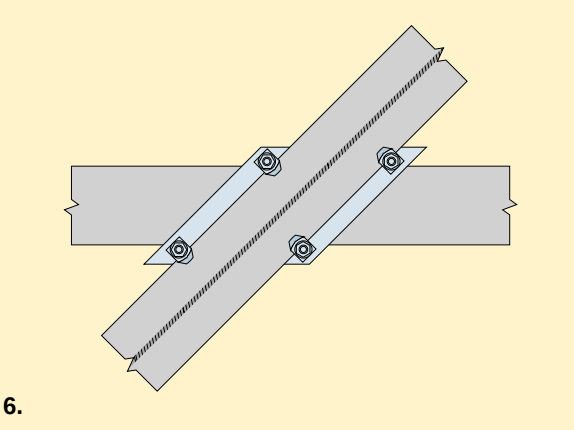
4.

UB to UB



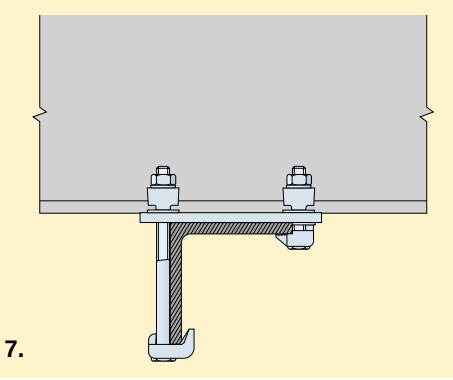
5.

Beams parallel and of equal width



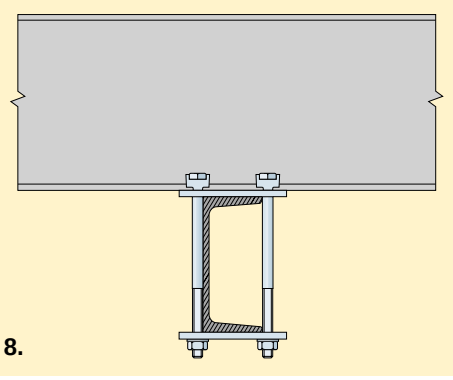
6.

Plan view of angular crossing



7.

Angle to UB



8.

RSC to UC

Cavity Fixings

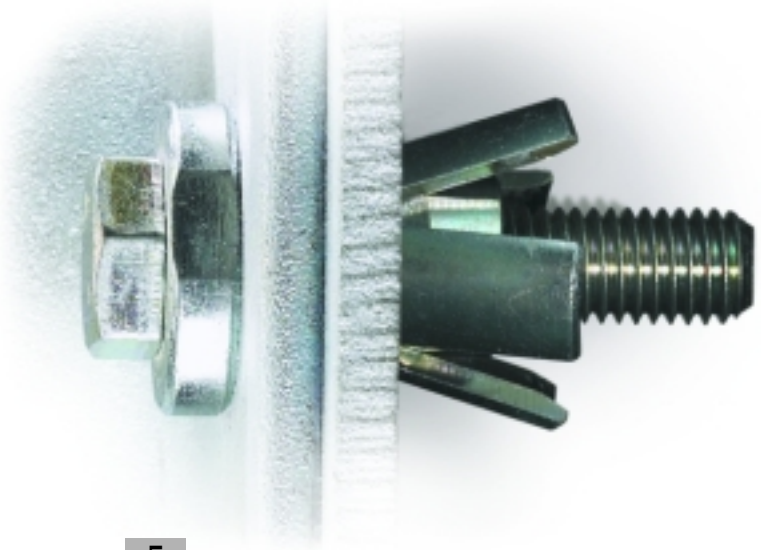
Lindapter cavity fixings give a simple, cost-effective solution when fixing to rectangular or circular hollow section steel, or to steelwork where access is available from one side only. They are ideal to use with any steel structures and eliminate the requirement for using unsightly welding or strapping.

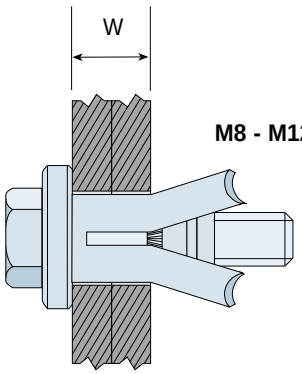
In certain situations, with specific markets, the use of welding and drilling is prohibited, this is where Lindapter cavity fixings are ideally suited to solving those problems. Used with either shop or site-drilled holes, they enable steelwork or services to be fixed quickly, easily and accurately. Problems normally encountered when aligning holes are eliminated because the cavity fixings are inserted after alignment. Should the steel need to be adjusted, the product can be removed and the hole re-used with a new bolt.

Installation time and costs are reduced with the use of Lindapter's cavity fixings through being easy to install without specialist skills, equipment or on-site power. Specifically suited to conditions where hot work permits are a constraint, the products do not require the presence of power or the use of specialist tools. The only tools required for the installation of the Hollo-Bolt, for example, are two wrenches, one for the bolt head and the other for the collar. As with other Lindapter products the technically advanced products are fully tested and all have guaranteed loads.

Cavity Fixings Contents

Type HB - Hollo-Bolt





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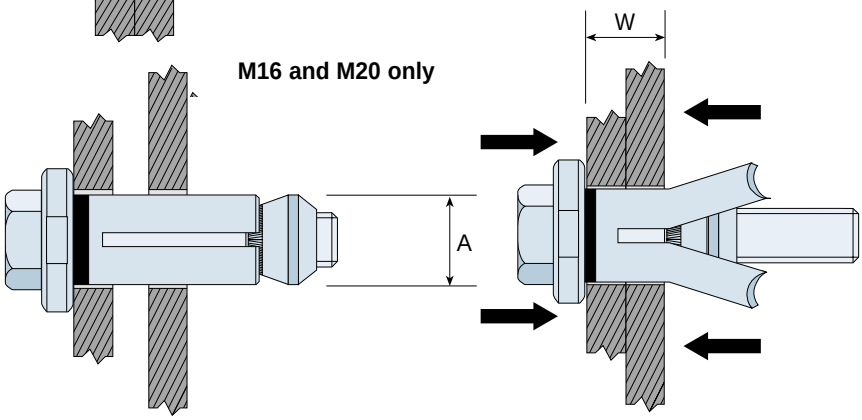


The Lindapter Hollo-Bolt is a patented method of securing to square, rectangular or circular hollow section steel, or to conventional steelwork where access is available from one side only. Awarded the Design Council's Millennium Products status for innovation in connecting to hollow section, the Hollo-Bolt also has third party endorsements from Corus and the UK's Steel Construction Institute. The Hollo-Bolt offers a tremendous reduction in installation time and costs over traditional methods, as well as giving the specifier absolute confidence through guaranteed loads with a built in factor of safety. For aggresive environments, the Hollo-Bolt comes with JS500 protection as standard and is available in stainless steel if the application demands.

M16 and M20 sizes feature a collapse mechanism to maximise clamping force and enable use as a primary moment connection.

Typical Hollo-Bolt applications include the connection or suspension of:

- Primary Steelwork
- Secondary Steelwork
- Mechanical Handling Equipment
- Lifting Gear
- Wall Ties
- Cladding
- Electrical Equipment
- Blast Walling
- HVAC Equipment
- Fire Protection Systems

Head Variations

A variety of finishes and colours are available.

Countersunk

Hexagonal Head

Button Head Security

Socket Head Cap Screw

Type HB - Hollo-Bolt

Bolt Size	Product Code	Setscrew Length (mm)	Fixing Thickness W (mm)		Across Flats Main Body (mm)	Tightening Torque (Nm)	Shank Diameter (mm) A	Hole Size (mm)	RHS Section***	S.W.L. (kN)* 5:1 Factor of Safety	
			Min	Max						Tensile	**Single** Shear
									100 x 100 x 6.3	4.0	
									100 x 100 x 10.0	4.0	
	HB 08 Size 1	50	3	22					140 x 140 x 5.0 / 6.3 / 8.0 / 10.0 / 12.5	4.0	
M8	Size 2	70	22	41	19	23	14	15	150 x 150 x 6.3	4.0	5
	Size 3	90	41	60					150 x 150 x 10.0	4.0	
									180 x 180 x 8.0	4.0	
									200 x 200 x 10.0	4.0	
									100 x 100 x 6.3	7.0	
									100 x 100 x 10.0	8.0	
									140 x 140 x 5.0	6.0	
	HB 10 Size 1	55	3	22					140 x 140 x 6.3	8.0	
M10	Size 2	75	22	41	24	45	18	19	140 x 140 x 8.0 / 10.0 / 12.5	8.5	10
	Size 3	90	41	60					150 x 150 x 6.3	8.0	
									150 x 150 x 10.0	8.0	
									180 x 180 x 8.0	7.0	
									200 x 200 x 10.0	8.0	
									100 x 100 x 6.3	10.0	
									100 x 100 x 10.0	10.5	
	HB 12 Size 1	60	3	25					140 x 140 x 5.0	6.5	
M12	Size 2	90	25	47	30	80	20	21	140 x 140 x 6.3	10.0	
	Size 3	110	47	69					140 x 140 x 8.0 /10.0 / 12.5	10.5	15
									150 x 150 x 6.3	10.0	
									150 x 150 x 10.0	10.5	
									180 x 180 x 8.0	10.0	
									200 x 200 x 10.0	10.5	
									100 x 100 x 6.3	13.5	
									100 x 100 x 10.0	18.5	
									140 x x140 x 5.0	8.0	
	HB 16 Size 1	75	8**	29					140 x 140 x 6.3	15.0	
M16	Size 2	100	29**	50	36	190	26	28	140 x 140 x 8.0 / 10.0	20.0	30
	Size 3	120	50**	71					140 x 140 x 12.5	22.0	
									150 x 150 x 6.3	11.5	
									150 x 150 x 10.0	15.0	
									180 x 180 x 8.0	17.0	
									200 x 200 x 10.0	15.0	
									100 x 100 x 6.3	16.0	
									100 x 100 x 10.0	25.0	
									140 x 140 x 6.3	16.0	
	HB 20 Size 1	90	8**	34					140 x 140 x 8.0	23.0	
M20	Size 2	120	34**	60	46	300	33	35	140 x 140 x 10.0	25.0	40
	Size 3	150	60**	86					140 x 140 x 12.5	40.0	
									150 x 150 x 6.3	12.5	
									150 x 150 x 10.0	19.0	
									180 x 180 x 8.0	18.0	
									200 x 200 x 10.0	19.0	

Stainless Steel Hollo-Bolt

Bolt Size	Product Code	Setscrew Length (mm)	Fixing Thickness W (mm)		Across Flats Main Body (mm)	Tightening Torque (Nm)	Shank Diameter (mm) A	Hole Size (mm)	RHS Section***	S.W.L. (kN)* 5:1 Factor of Safety	
			Min	Max						Tensile	**Single** Shear
M8	HB 08 316 SS	50	3	22	19	23	14	15	140 x 140 x 12.5	6	5
M10	HB 10 316 SS	55	3	22	24	45	18	19	140 x 140 x 12.5	10	10
M12	HB 12 316 SS	60	3	25	30	80	20	21	140 x 140 x 12.5	15	15
M16	HB 16 316 SS	75	8**	29	36	190	26	28	140 x 140 x 12.5	33	30
M20	HB 20 316 SS	90	8**	34	46	300	33	35	140 x 140 x 12.5	46	40

******* *Safe Working Loads for the Hollo-Bolt are dependent upon the yield strength of the hollow section steel particularly with some of the lighter sections. Safe working loads shown above have been determined through testing in material with minimum yield strength of 275 N/mm². Use of steel with lower yield strength will result in lower safe working loads. The highest tensile figure given for each bolt size is the safe working load of the Hollo-Bolt itself. Any lower figures against a particular size show that the mode of failure in that case is the hollow section steel, rather than the Hollo-Bolt.*

******** *Whilst the minimum fixing thickness for M16/M20 is 8mm, it is important that the outer ply is at least 8mm to maximise shear capabilities. Where the outer ply is below 8mm thickness, spacer washers should be used beneath the collar to increase to 8mm.*

********* *For further RHS Section details not listed, please contact our technical department.*

The tables above state the SWL with a 5:1 factor of safety and should be used for secondary applications, for primary design please consult the guide Joints in Steel Construction - Simple Connections.

The guide provides design guidence for the use of Hollo-Bolt and gives essential information for structural steelwork connections for use in buildings designed by the "Simple Method" i.e. braced frames where connections carry mainly shear and axial loads only.

To obtain further details on the Simple Connections guide please contact The Steel Construction Institute on Tel: +44 (0) 1344 623 345 or Fax: +44 (0) 1344 622 944

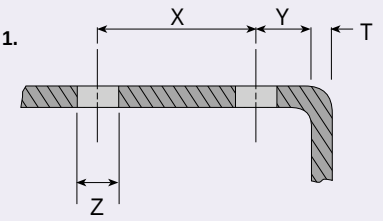
Published by SCI/BCSA Connections Group.
Publication Number: P212
ISBN 1 85942 072 9

Hole Preparation

Some care must be taken both in preparation of the drilled hole for the product and in the location of the hole with regard to the hollow section steel. The table below gives guidelines on minimum distance between hole centres for neighbouring Hollo-Bolts (X), minimum distance of hole centre from inside wall of hollow section steel (Y) and drill size to be used (Z). Diagram (**1.**) illustrates these dimensions.

Size	X (mm) MIN	Y (mm) MIN	Z Drill Size (mm)	MIN Edge Distance Y+T (mm)
HB 08	35	13	15	17.5mm
HB 10	40	15	19	22.5mm
HB 12	50	18	21	25.0mm
HB 16	55	20	28	32.5mm
HB 20	70	25	35	33.0mm

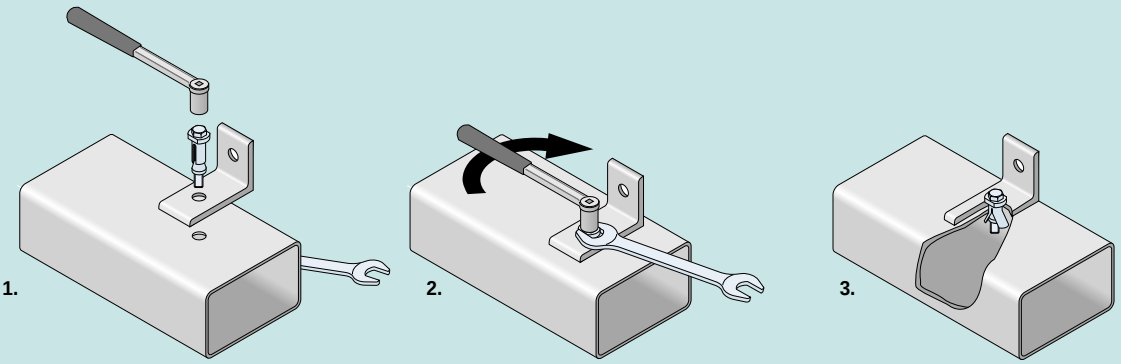
1.



Installing the Hollo-Bolt

Perhaps Hollo-Bolt's greatest advantage is the ease with which the product can be installed. Detailed below are the three simple installation stages.

Installation

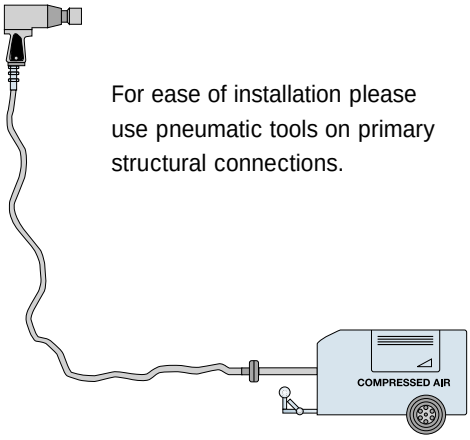


1. Drill holes in required position (see hole preperation table on page 32 for recommended hole size). Offer up the Hollo-Bolt and fixture to the steelwork (the example pictured above shows steel angle). Insert product through both fixture and steelwork, cone end first.

2. Grip the Hollo-Bolt collar with an open ended spanner. Using a torque wrench, tighten the central bolt to the recommened torque given in the table on the previous page.

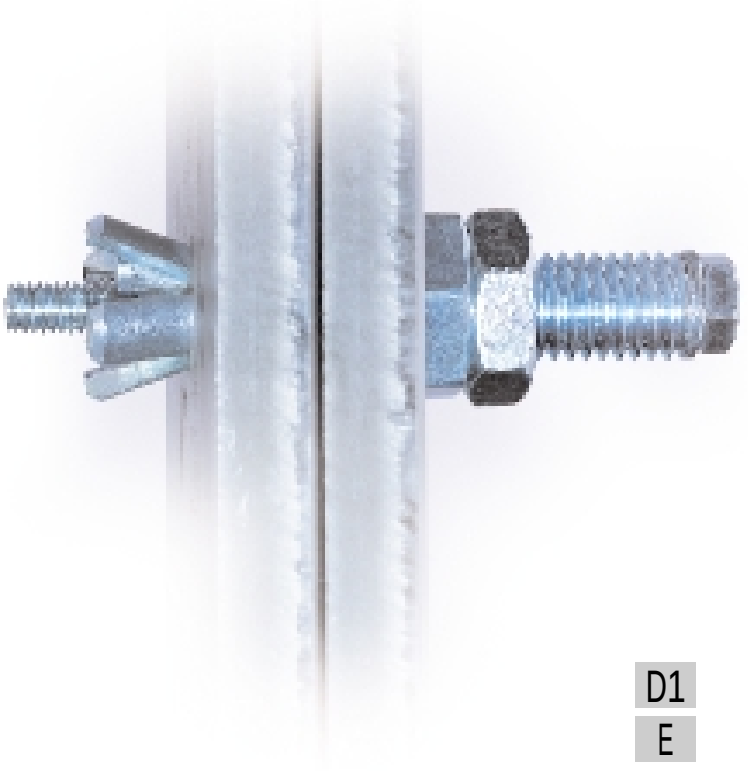
3. The Hollo-Bolt cone is drawn up into the body, spreading the products legs and providing a secure fixing.

NB. When installing, ensure that the Hollo-Bolt collar is held firmly against the fixture throughout the installation process.

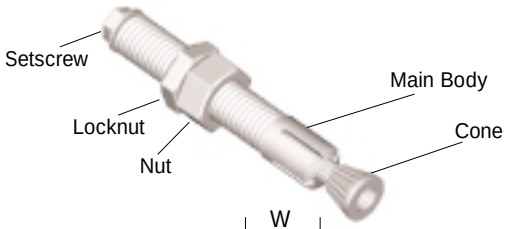


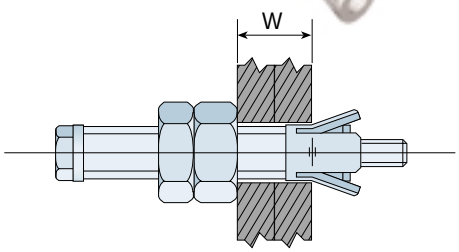
For ease of installation please use pneumatic tools on primary structural connections.

Hollo-Bolt Application Diagrams, please see page 35



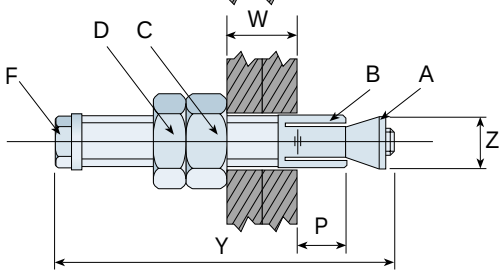
Type LB2 - Lindibolt 2





D1

E



The Lindibolt is a self heading bolt suitable for making connections to cavity steel structures in similar applications to the Hollo-Bolt but where the specific nature of the application precludes the Hollo-Bolt's use. For example where there is limitation on the size of hole which can be drilled (the Lindibolt requires a smaller hole than the Hollo-Bolt).

Product Code	Lindibolt Size Z	Dimensions (mm)			Projection P (mm)		Loads		Torque	
		Length Y	W Min	W Max	Min	Max	Tensile SWL* (kN)	Single Shear** SWL(kN)	Setscrew F (Nm)	Nut C/Nut D (Nm)
LB10	M10	68.5	7	30	7.5	10	1.5	3.4	2	20
LB12	M12	80.0	10	36	9	12	3.7	5	4	31
LB16	M16	105.0	12	48	12	16	5.2	9.8	9	81
LB20	M20	128.0	14	60	15	20	8.6	15.2	20	129
LB24	M24	157.5	18	72	18	24	12.6	22.5	31	203

* Tensile loads shown are based on tests carried out in BS EN 10025: 1993 Grade S275JR plate and have a Factor of Safety of 5 (on pullout).

** Single shear loads are based on tests carried out in BS EN 10025:1993 Grade S275JR plate and have a Factor of Safety of 5 on shearing the Lindibolt, providing that the plates have a higher bearing value.

Installing the Lindibolt

There are 6 steps to installing the Lindibolt, detailed below.

These guidelines refer to the diagram at the top of the page and the loads and dimensions table above.

Step 1. Drill clearance hole (Z + 1mm) through connection plates.

Step 2. Measure the total thickness of the plates to be connected (W) and set the Nut (C) at the distance of (W + Projection P). Tighten Locknut (D).

Step 3. Insert the Lindibolt through the pre-drilled holes, cone end first.

Step 4. Using a spanner to hold Nut (C), to prevent rotation, tighten Setscrew (F) to correct torque. The cone (A) will be drawn up inside the Lindibolt Body.

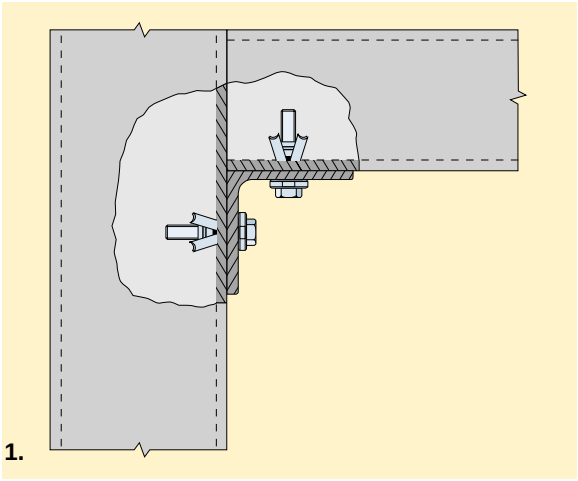
Step 5. Loosen off Locknut (D) and tighten Nut (C) to recommended torque to secure the plates.

Step 6. Secure by tightening Locknut (D) to recommended torque.

Torques and Spanner Sizes

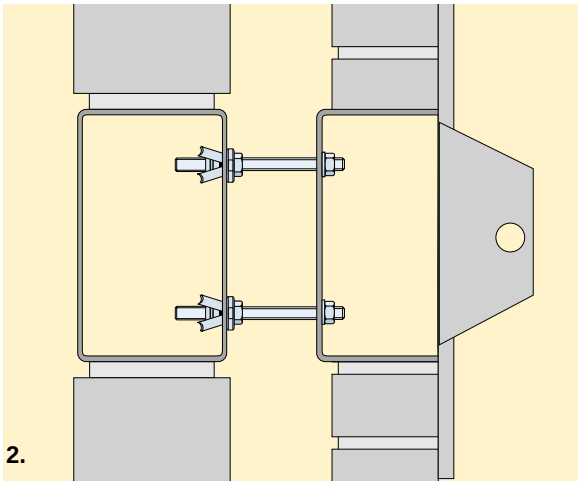
Lindibolt Size	Main Body (B) with Large Nut (C & D)		Setscrew Torque (F)		
	Torque (Nm)	Nut C & D (mm)	Size	Torque (Nm)	Nut A/F (mm)
M10	20	17	M5	2	8
M12	31	19	M6	4	10
M16	81	24	M8	9	13
M20	129	30	M10	20	17
M24	203	36	M12	31	19

Cavity Applications



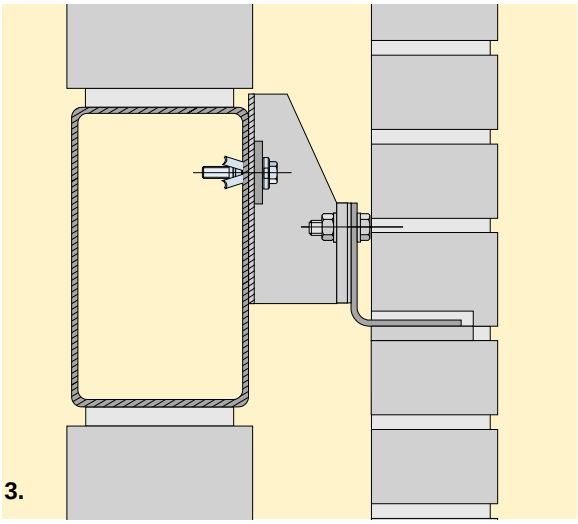
1.

Connection of two RHS sections at right angles to each other



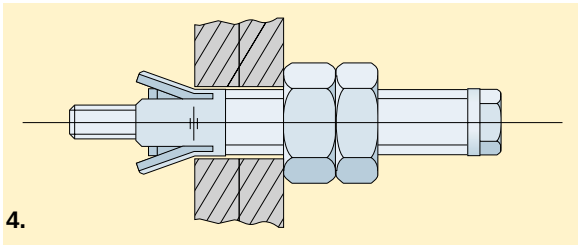
2.

Hollo-Bolts modified to incorporate studding securing brackets for solar blinds across a brickwork cavity to RHS



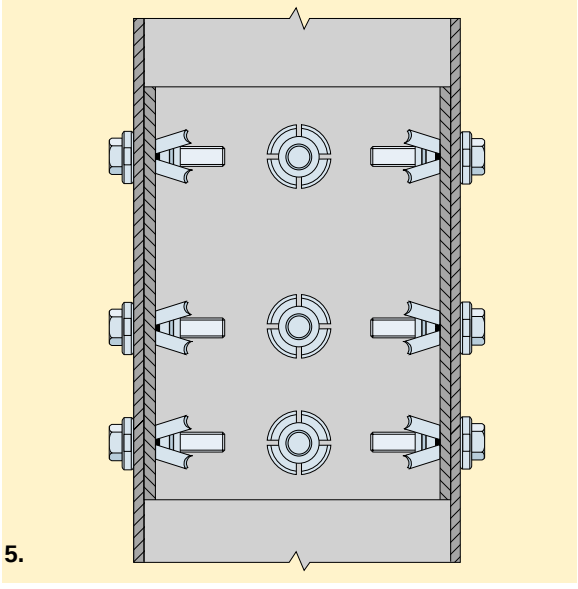
3.

Connection of adjustable brickwork support to rectangular hollow section



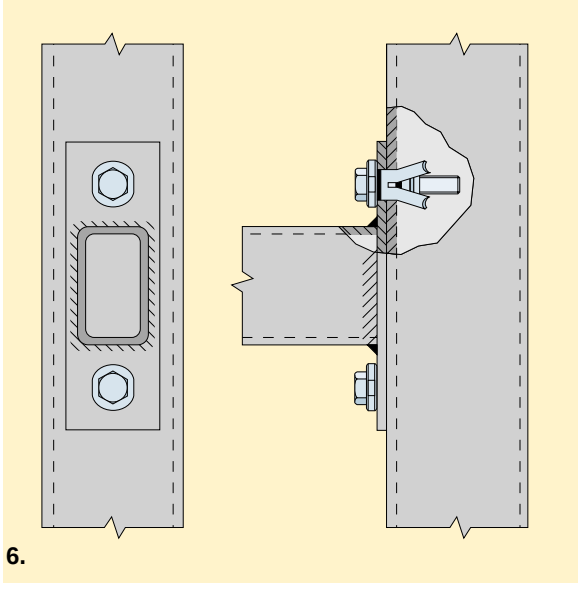
4.

Lindibolt fully expanded, connecting two steel fixtures.



5.

Hollo-Bolts used to facilitate sleeved connection of hollow section steelwork in communication tower application



6.

Hollo-Bolts used to make end plate connection as part of primary steel structure

Rail Fixings

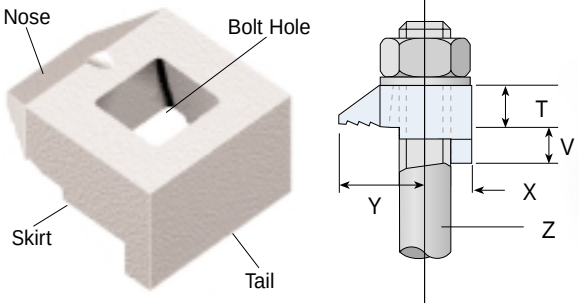
Lindapter's close working relationship with leading organisations such as London Underground Ltd leads to an involvement in many bespoke projects. Lindapter's engineers are able to work with a complex brief and offer a design to meet the customer's requirements, seeing it through prototyping to finished design and finally to manufactured items. Many of these designs offer a reduction in installation time for new rails, ensuring early delivery of the benefits from improved track configuration.

In addition to this bespoke service, Lindapter also offers a range of rail clips to suit many standard applications. Many of these offer the most cost-effective method of fixing the rails to the sleepers, as well as proving easier and less time-consuming to fit than other types of clip which require welding to the sleepers.

The main family of rail clips is the Holdfast range. All of which facilitate precise alignment of rails by allowing a high degree of stepless lateral adjustability. This alignment helps alleviate some of the problems that occur in track running machinery as a result of misalignment, such as excessive wheel, gearbox or bearing wear. The other products in the range are the type BR Rail Clip and the Forged Steel Rail Clip (RC) although none are suitable for high-speed applications.

Rail Fixings Contents

Type BR - Rail Clip



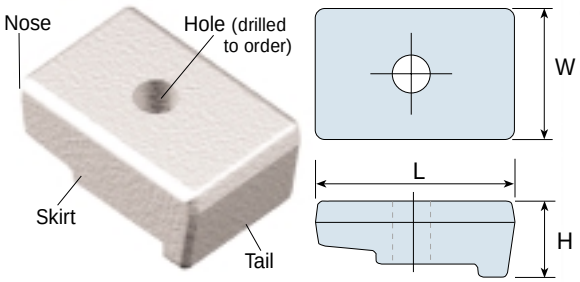
A1

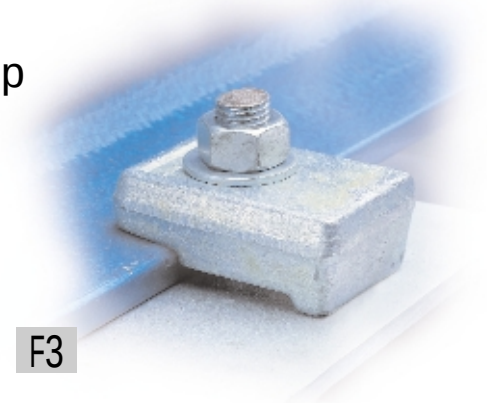
Lindapter's Type BR Rail Clip is a dual-purpose clip, which can be used as a steelwork connection or a rail clip. The BR features an angled nose that enables the product to accommodate tapered beam flanges of up to 8° slope and a full width tail in order to span slots in sleepers.

Product Code*	Bolt Size Grade 8.8 Z	Factor of Safety 5:1		Tightening Torque	Dimensions (mm)					
		Tensile SWL Per Bolt (kN)	Frictional Per Pair (kN)	(Nm)	Y	X	Tail-Length V Short	Tail-Length V Medium	T	Width
BR12	12	5.8	0.7	69	26	13	4	6	13	29
BR16	16	7.3	1.5	147	30	16	6	8	16	35
BR20	20	14.7	3	285	36	19	7	10	19	42
BR24	24	19.7	4.5	491	48	25	9	12	25	54

**Add suffix S or M to product code to denote tail length required.*

Type RC - Forged Steel Rail Clip



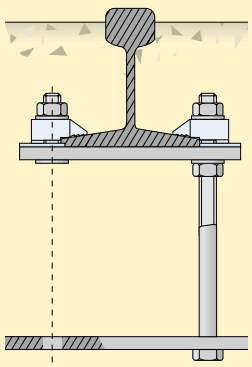


F3

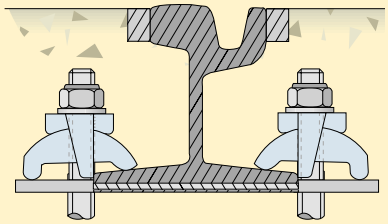
The Type RC rail clip is designed to secure rails of approx. 10mm base thickness, where the bolt is close to or slightly back from the rail base. The product can be drilled to suit your hole size and position requirements, from M12 to M30 bolts. The tail is carried across the full product width in order to span slots in sleepers.

Product Code	Slope of Nose	Length (mm) L	Overall Height (mm) H	Width (mm) W
RCS	5.5°	76	29	50

Rail Clip Applications

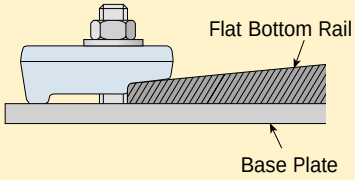


1.



Type LR (see page 16) can also be used as a Rail Clip

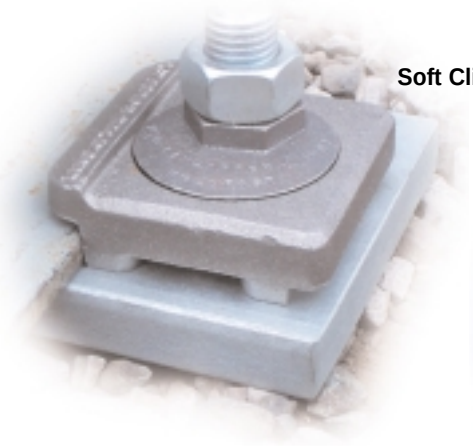
2.



3.

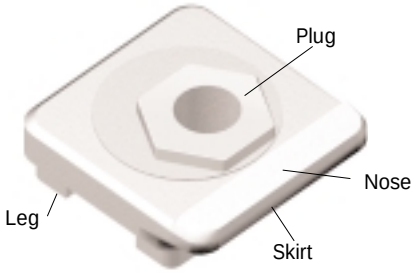
Type HD - Holdfast

The Lindapter Holdfast is a family of three rail clips - ‘Spring’, ‘Hard’ and ‘Soft’, all of which facilitate precise alignment of the rails by allowing a high degree of stepless lateral adjustability.

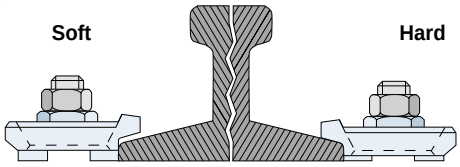


Soft Clip

Hard Clip



A3 B3

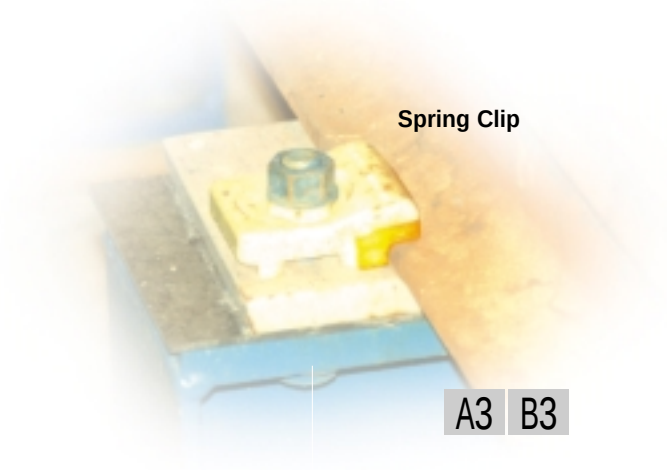


Soft Clip

The soft clip holds the rail in precise alignment laterally whilst accommodating a calculated amount of vertical rail movement caused by rail wave. Reducing stress in both rail and clips, along with fatigue stresses that would normally be transmitted to the holding down bolt. This clip should be used for continuous welded runs, or when rail is supported by a resilient pad. Not for use on short runs of rail.

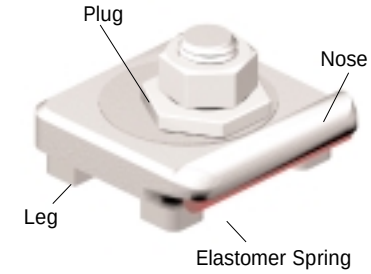
Hard Clip

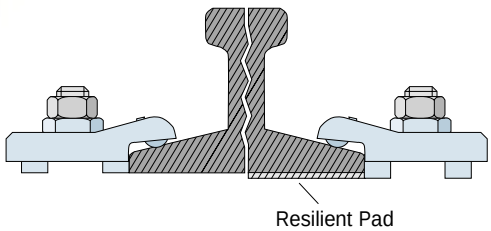
The hard clip fixes the rail both laterally and vertically, clamping the rail down tightly and allowing no vertical rail movement. Designed for short runs of rail, the hard clip should not be used when the rail is supported by a resilient pad.



Spring Clip

A3 B3





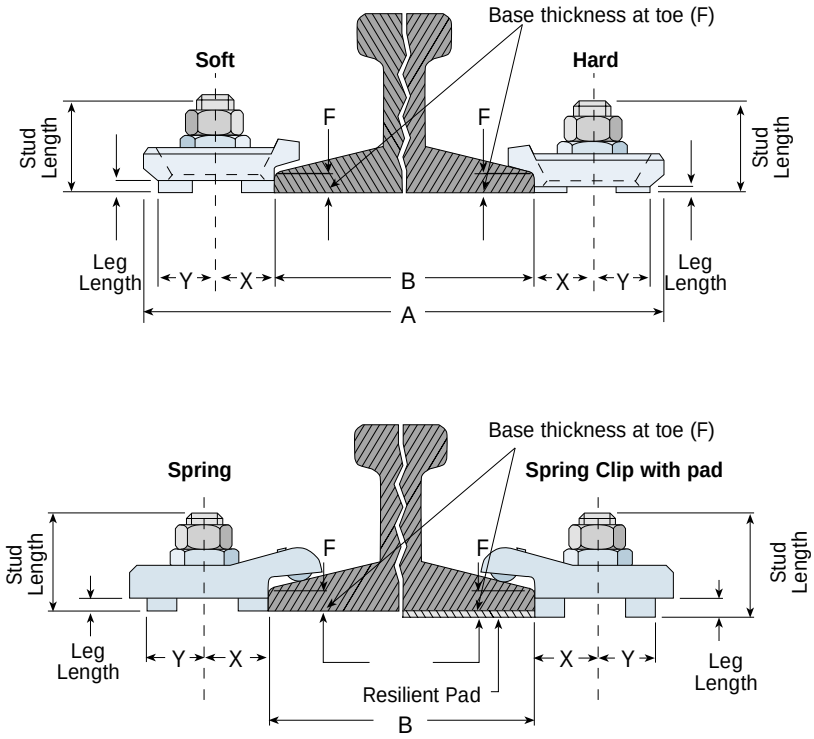
Spring Clip

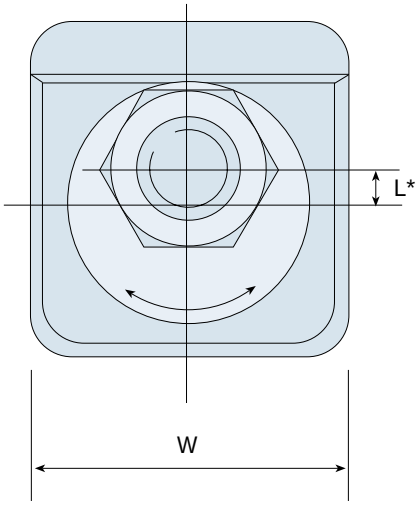
The spring clip version incorporates an elastomer spring into the nose of the product, designed to provide some vertical restraint to the rail whilst still allowing the rail to lift with rail wave. The product features a recessed nose which ensures that there is no displacement of the spring when a lateral force is applied. The spring is manufactured from high density synthetic polymer PU500-15 which has a Shore A hardness of 94.97. The spring is unaffected by salt water and most chemicals and has a high resistance to abrasion.
All three Holdfast clips are designed for use with most common rail sections and are supplied with leg length to suit rail base thickness as required.

Resilient Pads (for use with Soft and Spring Clips)

Both the spring and soft clips can be used with a resilient pad to decrease track running noise /structural vibration, level out irregular contact between surface and rail and to spread wheel load evenly over a wider area.

Type HD - Holdfast





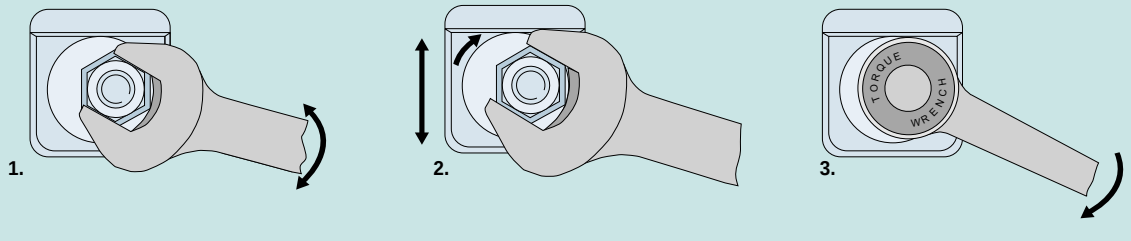
*Lateral adjustment
L (+ or -)

Dimensions (mm)										
Bolt Diameter Z	Clip Type	Tightening Torque (Nm)	X	Y	W	Lateral Safe *** Working Load(kN)	Leg Length	Stud/Bolt Length**	Lateral Adjustment (Lmax)	Min A
20	Hard	450	30	27	74	46	F-8	F+38	11.5	B+137
20	Soft	450	30	27	74	46	F-5	F+40	11.5	B+137
20	Soft & Pad*	450	30	27	74	46	F	F+45	11.5	B+137
20	Spring	450	30	27	73	46	F-7	F+40	11.5	B+137
20	Spring & Pad*	450	30	27	73	46	F-2	F+45	11.5	B+137
24	Hard	760	30	27	74	60	F-8	F+41	8	B+130
24	Soft	760	30	27	74	60	F-4	F+43	8	B+130
24	Soft & Pad*	760	30	27	74	60	F+1	F+48	8	B+130
24	Spring	760	30	27	73	60	F-7	F+43	8	B+130
24	Spring & Pad*	760	30	27	73	60	F-2	F+48	8	B+130

**Where resilient pads are included, leg lengths are based on 5mm pads thickness. Other pads thicknesses can be used and adjustment made to stud/bolt length and leg length accordingly.*
***Amount protruding above base plate/concrete.*
****Quoted safe working loads include a factor of safety of 4:1 on ultimate failure*

NB. Leg length quoted is appropriate for use with rail sections only, with tapered base.
For parallel sections please refer to Lindapter.

Installation



1. Position clip on bolt or stud. Place the plug in three o'clock position and tighten the nut.
2. Rotate the built in nut profile in a clockwise direction from the 3 o'clock position to locate the clip against the rail and laterally adjust the rail if required.
3. Apply the recommended torque to the hexagon nut.

Floor Fixings

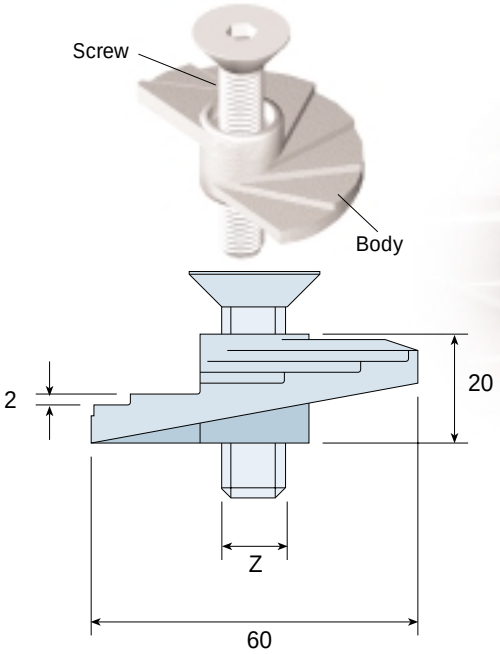
The benefits of using Lindapter floor fixings for chequerplate and open grate flooring are both financial and time saving. Combining high performance with convenience the whole range of fixings reduces the cost of installation and makes the use of the range cost-effective, quick and reliable. There is no requirement for scaffolding as installation can be carried out without the need for access to the underside of the flooring with no special equipment required. The fixings can be installed by one man with no specialist expertise without the need to drill or weld, not only does this give significant cost savings, it also maintains the integrity and protective coatings of existing steelwork.

Lindapter floor fixings are fully-tested for heat, vibration service life and load capacity, and are guaranteed products which carry various approvals for peace of mind when specifying in applications. And with a minimal protrusion above walkways there is no possibility of accidents so safety issues are not compromised.

Because of the fact that they can be used without the need for hot work permits, Lindapter floor fixings are particularly suited to offshore, petrochemical and processing environments.

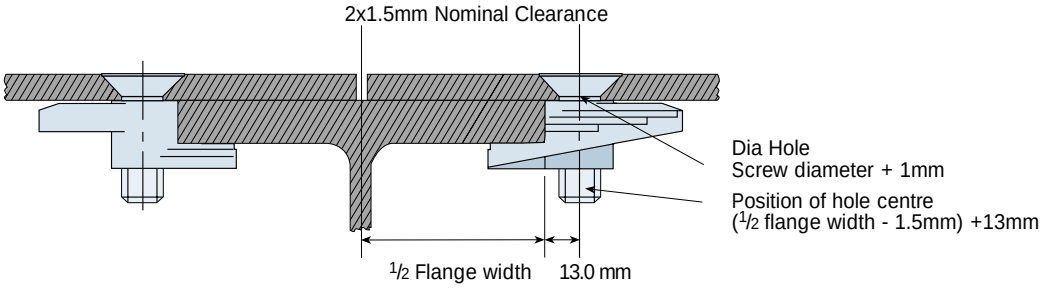
Floor Fixings Contents

Type FF - Floorfast™



A1
P

The Floorfast is an ingenious design which enables steel floorplates to be fixed from above, by one man only, using simply a tee-handled hexagon key. There is no need for access from below and no site drilling or welding is required. The product consists of a malleable iron body casting with a countersunk socket screw. The eccentric stepped web of the casting automatically locks under the steelwork and is suitable for flange thicknesses from 3mm to 15mm. Flanges above 15mm thickness can be accommodated by the use of a simple packing piece.
NB. Body castings cannot be supplied without screws.

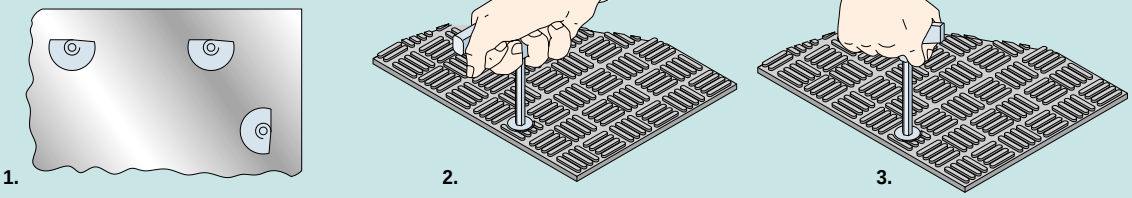


Product Code	Screw Size Z	To Suit Floorplate (mm)	To Suit Flange Thickness (mm)	Hexagon Key Required (A/F, mm)	Tightening Torque (Nm)*
FF08	M8	3-12	3-15	5	11
FF10	M10	5-12	3-15	6	22
FF12	M12	6-12	3-15	8	22

**This is a Torque which can be comfortably applied using the T handled hexagon key*

Access from beneath is not required, providing the following installation guidelines are followed. If holes have not been pre-drilled, 13mm diameter holes need to be positioned as shown in the diagram above.

Installation

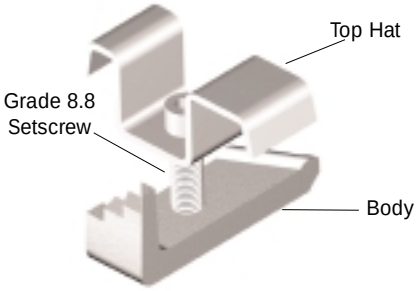


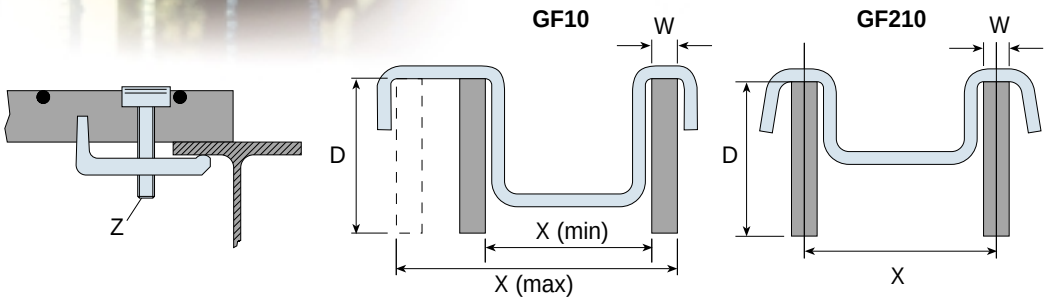
1. Position Lindapter Floorfast on underside of floorplate with stepped surface facing inwards and the straight edge of the web parallel to the edge of the plate, facing in the direction of the steelwork to be connected to. Hand tighten the Floorfast, then raise the Floorplate and lay it into position. The Floorfast units will give a positional reference.
2. Using a hexagon key release the countersunk screw one full turn.
3. Tighten down the countersunk socket screw.

Removal

Using a hexagon key, give the Type FF one full anticlockwise turn to release connection from the flange.

Type GF - Grate-Fast®





M8 A8 O
M10 A8 J8

The Grate-Fast enables rapid and secure connection of open grate flooring to steel sections. Grating can be fixed by one man only, working from above, without the need to drill the steel, or weld on site.
The standard product M10 (GF10) consists of a pre-assembled 'top-hat' bracket, socket head capscrew and body casting and provides the additional benefit of increased clamping force over lower quality clips.
For specific applications, it can be supplied with an extra-strength top-hat bracket (see GF210), for use with 30mm width floor grating bars ONLY. The M8 Grate-Fast is designed specifically for use with GRP grating found in corrosive installations.

Product Code	Screw Size Z	To Suit Flange Thickness (mm)	Body Casting Width (mm)	Grating Bar Width W (mm)		Grating Bar Distance X (mm)		Grating Bar Depth* D (mm)	
				Min	Max	Min	Max	Min	Max
GF08	M08	3-19	16	5	10	19	48	14	38
GF10	M10	3-19	20	3	7	25	45	20	30
GF210	M10	3-19	20	3	6.5	30	30	19	32

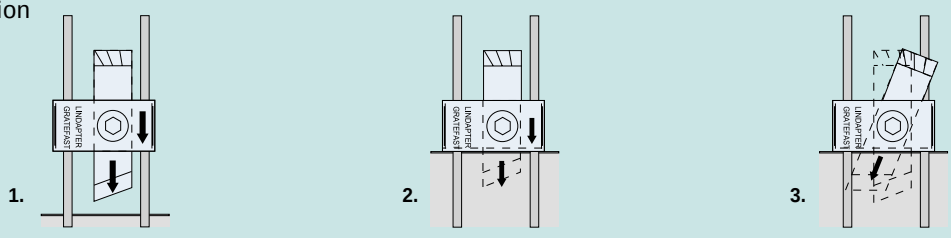
**Longer screws available for greater bar depth*

Tools and Tightening Torques

Screw Size Z	Hexagon Key (mm A/F)	Tightening Torque** (Nm)
M8	6	5
M10	8	11

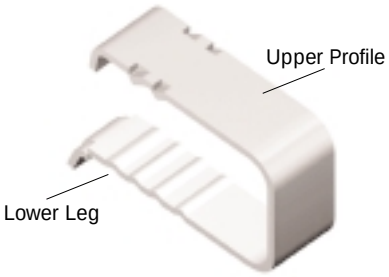
***Can be comfortably applied using a Tee-handled hexagon key*

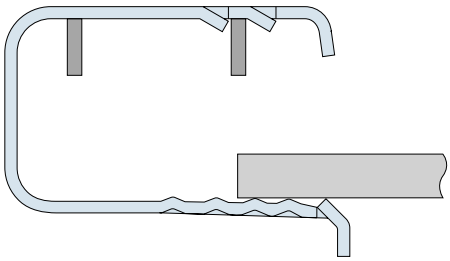
Installation



1. Position the pre-assembled Grate-Fast with the body between the grating bars and the nose pointing towards the steelwork. The arrows on the top hat bracket should also be pointing towards the supporting steelwork and the bracket itself resting on the bearing bars.
2. Slide the Grate-Fast towards the steelwork until the nose fits under the beam flange. Where necessary adjust the body/screw to the approximate flange thickness/grating depth.
3. Tighten the capscrew using the hexagon key. The Grate-Fast body casting will automatically rotate until it locks under the bearing bar, with the nose under the flange. Continue tightening to the recommended torque.

Type GF3030





G4

The GF3030 is a groundbreaking product that enables the connection of European style 30 x 30 floor grating to steel sections. The product's ingenuity lies in its place and stand installation method, which can be carried out by one person only, working from above, without the need to drill or weld. Not only does this give significant cost savings, but maintains the integrity of existing steelwork.

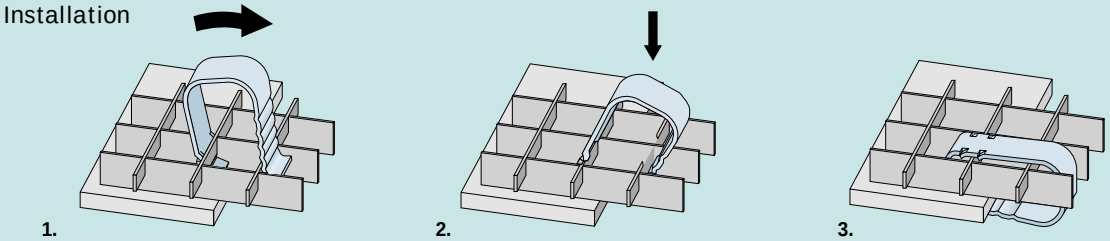
The GF3030 is designed specifically for use with 30mm depth floor grating. It is however possible to use the product on other grating depths, providing the total fixing thickness (grating depth + steelwork flange thickness) is between 38mm (minimum) and 48mm (maximum). The steelwork flange thickness range is 8mm to 18mm. For further details, please contact Lindapter.

NB. The Type GF3030 is not suitable for sloping flanges.

Clamping Force Examples

Grating Depth (mm)	Steel Flange Thickness (mm)	Total Clamping Thickness (mm) (Grating Depth and Steelwork Flange Thickness)	Clamping Force per Clip (N)
30	8	38	340
30	13	43	530
30	18	48	680

Installation



1. Position the fixing with the grating bar located between the two tabs on the upper profile, facing towards the supporting steelwork.
2. Apply a downward force to the fixing, so that the lower leg passes through the grating.
3. Apply a downward force to the top of the fixing, with the sole of the foot, or a hammer. The fixing then snaps into place, flush with the grating deck. If the lower profile contacts the steelwork web, the GF3030 will automatically relocate itself, locking onto the first tab.

Removal

Removing the GF3030 after installation is simple - using a screwdriver or lever, raise the back of the GF3030 into position shown in diagram 2. Place the lever between the steelwork and lower leg of the fixing and prise GF3030 away from the steelwork.

NB. After removing the GF3030, it is essential that it is inspected for deformation or wear prior to re-use

Support Fixings

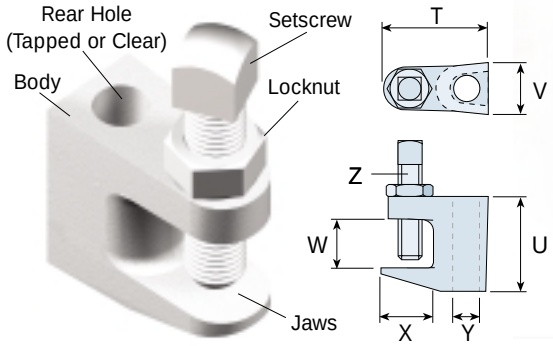
Lindapter's Support Systems range covers all aspects of fixing to or suspending from structural steelwork. Including ideal solutions for the suspension of heating, ventilating and air conditioning equipment; pipework; fire protection systems; electrical equipment; cable trays and also suspended ceilings. Lindapter has also produced a range of fixings to connect services to composite steel floor decking. They are designed to lock quickly and securely into the re-entrant channel of the decking to enable easier installation. All Lindapter decking fixings have been designed in conjunction with the decking manufacturer to fulfil the requirements of their customers.

All products offer guaranteed load bearing capabilities and factor of safety (with most products having 4:1 factor of safety) to ensure safe and reliable support systems and peace of mind. As no drilling or welding is required with Lindapter Support Fixings, existing steelwork is not weakened and on site adjustment can be made quickly and easily. Lindapter Support products are safe in explosive environments meaning hot work permits are not needed.

The product range includes unique products such as the FLS, the only swivel beam flange clamp to meet the stringent performance criteria required for FM and Vds approval. The product offers high load bearing capacity, whilst removing the need to bend threaded rod – offering assurance for consultants and users alike. It offers articulation to 90° forwards or 45° sideways and backwards, within a compact space.

Support Fixings Contents

Type FL - Flange Clamp



A1 FM VE V S

The simplest, quickest and most cost-effective method of suspending building services from steel beams and suitable for use with parallel or tapered flange beams, the FL can be supplied with the back hole drilled to accept a plain rod or tapped to accept a threaded rod. The FL uses a grade 8.8 cup point setscrew to provide maximum bite into steelwork and maximum load performance.

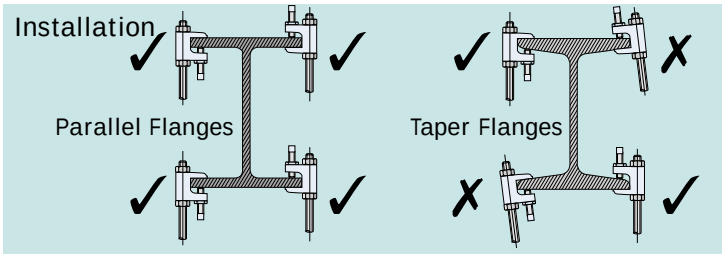
*Product Code	Drop Rod	Tensile Loads Safe Working Load 4:1(kN)	Setscrew Torque (Nm)	Locknut Torque (Nm)	T	U	V	W	X	Y	Z
FL16	M6	1.1	8	11	36	35	19	17	20	7	8
FL18	M8	1.1	8	11	36	35	19	17	20	9	8
FL210	M10	2.4	8	22	45	40	22	19	22	11	10
FL312	M12	3.1	8	22	50	46	25	23	28	13	10
FL412	M12	3.1	8	22	53	51	26	28	27	13	10

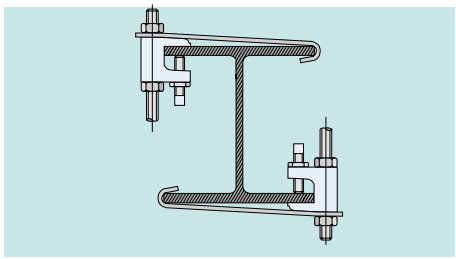
** add T or P suffix to indicate preference of plain or tapped hole.*

Installation

1. Slide FL onto beam flange and tighten setscrew to recommended torque. To avoid over tightening, a rough guide to achieve the correct torque is to tighten the setscrew with thumb and forefinger and then apply a further quarter turn (90˚) with a spanner. When used with taper flanges it is important to ensure that the setscrew of the FL bites into the tapered face of the flange, rather than the parallel underside.
2. Tighten the locknut to the recommended torque.

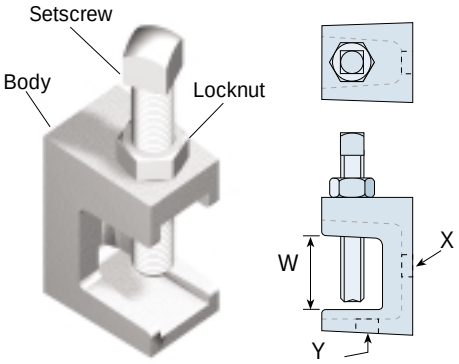
NB. A Flange Clamp with a Hexagon Head is now available dependent on quantity, please contact Lindapter for details.





On applications supporting pipework above 65mm bore the additional safety strip should be used. NOTE: This style of safety bracket can also be used on tapered flanges. Please contact Lindapter for details.

Type LC - Lindiclip



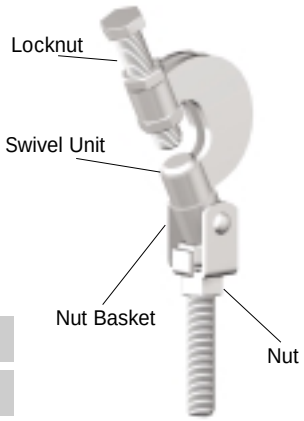
A1

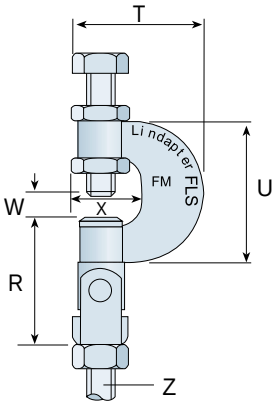
Designed to carry lighter loads than the FL or F3 products, the Lindiclip is supplied assembled with an M6 case-hardened cup point setscrew and locknut and will accept threaded rod or cable clips. Standard specification is for both holes to be tapped M6, but M8 is available as an option.

Product Code	Loads Tensile (kN) Factor of safety of 4:1		Setscrew Torque	Locknut Torque	Dimensions (mm)		
	Tensile X	Tensile Y	(Nm)	(Nm)	W	X	Y
LCLIP	0.18	0.59	4	4.5	20	6	6

Installation as with Type FL

Type FLS - Swivel Flange Clamp





I1
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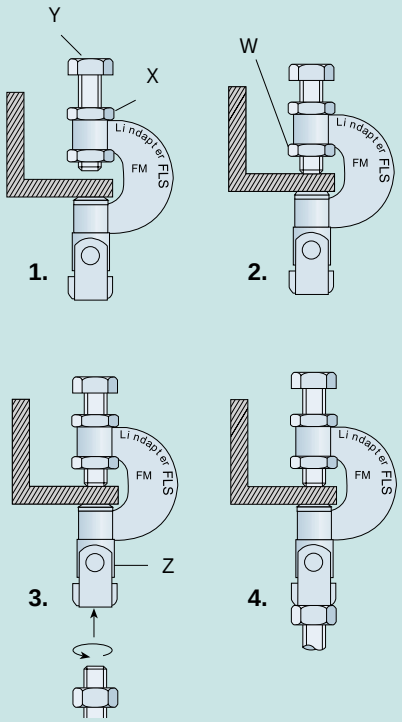
The FLS is the only swivel beam flange clamp to meet the stringent performance criteria required for FM and Vds approval. The product offers high load bearing capacity with a guaranteed safe working load, whilst removing the need to bend threaded rod - offering peace of mind for consultants and users alike. The product is ideal for the suspension of building services and offers an increased flexibility in system design.

Product Code	Rod Size Z	Factor of Safety	Safe Working Load (kN) (<25°)	Safe Working Load (kN) (>25°)	Max Sideways/ Backwards Articulation	Torque (Nm)		Dimensions (mm)				
						Y	X	R	T	U	W	X
FLS08	M08	4:1	2.5	1.5	45°	18	18	55	53	58	17	27
FLS10*	M10	4:1	2.5	1.5	45°	18	18	55	53	58	17	27

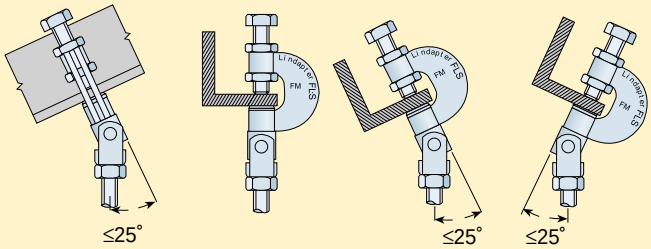
**The M10FLS carries FM approval for applications up to and including 25°*

Installation

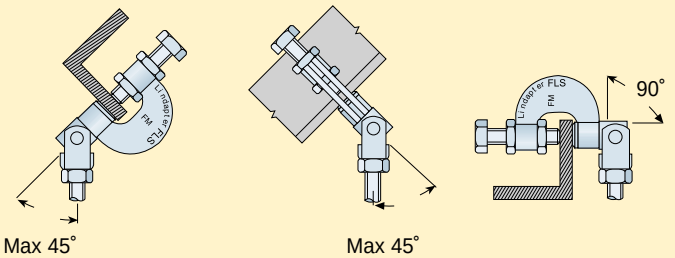


Approved Applications

FM V S



Non Approved Applications / Parallel flanges only



1. Unwind upper locknut (X) to fullest extent. Unwind setscrew (Y) as to fit onto flange of steelwork.
2. Ensuring lug on locknut (W) locates into main body, tighten down setscrew to the recommended tightening torque of 18Nm. Tighten down upper locknut to recommended torque of 18Nm.
3. Install threaded rod by screwing into nut located in nut basket (Z). Ensure full thread capture.
4. Secure assembly from beneath using a locknut (not supplied).

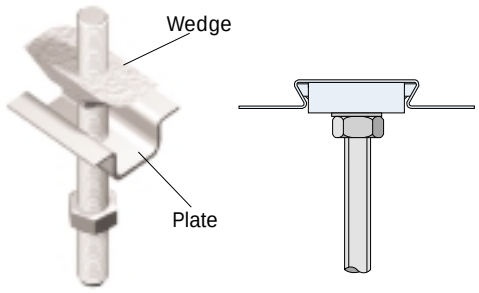
On applications supporting pipework above 65mm bore the additional safety strip should be used.
NB. The style of safety bracket can also be used on tapered flanges. See installation of FL on page 45 for a guide to installation. If in any doubt please contact Lindapter for details.

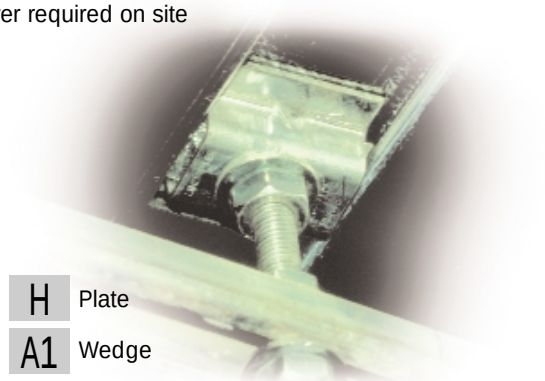
Lindapter Decking Fixings

Lindapter's range of mechanical fixings, to connect services to composite steel floor decking, brings a range of benefits to both the specifier and installer alike. Designed in conjunction with the decking manufacturer to fulfil the specific requirements of their customers, the advantages of using these mechanical methods of fixing against alternative methods include:

- Reduced installation time
- Guaranteed Safe Working Loads
- No specialist tools or skills required
- Structural integrity of decking maintained
- Adjustable and removable
- Minimum Factor of Safety of 3:1 on all decking fixings
- No risk of delamination
- No power required on site

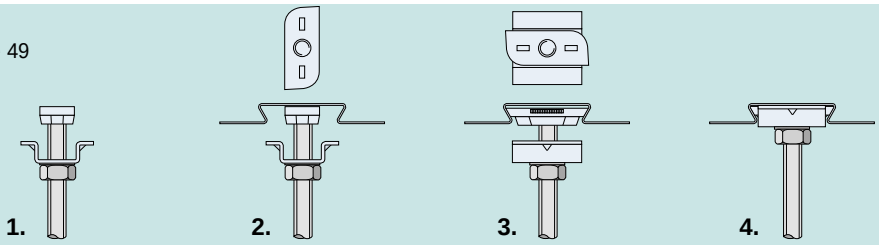
Type AW - Alphawedge





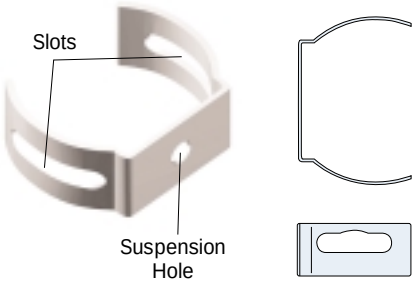
The Alphawedge (AW) is designed to lock quickly and securely into the re-entrant channel of Alphalok or Ribdeck AL decking. The product consists of two parts - a wedge and a plate and has a **Safe Working Load of 1kN.** The Wedge can be tapped to accommodate thread rod sizes M6, M8 or M10.

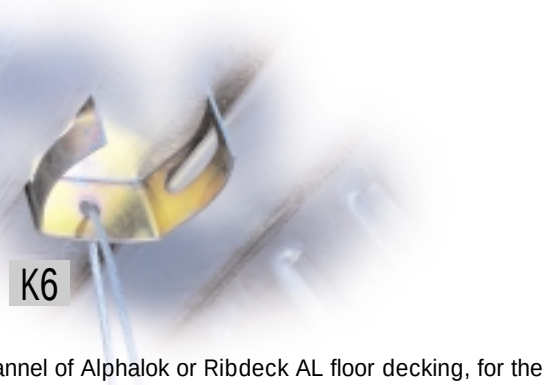
Installation
*see note on page 49



1. Pre-assemble the Alphawedge onto the threaded rod as shown in diagram 1.
2. Insert the wedge into the re-entrant channel of the decking, flat surface uppermost and rotate until the chamfered cams engage in the sides of the channel, holding the wedge firmly in place.
3. Slide the plate up the threaded rod, over the wedge, to lock it in position in the channel.
4. Tighten the locknut beneath the plate to hold the assembly in position.

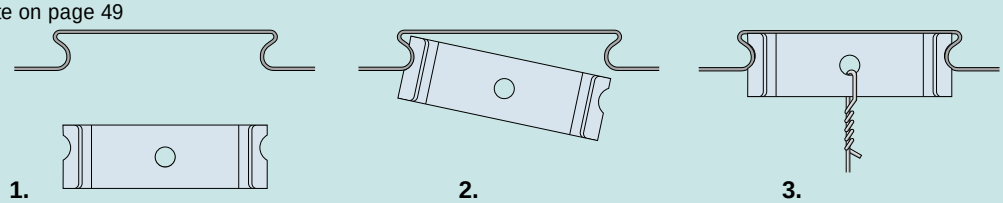
Type AC - Alphaclip





The Alphaclip (AC) is designed to fit into the re-entrant channel of Alphalok or Ribdeck AL floor decking, for the installation of suspended ceilings with a **Safe Working Load of 0.05kN** and a **4:1 Factor of Safety**. The clip's design makes installation quick and simple and allows for manufacturing tolerances within the re-entrant channel.

Installation
*see note on page 49

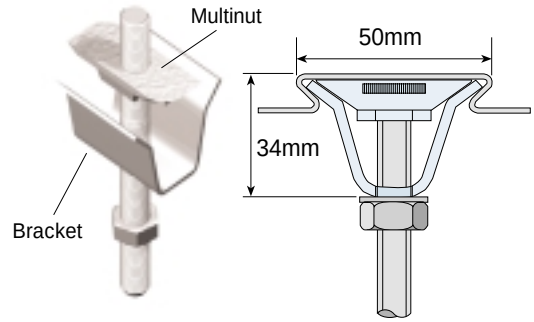


1. Hold Alphaclip in position shown, with the slots at the top, nearest the decking.
2. Locate one slot of the Alphaclip into one side of the decking channel, then squeeze the clip and push upwards so that it snaps into place.
3. Insert suspension wire through front hole and twist back on itself to secure.

Bracket H

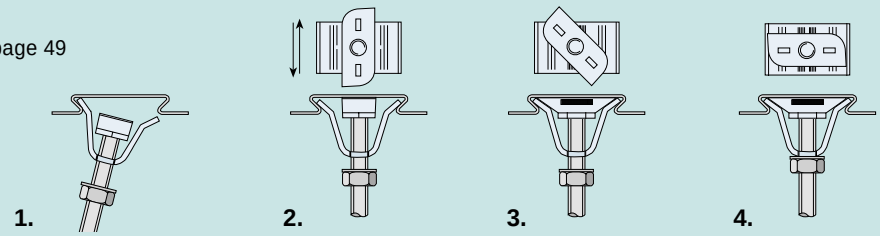
Multinut A1

Type MW2 - Multiwedge 2

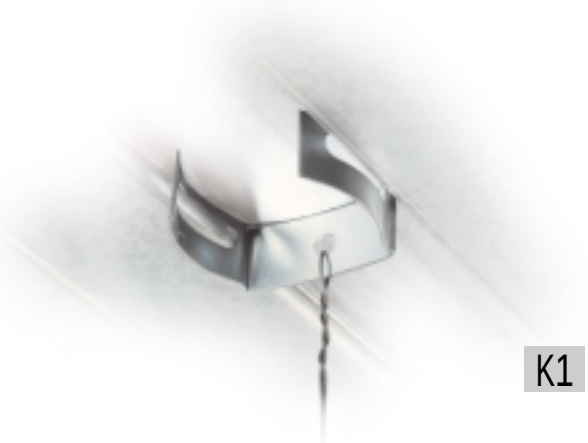


Multiwedge 2 enables quick and easy suspension of building services from Ward Building Components Multideck 60 and 80 composite steel/concrete floor decking. It eliminates the need for shot firing or drilling and hence preserves the strength of the floor decking by avoiding any potential damage. The 'Multi-Nut' can be tapped to accommodate threaded rod size M6, M8 or M10 and has a **Safe Working Load of 1.47kN.**

Installation
*see note on page 49

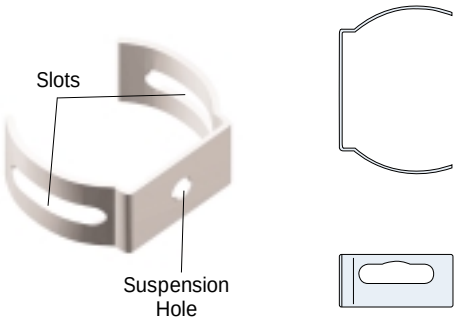


1. Position Multi-nut and bracket on threaded rod as shown and insert one leg of bracket into re-entrant channel of decking. Snap other leg of bracket into channel, using a hammer blow if required.
2. Slide assembly to desired position along length of re-entrant channel.
3. Push and turn the multi-nut clockwise until it locks into the channel walls.
4. Tighten the hexagon nut beneath the assembly to a **torque of 10Nm**.



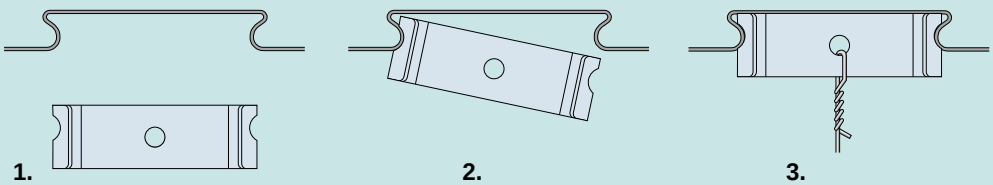
K1

Type MC - Multiclip



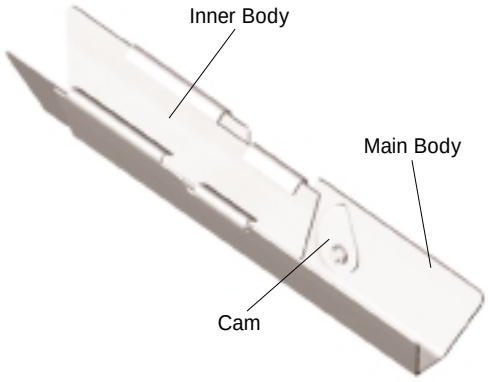
Designed to fit into the re-entrant channel of Ward Multideck 60 and 80 composite floor decking, for the installation of suspended ceilings. The clip's design makes installation quick and simple and allows for manufacturing tolerances within the re-entrant channel, with a **Safe Working Load of 0.05kN** and a **4:1 Factor of Safety.**

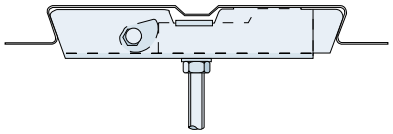
Installation *see note on page 49

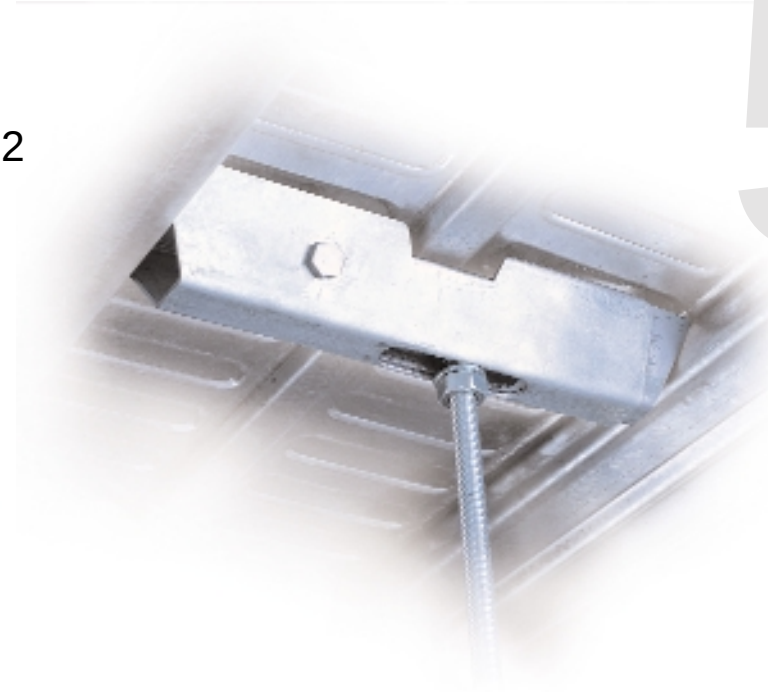


1. Hold Multiclip in position shown, with the slots at the top, nearest the decking.
2. Locate one slot of the Multiclip into one side of the decking channel, then squeeze the clip and push upwards so that it snaps into place.
3. Insert suspension wire through front hole and twist back on itself to secure.

Type SD2 - The Slimdek 2



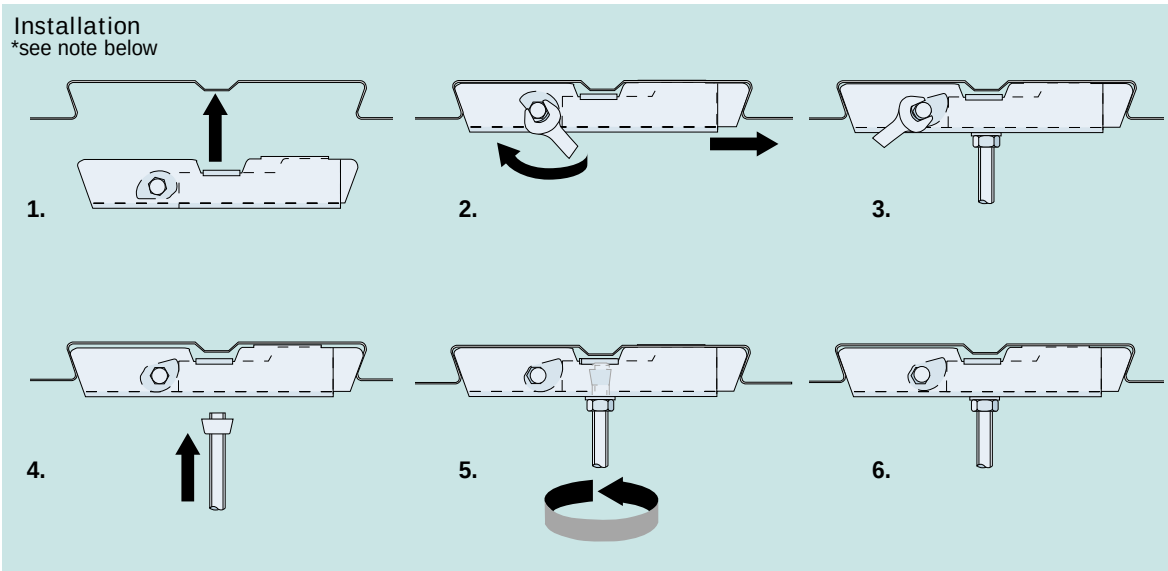




H5

The new adjustable Slimdek 2 fixing is designed for use with Corus revolutionary Slimdek system to accommodate variances encountered on site and enable secure suspension of services directly from the underside of SD225 composite floor decking. Installation of Slimdek 2 is fast and accurate every time and is carried out without specialist tools or skills because the product slots easily into the re-entrant channel and is locked mechanically with a 180° turn of a spanner. Variable drop rod position and lateral adjustability along the re-entrant channel permit unhindered alignment of service runs, whilst the shallow fixing depth enables pipework, ducting, electrical equipment and cable tray to run within the structural floor space. The assembly consists of a main body and a M6, M8 and M10 V-Nut. The Slimdek 2 has a **3:1 factor of safety** and a **safe working load of 1kN.**

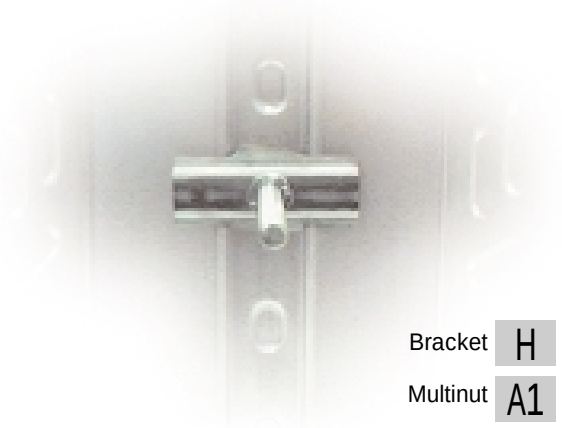
Installation
*see note below

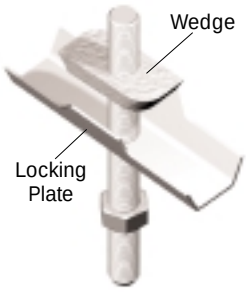


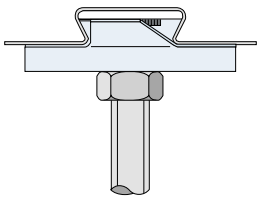
1. With Slimdek 2 in it's retracted position (as supplied) locate the fixing in the re-entrant channel.
2. Hold Slimdek 2 in position with one hand, then use a 13mm across flats spanner on the hexagon nut to rotate the cam in the direction shown above
3. Rotate the nut until the inner body of the fixing locates against the re-entrant channel, and the nut feels tight.
4. Pre–assemble the Lindapter V-nut onto the threaded rod and offer it up to the main body with the V-nut in line with the slot.
5. Rotate the V-nut through 90° to allow it to sit at the bottom of the Slimdek 2 body.
6. Secure the assembly from beneath with a nut and washer.

NB. The decking manufacturer's installation procedures must be followed or the decking profile may be deformed/distorted causing the Lindapter fixing to not fit correctly or carry the safe working load stated. If distortion is evident the fixing must not be used. If in doubt, please contact Lindapter Technical Sales & Support Department for advice.

Type TR60 - Wedge







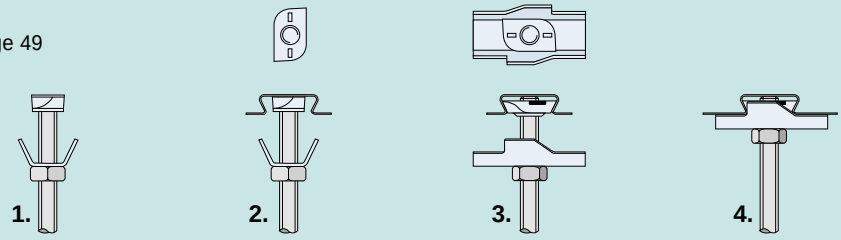
Bracket H

Multinut A1

Ideal for the suspension of building services, the TR60 is designed for specific use with the SMD TR60 and TR80 decking profile. With the ability to accommodate threaded rod sized M6, M8 and M10, and a guaranteed **Safe Working Load of 1kN** with a **Factor of Safety of 3:1**.

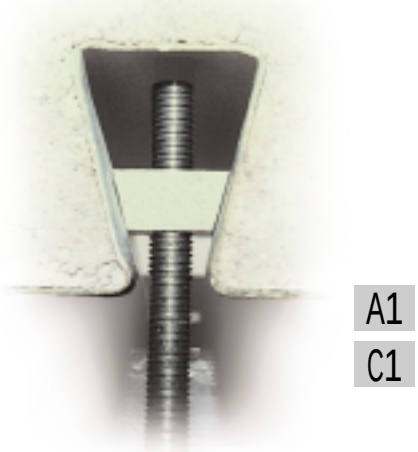
Installation

*see note on page 49



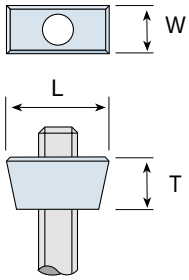
1. Pre-assemble the wedge and locking plate onto the wedge and threaded rod as shown in Step 1.
2. Insert the wedge into the re-entrant channel of the decking, flat surface uppermost and rotate until the chamfered cams engage on the sides of the channel, the wedge should be firmly in place.
3. Slide the plate up the threaded rod and over the wedge to lock it into position in the channel.
4. Tighten the locknut beneath the plate to hold the assembly in position.

Type VN - V Nuts



A1

C1

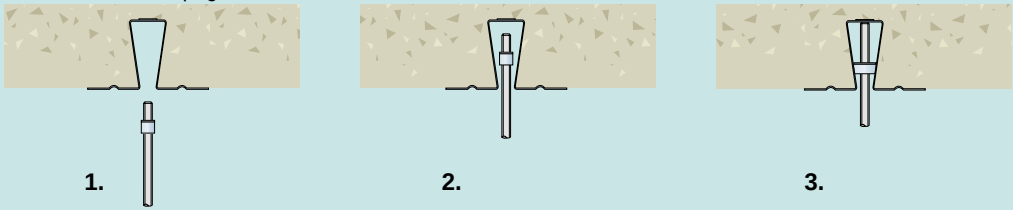


Product Code	Drop Rod Size	Loads (kN)	Width W	Length L	Thickness T
VN04	M4	0.86	12.5	25	13
VN05	M5	1.4	12.5	25	13
VN06	M6	1.8	12.5	25	13
VN08	M8	2	12.5	25	13
VN10	M10	2.1	12.5	25	13

The V Nut fits into the slots of 'V' profile composite floor decking, such as HoloRib, and is available with a threaded hole tapped M4, M5, M6, M8 or M10. The VN is suitable for decking with a **15° tapered slot. Factor of safety is 4:1.**

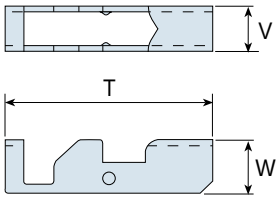
Installation

*see note on page 49



1. Screw VN onto threaded rod.
2. Insert VN and rod into re-entrant channel of decking.
3. Rotate both rod and V Nut through 90° so that tapered sides engage the sides of the channel.

Type TC - Toggle Clamp



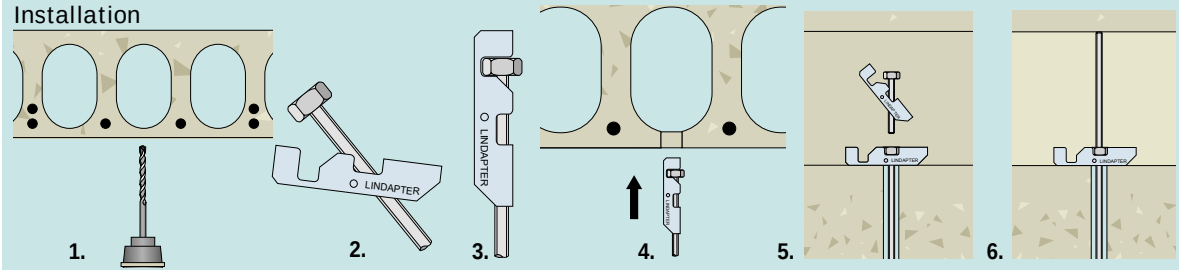
G1 FM VE

Product Code	Drop Rod	Tensile SWL (kN)* Factor of safety of 4:1	Dimensions (mm) T	V	W	Drill Hole Size (Ømm)
TC08	M8	2.45	68	13	16.5	22
TC10	M10	2.45	68	15	17.5	25

**Tensile SWL subject to the strength of the supporting material structure.*

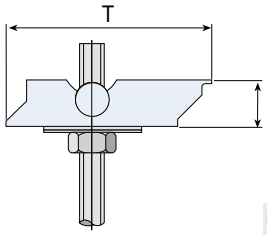
A quick and secure method of suspending building services from hollow concrete flooring, hollow section steel, steel sheeting or purlins. Consisting of a mild steel body and a grade 8 nut - which must be used - it can generate considerable savings by its speed of installation. The minimum depth of hollow core section with which the product can be used is 75mm.

Installation

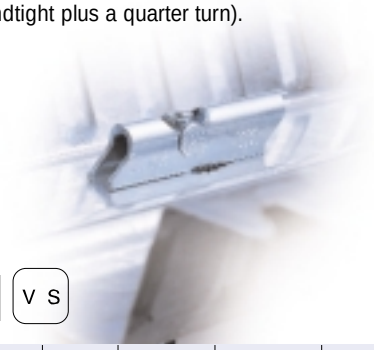


1. Drill hole in structure from which services are to be supported (M8:22mm, M10:25mm). If toggle is to be used to support from hollow concrete, ensure that hole is drilled central to hollow core. Avoid reinforcing bars.
2. Insert threaded rod through toggle. Assemble as shown, ensuring nut is flush with end of rod.
3. Align toggle parallel with rod, so that nut engages into the retaining cavity.
4. Offer up the assembly, inserting the toggle body completely through the hole. Ensure that the type TC is positioned along and not across the cavity.
5. Shake rod so that toggle body locates horizontally across hole. Allow rod to drop down so that the nut locates in the seat in the toggle body.
6. Wind up rod to obtain a clearance of rod above the nut, to ensure maximum thread engagement. If depth of hollow section allows, tighten threaded rod to top of section as shown. It is recommended that a nut and plate washer be used to close the hole and secure the assembly. (Toggle tightening torque 10Nm or handtight plus a quarter turn).

Type TD - Tipping Dowel



N1 V S

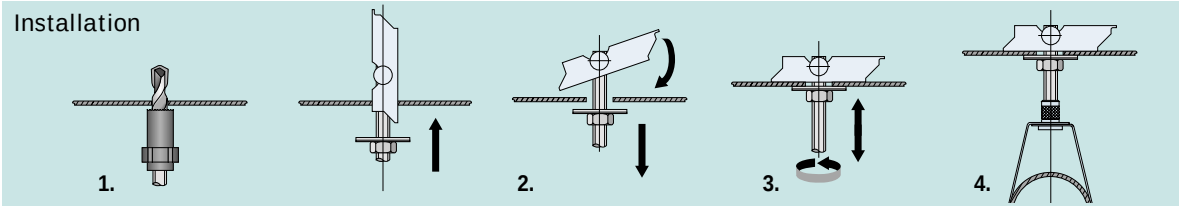


Product Code	Drop Rod	Length (mm)	Drill Hole Size (Ømm)	Tensile* SWL (kN)	Dimensions(mm) T	W
TD KV8-100	M8	100	22	0.8	84	19
TD KV8-200	M8	200	22	0.8	84	19
TD KV8-300	M8	300	22	0.8	84	19
TD KV8-500	M8	500	22	0.8	84	19
TD KV10-100	M10	100	25	0.8	84	19
TD KV10-200	M10	200	25	0.8	84	19

**Tensile SWL when not used in decking is 1(kN)*
**Tensile SWL subject to the strength of the supporting material structure.*

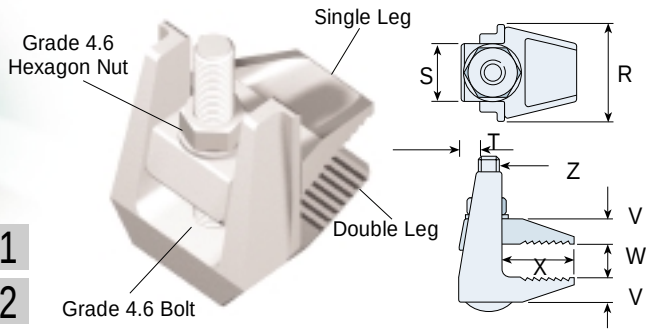
This simple Tipping Dowel with enclosed pivot for secure engagement of the threaded rod and quick installation provides a positive, mechanical method for securing suspended building services from hollow concrete flooring, hollow section steel, steel decking or purlins. **The Type TD has a 5:1 Factor of Safety. The Type TD is only approved for metal decking with a thickness greater than 0.75mm.**

Installation



1. Drill hole into structure from which services will be hung (M8:22mm, M10:25mm) then insert Tipping Dowel and thread rod.
2. A quick downward movement will engage the Tipping Dowel into the retaining cavity. (Type TD tightening torque 10Nm or handtight plus a quarter turn)
3. Wind the threaded rod upwards through the Tipping Dowel.
4. Secure with locking nut and plate washers provided.

Type F3 - Flange Clamp



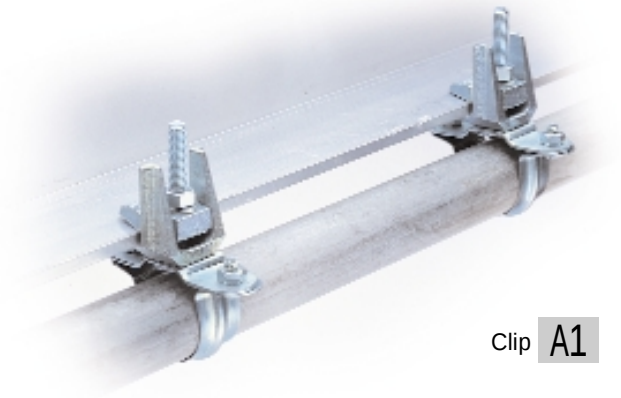
M6 A1

All Others A2

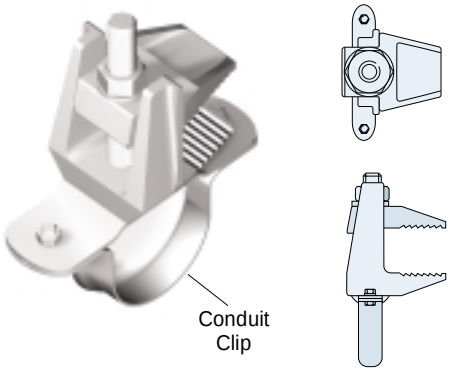
The F3 is a two part flange clamp suitable for suspending building services from steel beams or for securing the covers of vessels. The hexagon nut can be replaced with a handwheel or wrench handle and the central bolt can be substituted with either drop rod or J bolts.

Product Code		Bolt Size Z	Loads Factor of Safety 4:1 (kN)	Torque (Nm)	Dimensions (mm)						F3/CC Outside Dia of conduit (mm)
With bolt	Without Bolt		Bolt Grade 4.6		X	W	V	T	R	S	
F306NC	F306NB	M6	0.5	3	15	0-20	6	5	27	16	13, 20 or 25
F308NC	F308NB	M8	0.9	6	20	0-25	8	6	33	19	-
F310NC	F310NB	M10	1.2	20	25	0-30	10	7	38	22	32, 38 or 50
F312NC	F312NB	M12	2.0	39	35	0-40	12	9	49	29	-
F316NC	F316NB	M16	4.0	93	46	0-55	16	12	60	36	-
F320NC	F320NB	M20	6.0	177	55	0-70	19	15	76	44	-

Type F3/CC - Conduit Clip Option

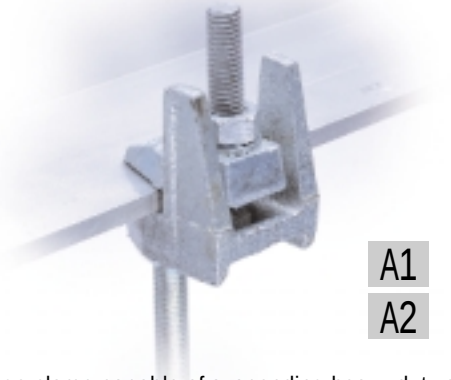


Clip A1



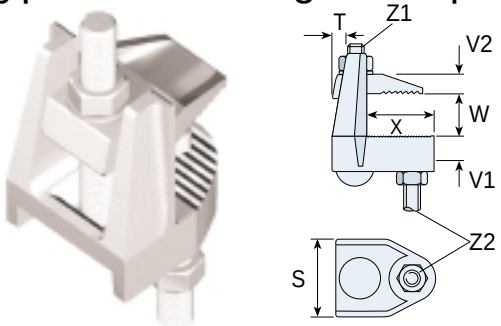
For fixing electrical conduit and cabling to steel beams, special F3CC options are available. Contact Lindapter for details

Type BICC - Flange Clamp



A1

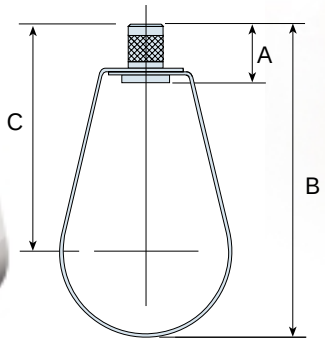
A2



A two-part flange clamp capable of suspending heavy duty armoured cable using claw type cleats. The fixing is suitable for use with a wide range of steelwork and flange thickness.

Product Code	Bolt Size Z1/Z2	Loads (kN)	Torque (Nm)	Dimensions (mm)					
		Bolt Grade 4.6 (Factor of safety of 4:1)		W	V1	V2	X	T	S
F310BICCA	M10	1.2	20	30	10	16	30	6.5	40

Type SH - Strap Hanger

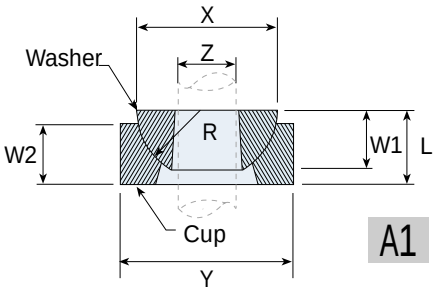


H5

Strap Hanger carries Factory Mutual approval for the suspension of pipework used in fire sprinkler installations and is available to suit a wide range of pipe sizes, strap hangers can be supplied with or without a hanger nut.

Product Code		Dimensions (mm)						Product Code		Dimensions (mm)					
Without Hanger Nut	With Hanger Nut	Nominal Bore	A	B	C	Nuts Tapped	Without Nut/Plain Hole	Without Hanger Nut	With Hanger Nut	Nominal Bore	A	B	C	Nuts Tapped	Without Nut/Plain Hole
SH025	SH025N	25	22	75	57.5	M8/10	9/11	SH080	SH080N	80	22	159	114	M8/10	9/11
SH032	SH032N	32	22	86	64	M8/10	9/11	SH100	SH100N	100	22	219	161	M8/10	9/11
SH040	SH040N	40	22	99	74	M8/10	9/11	SH125	SH125N	125	26.5	247	177	M12	13
SH050	SH050N	50	22	116	85	M8/10	9/11	SH150	SH150N	150	26.5	284	199.5	M12	13
SH065	SH065N	65	22	135	96.5	M8/10	9/11	SH200	SH200N	200	24	373	261	M16	18

Type HW / HC - Hemispherical Washer and Cup



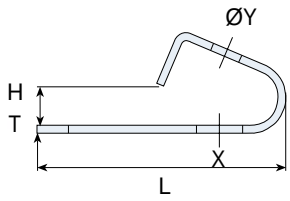
A1

Used together to enable building services to be hung via a drilled hole in an angled surface, the cup/washer combination allows a 10° swing either side of the vertical. The washer can be used without the cup, if required.

Product Code		Dimensions (mm)						
		Diameter	Washer		Washer & Cup		Cup	
Washer	Cup	of Bolt/Rod Z	X	W1	R	L	Y	W2
HW06	-	M6	19	9	-	-	-	-
HW08	-	M8	22	10	-	-	-	-
HW10	HC10	M10	25	12	13	14	32	12
HW12	HC12	M12	29	12	14	16	35	12
HW16	HC16	M16	34	16	17	19	41	16
HW20	HC20	M20	44	19	22	24	54	19
HW24	HC24	M24	57	25	29	32	67	25
HW30	HC30	M30	67	29	33	35	76	29

L1

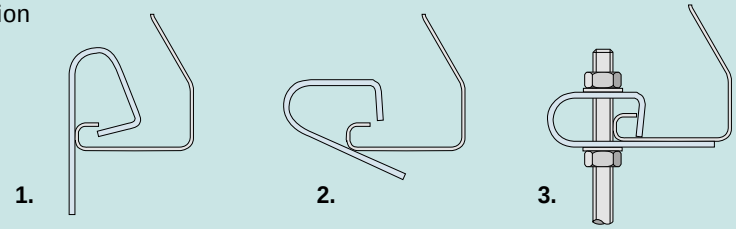
Type Z10 - Purlin Clamp



A purlin clamp that encompasses the full range of purlin sections and improves ease of installation due to its 'wider-mouth'.

Product Code	Torque (Nm)	T (mm)	L (mm)	H (mm)	W (mm)	X (mm)	Y (mm)
Z10	8	3	85	16	25	18	12

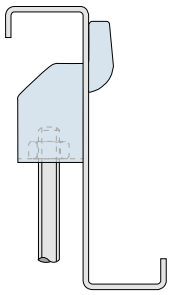
Installation



Purlin Type	Load (kN)
Multi-beam 2 & 3	0.20
Metsec	0.10 - 0.20
Zeta	0.15

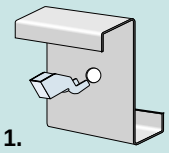
H1

Type WF - WebFix

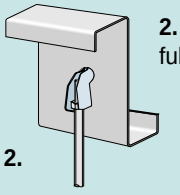


An ingenious method of suspending building services directly from the web of Zed purlins. The WebFix can be used with holes pre-drilled by the manufacturer or drilled on site, and installs in a matter of seconds. Working to a maximum thickness of 4mm for the purlin section the WebFix gives a Safe Working Load of 1kN when used with a M10 grade 8 nut with a **5: 1 Factor of Safety.**

Installation



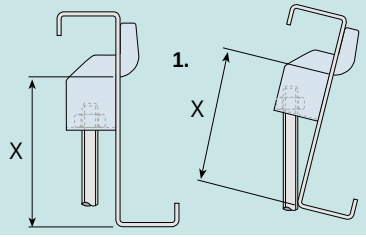
1. Squeeze legs of WebFix together and insert through pre-drilled 18mm hole in purlin. Push product body towards web of purlin until it snaps into place.



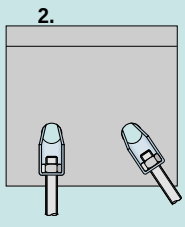
2. Assemble with nut and ensure full thread capture

Purlin Angle and Hole Position

The WebFix enables threaded rod to hang vertically, allowing for the angle of inclination or cant of the purlin itself.



1. Canted Purlins. As the angle of backwards cant increases, the maximum allowable distance X (hole centre to bottom edge of purlin) must decrease. The table on the right shows the maximum value of X at various angles of roof pitch.

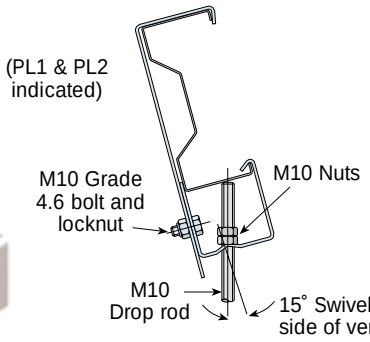


2. Inclined Purlins. The WebFix can be adjusted to whatever angle is required. Hole position is not a limiting factor on product installation in this case, however the note * next to the table still applies.

Roof Pitch°	0	10	20	30
Xmax (mm)	*	103	94	74

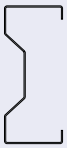
**To maximise the strength of the purlin section, it is recommended that distance X is as large as possible.*

Type PL - Adjustable Two Piece Wraparound Purlin Fixing



H5

A two-piece wraparound purlin hanger, designed to spread the load to the full section of the purlin. Four different variations are available, to suit different types and sizes of purlin. Suspension from canted purlins is allowable, as the PL caters for a 15° swivel either side of the vertical.

Product Code	To suit Purlin			Select Hole No.	Factor of Safety	Safe Working Load (kN)*
	Type	Profile	Depth			
PL1	MULTIBEAM 2®		140	1	4:1	0.6
			170	2		
			200	3		
PL2			200	1	4:1	0.6
			230	2		
			260	3		
PL3	METSEC®		232	1	4:1	0.6
			262	2		
PL4	ZETA®		150	1	4:1	0.6
			175	2		
			200	3		

** Subject to strength of supporting purlin*

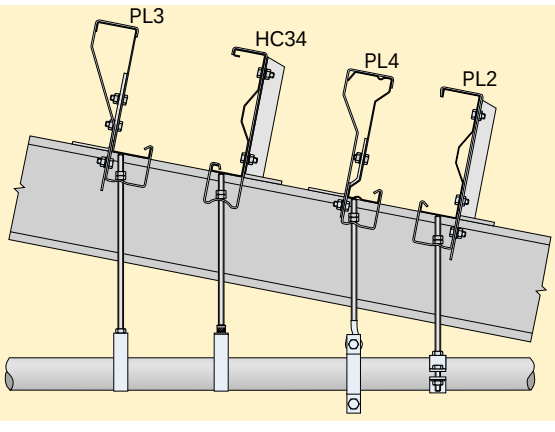
Type HC34 - One Piece Wraparound Purlin Fixing

M

HC34 is a range of one-piece wraparound purlin hangers designed specifically to suit Ward's Multibeam 3 range of purlins, they provide a cost-effective alternative to drilling purlins. **HC34 can be used to suspend from canted purlins at up to 15° from the vertical.**

Product Code	To suit Purlin	Depth	Factor of Safety	Safe Working Loads (kN)
HC34/145	145	210	3:1	0.75
HC34/175	175	240	3:1	0.75
HC34/205	205	270	3:1	0.75
HC34/235	235	300	3:1	0.75
HC34/265	265	330	3:1	0.75

Applications



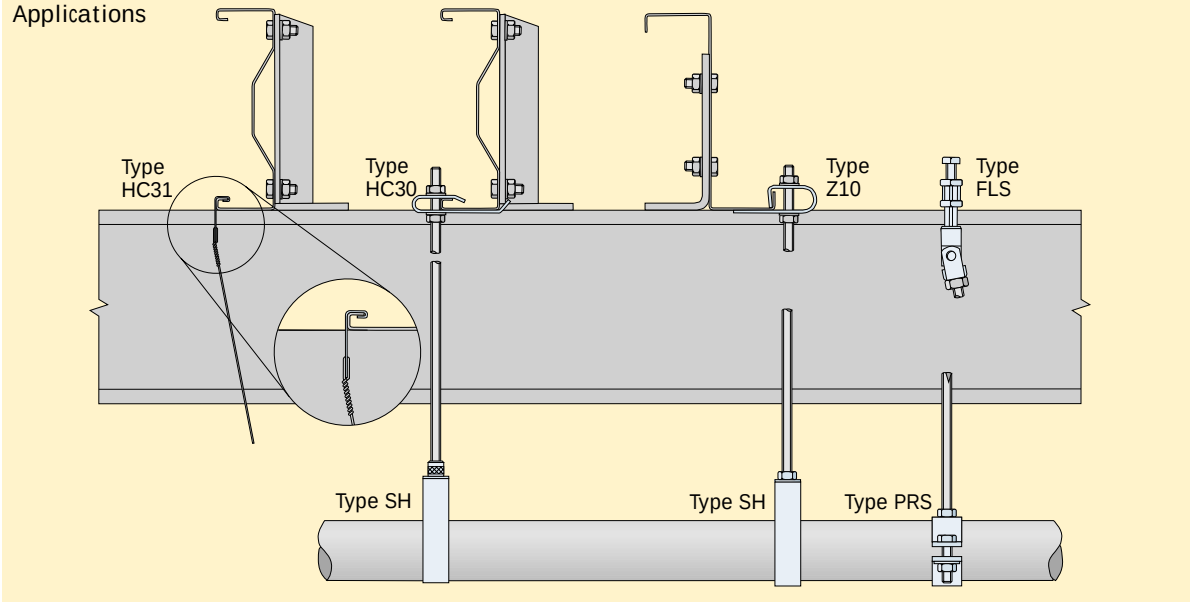
Type HC31 - Suspended Ceiling Clip

HC31 is designed to clip onto the edge of Ward Multibeam 3 purlins, to enable the installation of suspended ceilings. A **Safe Working Load of 0.2kN** is subject to the strength of the supporting purlin, please refer to the manufacturers specifications if unsure.

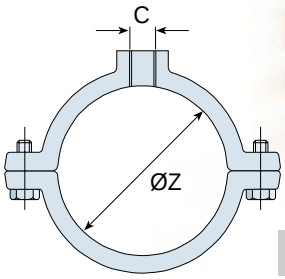
Type HC30 - Purlin Clamp

HC30 clamps around the bottom edge of Ward Multibeam 3 purlins without the need to drill, and is suitable for the suspension of building services if the purlin is horizontal. A **Safe Working Load of 0.2kN** and a **Factor of Safety of 3:1**

Applications



Type PRM - Malleable Iron Pipe Rings



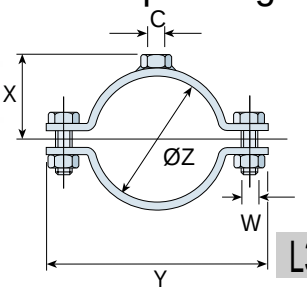
A3

Designed to support building services pipework without gripping it tightly. Available as either single or double boss versions, bosses are tapped to accept threaded rod. A bolt and nut must be used to connect the two halves for use in sprinkler installations.

Product Code*	Dimensions (mm) Pipe Bore	Pipe Outside Diameter Z	Bosses Tapped C	Product Code	Dimensions (mm) Pipe Bore	Pipe Outside Diameter Z	Bosses Tapped C
PRM010	10	17	M10	PRM050	50	60	M10
PRM015	15	22	M10	PRM065	65	76	M12
PRM020	20	27	M10	PRM080	80	89	M12
PRM025	25	34	M10	PRM100	100	114	M12
PRM032	32	42	M10	PRM125	125	140	M12
PRM040	40	48	M10	PRM150	150	168	M16

** Add D of S suffix to indicate Double or Single preference.*

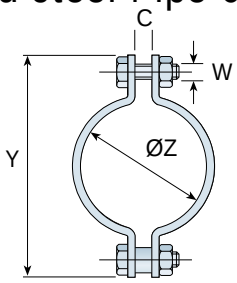
Type PRS - Mild Steel Pipe Rings



L3

Mild steel pipe rings are designed to grip the pipe when installed, they are available with either single or double bosses.

Type PC - Mild Steel Pipe Clips



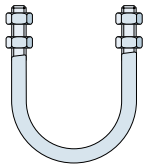
L3

Mild steel pipe clips grip the pipework but are suspended from one of the connecting bolts.

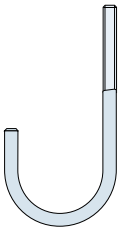
Product Code*		Dimensions (mm)						Product Code*		Dimensions (mm)					
Pipe Ring	Pipe Clip	Pipe Bore	Pipe O/D Z	Y	X	Bolt & Boss Diameters C & W	Steel Section	Pipe Ring	Pipe Clip	Pipe Bore	Pipe O/D Z	Y	X	Bolt & Boss Diameters C & W	Steel Section
PRS15	PC15	15	22	64	20.5	M8	25 x 3	PRS100	PC100	100	115	189	73.5	M12	35 x 6
PRS20	PC20	20	27	70	22	M8	25 x 3	PRS125	PC125	125	140	230	86	M12	35 x 6
PRS25	PC25	25	34	77	26.5	M8	25 x 3	PRS150	PC150	150	168	277	103	M16	50 x 6
PRS32	PC32	32	43	94	32.5	M10	25 x 3	PRS175	PC175	175	194	294	116	M16	50 x 6
PRS40	PC40	40	49	102	35.5	M10	25 x 3	PRS200	PC200	200	219	343	128.5	M16	50 x 6
PRS50	PC50	50	60	120	41.5	M10	25 x 3	PRS225	PC225	225	245	350	146.5	M20	50 x 8
PRS65	PC65	65	76	146	53	M12	30 x 5	PRS250	PC250	250	273	380	160.5	M20	50 x 8
PRS80	PC80	80	89	156	60	M12	30 x 5	PRS300	PC300	300	324	440	186	M20	50 x 8

** Add D of S suffix to indicate Double or Single preference.*

Type UB - U Bolts and Type JB - J Bolts



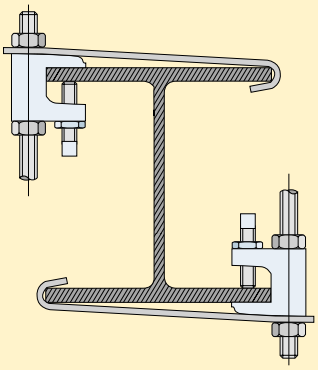
D1



D1

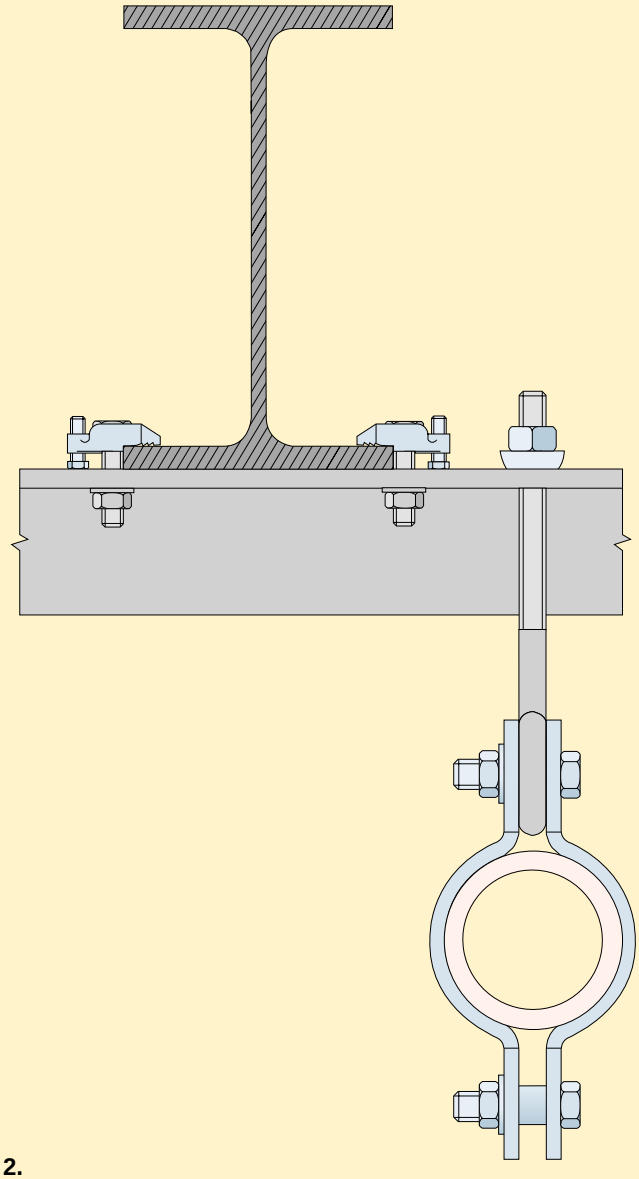
These versatile bolts are useful pipe supports. U Bolts are produced to either long or short leg and thread lengths and specials of both styles can be made to order depending on quantity.
Please contact Lindapter for details on what sizes are available of these products.

Applications



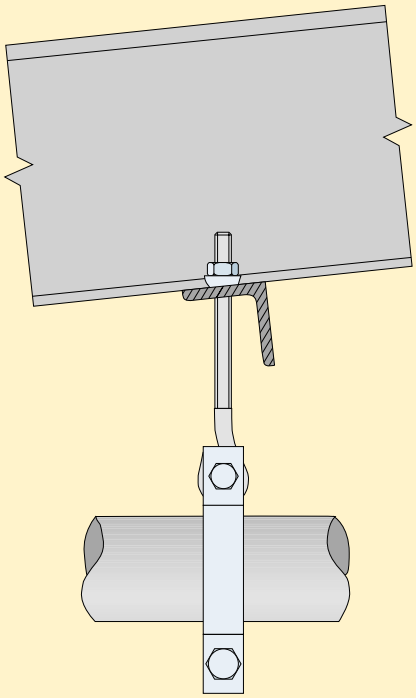
1.

On applications supporting above 65mm bore the additional safety strip should be used.



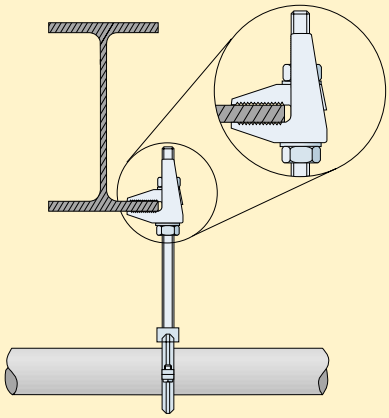
2.

Cantilevered pipe support with D2 and HW



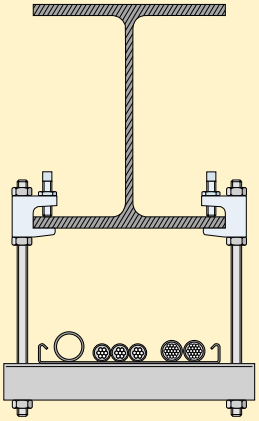
3.

Types HW with FRP



4.

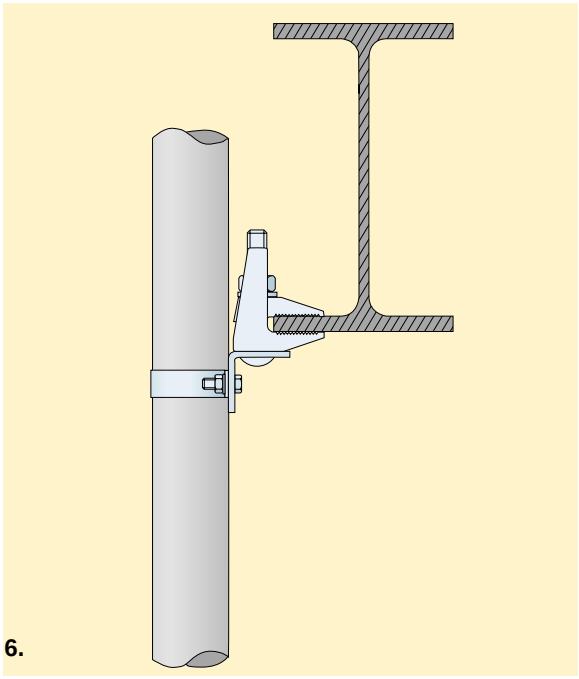
F3 and pipe ring



5.

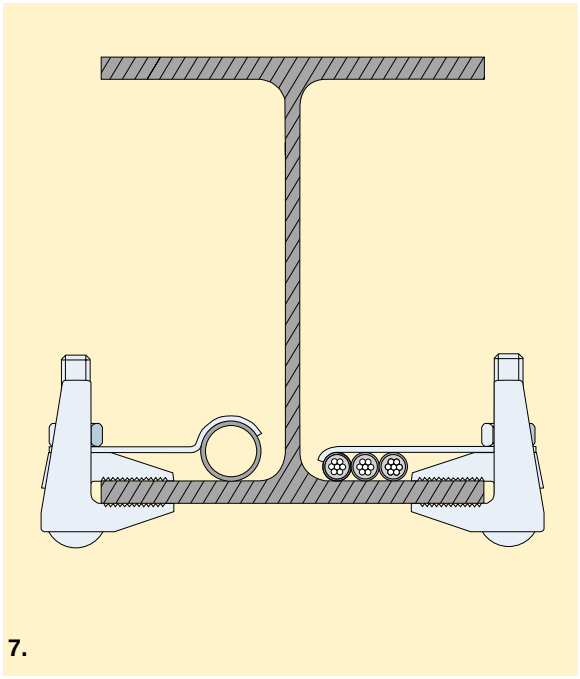
FL beam suspending cable tray

Applications



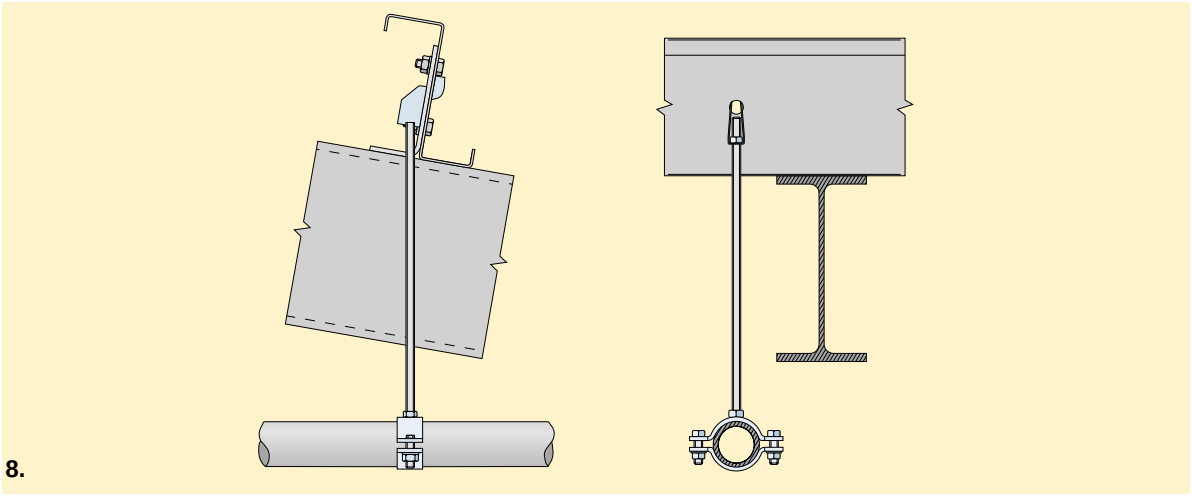
6.

F3 conduit clip (ADC)



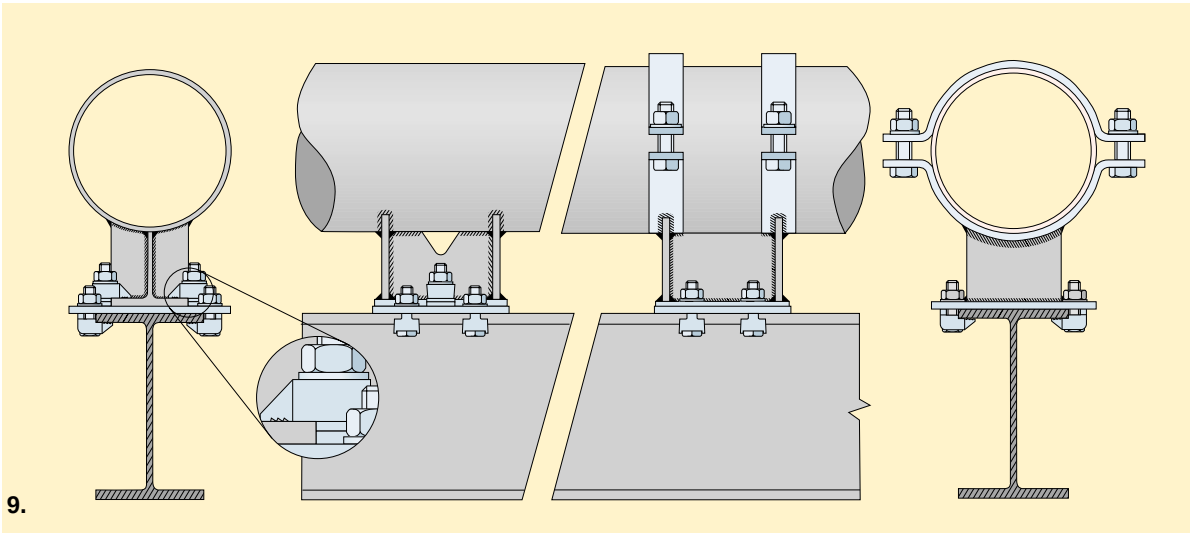
7.

F3 with pipe and cable clips



8.

WebFix and FPC



9.

Pipe expansion arrangement

Lindapter pipe clamp

Pressure Vessel Clamps

Included in the range of Lindapter products that are currently available is a number of products specifically designed for use with Pressure Vessels. As with all Lindapter products our aim is to provide innovative alternatives to traditional connection methods, using the vast experience gained, strong technical and engineering skills and the latest methods including CAD and FEA.

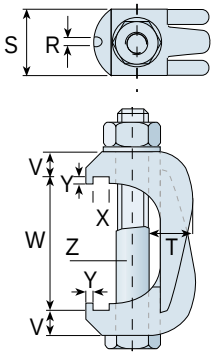
The importance of verified loads and reliability is fully recognised therefore a rigorous testing programme is carried out and all products come fully guaranteed and therefore a specifier or contractor can be 100% confident in Lindapter's product performance.

The range of clamps and accessories are produced for use on flanged connections of pressure vessel pipework and autoclaves. A product for use with swing clamps on tanker lids and inspection covers is also part of the range and there is a useful general purpose clamp - Type F9 - that is appropriate for securing all types of steelwork and the covers of vessels and tanks. In addition the Type F9 can also be used as a connection for engineers, welders, joiners and others.

All the clamps can be used with a range of accessories that are part of this range, where the nut of the clamp can be replaced with a handwheel or wrench handle.

Pressure Vessel Clamps Contents

Type F2 - Nut Clamp



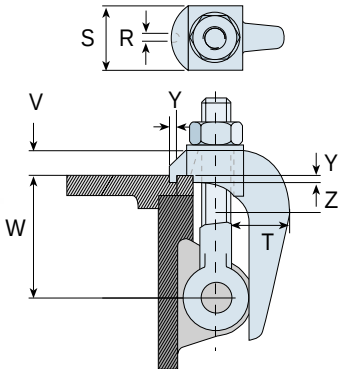
Product Code	Bolt Dia Z	Load (kN)	Dimensions(mm) Y	X	W	V	T	S	R
F210NC	M10	1.96	2.5	6.5	22 to 48	9	19	25	5.0
F212NC	M12	2.8	3.0	8.0	29 to 64	11	24	30	6.0
F216NC	M16	5.6	4.0	11.0	35 to 79	14	30	35	6.5
F220NC	M20	8.4	5.0	12.0	51 to 95	17	36	43	6.5
F224NC	M24	14	6.5	16.5	64 to 127	22	49	59	13.0

Safe Working Loads are based on a factor of safety of 5:1.
Use of any lower factor is at the customer's discretion.

A1

The type F2 is designed for use on the flanged connections of pressure vessels, pipework, etc. and is a two part clamp (single leg and double leg). The nut of the clamp can be replaced with either a handwheel or wrench handle.

Type F2 - Eyebolt Nut Clamp



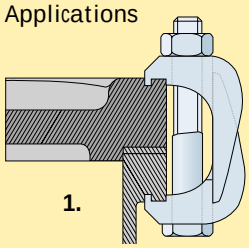
Product Code	Bolt Dia Z	Load (kN)	Dimensions(mm) Y	X	W	V	T	S	R
F206ENC	M6	-	1.5	5.0	16 to 32	5.5	14	18	3.0
F208ENC	M8	-	2.0	5.5	19 to 40	7	17	21	3.0
F210ENC	M10	1.96	2.5	6.5	22 to 48	9	19	25	5.0
F212ENC	M12	2.8	3.0	8.0	29 to 64	11	24	30	6.0
F216ENC	M16	5.6	4.0	11.0	35 to 79	14	30	35	6.5
F220ENC	M20	8.4	5.0	12.0	51 to 95	17	36	43	6.5
F224ENC	M24	14	6.5	16.5	64 to 127	22	49	59	13.0

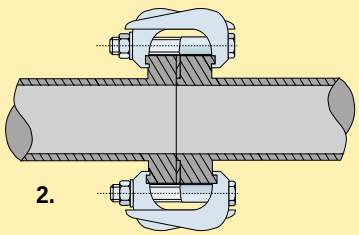
Safe Working Loads are based on a factor of safety of 5:1.
Use of any lower factor is at the customer's discretion.

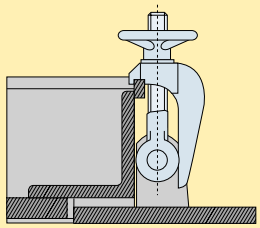
A1

The F2 eyebolt nut clamp consists of the single leg from the F2 shown above, plus an eyebolt, to enable the assembly to be used as a swing clamp on tanker lids, inpection covers, etc. The leg of the clamp should always bear on the head of the eyebolt. The nut can be replaced with either a handwheel, a single or double wrench handle. Many F2 sizes are also available in either mild steel or stainless.

Typical Applications







Lindapter offer a full range of accessories to use alongside the Pressure Vessel Clamp range. **Lugs and Pivot Pins, Eyebolts, Handwheels, Single and Double Wrench Handles** are all included.
Please contact Lindapter for details.

Type EB - Eyebolt

Type H - Handwheel

Type WS - Single Wrench Handle

Type WD - Double Wrench Handle

Type F9 - Flange Clamp

An extremely useful general purpose clamp which can be used to clamp steelwork directly together without the need for a location plate. Suitable for connecting all types of parallel flanged steelwork, as well as the covers of vessels, tanks etc. See Page 21 for further details.

Bespoke / Fabrication

Lindapter realise that not every project is the same, many projects need to be individually assessed. To help solve a connection problem Lindapter will carry out site visits or meet engineers to ascertain the precise requirement and advise on the best solution. It is understood that conventional use of Lindapter products may not always provide the answer for unique projects. If a solution can not be found using standard products Lindapter have a team of engineers with vast experience in providing bespoke design solutions for the most complex of projects.

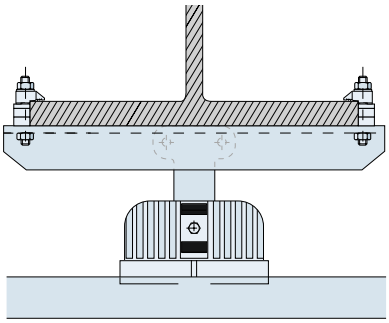
Lindapter's team of design engineers is always available to examine your application in depth and, if necessary, design special fixings to meet your requirements (subject to quantity).

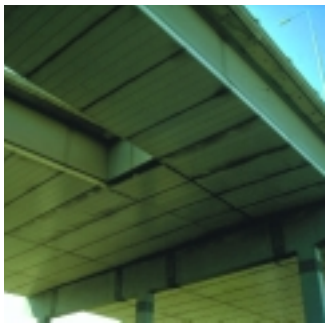
Sophisticated CAD systems enable engineers to design special products to solve the majority of application problems. If required Finite Element Analysis is used to gain a greater understanding of product and beam behaviour. Lindapter also have the ability to fabricate a whole range of connection solutions.

Over the years Lindapter have provided the solution for numerous bespoke projects, pages 63 and 64 highlight just a few examples.

Bespoke / Fabrication Contents

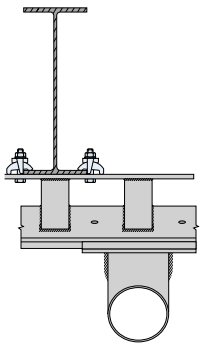
A19 Tees Viaduct-Refurbishment

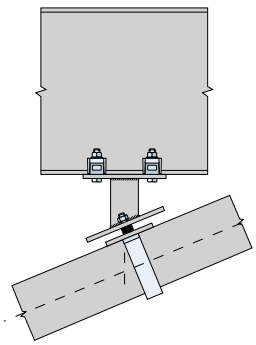




Lindapter type F3 support fixings together with types B and F9 steelwork fixings were part of the assemblies used to suspend glass reinforced plastic (GRP) panels from the underside of the A19 Tees Viaduct at Middlesborough, as part of a £10.7 million refurbishment project.
The complete fixings were designed and supplied by Lindapter to be used in the creation of a walkway for maintenance staff and an enclosure to protect the bridge's steelwork from the elements. The walkway membrane, developed by the Transport Research Laboratory in conjunction with Faber-Maunsell and Partners, meant that the mandatory six yearly inspection of the bridge could be carried out without the expense of providing temporary access facilities. The high level 640 metre length of the bridge, combined with the River Tees and the Railtrack main line running below, would have made this difficult and costly.
The fully adjustable Lindapter assemblies connect to the girder flanges under the bridge and are secured to tie bars on the transverse ribs of the walkway panels. They were chosen because they are maintenance free, can carry a specified load and are easily assembled using simple tools. The success of the installation has led to their use on several other bridge enclosure projects.

Runcorn Bridge - Installation of Pipework



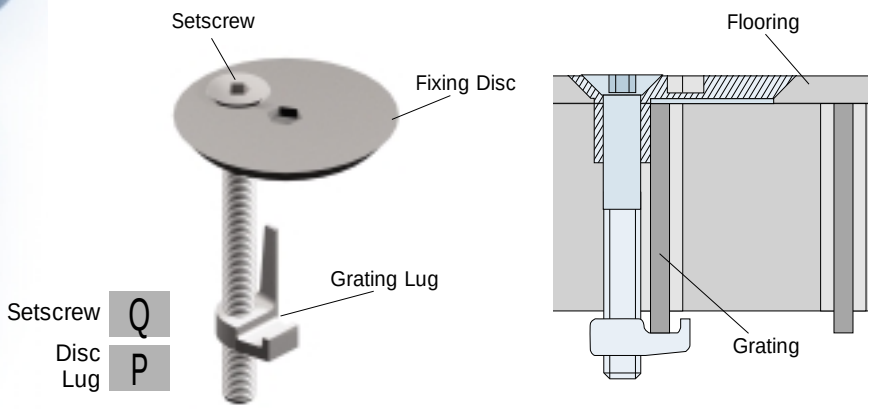


Lindapter's steelwork fixings simplified a major installation along the 1050 metre span of the Runcorn Bridge. The installation allowed pipework containing fibre optic cable to be carried across the River Mersey to bring cable television to adjacent regions.

The project was complicated by the presence of existing services and steelwork which had been added to the bridge soffit during an earlier widening project, leaving no direct route across for further pipework. Following a complete survey of the bridge, and close collaboration with the project consultants Atkins, Lindapter designed and supplied over 70 different connections to overcome these difficulties. The products possessed the additional advantage that no power was needed at the point of connection - ideal with the length of bridge span and the sheer altitude involved. In addition, a gas main running beneath the bridge meant that drilling or welding the steelwork would have been hazardous.

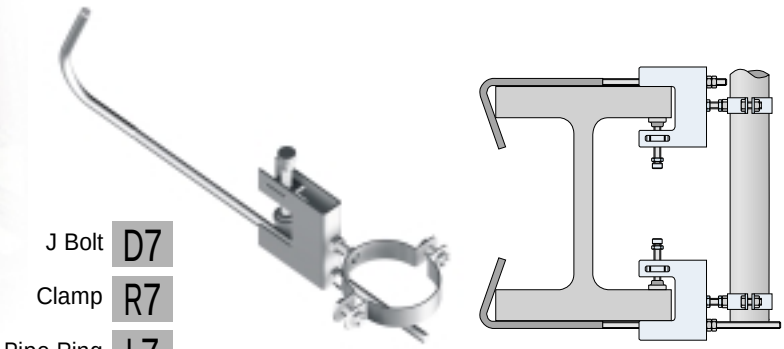
Bespoke / Fabrication

Type 1055



The Type 1055 was designed for Amec on behalf of Shell UK Exploration and Production, operator in the UK sector of the North Sea for Shell and Esso. The bespoke floor fixing enables the fitting of solid plate flooring over open-mesh or open-grid flooring using simple hand tools, without the need for any on-site drilling or welding, and without access to the underside of the open-grid flooring.
The Type 1055 steel fixing is utilised with pre-drilled plates which can be placed at any orientation and fitted from above by a single person. No hot work permit is required and no awkward or time consuming scaffolding is needed to gain access to the underside of the existing grid or mesh. The Type 1055 can also be used for the fitting of temporary solid flooring where operators need to be able to fix solid flooring quickly and easily, and remove it when required.

Type BSF (Bridge Sign Fixing)



Lindapter's work with highway, rail and other bridge applications led to the development of the Bridge Sign Fixing, designed specifically to connect square or triangular height signs to steel bridges. This system offers two distinct advantages:

1. The road beneath the bridge only has to be closed once. No need for the traditional process of closing the road, measuring the job, fabricating a clamp back at the shop, before closing the road again for installation. Lindapter's product needs only one road closure, when an anchorage point can be created in one hour or less.
2. One clamp is suitable for most applications. There is no need to fabricate a special clamp, hence achieving a considerable saving in detailing and manufacturing time. To summarise the benefits on offer:

- Road closure time is reduced
- No special fabrication is necessary
- No special tools are necessary
- Range of beam flange widths and thicknesses catered for
- No drilling or welding necessary
- Built-in safety features give extra confidence

Product Development

Lindapter has operated a Product Development department comprising of both qualified engineers and technician apprentices for over twenty-five years.

The Product Development strategy encompasses:
Providing high quality technically innovative fixing solutions to the construction industry.
Continually improving best practice on-site.
Design to strengthen and carry the Lindapter brand across all sales territories.
The responsibility of the department includes the introduction of additional core products to the range, continuous research and product testing, forming design and research partnerships and also the management of Trade Marks and Patents.

The design partnerships already established include:

Corus
The Steel Construction Institute (SCI)
The British Constructional Steelwork Association (BCSA)
CIDECT. (Comité International pour le Développement et l' Etude de la Construction Tubulaire)
Building Research Establishment (BRE)
American Institute of Steel Construction (AISC)
Consultant Design Engineering Companies

Research Partnerships which Lindapter have already been involved with include:

Leeds University
Sheffield University
Nottingham University
Oxford University
Trento University
HERA New Zealand Heavy Engineering Research Association
University of Toronto
Technische Universität Hamburg-Harburg
University of Manchester
Oxford Brookes
Universität Karlsruhe (TH)

Product Development within Lindapter has many services it can provide you, the customer:

Product Design / Development
Product Testing / Evaluation
CAD Facility 2D / 3D
Finite Element Analysis
Production Drawing Management
Report Generation
Patent & Trade Mark Management
Technical Assistance

The facility utilises the latest computer aided design systems combined with three separate test machines. One 2 ton, 5 ton and 100 ton respectively. With computerised data logging, curve mapping and Finite Element systems, real time application analysis can be provided to our customers on a daily basis if required.

Potential customers are regularly invited to the facility to witness Lindapter connection products subjected to applied load tests. And actual product demonstrations are often critical in securing projct based business.

In the opinion of Lindapter there are no such connections as non-critical connections - all connection devices are required to meet known applied loads which should give peace of mind to specifiers and contractors alike.

For any applications beyond the scope of the standard Lindapter product range, the Product Development Team will be happy to work alongside your organisation to engineer alternative bespoke solutions based upon suitable product volume.

Quality

The Lindapter product range offers you a flexible, reliable and cost effective alternative to the more traditional methods of securing steelwork, such as site drilling or welding. The range provides the most demanding engineers with an effective solution to their fixing requirements under the most arduous conditions and in sometimes hazardous and corrosive environments worldwide. Lindapter International continually strives to improve, in order to maintain the ultimate in quality standards for its products and services. This means that whether you are a specifier or a user you can be 100% confident in Lindapter's product performance.
In accordance with this policy, Lindapter is accredited under two quality schemes:

British Standards Institution

Lindapter is registered under BS EN ISO 9001, as a company with a suitable system of quality management.

BS EN ISO 9001:1994 Q5143

A copy of Lindapter's quality policy is available on request.

Testing and Approvals

Lindapter believes in gaining the full support of industry approval bodies wherever relevant to our products. As you look at the products in the Lindapter catalogue, the following symbols are placed alongside products which are approved by the particular body.

Structural Approvals

The Deutsche Institut für Bautechnik, Berlin is a body which approves products and materials for use in structural engineering applications in the construction and civil engineering industries.

Lloyds Register Type Approved Products have been subjected to tensile, frictional, shear, vibration and shock tests, witnessed and verified by Lloyds Register.

The TUV approval is the certifying authority for safety, quality and environmental protection

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

Fire Protection Approvals

The American Insurance Association, Factory Mutual, offers an approval which is recognised by the fire protection industry world-wide.

Verband der Schadenversicherer e.v. is a German insurance association who also offer a rigorous approval for products used in the fire protection industry.

These approvals serve to reinforce Lindapter's extensive in-house testing procedures. All Lindapter products are fully tested in all relevant applications, so you can be 100% confident whether specifying or using that Lindapter products will perform as per the information detailed in this catalogue. Loads published are the product safe working loads, taking into account a guaranteed factor of safety (5 or 4 in most cases).

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Fire & Building Products

The Steel Construction Institute
MEMBER

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