ANOTHER WORLD'S FIRST by Lindapter®

Celebrating 85 years of innovation

ICC ES ESR-3976 Approved

ICC approved Girder Clamps for structural and seismic designs

Lindapter's Type AF / AAF Girder Clamp is the **world's first** and **only** approved structural steel clamping system that is compliant with the International Building Code.

- **ICC-ES (International Code Council) Evaluation Report ESR-3976**
- **Independently tested to Acceptance Criteria AC469**
- No drilling or welding in the field!
- Faster installation reduces labor costs
- For structural steel sections including W and S beams, channels, and angles
- High tensile and slip resistance capacities
- Free connection detailing service

This document contains extracts from evaluation report ESR-3976. Visit **www.LindapterUSA.com** to view the full report.

Lindapter® 866 566-2658 (BOLT) inquiries@LindapterUSA.com www.LindapterUSA.com

ICC-ES approved use

ICC-ES is North America's leading evaluation service for innovative building products, providing evidence that products meet the requirements of building codes and technical standards. Extracts from ESR-3976 are below:

> *The Type AF and AAF Girder Clamp assemblies are an alternative to high-strength bolt assemblies (consisting of high strength bolts, matching nuts and washers) prescribed in AISC 360. As illustrated, Girder Clamp assemblies are used in structural steel connections with either a location plate or an end plate.*

> *The Type AF and AAF Girder Clamp assemblies may be used to resist axial tension and slip due to load combinations that include wind load or seismic load for steel structures assigned to Seismic Design Categories A to C.*

Product Testing and Evaluation Process

Testing was carried out by an independent ISO 17025 accredited testing laboratory. ICC-ES thoroughly examined independent test reports, calculations, quality control methods and other factors.

After extensive analysis, ICC-ES has certified the Type AF and Type AAF Girder Clamp and is the **world's first** and **only** steel clamping system with the following:

- ✔ *High resistance to tensile loading in accordance with Acceptance Criteria (AC469).*
- ✔ *Compliance with the International Building Code.*
- ✔ *Compliance with the International Residential Code.*
- ✔ *Approved for use in Seismic Design Categories A, B and C.*

Reasons to use Lindapter Girder Clamps

Cost effective and time saving

High strength

Adjustable

Safer connections

Free connection detailing service

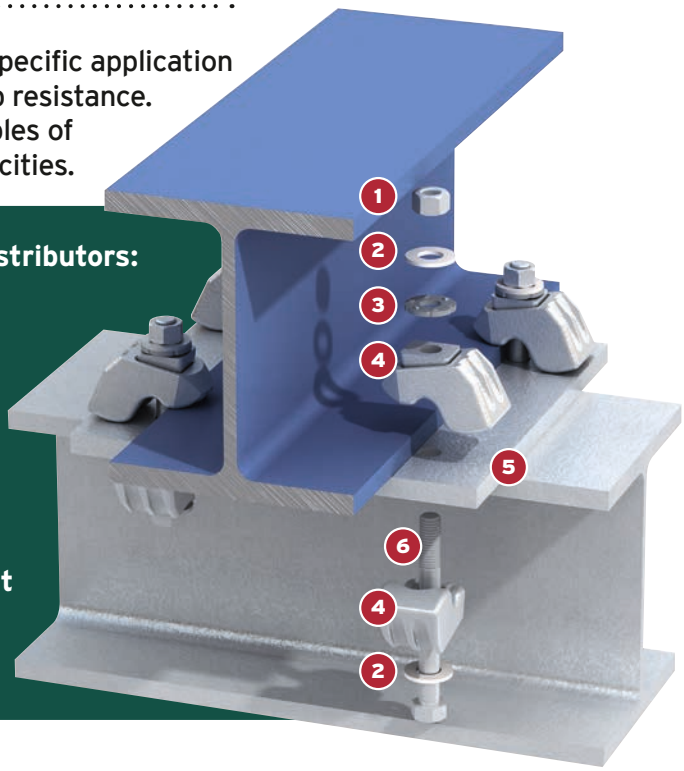
Typical Girder Clamp Components

Girder Clamp connection systems are configured to suit specific application requirements, for example high tensile loading or high slip resistance. A typical four-bolt configuration is shown, however multiples of two bolts with clamps can be added to increase load capacities.

All components supplied by Authorized Lindapter Distributors:

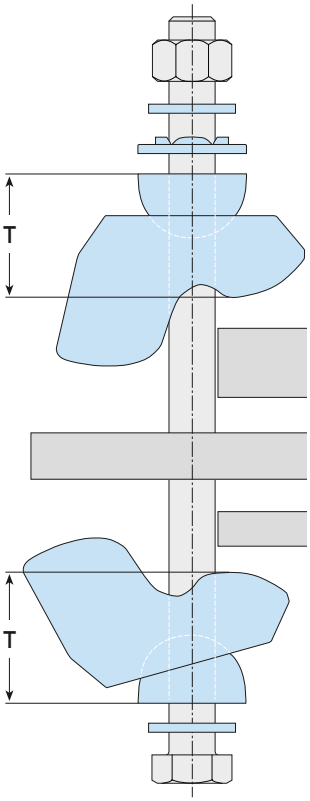
1) **Hexagon Nut** to A563 Grade DH.
2) **Standard Hardened Washer** to ASTM F436.
3) **DTI Washer** to ASTM F959.
4) **Lindapter Clamps** dependent on the application, Type AF or Type AAF can be used.
5) **Location Plate** enables all components to be located in the correct position.
6) **Standard ASTM F3125 A325 / A490 Hexagon Bolt**

Packing Pieces (if required) increase the clamping range to suit flange thickness (see page 6).

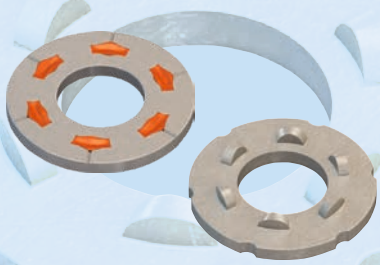


Bolt Length Calculator

To calculate the bolt length, simply add up all parts the bolt will go through and use the next standard bolt length. The example below is 1/2" Type AAF with A325 bolts to connect W12 x 26 below W14 x 61:



0.5" bolt Ø as bolt protrusion	1/4"
Height of nut (A563 Grade DH)	1/2"
Hardened Washer (ASTM F436)	1/8"
DTI Washer (ASTM F959)	1/8"
T of top clamp	1 3/8"
Top section (W14 x 61)	5/8"
Plate thickness	1/2"
Lower section (W12 x 26)	3/8"
T of lower clamp	1 3/8"
Hardened Washer (ASTM F436)	1/8"
Total length	5 3/8"
Next standard bolt length	5 1/2"



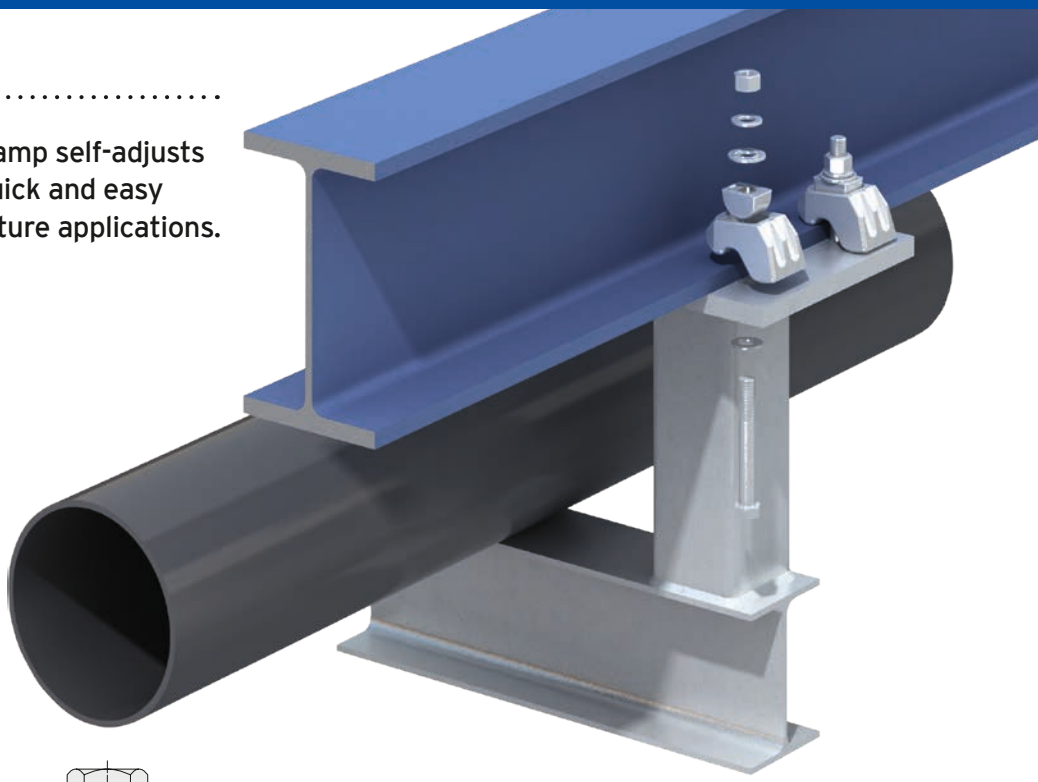
Using DTI Washers

Direct Tension Indicator (DTI) washers provide a visual indication that the correct preload has been achieved in the bolt.

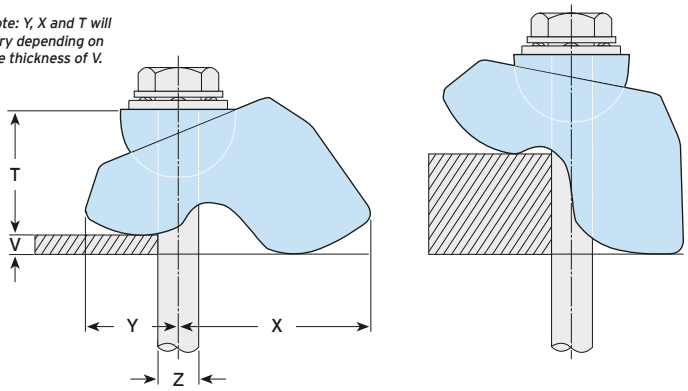
To comply with ICC-ES ESR-3976 DTI Washers to ASTM F959 must be used. For guidance please refer to ASTM F959 and DTI washer manufacturers' instructions.

Type AAF

Lindapter's latest patented Girder Clamp self-adjusts to various flange thicknesses for a quick and easy installation. Suitable for low temperature applications.



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



Type AAF at a glance...

- ✔ Sizes 1/2", 5/8" and 3/4"
- ✔ Adjustable and easy to install
- ✔ Low temperature tested (-76°F / -60°C)
- ✔ For W and S beams
- ✔ Hot dip galvanized as standard

Design Data

LRFD and ASD design strengths for the Type AAF (taken from ESR-3976) are to be used when designing a connection to AISC 360, AISC 341 and ASCE/SEI 7 as referenced in section 2205 of the IBC.

Material: Low temperature SG iron, hot dip galvanized.

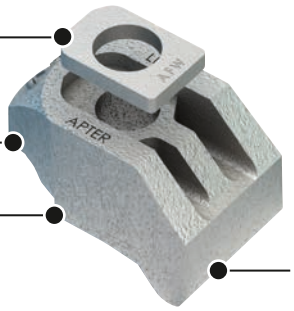
Part Number	Bolt Size	Bolt Grade	Clamping Range V	Y	X	T	Width	Allowable Loading (four bolt configuration) Static LRFD Method Tension lbs	Static LRFD Method Slip lbs	Static ASD Method Tension lbs	Static ASD Method Slip lbs	Seismic Design Category A, B and C LRFD Method Tension lbs	Seismic Design Category A, B and C LRFD Method Slip lbs	Seismic Design Category A, B and C ASD Method Tension lbs	Seismic Design Category A, B and C ASD Method Slip lbs
LAAF050	1/2"	A325	3/16" - 1"	1" - 15/16"	1 1/16" - 1 15/16"	1 1/32" - 1 3/8"	1 5/8"	24054	2698	15017	1686	19513	2698	12207	1686
LAAF062	5/8"	A325	1/4"- 1 3/16"	1 5/16" - 2"	1 1/4" - 2 5/16"	1 3/8" - 1 13/16"	2 3/16"	36419	5395	22773	3485	30169	5395	18884	3485
LAAF075	3/4"	A325	1/4"- 1 9/16"	1 7/8" - 3 1/16"	1 15/16" - 2 1/2"	2 1/16" - 2 1/2"	3"	61215	8138	38262	5081	44625	8138	27921	5081
LAAF050	1/2"	A490	3/16" - 1"	1" - 15/16"	1 1/16" - 1 15/16"	1 1/32" - 1 3/8"	1 5/8"	30394	4766	19019	2967	23020	4766	14410	2967
LAAF062	5/8"	A490	1/4"- 1 3/16"	1 5/16" - 2"	1 1/4" - 2 5/16"	1 3/8" - 1 13/16"	2 3/16"	39746	6304	24841	3934	37183	6304	23268	3934
LAAF075	3/4"	A490	1/4" - 1 9/16"	1 7/8" - 3 1/16"	1 15/16" - 2 1/2"	2 1/16" - 2 1/2"	3"	67420	13264	42129	8295	52605	13264	32935	8295

- For LRFD or ASD connections only.
- For hot dip galvanized or plain steel sections, if using painted steel the coating must be removed at the point of contact to comply with ICC-ES ESR-3976.
- Packing pieces are available to increase the clamping range, see page 6. Location plate and end plate details can be found on page 7.

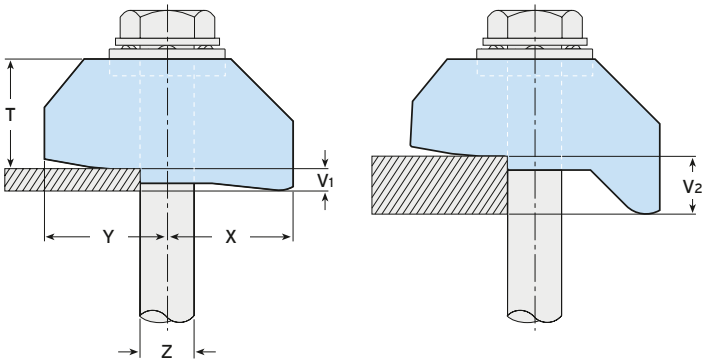
Type AF

The world's strongest ICC-ES approved Girder Clamp offers the highest allowable loading. Like all Lindapter clamps, Type AF can be configured with more than four bolts to further increase load capacities.

Type AF with Type AFW washer (required)



HIGH SLIP RESISTANCE



Type AF at a glance...

- ✔ Sizes 1/2", 5/8", 3/4" and 1"
- ✔ Available in size 1" for the highest resistance to tension and slip
- ✔ For W and S beams
- ✔ Hot dip galvanized as standard

Design Data

LRFD and ASD design strengths for the Type AF (taken from ESR-3976) are to be used when designing a connection to AISC 360, AISC 341 and ASCE/SEI 7 as referenced in section 2205 of the IBC.

Material: SG iron, hot dip galvanized.

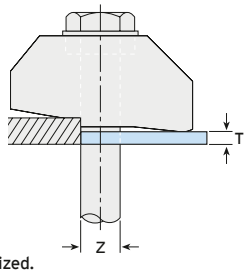
Part Number	Bolt Size	Bolt Grade	Tail Length Short V_1	Tail Length Medium V_2	Y	X	T	Width	Allowable Loading (four bolt configuration) Static LRFD Method Tension lbs	Static LRFD Method Slip lbs	Static ASD Method Tension lbs	Static ASD Method Slip lbs	Seismic Design Category A, B and C LRFD Method Tension lbs	Seismic Design Category A, B and C LRFD Method Slip lbs	Seismic Design Category A, B and C ASD Method Tension lbs	Seismic Design Category A, B and C ASD Method Slip lbs
LAF050	1/2"	A325	3/16"	1/2"	1 1/8"	1 1/16"	7/8"	1 9/16"	24054	2698	15017	1686	19513	2698	12207	1686
LAF062	5/8"	A325	5/16"	9/16"	1 3/8"	1 1/2"	1 1/16"	1 15/16"	36419	5395	22773	3485	30169	5395	18884	3485
LAF075	3/4"	A325	3/8"	11/16"	1 9/16"	1 9/16"	1 1/4"	2 3/16"	61215	8138	38262	5081	44625	8138	27921	5081
LAF100	1"	A325	9/16"	1 1/8"	1 7/8"	2 3/8"	1 5/8"	3 1/4"	103272	12747	64545	7958	86709	12747	54269	7958
LAF050	1/2"	A490	3/16"	1/2"	1 1/8"	1 1/16"	7/8"	1 9/16"	30394	4766	19019	2967	23020	4766	14410	2967
LAF062	5/8"	A490	5/16"	9/16"	1 3/8"	1 1/2"	1 1/16"	1 15/16"	39746	6304	24841	3934	37183	6304	23268	3934
LAF075	3/4"	A490	3/8"	11/16"	1 9/16"	1 9/16"	1 1/4"	2 3/16"	67420	13264	42129	8295	52605	13264	32935	8295
LAF100	1"	A490	9/16"	1 1/8"	1 7/8"	2 3/8"	1 5/8"	3 1/4"	137049	18116	85655	11322	118924	18116	74434	11322

- For LRFD or ASD connections only.
- For hot dip galvanized or plain steel sections, if using painted steel the coating must be removed at the point of contact to comply with ICC-ES ESR-3976.
- Packing pieces are available to increase the clamping range, see page 6. Location plate and end plate details can be found on page 7.

Packing Pieces for Types AF and AAF

Packing pieces are used to suit a range of flange thicknesses. Type AF is available with two different tail lengths (short and medium) and the correct combination of packing pieces should be used, see the table at the bottom of the page.

Type AFCW



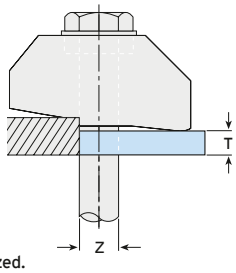
Mild steel, hot dip galvanized.

Product Code	Bolt Size Z	Dimension T
LAF050CW*	1/2"	1/16"
LAF062CW*	5/8"	1/16"
LAF075CW	3/4"	1/16"

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

Note: Type AFCW has a slight bend along its center line which flattens out during installation.

Type AFP1 / AFP2 / AAFP3

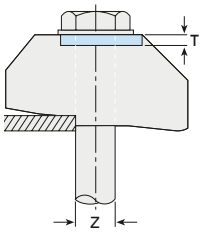


Mild steel, hot dip galvanized.

Product Code	Bolt Size Z	Dimension T
LAF050P1*	1/2"	3/16"
LAF062P1*	5/8"	3/16"
LAF075P1	3/4"	3/16"
LAF100P1	1"	3/16"
LAF050P2*	1/2"	3/8"
LAF062P2*	5/8"	3/8"
LAF075P2	3/4"	3/8"
LAF100P2	1"	3/8"
LAAF075P3*	3/4"	13/16"

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

Type AFW



SG iron, mild steel, hot dip galvanized.

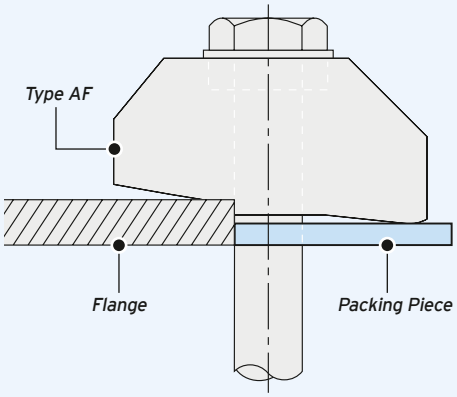
Product Code	Bolt Size Z	Dimension T
LAF050W	1/2"	3/16"
LAF062W	5/8"	3/16"
LAF075W	3/4"	1/4"
LAF100W	1"	3/8"

Note: Type AFW converts the recess to a flat top and is required for A325 and A490 structural bolts.

Tail Length and Packing Piece Combinations for Type AF

Choose the correct combination for your configuration using this table. Note these calculations are for parallel flanges and beams up to 10° slopes only.

For example, a 3/4" Type AF on a 1 9/16" flange requires 1 x Type AF medium tail (M), 1 x Type AFCW and 2 x Type AFP2.



Flange Thickness	Clamp Size 1/2" AF	1/2" AFCW	1/2" AFP1	1/2" AFP2	5/8" AF	5/8" AFCW	5/8" AFP1	5/8" AFP2	3/4" AF	3/4" AFCW	3/4" AFP1	3/4" AFP2	1" AF	1" AFCW	1" AFP1	1" AFP2
3/16"	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/4"	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/16"	S	1	-	-	S	-	-	-	-	-	-	-	-	-	-	-
3/8"	S	-	1	-	S	1	-	-	S	-	-	-	-	-	-	-
7/16"	S	-	1	-	S	1	-	-	S	-	-	-	-	-	-	-
1/2"	M	-	-	-	S	-	1	-	S	1	-	-	S	-	-	-
9/16"	M	1	-	-	M	-	-	-	S	2	-	-	S	-	-	-
5/8"	S	-	-	1	M	-	-	-	S	-	1	-	S	-	-	-
11/16"	M	-	1	-	M	1	-	-	M	-	-	-	S	-	-	-
3/4"	S	2	-	1	M	2	-	-	M	-	-	-	S	-	1	-
13/16"	S	-	1	1	M	-	1	-	S	-	-	1	S	-	1	-
7/8"	M	-	-	1	M	1	1	-	M	2	-	-	S	-	1	-
15/16"	M	1	-	1	M	2	1	-	M	-	1	-	S	-	-	1
1"	S	-	-	2	M	-	-	1	M	1	1	-	S	-	-	1
1 1/16"	S	1	-	2	M	1	-	1	M	2	1	-	S	-	-	1
1 1/8"	M	3	-	1	S	-	-	2	M	-	-	1	S	-	-	1
1 3/16"	S	-	1	2	M	-	1	1	M	1	-	1	M	-	-	-
1 1/4"	S	1	1	2	M	1	1	1	M	2	-	1	M	-	-	-
1 5/16"	M	-	-	2	S	-	1	2	M	-	1	1	M	-	-	-
1 3/8"	S	-	-	3	M	-	-	2	M	1	1	1	M	-	1	-
1 7/16"	M	2	-	2	M	1	-	2	M	2	1	1	M	-	1	-
1 1/2"	M	-	1	2	S	-	-	3	M	-	-	2	M	-	-	1
1 9/16"	M	1	1	2	M	-	1	2	M	1	-	2	M	-	-	1
1 5/8"	M	2	1	2	M	1	1	2	M	1	-	2	M	-	-	1
1 11/16"	M	-	-	3	S	-	1	3	M	-	1	2	M	-	1	1
1 3/4"	M	1	-	3	M	2	1	2	M	1	1	2	M	-	1	1
1 13/16"	S	3	1	3	S	4	-	3	S	3	-	3	M	-	1	1
1 7/8"	S	1	-	4	M	1	-	3	M	-	-	3	M	-	1	1
1 15/16"	M	1	1	3	M	2	-	3	S	2	1	3	M	-	-	2
2"	S	-	1	4	M	3	-	3	S	3	1	3	M	-	-	2

For thicker flanges please contact Lindapter.

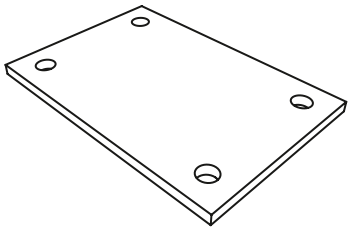
S = Type AF short tail | **M** = Type AF medium tail

Location and End Plates for Types AF and AAF

These plates ensure the clamps and bolts are located in the correct position relative to the supporting steel. If you would like help choosing a suitable plate, please contact Lindapter.

Location Plate

What is it?
Location plates are simple fabricated items designed to sit between the two sections to be clamped together to ensure the bolts are fixed at the correct centers.



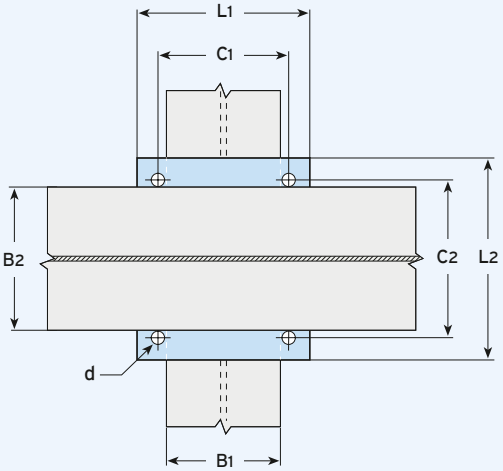
Material: Structural steel A572 Grade 50. For other grades contact Lindapter.

Bolt Size	Hole Ø	Plate Thickness		Hole Centers	Length / Width	Hole Centers	Length / Width
	d	A325	A490	C1	min L1	C2	min L2
1/2"	9/16"	1/2"	1/2"	B1 + 9/16"	B1 + 4"	B2 + 9/16"	B2 + 4"
5/8"	11/16"	5/8"	5/8"	B1 + 11/16"	B1 + 4"	B2 + 11/16"	B2 + 4"
3/4"	13/16"	3/4"	3/4"	B1 + 13/16"	B1 + 6"*	B2 + 13/16"	B2 + 6"*
1"	1 1/16"	1 1/8"	1 1/8"	B1 + 1 1/8"	B1 + 7"	B2 + 1 1/8"	B2 + 7"

*** Plate width for Type AF size 3/4" can be reduced to 5" if required.**

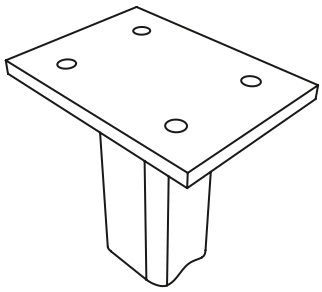
LOCATION PLATE DIMENSIONS

L1 = Location Plate Length, **L2** = Location Plate Width, **B1, B2** = Flange Width, **C1, C2** = Hole Centers, **d** = Hole Ø



End Plate

What is it?
End plates are simple fabricated items that are pre-welded to support frames, bracket or sections, allowing connection to the supporting structure with standard Lindapter clamps.



Material: Structural steel A572 Grade 50.
For other grades contact Lindapter.

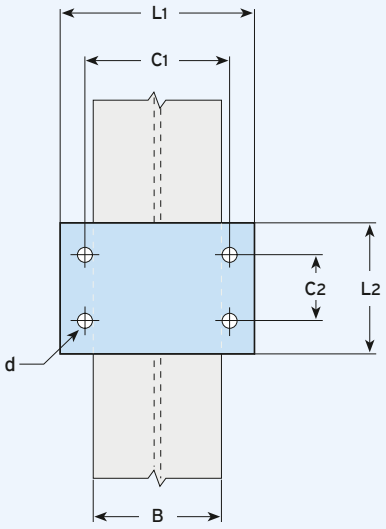
Bolt Size	Hole Ø	Plate Thickness[1)]		Hole Centers	Length	Hole Centers	Width
	d	A325	A490	C1	min L1	C2	min L2
1/2"	9/16"	5/8"	5/8"	B + 9/16"	B + 4"	3 1/8"	C2 + 3 1/8"
5/8"	11/16"	3/4"	1"	B + 11/16"	B + 4"	4"	C2 + 4"
3/4"	13/16"	1"	1"	B + 13/16"	B + 6"*	7"	C2 + 7"
1"	1 1/16"	1 1/4"	1 1/4"	B + 1 1/8"	B + 7"	7 7/8"	C2 + 7 7/8"

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

*** Plate width for Type AF size 3/4" can be reduced to 5" if required.**

END PLATE DIMENSIONS

L1 = End Plate Length, **L2** = End Plate Width, **B** = Flange Width, **C1, C2** = Hole Centers, **d** = Hole Ø



Use Lindapter's Bolt Length Calculator on **page 3** to calculate the correct bolt length for your application.

Other Leading Approvals

CE Mark provides additional assurance for engineers, specifiers and contractors because it demonstrates that Lindapter's products are independently tested and approved to multiple international standards.

bsi. ISO 9001 Quality Management
Q 05143

bsi. ISO 14001 Environmental Management
EMS 546660

ISO is the International Organization for Standardization of safety, quality and environmental protection. ISO 9001 and ISO 14001 certifications verify that Lindapter's products are produced under strict quality and environment management systems to ensure consistently high manufacturing standards.

Project Example American Copper Buildings, New York City, NY

Girder Clamps secure the steel façade frame to the structural beams on the three-story skybridge suspended 300ft high. Lindapter's Type AAF clamp self-adjusts to suit different flange thicknesses and its lateral adjustability allows contractors to quickly position, align and secure steel sections.