

High Slip
Resistance Clamps
by **lindapter**[®]

Technical Innovation in Steelwork Connections

Lindapter®, the inventor and manufacturer of steelwork clamping systems, has developed a range of patented High Slip Resistance (HSR) girder clamps specifically for frictional applications and high tensile loading.

WHY USE LINDAPTER HSR CLAMPS?



SAVE TIME & MONEY

Steel sections are simply clamped together, avoiding time-consuming methods such as welding or conventional drilling and bolting.



HIGH STRENGTH & DURABILITY

Lindapter's HSR clamps are manufactured from high strength SG iron with a hot dip galvanised coating to resist both high load requirements and aggressive environments.



ADJUSTABILITY

Steel sections can be quickly aligned by sliding the section into the correct position before tightening the clamp assembly to complete the installation.



SAFETY

On-site drilling and welding is avoided, encouraging safer site conditions and removing the need for hot work permits.

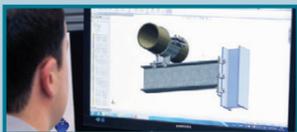


APPROVED SOLUTIONS

Product specifications have been independently verified by TÜV Nord including resistance to slip, defined by TÜV Nord as movement in the connection that exceeds 0.1mm.

FREE CONNECTION DESIGN AVAILABLE

For more information, please see Page 11.

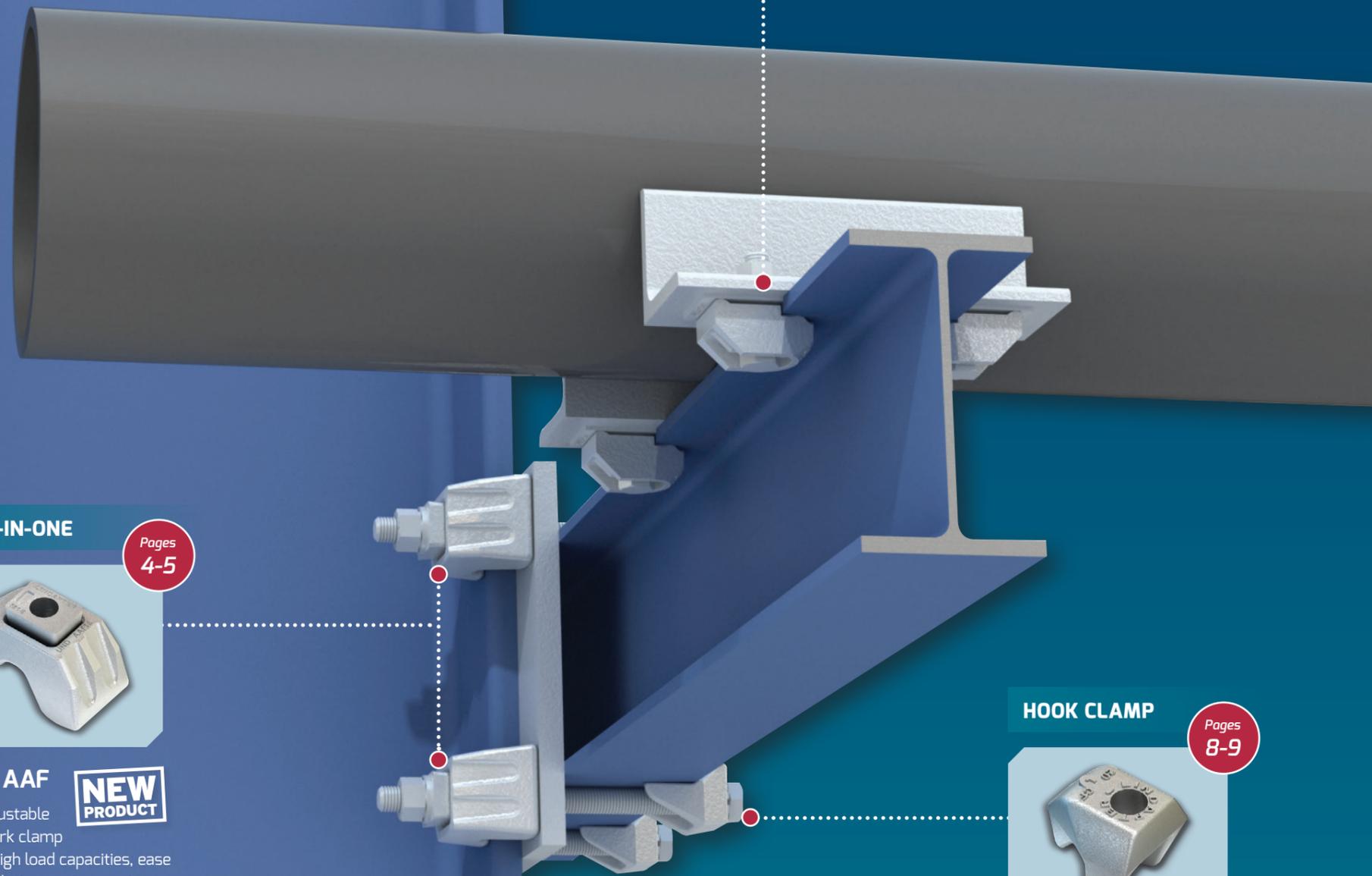


HEAVY DUTY

Pages 6-7

Type AF

This steelwork clamp is available in larger sizes up to M24 for very high load applications.



ALL-IN-ONE

Pages 4-5



Type AAF

NEW PRODUCT

This adjustable steelwork clamp offers high load capacities, ease of installation, anti-corrosion protection and performance, even in low temperature environments.

HOOK CLAMP

Pages 8-9



Type CF

This clamp hooks over the flanges of beams, angles and channels to provide a connection solution where the flanges of the connecting steel sections do not face.



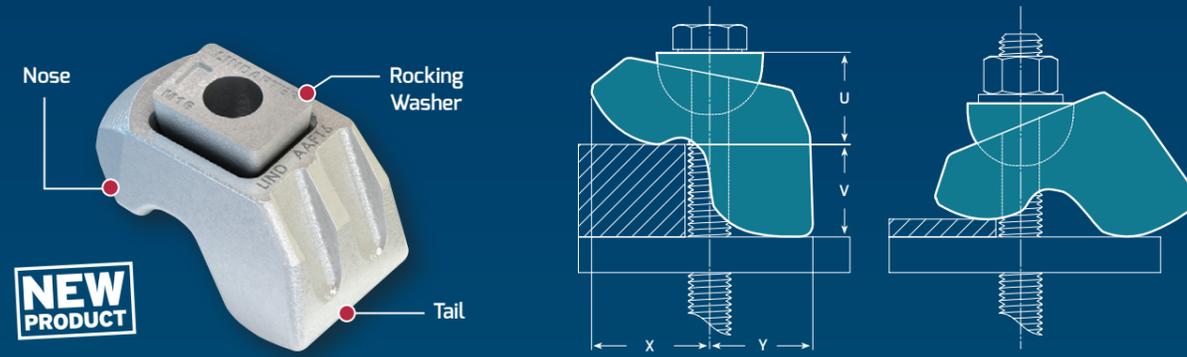
NEW PRODUCT

Type AAF

Lindapter's flagship product features an innovative 2-part design that allows the clamp to self-adjust to suit a range of flange thicknesses, while the low temperature SG iron provides resistance in cold environments where impact strength is important.

This 'Adjustable AF' is an enhanced version of Lindapter's Type AF product (page 6) and maintains the same safe working load capacities but is faster to install due to an impressive clamping range of 6-30mm (size M16).

TECHNICAL DATA

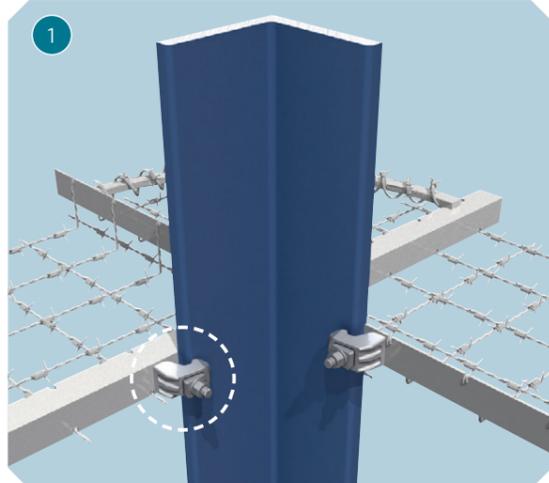


Material: Low temperature SG iron to EN 1563, hot dip galvanised to EN ISO 1461.

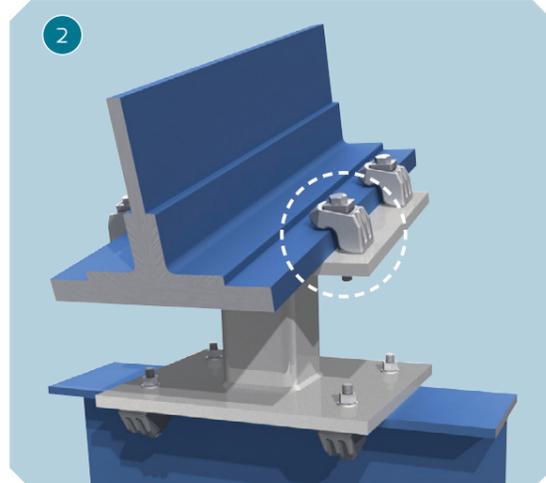
Product Code	Bolt		Safe Working Loads				Tightening Torque	Dimensions				Width
			Tensile Resistance / 1 Bolt (F.O.S 4.5:1)	Slip Resistance ¹⁾ / 2 Bolts (F.O.S 2:1)		Clamping Range ³⁾		V	Y	X	U	
				Painted Steelwork ²⁾	Galvanised Steelwork							
AAF12	M12	8.8	8.5	3.4	3.9	90	5 - 26	25 - 34	27 - 49	26 - 42	41	
AAF16	M16	8.8	16.0	8.0	10.0	240	6 - 30	34 - 50	31 - 58	35 - 46	56	
AAF12	M12	10.9	10.0	4.0	5.2	130 (100*)	5 - 26	25 - 34	27 - 49	26 - 42	41	
AAF16	M16	10.9	19.5	11.0	12.0	300 (250*)	6 - 30	34 - 50	31 - 58	35 - 46	56	

1) Slip Resistance figures are based on Type AAF and Location Plates in hot dip galvanised finish calculated against slip (movement exceeding 0.1mm).
 2) Shot blast and painted steelwork
 3) For thicker flanges, packing pieces AFP1 and AFP2 are available.
 * Torque for lubricated bolts
 NB. Y, X and U will vary depending on the thickness of V.

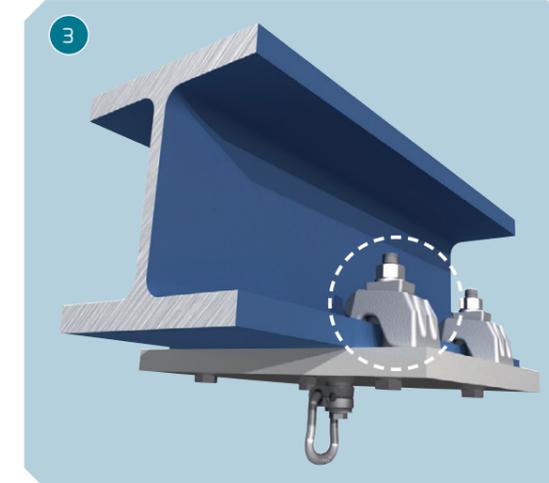
TYPICAL APPLICATIONS



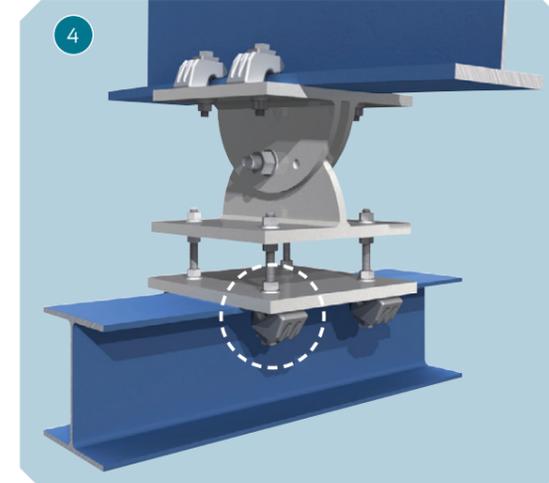
Anti-climbing system for pylons: The Type AAF adjusts to fit different thicknesses of steel and offers vertical adjustability.



Bridge strengthening: This combined loading configuration (slip resistance and tension) allows one connection design to be used on multiple sections.



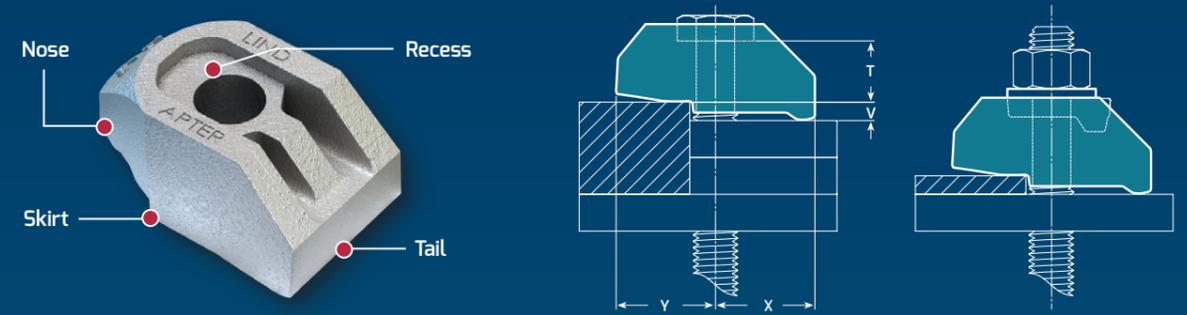
Lifting points: Lindapter manufactures customised assemblies for specific load requirements e.g. vertical, angle or horizontal loads.



Roof supports: The Type AAF is ideal for connecting to curved roofs. This assembly provides vertical and horizontal adjustability.

TYPICAL APPLICATIONS

TECHNICAL DATA



Material: SG iron to EN 1563, hot dip galvanised to EN ISO 1461.

Product Code	Bolt		Safe Working Loads				Tightening Torque	Dimensions					
			Tensile Resistance / 1 Bolt (F.O.S 5:1)	Slip Resistance ¹⁾ / 2 Bolts (F.O.S 2:1)		Y		X	Tail Length		T	Width	
				Painted Steelwork ²⁾	Galv. Steelwork				short	medium			Type AF
Size	Property Class	kN	kN	kN	Nm	mm	mm	mm	mm	mm	mm	mm	
AF12	M12	8.8	8.5	3.4	3.9	90	27	27	5	12.5	17	22	39
AF16	M16	8.8	16.0	8.0	10.0	240	35	37	8	15	22	27	49
AF20	M20	8.8	26.3	13.0	16.0	470	40	39	10	18	25	31	56
AF24	M24	8.8	40.0	24.0	30.0	800	48	60	15	30	32	42	82
AF12	M12	10.9	10.0	4.0	5.2	130 (100*)	27	27	5	12.5	17	22	39
AF16	M16	10.9	19.5	11.0	12.0	300 (250*)	35	37	8	15	22	27	49
AF20	M20	10.9	30.0	20.0	25.0	647 (450*)	40	39	10	18	25	31	56
AF24	M24	10.9	62.5 ³⁾	28.0	35.0	1000 (800*)	48	60	15	30	32	42	82

1) Slip Resistance figures are based on Type AF and Location Plates in hot dip galvanised finish calculated against slip (movement exceeding 0.1mm).

2) Shot blast and painted steelwork

3) 3.2:1 Factor of Safety

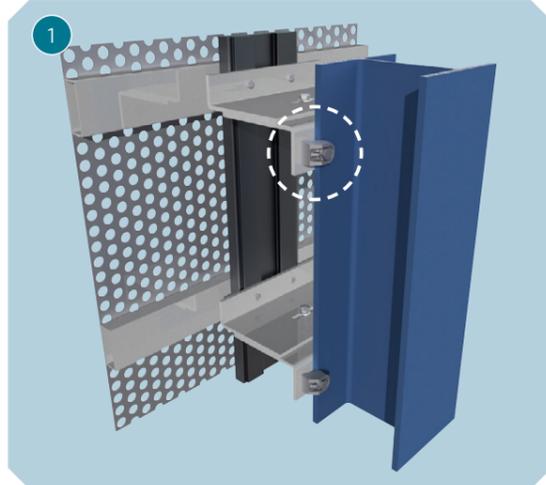
* Torque for lubricated bolts

Type AF

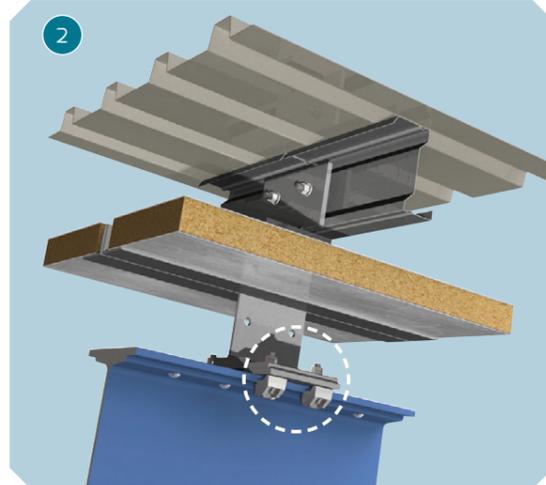
The product specifications of all Lindapter HSR clamps are independently verified by TÜV Nord and this heavy duty clamp offers the highest loading capacities available, for example, a typical four bolt configuration has a static slip resistance of up to 70kN or tensile resistance up to 250kN.

The Type AF requires a specific configuration of packing pieces to be installed under the clamp to suit the thickness of the flange (page 10). If there is a requirement to connect various sized steel sections or low temperature considerations, the Type AAF is recommended (page 4).

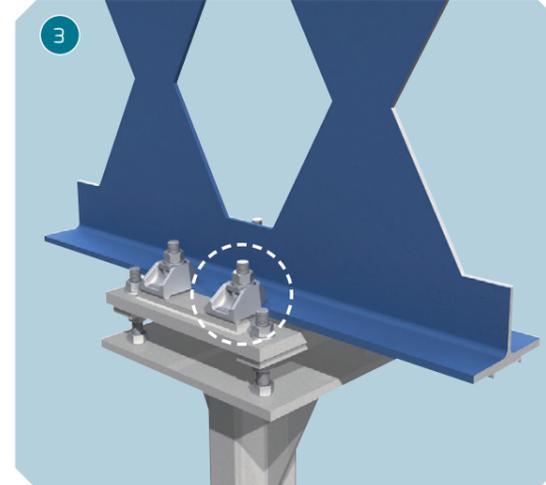
TYPICAL APPLICATIONS



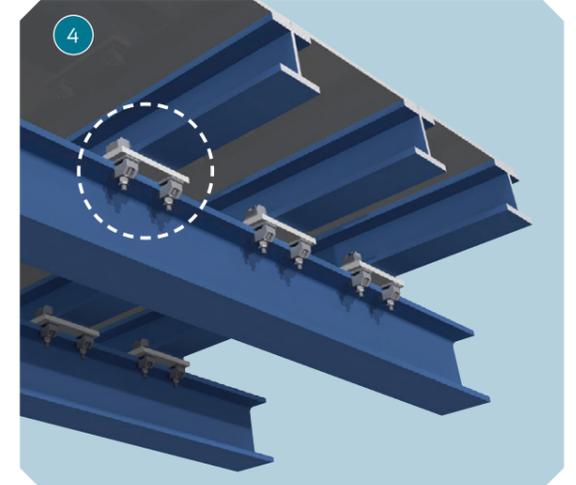
Cladding support system: Perforated steel cladding is connected to a vertical column providing vertical and lateral adjustment (Portello Project, Milan, Italy).



Roof supports: The iconic curved roof at St Pancras Station, London, is secured by Type AF clamps in an assembly that attaches roof supports to the original riveted steel frame.



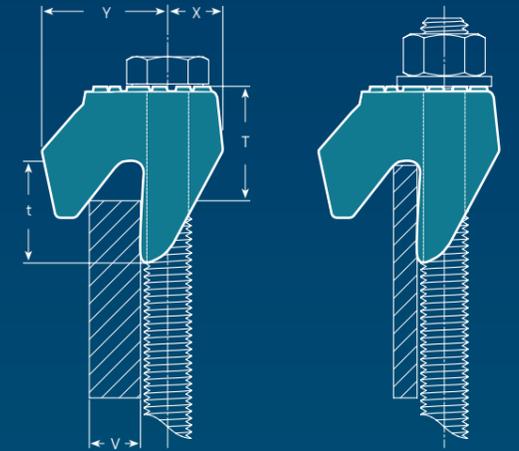
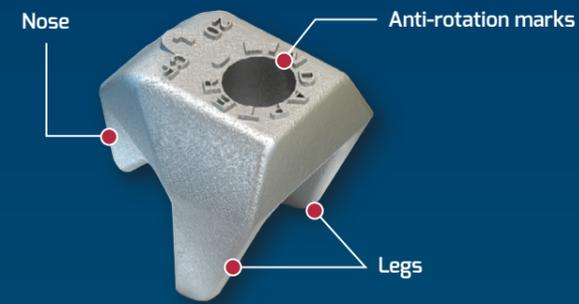
Conveyor supports: This M24 Type AF clamp assembly provided a high tensile load capacity of 250kN required for the conveyor supports at Gatwick Airport, UK.



Bridge strengthening assembly: Type AF girder clamps are used to strengthen the up-line girders of Morton's Leam Bridge, Cambridgeshire, UK.

TYPICAL APPLICATIONS

TECHNICAL DATA



Material: SG iron to EN 1563, hot dip galvanised to EN ISO 1461.

Product Code	Bolt Size (Property Class 8.8)	Safe Working Loads				Tightening Torque Nm	Dimensions				
		Tensile Resistance / 1 Bolt (F.O.S 5:1) kN	Slip Resistance ¹⁾ / 2 Bolts (F.O.S 2:1)		Clamping Range mm		Y mm	X mm	T mm	t mm	Width mm
			Painted ²⁾ Steelwork	Galv. Steelwork							
CF12	M12	8.5	3.4	3.9	90	32	14	6 - 13	21 - 29	25	46
CF16	M16	16.0	8.0	10.0	240	44	18	8 - 16	25 - 33	32	56
CF20	M20	26.3	13.0	16.0	470	53	22	10 - 19	30 - 41	45	65

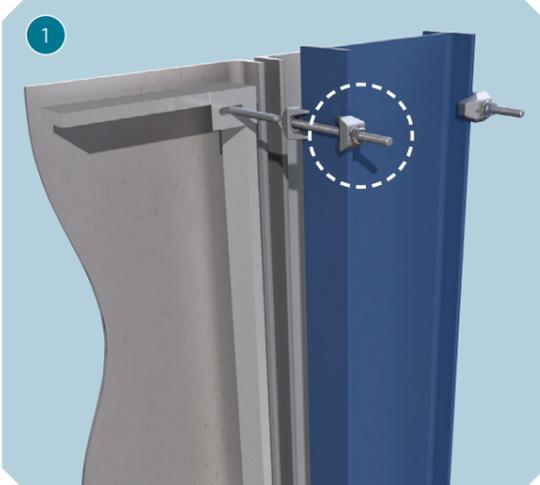
1) Slip Resistance figures are based on Type CF and Location Plates in hot dip galvanised finish calculated against slip (movement exceeding 0.1mm).
2) Shot blast and painted steelwork

Type CF

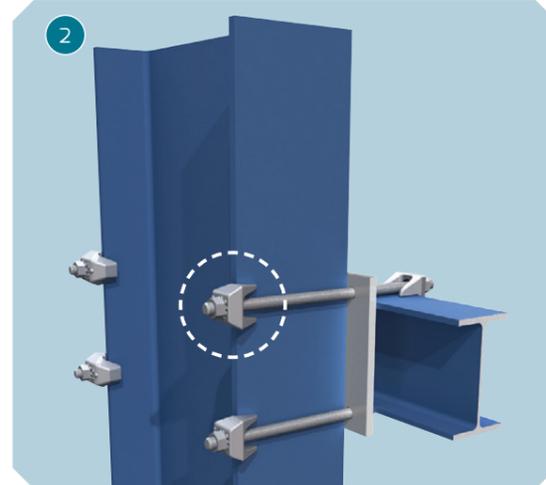
This clamp hooks over the flanges of beams, angles and channels to provide a connection solution in situations where the flanges of the connecting steel sections do not face each other, for example, connecting upright horizontal beams to vertical columns.

Type CF can be combined with all Lindapter HSR clamps when used with property class 8.8 bolts (refer to the opposite page for safe working loads).

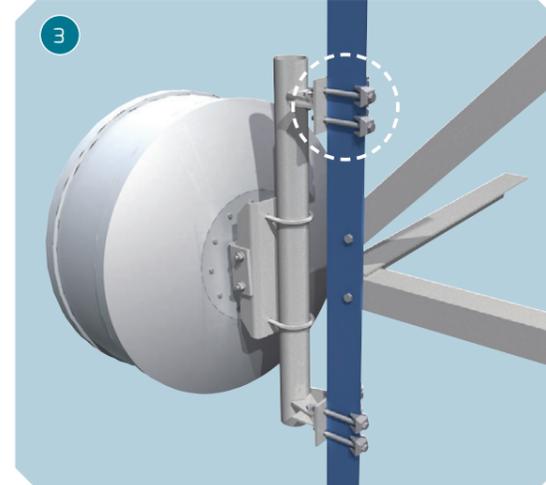
TYPICAL APPLICATIONS



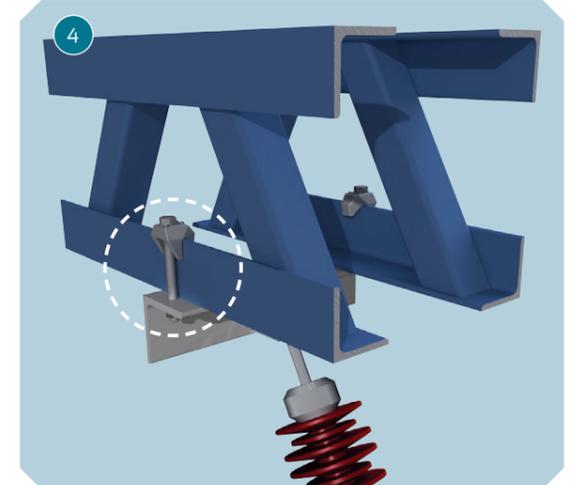
Cladding: The Type CF secures GRC panels to a vertical steel section, allowing both vertical and horizontal adjustment.



Roof supports: New steelwork is attached to an existing frame at the Chivas Regal Distillery, Keith, Scotland in an application that requires high slip resistant capacities.



Towers and masts: A communications antenna is secured to a tower with a connection assembly that is quick to install and offers vertical adjustability.



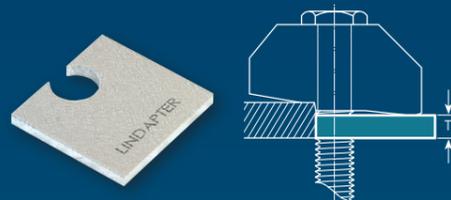
Overhead catenary support: Overhead line equipment is supported from a steel frame in a combined load application.

TYPICAL APPLICATIONS

Type AF Accessories

PACKING PIECES

Packings to adjust the clamp's tail length to meet different beam flange thicknesses.



Product Code	Bolt	Dimensions T (mm)
AF12CW	M12	2
AF12P1	M12	5
AF12P2	M12	10
AF16CW	M16	2
AF16P1	M16	5
AF16P2	M16	10
AF20CW	M20	2
AF20P1	M20	5
AF20P2	M20	10
AF24P1	M24	5
AF24P2	M24	10

TYPE AFW

A washer used to fill the Type AF recess. Features two projections which, when the Type AFW is inverted, will captivate and prevent rotation of the larger hexagons of pre-loadable bolts to BS EN 14399 (M12 - M20).



Product Code	Bolt	Dimensions T (mm)
AFW12	M12	5
AFW16	M16	5
AFW20	M20	6
AFW24	M24	10

TAIL LENGTH / PACKING COMBINATIONS

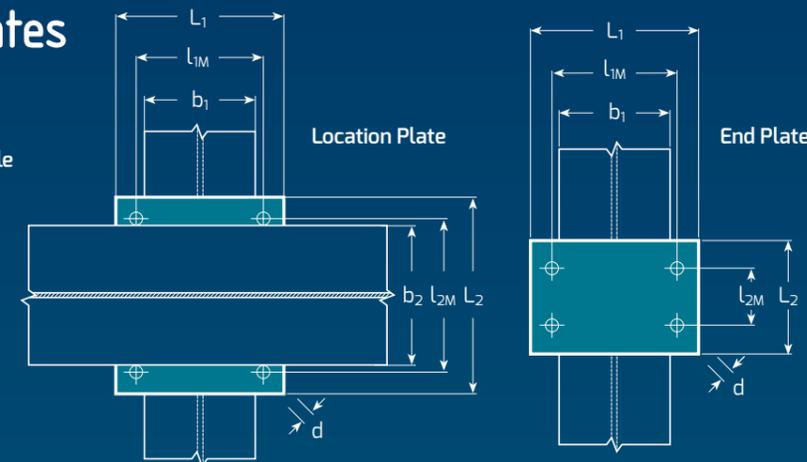
Parallel flanges and beams of up to 10° slope.

Flange Thickness mm	M12				M16				M20				M24			
	AF	AFCW	AFP1	AFP2	AF	AFCW	AFP1	AFP2	AF	AFCW	AFP1	AFP2	AF	AFP1	AFP2	
5	s	-	-	-	*	-	-	-	*	-	-	-	*	-	-	
6	s	-	-	-	*	-	-	-	*	-	-	-	*	-	-	
7	s	1	-	-	s	-	-	-	*	-	-	-	*	-	-	
8	s	1	-	-	s	-	-	-	*	-	-	-	*	-	-	
9	s	2	-	-	s	-	-	-	s	-	-	-	*	-	-	
10	s	-	1	-	s	1	-	-	s	-	-	-	*	-	-	
11	s	3	-	-	s	1	-	-	s	-	-	-	*	-	-	
12	s	1	1	-	s	2	-	-	s	1	-	-	s	-	-	
13	m	-	-	-	s	-	1	-	s	1	-	-	s	-	-	
14	m	1	-	-	s	3	-	-	s	2	-	-	s	-	-	
15	s	-	-	1	m	-	-	-	s	-	1	-	s	-	-	
16	m	2	-	-	m	-	-	-	s	3	-	-	s	-	-	
17	m	-	1	-	m	1	-	-	m	-	-	-	s	-	-	
18	m	-	1	-	s	-	-	1	m	-	-	-	s	1	-	
19	m	1	1	-	m	-	1	-	m	-	-	-	s	1	-	
20	s	-	1	1	m	-	1	-	m	1	-	-	s	1	-	
21	m	2	1	-	m	-	1	-	m	1	-	-	s	1	-	
22	m	2	1	-	m	1	1	-	m	2	-	-	s	1	-	
23	m	-	-	1	m	1	1	-	m	-	1	-	s	-	1	
24	m	1	-	1	m	-	-	1	m	1	1	-	s	-	1	
25	s	-	-	2	m	-	-	1	m	1	1	-	s	-	1	
26	m	2	-	1	m	-	-	1	s	1	1	1	s	-	1	
27	m	2	-	1	m	1	-	1	s	1	1	1	m	-	-	
28	m	-	1	1	s	-	-	2	m	-	-	1	m	-	-	
29	m	1	1	1	m	-	1	1	m	-	-	1	m	-	-	
30	s	-	1	2	m	-	1	1	m	1	-	1	m	-	-	
31	s	-	1	2	m	-	1	1	m	1	-	1	m	-	-	
32	m	-	-	2	m	1	1	1	m	-	1	1	m	1	-	
33	m	-	-	2	m	1	1	1	m	-	1	1	m	1	-	
34	m	1	-	2	m	-	-	2	m	-	1	1	m	1	-	
35	s	-	-	3	m	-	-	2	s	-	1	2	m	1	-	
36	s	-	-	3	m	-	-	2	m	1	1	1	m	1	-	
37	m	-	1	2	m	1	-	2	m	-	-	2	m	1	-	
38	m	-	1	2	s	-	-	3	m	-	-	2	m	1	1	
39	m	1	1	2	m	-	1	2	m	-	-	2	m	-	1	
40	s	-	1	3	m	-	1	2	m	1	-	2	m	-	1	
41	s	-	1	3	m	-	1	2	m	1	-	2	m	-	1	
42	m	-	-	3	m	1	1	2	m	-	1	2	m	-	1	
43	m	-	-	3	s	-	1	3	m	-	1	2	m	1	1	
44	m	1	-	3	m	-	-	3	m	-	1	2	m	1	1	
45	s	-	-	4	m	-	-	3	m	1	1	2	m	1	1	
46	s	-	-	4	m	-	-	3	m	1	1	2	m	1	1	
47	m	-	1	3	m	1	-	3	m	-	-	3	m	1	1	
48	m	-	1	3	s	-	-	4	m	-	-	3	m	-	2	
49	s	-	1	4	m	-	1	3	m	-	-	3	m	-	2	
50	s	-	1	4	m	-	1	3	m	1	-	3	m	-	2	

s = short m = medium * = Type not applicable

Location and End Plates

This is an essential part of the girder clamp assembly that enables all the components to be located in the correct position. The hole centres and plate thickness are calculated to suit the individual application.



- L₁ = Plate length
- L₂ = Plate width
- L_{1M}, L_{2M} = Hole centres
- b₁, b₂ = Flange width
- d = Hole Ø

PLATE DIMENSIONS

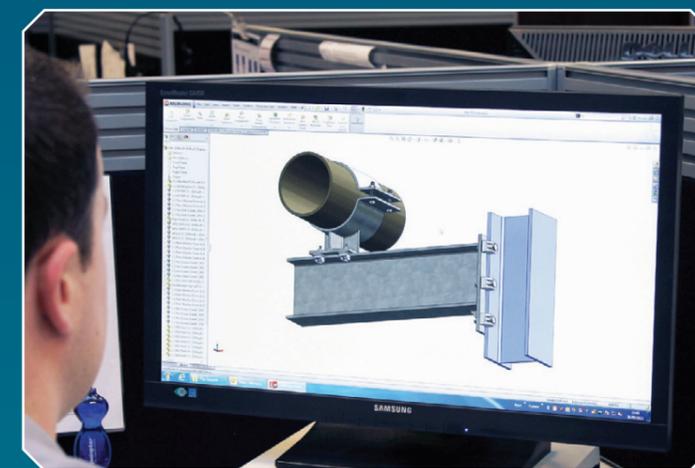
Material: Mild steel minimum grade S355 JR/J0/J2 to be specified by the Engineer to suit the application.

Bolt	Hole Ø d mm	Location Plate			End Plate ¹⁾				
		Plate Thickness mm	Hole Centres L _{1M} , L _{2M} mm	Length / Width min L ₁ , min L ₂ mm	Plate Thickness mm	Hole Centre L _{1M} mm	Length min L ₁ mm	Hole Centre min L _{2M} mm	Width min L ₂ mm
M12	14	10	b + 14	b + 90	15	b ₁ + 14	b ₁ + 90	80	L _{2M} + 80
M16	18	15	b + 18	b + 110	25	b ₁ + 18	b ₁ + 110	100	L _{2M} + 100
M20	22	20	b + 22	b + 130	30	b ₁ + 22	b ₁ + 130	180	L _{2M} + 180
M24	26	25	b + 26	b + 180	40	b ₁ + 26	b ₁ + 180	200	L _{2M} + 200

¹⁾ Depending on the type of connection and associated end plate used, the thickness may need to be modified to comply with accepted local design codes.

The Lindapter Support Service

Lindapter's experienced Engineers will design your connection free-of-charge to ensure a hassle-free specification process. Email your connection requirements to support@lindapter.com or call +44 (0)1274 521444 to speak with the Technical Support Team.



The Technical Support service includes:

- FREE CONNECTION DESIGN
- 2D / 3D DRAWINGS
- QUOTATION
- INSTALLATION GUIDANCE

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