

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 unique 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.



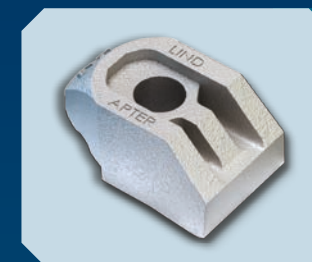
APPROVED SOLUTIONS

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 SERVICE



Experienced Lindapter Engineers can design a bespoke connection based on your requirements. See Page 11 for more information.



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.

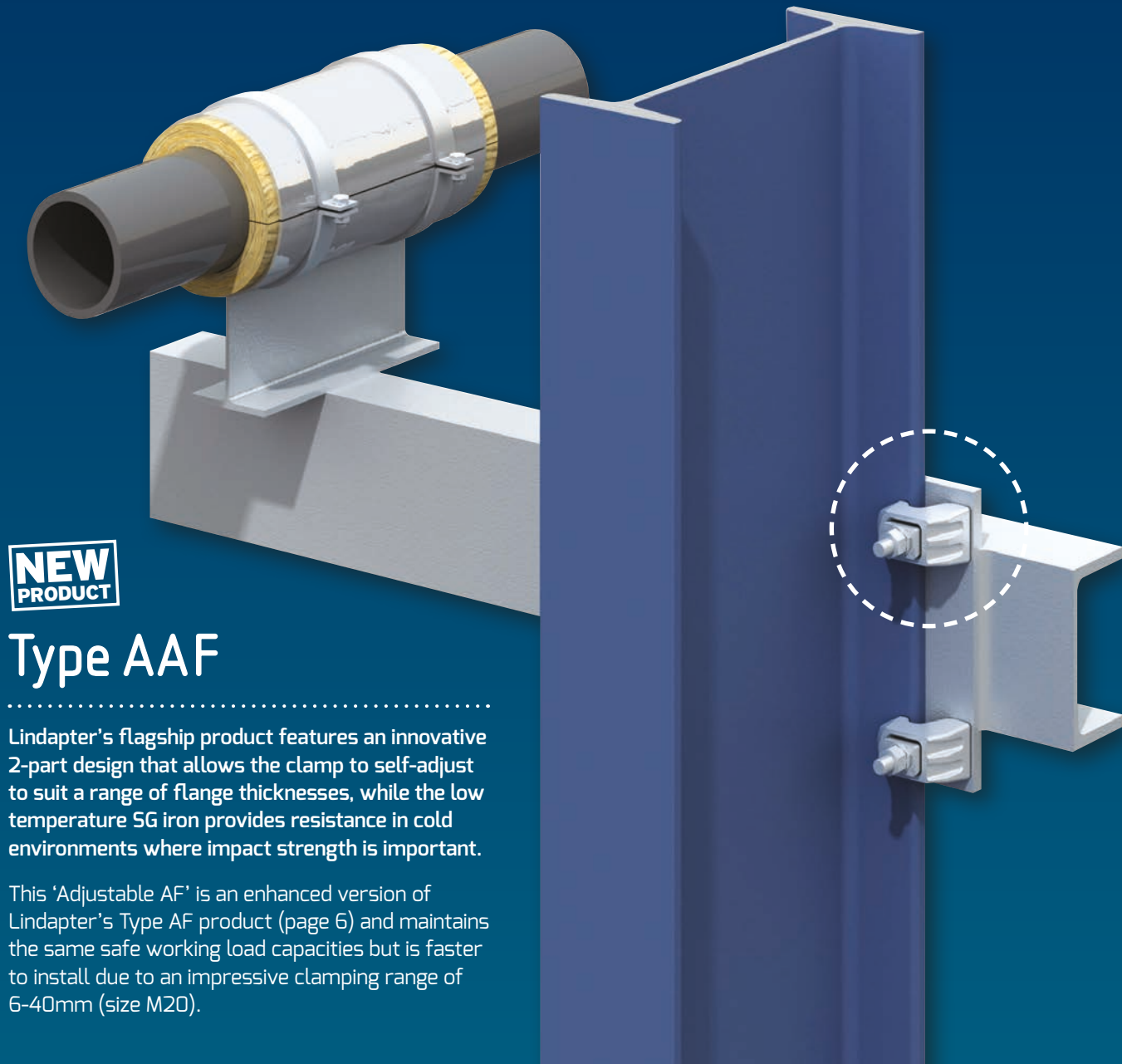
HOOK CLAMP

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.



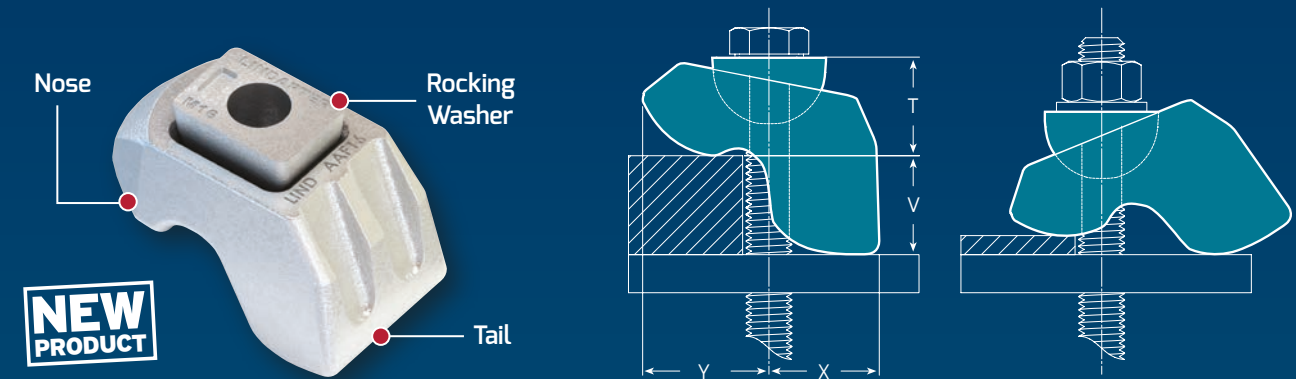
NEW
PRODUCT

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 6-40mm (size M20).

TECHNICAL DATA



Material: Low temperature SG iron to EN 1563, hot dip galvanised to EN ISO 1461.
European Community Design Registration Number 002677567-0001.

Product Code			Safe Working Loads			Tightening Torque ⁺	Dimensions				
			Tensile Resistance / 1 Bolt (F.O.S 4.5:1)	Slip Resistance ¹⁾ / 2 Bolts (F.O.S 2:1)			V	Y	X	T	
				Painted Steelwork ²⁾	Galvanised Steelwork						Width
Size	Property Class		kN	kN	kN	Nm	Clamping Range ³⁾	mm	mm	mm	mm
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
AAF20	M20	8.8	26.3	13.0	16.0	470	6 - 40	48 - 78	49 - 64	52 - 64	77
AAF12	M12	10.9	10.0	4.0	5.2	130	5 - 26	25 - 34	27 - 49	26 - 42	41
AAF16	M16	10.9	19.5	11.0	12.0	300	6 - 30	34 - 50	31 - 58	35 - 46	56
AAF20	M20	10.9	30.0	20.0	25.0	647	6 - 40	48 - 78	49 - 64	52 - 64	77

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

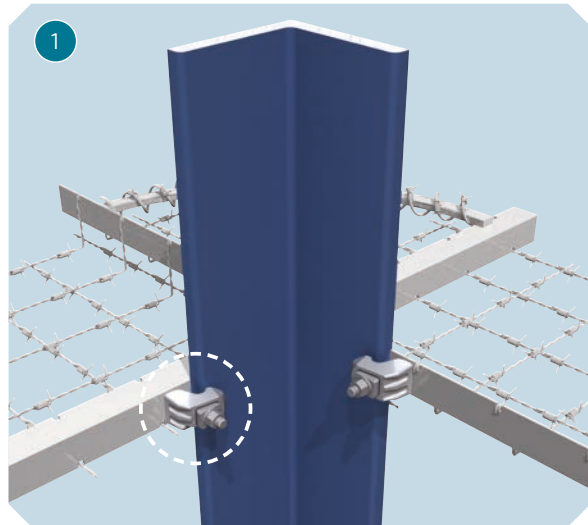
2) Shot blast and painted steelwork.

3) For thicker flanges, packing pieces AFP1 and AFP2 are available (for AAF12 & AAF16 only) or packing piece AFP3 (for AAF20 only).

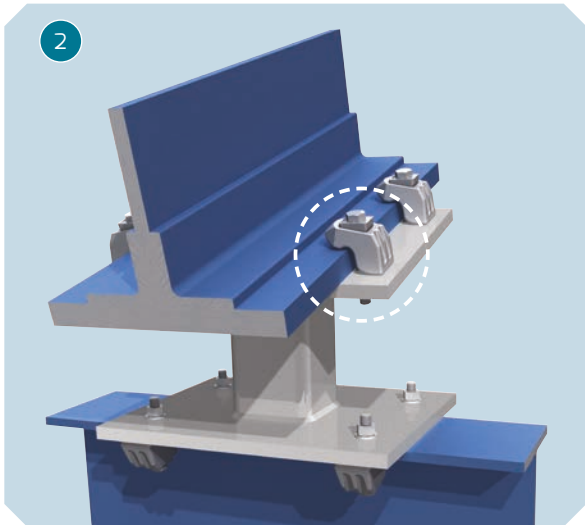
4) All torque figures provided are based on fasteners in an unlubricated condition. For further information contact Lindapter.

NB: Y, X and T will vary depending on the thickness of V.

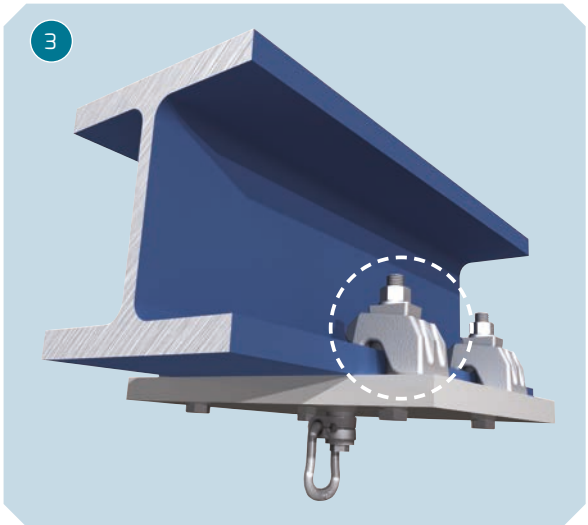
TYPICAL APPLICATIONS



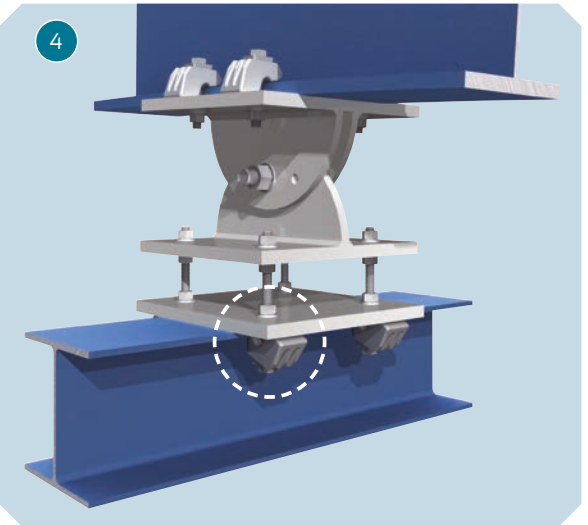
Anti-climbing system for pylons: The Type AAF adjusts to fit different thicknesses of steel and offers vertical adjustability.



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

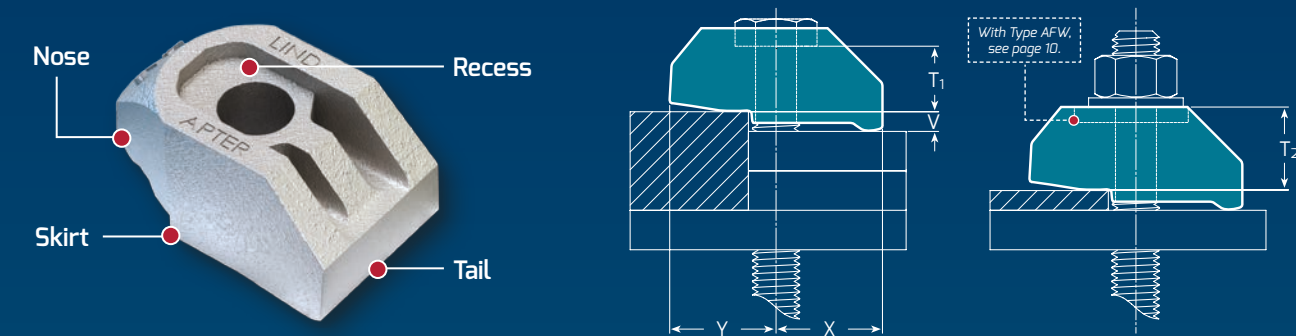


Type AF

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).

TECHNICAL DATA



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

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

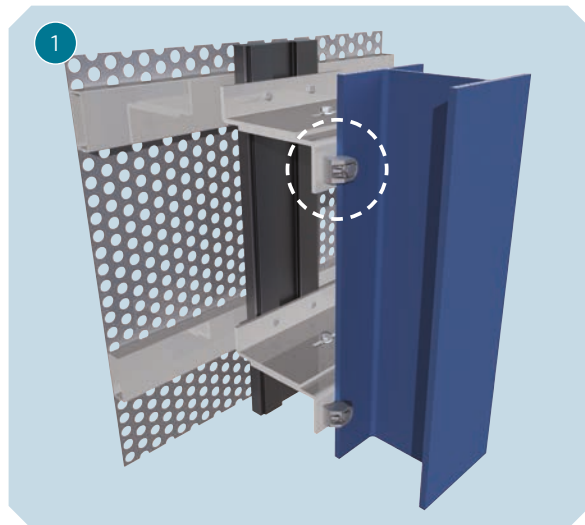
1) Slip Resistance figures are based on Type AF and Location Plates in hot dip galvanised finish calculated against slip (movement exceeding 0.1mm).

2) Shot blast and painted steelwork.

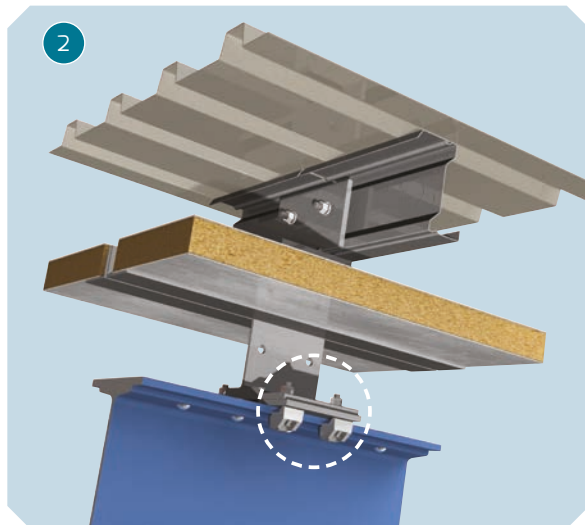
3) 3.2:1 Factor of Safety.

* All torque figures provided are based on fasteners in an unlubricated condition. For further information contact Lindapter.

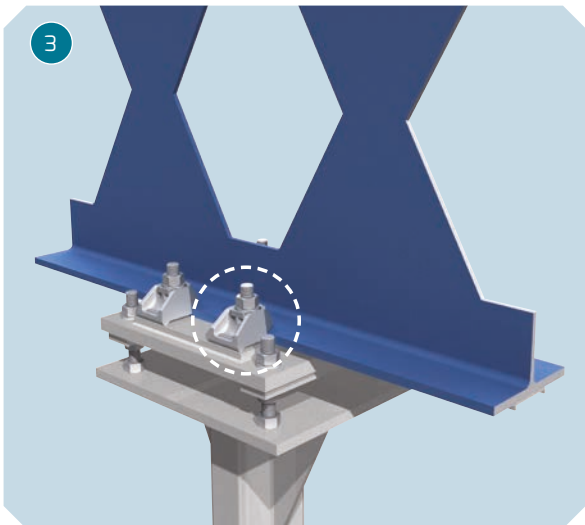
TYPICAL APPLICATIONS



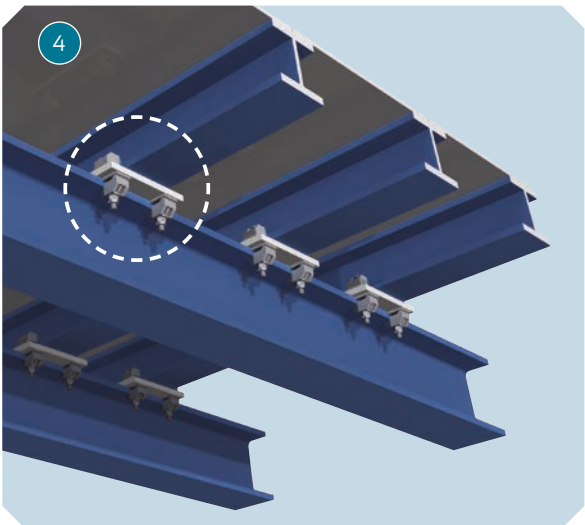
Cladding support system: Perforated steel cladding is connected to a vertical column providing vertical and lateral adjustment (Portello Project, Milan, Italy).



Roof supports: Type AF clamps secure the iconic curved roof at St Pancras Station, London, in a roof support assembly that attaches to the original riveted steel frame.



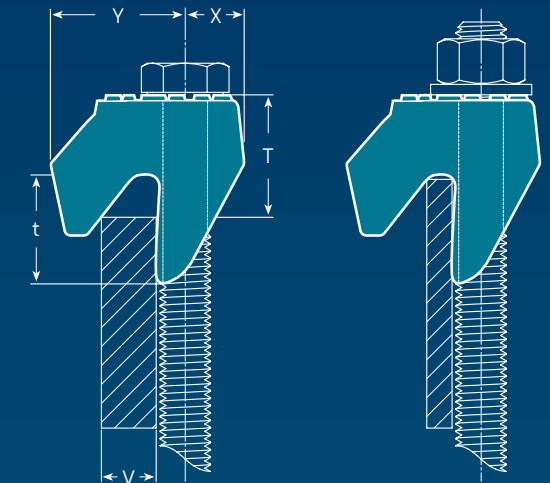
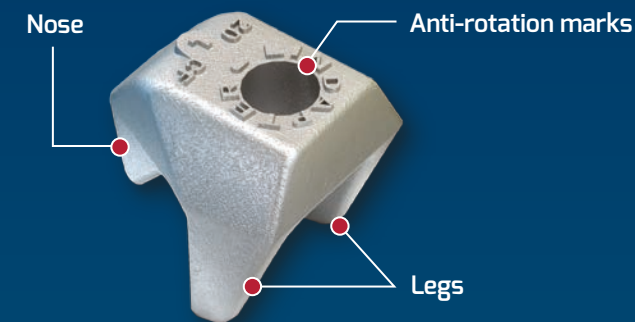
Conveyor supports: This M24 Type AF clamp assembly provided a high tensile load capacity of 250kN required for the conveyor supports at Gatwick Airport, UK.



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.
European Registered Design Numbers: 000654462-0001, 000654462-0002, 000654462-0003.

Product Code		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)			V	Y	X	T	t	Width
			Painted ²⁾ Steelwork	Galv. Steelwork		Clamping Range					
	Bolt Size (Property Class 8.8)	kN	kN	kN	Nm	mm	mm	mm	mm	mm	mm
CF12	M12	8.5	3.4	3.9	90	6 - 13	32	14	21 - 29	25	46
CF16	M16	16.0	8.0	10.0	240	8 - 16	44	18	25 - 33	32	56
CF20	M20	26.3	13.0	16.0	470	10 - 19	53	22	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.

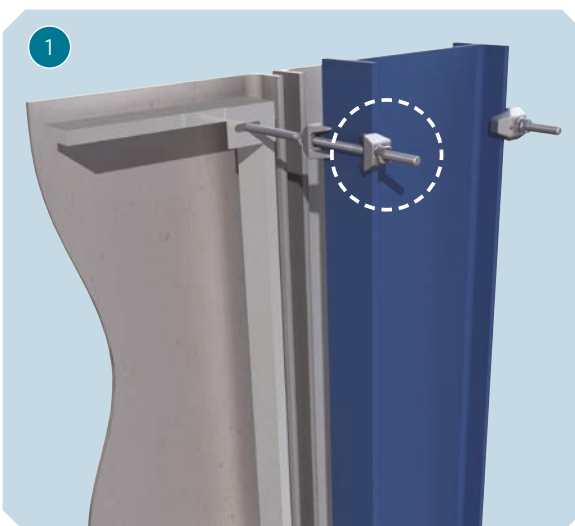
* All torque figures provided are based on fasteners in an unlubricated condition. For further information contact Lindapter.

Type CF

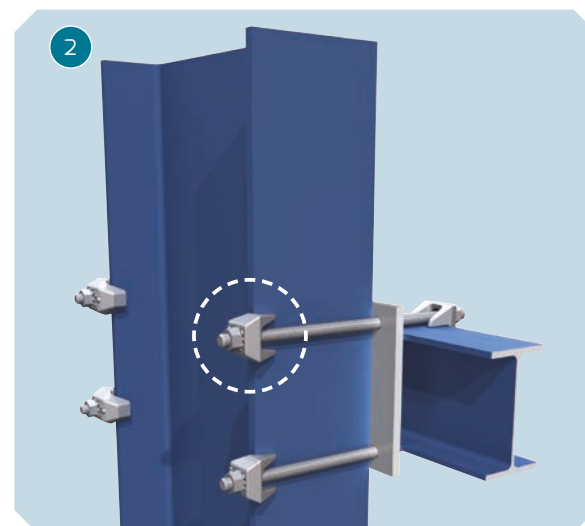
This clamp hooks over the flanges of beams, angles and channels to provide a connection solution in situations where the flanges of the connecting steel sections do not face each other, for example, connecting upright horizontal beams to vertical columns.

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).

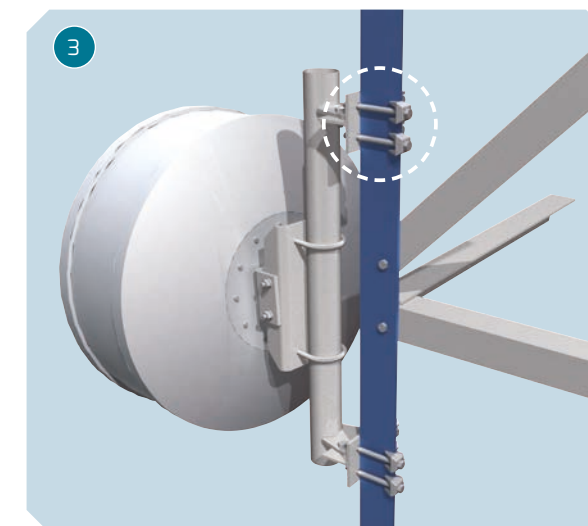
TYPICAL APPLICATIONS



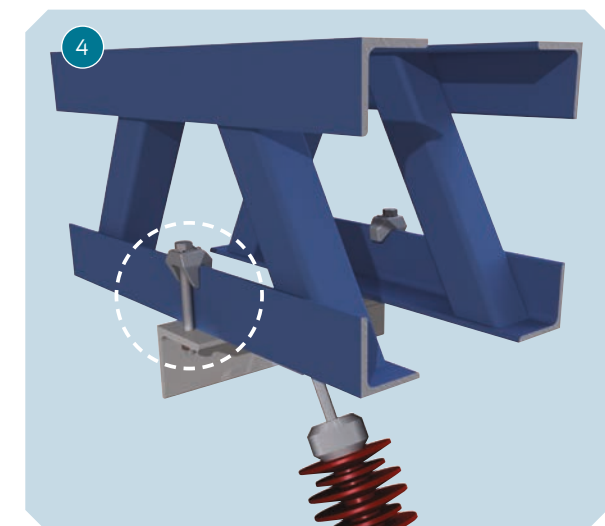
Cladding: The Type CF secures GRC panels to a vertical steel section, allowing both vertical and horizontal adjustment.



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.



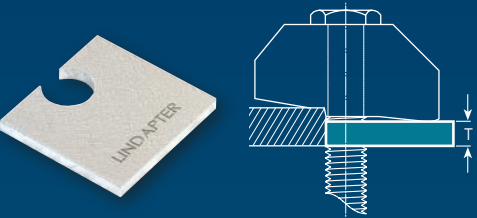
Overhead catenary support: Overhead line equipment is supported from a steel frame in a combined load application.

TYPICAL APPLICATIONS

Type AF Accessories

PACKING PIECES

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

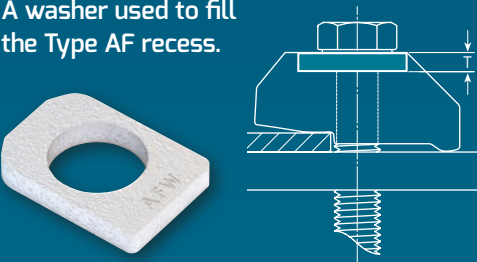


Product Code	Bolt	Dimensions T (mm)
AF12CW*	M12	2
AF12P1*	M12	5
AF12P2*	M12	10
AF16CW*	M16	2
AF16P1*	M16	5
AF16P2*	M16	10
AF20CW	M20	2
AF20P1	M20	5
AF20P2	M20	10
AF20P3**	M20	20
AF24P1	M24	5
AF24P2	M24	10

* Also compatible with Type AAF clamp.
** AAF20 only.

TYPE AFW

A washer used to fill the Type AF recess.



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	M12				M16				M20				M24			
	mm	AF	AFCW	AFPI	AFP2	AF	AFCW	AFPI	AFP2	AF	AFCW	AFPI	AFP2	AF	AFPI	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 & 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

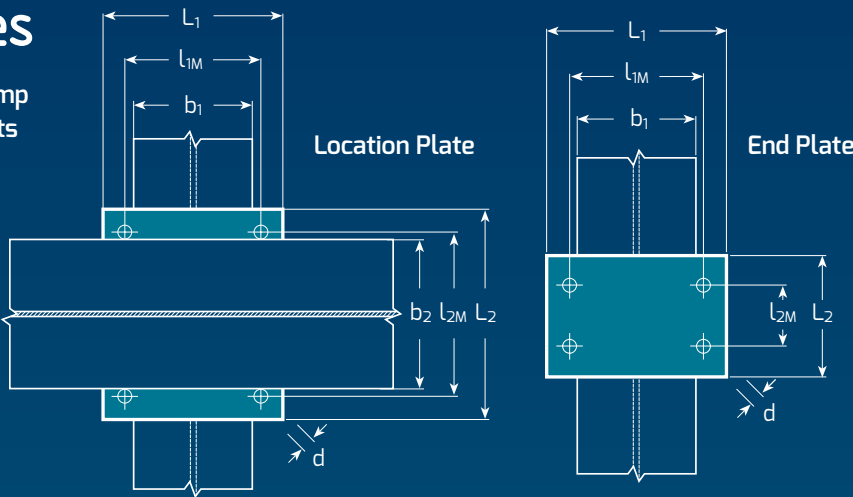


PLATE DIMENSIONS

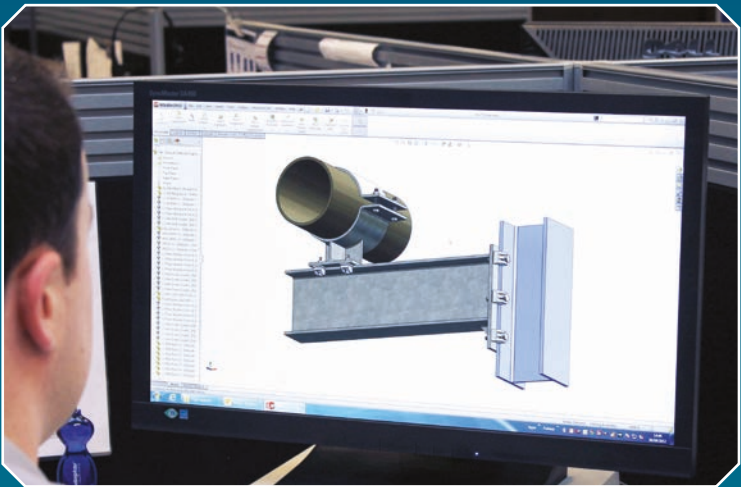
Material: Mild steel minimum grade S355 JR/J0/J2 to be specified by the Engineer to suit the application.

Bolt	Hole Ø	Location Plate						End Plate ¹⁾						
		Plate Thickness		Hole Centres l _{1M} , l _{2M} mm	Length / Width		Plate Thickness		Hole Centre l _{1M} mm	Length		Hole Centre min l _{2M} mm	Width min L ₂ mm	
		8.8 mm	10.9 mm		Type AF min L ₁ , min L ₂ mm	Type AAF min L ₁ , min L ₂ mm	8.8 mm	10.9 mm		Type AF min L ₁ mm	Type AAF min L ₁ mm			
M12	14	10	12	b + 14	b + 90	b + 90	15	20	b ₁ + 14	b + 90	b + 90	80	l _{2M} + 80	
M16	18	15	15	b + 18	b + 110	b + 110	20	25	b ₁ + 18	b + 110	b + 110	100	l _{2M} + 100	
M20	22	20	20	b + 22	b + 130	b + 150	25	25	b ₁ + 22	b + 130	b + 150	180	l _{2M} + 180	
M24	26	25	25	b + 26	b + 180	-	30	30	b ₁ + 26	b + 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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