

February 2024



# lindapter®



Technical Innovation in Steel Connections

## Welcome

For over 90 years Lindapter has earned a respected reputation as the pioneer in the design and manufacture of steel clamping systems, growing from a modest family business into a reputable global brand by providing a faster, cost-effective alternative to drilling or welding.

## History



Lindapter's proud heritage began in 1934 when Engineer Henry Lindsay (above) invented an entirely new concept of connecting steel with the Lindsay Bolt Adapter, a solution that allowed steel beams to be quickly clamped together, instead of time-consuming drilling or welding.

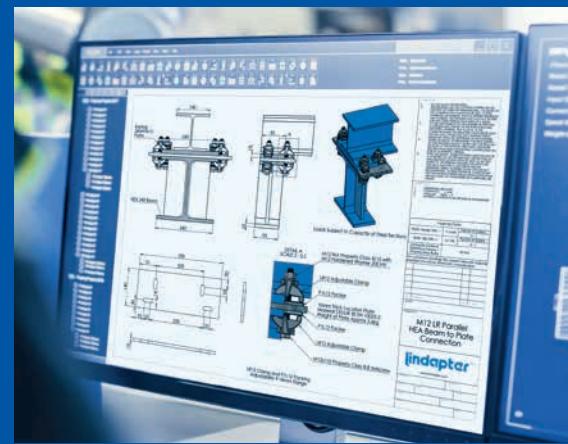
Henry combined the words 'Lindsay' and 'Adapter' to create the trusted brand name. Today Lindapter remains true to its roots, by continuing to invent and manufacture high quality, safe products that save steel contractors time and money.

Lindapter's unique connections can be installed with standard hand tools and allow faster construction, reduce labor costs and allow on-site adjustability with no damage to steel sections.

PAGES  
4 - 5

## Here to help you

Lindapter's team of experienced Engineers offer unrivalled support which includes free connection detailing and custom product development, from initial design through to installation guidance.



## Girder Clamps

PAGES  
6 - 35

High strength connections for steel beams, channels or angles. Type AF and AAF clamps have been evaluated by ICC-ES for structural connections in all Seismic Design Categories (A to F).



## Lifting Points

PAGES  
36 - 39

These assemblies support the lifting or rigging of general equipment. Can be used for single lift situations or permanent applications such as theater, lighting and rigging units.



- ▶ Load values and typical Factors of Safety (FOS) shown in this catalog are for Lindapter products only and are subject to the strength of the supporting section. Tightening torques stated are for unlubricated fasteners.



## Connections for a range of industries...



Building



Energy



Bridges



Infrastructure



Telecom

PAGES  
40 - 59

Expansion bolts for quickly connecting steel sections to Hollow Structural Section (HSS) from one side. All Hollo-Bolts have been evaluated by ICC-ES for all Seismic Design Categories (A to F).



## Pipe / Conduit Supports

PAGES  
64 - 69

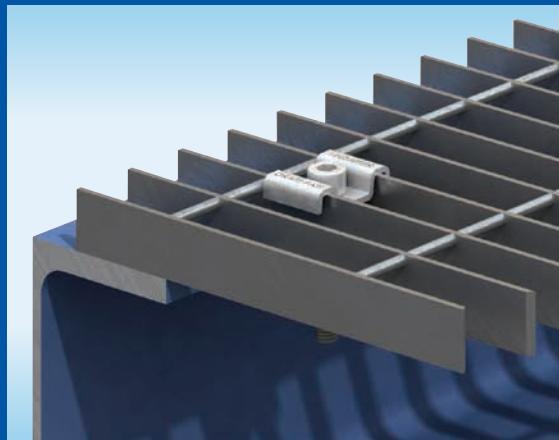
Easy-to-install solutions for suspending building services from structural or secondary beams. The adjustability of these products allows pipework and other equipment to be quickly positioned.



## Steel Floor Connections

PAGES  
60 - 63

A range of innovative products for connecting steel flooring to the supporting steel without the need for on-site drilling or welding. Installation can be carried out quickly and safely from above.



## Case Studies

PAGES  
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Read how Lindapter's proven connection solutions have been used in prestigious construction projects such as the Tobin Bridge in Boston and the Wilshire Grand Center in Los Angeles.

PAGES  
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## Frequently Asked Questions

PAGES  
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## Structural Sections

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## Approvals

## We are here to help

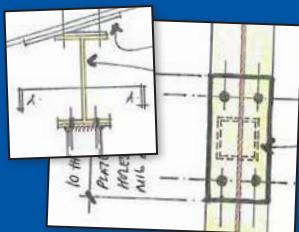
Lindapter's team of experienced Engineers offer an unrivalled support service, including free connection detail and custom product development. Lindapter's philosophy is to deliver the highest level of service from initial detail through to installation guidance.

## Free connection detailing

Lindapter can design a custom connection based on your specific requirements free of charge in three easy steps. Based on your connection requirements, our Technical Support Engineers will supply customized CAD drawings and BIM compatible files to complement your structural designs.

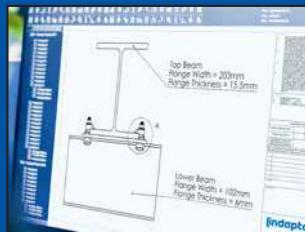
### Step 1

Email your requirement to [support@Lindapter.com](mailto:support@Lindapter.com)



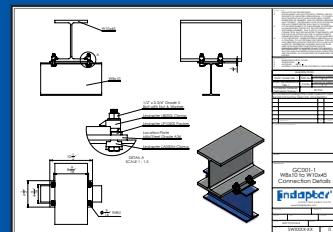
### Step 2

Our experienced Engineers will design your custom solution



### Step 3

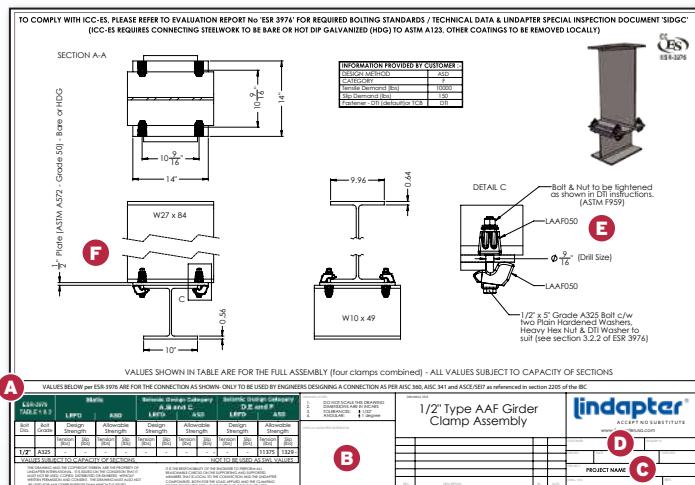
An Engineer will send a detailed connection drawing (see below)



## What we require...

If you would like Lindapter to design your custom connection, please make sure to have the following:

1. Member sizes to be used or flange width and thickness
2. Loads to be resisted (eg. 2,000lbs tension and 3,000lbs slip)
3. General arrangement sketch / verbal description
4. Project Name / Title / Location (optional)

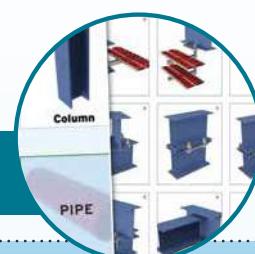


## The Design Sheet

Each submittal includes:

- A** Assembly Data (Design Strength and Allowable Strength or Safe Working Loads)
- B** Lindapter distributor purchasing information
- C** Customized project name or detail
- D** Your company name
- E** Lindapter product requirements
- F** Additional dimensions for precise fabrication

Alternatively, try our **NEW** online Application Selector and browse popular connection assemblies to find your perfect solution



## Additional technical support services available to you

We offer comprehensive design and support, tailoring our products to your application. Our team of qualified Structural and Mechanical Engineers are on hand to work with you to deliver the highest level of service from initial concept designs through to completion.

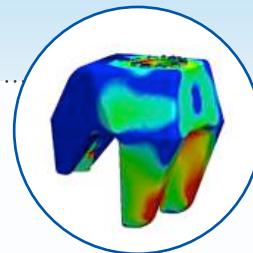
### Engineered Solutions

Lindapter's Research & Development facility and unique expertise facilitates a custom product development service, passionately referred to as 'Engineered Solutions'. Supported by the latest technology including 3D modelling, 3D printing, FEA and three test machines with a capacity of 5 to 24 tons, Lindapter's Engineers can develop solutions that satisfy your connection demands.

#### Key R&D Capabilities

- ✓ Creating initial concepts and 3D models, performing FEA stress analysis to validate designs
- ✓ 3D printed samples help verify the design before prototypes are made and tested
- ✓ In-house test facility with three machines with a capacity of 5 to 24 tons for static, tensile, compression, shear and slip tests
- ✓ The team ensure products meet or exceed industry standards

Contact Lindapter to design a solution for your connection requirement. Email [support@Lindapter.com](mailto:support@Lindapter.com) or call **866-566-2658 (BOLT)** for more details.



### Lunch and Learn

We are pleased to offer Lunch and Learn presentations either in person or online and run regular live webinars. These presentations look at the unique solutions, offered by Lindapter, for connecting steel faster and more cost-effectively compared to alternative traditional methods of welding or drilling or bolting.



#### Who should attend?

Structural Engineers, Consulting Engineers and Specifiers involved with the design of steel-to-steel connections.

#### How do I book?

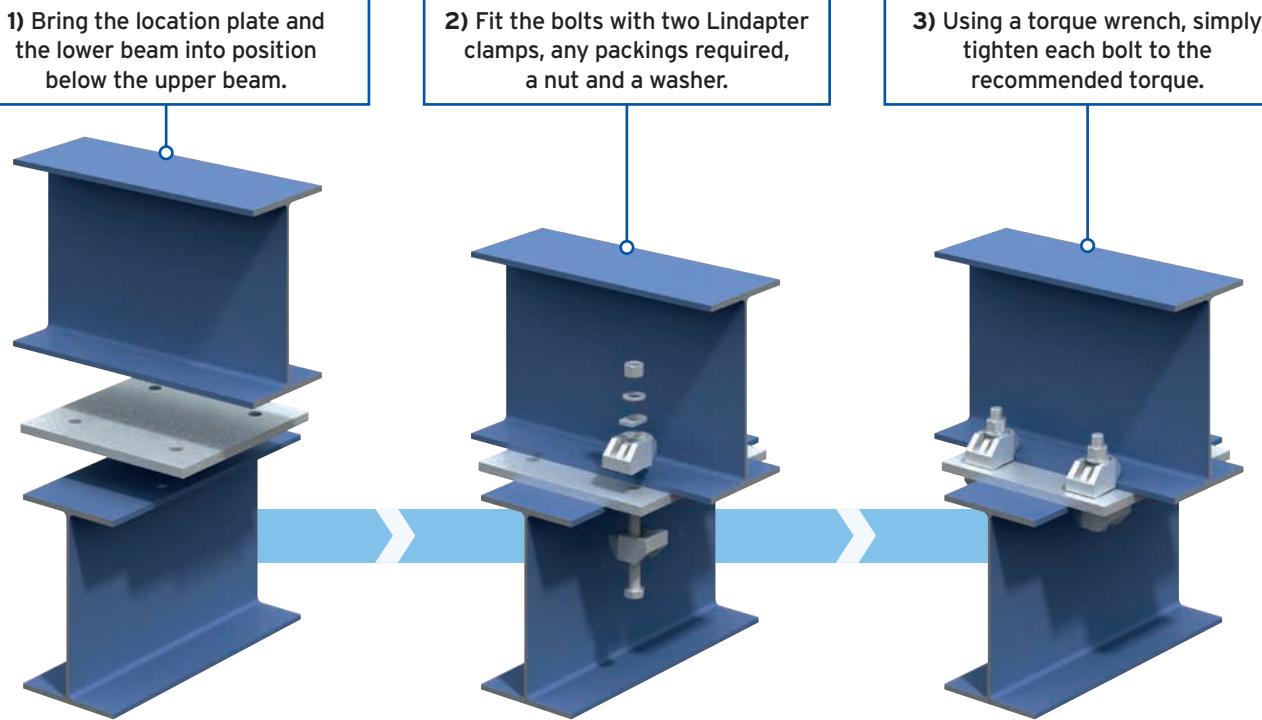
Please complete the Lunch and Learn form on the Lindapter website. Once we receive your request we will contact you to confirm the date and time. Webinars can be booked via our website Live Webinar Schedule news page.



## Girder Clamp - The Connection Concept

Lindapter products provide a faster, cost-effective alternative to drilling or welding in the field and are designed to reduce installation time and labor costs. A high strength, permanent (or temporary) connection is quickly achieved by clamping two steel sections together.

### Quick and easy to install



### REASONS TO USE...



#### Save time and money

Clamping two steel sections together avoids time-consuming welding or conventional drilling and bolting.



#### High strength

Lindapter clamps are manufactured from high strength materials to resist high load requirements and harsh environments.



#### Adjustable

Quickly align steel sections by sliding the section into the correct position before tightening the Girder Clamp to complete the installation.



#### Safer connections

Drilling and welding in the field is avoided, removing the need for hot work permits and encouraging safer site conditions.



#### Industry leading approvals

Lindapter has earned a reputation synonymous with safety and reliability, gaining multiple independent approvals. Further details can be found on [page 86](#).



#### Free connection detailing

Lindapter's experienced Engineers can detail a custom connection based on your specific requirements free of charge. See [page 4](#) for more details.

Turn to [page 8](#) to see the components of a Girder Clamp in more detail.



Watch how to install Girder Clamps at [www.Lindapter.com](http://www.Lindapter.com)



## Typical Configurations

The Girder Clamp represents a range of Lindapter products that are compatible with virtually any shape or size of steel section and can withstand loading conditions in a wide variety of applications, for example:

STANDARD

### Beam-to-beam (tensile loading)

The original configuration is designed to secure steel sections and resist tensile loading. It features a pre-drilled location plate that is placed between the beams to locate the four bolts. Each bolt has two Lindapter components to clamp the flange immediately above and below the plate. For larger beams with increased flange thicknesses, packing pieces may be required to raise the height of the clamp to ensure the component is positioned correctly on the beam.

See the components of a Girder Clamp in more detail on **page 8**.



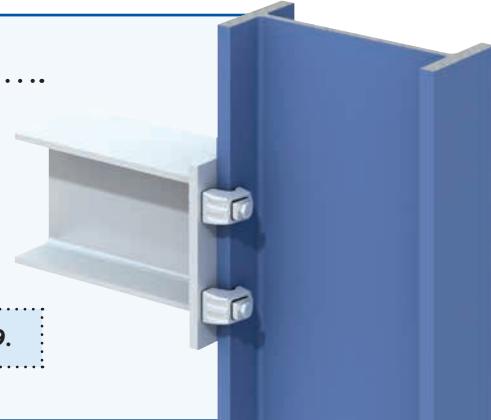
HIGH SLIP RESISTANCE

### Beam-to-column (slip resistance)

This configuration utilizes a High Slip Resistance (HSR) clamp to achieve a secure connection to vertical columns.

An end plate is pre-fabricated to the section that will be joined to the column. The purpose of this plate is to locate the bolts and provide a fastening position for the Lindapter clamps.

Lindapter's range of HSR clamps can be found on **pages 10 - 19**.



ADJUSTABLE

### Inclined beam-to-beam (combined loading)

A fabricated assembly, optimized with Lindapter's adjustable High Slip Resistance clamps to resist both tensile loading and slip.

This solution is adjustable, allowing for a connection to a wide range of flange thicknesses for added convenience. Lindapter can detail and supply the entire assembly to suit individual applications.

Read more about free connection detailing on **page 4**.



Lindapter has a solution for connecting almost any type of steel section including W beams, S beams, channels, angles and more. See **pages 31 - 35** for examples.



## Girder Clamp Configuration

A Girder Clamp is a connection system configured with components to suit specific application requirements, for example high tensile loading or high corrosion resistance. Take advantage of our free connection detailing to find the best solution for your connection requirement.

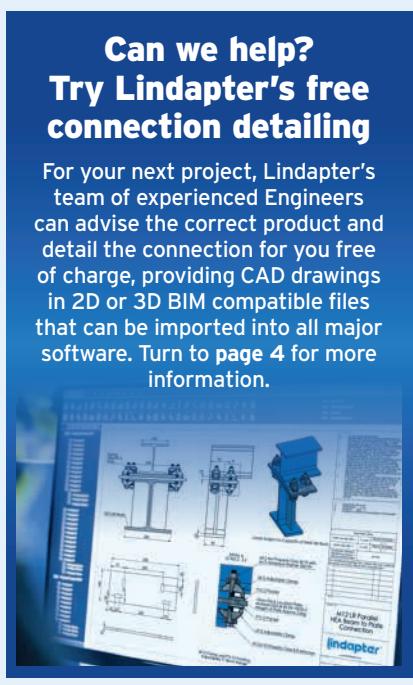
### Typical Girder Clamp Components



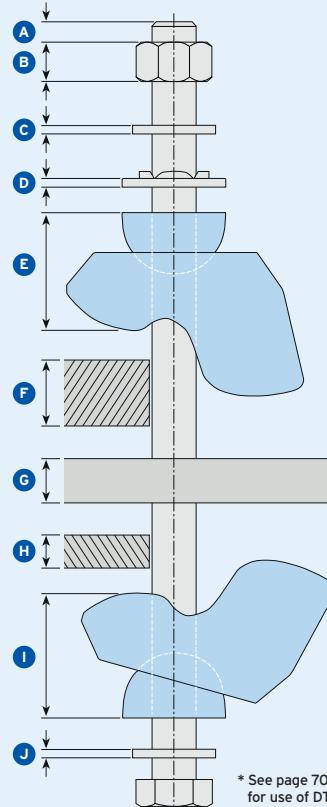
► This example is for illustration purposes only. Contact Lindapter to determine the optimum configuration for your connection requirement.

### Bolt Length Calculator

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



|  |               |
|--|---------------|
| <b>A</b> Bolt protrusion = 0.5 x bolt Ø    | <b>1/4"</b>   |
| <b>B</b> Height of nut                     | <b>1/2"</b>   |
| <b>C</b> Hardened Washer                   | <b>1/8"</b>   |
| <b>D</b> DTI Washer (if applicable)*       | <b>1/8"</b>   |
| <b>E</b> T of top clamp                    | <b>1 3/8"</b> |
| <b>F</b> Flange thickness of top section   | <b>5/8"</b>   |
| <b>G</b> Plate thickness                   | <b>1/2"</b>   |
| <b>H</b> Flange thickness of lower section | <b>3/8"</b>   |
| <b>I</b> T of lower clamp                  | <b>1 3/8"</b> |
| <b>J</b> Hardened Washer                   | <b>1/8"</b>   |
| <b>Total length</b>                        | <b>5 3/8"</b> |
| <b>Next standard bolt length</b>           | <b>5 1/2"</b> |



## Product Configuration

The table below shows the various components that can be assembled in a Girder Clamp arrangement. Each product has specific properties, for example the Type AF heavy duty clamp can resist tensile loads up to 56,200lbs when used with four bolts (A490) in a Girder Clamp assembly.

### Single Components

| Product                    | Parallel Flanges  | Tapered Flanges | Tensile    | High Slip Resistance | Slotted Clearance Holes | Adjustable | Stainless Steel | Evaluated for Fatigue | ICC-ES Approved  |
|----------------------------|---|-----------------|------------|----------------------|-------------------------|------------|-----------------|-----------------------|------------------|
| <b>Type AAF</b><br>page 10 |    | ✓               | ✓<br>≤ 10° | ✓                    | ✓                       | ✓          | -               | ✓                     | ✓<br>pages 14-15 |
| <b>Type AF</b><br>page 11  |    | ✓               | ✓<br>≤ 10° | ✓                    | ✓                       | ✓          | -               | ✓                     | ✓<br>pages 16-17 |
| <b>Type CF</b><br>page 12  |    | ✓               | ✓<br>≤ 10° | ✓                    | ✓                       | -          | ✓               | -                     | -                |
| <b>Type LR</b><br>page 20  |    | ✓               | ✓<br>≤ 15° | ✓                    | -                       | ✓          | ✓               | -                     | -                |
| <b>Type A</b><br>page 22   |   | ✓               | ✓<br>≤ 4°  | ✓                    | -                       | -          | -               | -                     | ✓                |
| <b>Type B</b><br>page 23   |  | ✓               | ✓<br>≤ 4°  | ✓                    | -                       | -          | -               | -                     | ✓                |
| <b>Type LS</b><br>page 26  |  | ✓               | ✓<br>≤ 10° | ✓                    | -                       | ✓          | ✓               | ✓                     | -                |
| <b>Type BR</b><br>page 28  |  | ✓               | ✓<br>≤ 8°  | ✓                    | -                       | ✓          | -               | -                     | -                |

### Other Clamp Systems (these products do not require a location plate)

| Product                   | Parallel Flanges  | Tapered Flanges | Tensile | High Slip Resistance | Slotted Clearance Holes | Adjustable | Stainless Steel |
|---------------------------|---|-----------------|---------|----------------------|-------------------------|------------|-----------------|
| <b>Type FC</b><br>page 29 |  | ✓               | ✓       | ✓                    | -                       | -          | ✓               |
| <b>Type F9</b><br>page 30 |  | ✓               | -       | ✓                    | -                       | ✓          | -               |

### Also available

**ICC-ES Approved Girder Clamps**  
See pages 14 - 17 for more information.



**Lindapter Lifting Points**  
See pages 36 - 39 for more information.

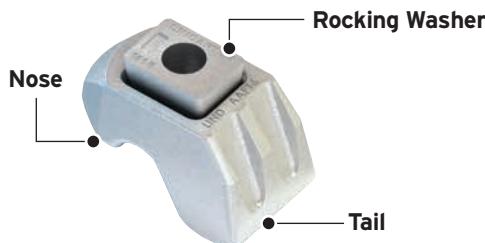


## Type AAF

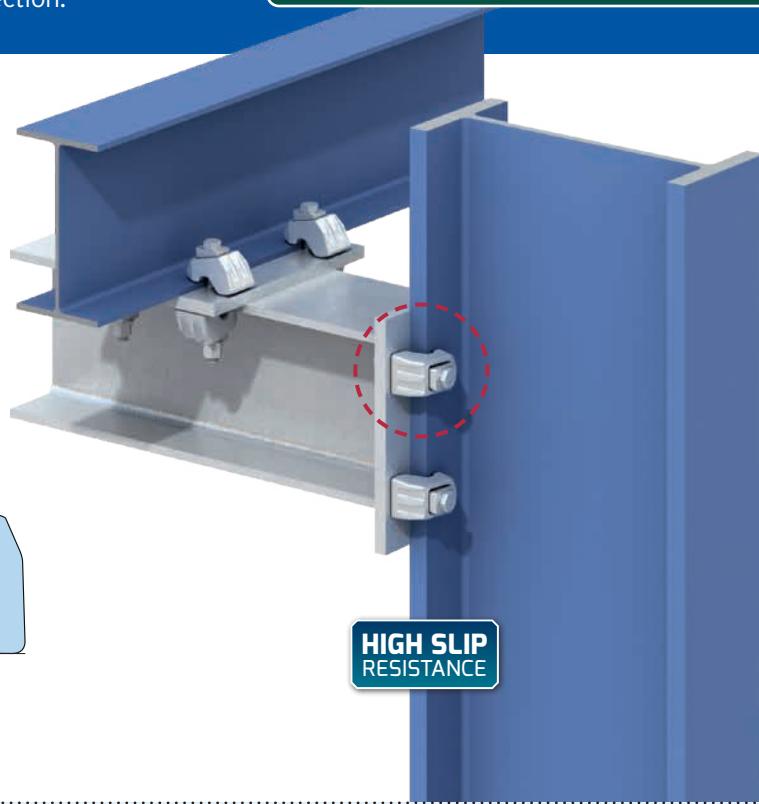
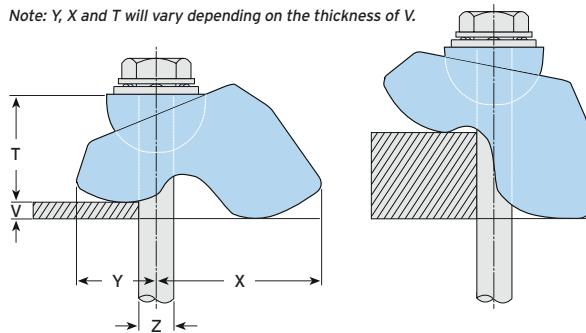
This adjustable High Slip Resistance clamp is easy to install and provides high load capacities even in low temperature environments down to -76°F. Hot dip galvanized corrosion protection.



**IMPORTANT: If you are designing a connection to the IBC, refer to the ICC-ES data on pages 14 - 15.**



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



- High slip resistance clamp evaluated for tensile, slip and combined load applications.
- Independently evaluated for fatigue resistance per ICC-ES ESR-3976, AISC 360 Appendix 3 and EN 1993-1-9.

- Self-adjusts to suit a range of flange thicknesses.
- Safe working loads apply in temperatures as low as -76°F.
- For parallel and tapered flanges up to and including 10°.
- The tail spans slotted clearance holes.

➤ Lindapter recommends the use of DTI Washers when using A325 or A490 structural bolts with Type AAF. For further information refer to page 70.

➤ For fatigue resistance please refer to ESR 3976 for appropriate stress category in accordance with AISC 360 Appendix 3 or contact our Technical Support team.

Material: Low temperature SG iron, hot dip galvanized.

| Product Code | Size Z | Grade  | Safe Working Loads                      |   |                                 | Minimum Plate Thickness (see page 19) | Tight. Torque* | Clamping Range <sup>3)</sup> V | Dimensions        |               |                |               |        |
|--------------|--------|--------|---|---|---------------------------------|---------------------------------------|----------------|--------------------------------|-------------------|---------------|----------------|---------------|--------|
|              |        |        | Tensile Resistance / 1 Bolt (FOS 4.5:1) | Slip Resistance <sup>1)</sup> / 2 Bolts (FOS 2:1) | Painted Steel <sup>2)</sup> lbs | Galv. Steel lbs                       | Location Plate | End Plate                      | Galv. Steel ft lb | Y             | X              | T             |        |
| LAAF050      | 1/2"   | 5/A325 | 1911                                    | 764   | 877                             | 1/2"                                  | 5/8"           | 66                             | 3/16"-1"          | 1"-15/16"     | 11/16"-115/16" | 11/32"-13/8"  | 15/8"  |
| LAAF062      | 5/8"   | 5/A325 | 3597                                    | 1798  | 2248                            | 5/8"                                  | 3/4"           | 177                            | 1/4"-13/16"       | 15/16"-2"     | 11/4"-25/16"   | 13/8"-113/16" | 23/16" |
| LAAF075      | 3/4"   | 5/A325 | 5901                                    | 2922  | 3597                            | 3/4"                                  | 1"             | 347                            | 1/4"-19/16"       | 115/16"-21/2" | 17/8"-31/16"   | 21/16"-21/2"  | 3"     |
| LAAF062      | 5/8"   | A490** | 4383                                    | 2473  | 2698                            | 5/8"                                  | 1"             | 221                            | 1/4"-13/16"       | 15/16"-2"     | 11/4"-25/16"   | 13/8"-113/16" | 23/16" |
| LAAF075      | 3/4"   | A490** | 6744                                    | 4496  | 5620                            | 3/4"                                  | 1"             | 477                            | 1/4"-19/16"       | 115/16"-21/2" | 17/8"-31/16"   | 21/16"-21/2"  | 3"     |

1) Slip resistant values calculated against movement exceeding 0.004" / 0.1mm.

2) Shot blast and painted steel.

3) Packing pieces are available to increase the clamping range, see page 18.

Note: Location plate and end plate details can be found on page 19.

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70. \*\* Limited availability of Grade A490 bolts - please check availability before specifying.

Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



## Type AF

A heavy duty clamp offering the highest load capacities of all Lindapter's High Slip Resistance clamps. Hot dip galvanized corrosion protection.



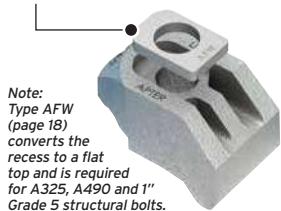
**IMPORTANT:** If you are designing a connection to the IBC, refer to the ICC-ES data on pages 16 - 17.



Evaluated for fatigue resistance per  
ICC-ES ESR-3976

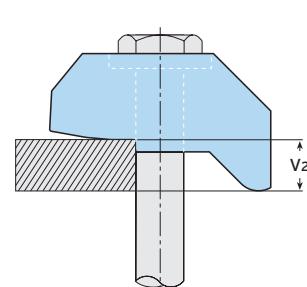
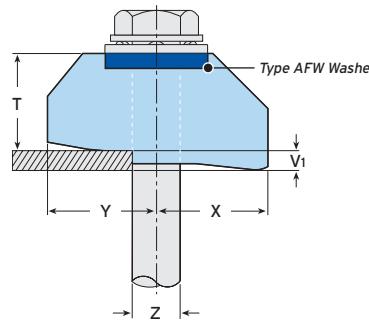
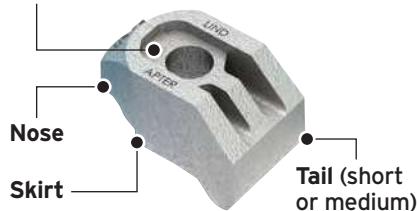


**Type AF with Type AFW washer**  
(Type AFW supplied separately)



Note:  
Type AFW (page 18) converts the recess to a flat top and is required for A325, A490 and 1" Grade 5 structural bolts.

**Recess - holds bolt head captive**  
(Grd. 5 bolts, sizes 1/2" - 3/4" only)



**HIGH SLIP RESISTANCE**

- High slip resistance clamp evaluated for tensile, slip and combined load applications.
- Static slip resistance of 15,736lbs or tensile 56,200lbs (4 x A490 bolt configuration, size 1").

- Independently evaluated for fatigue resistance per ICC-ES ESR-3976, AISC 360 Appendix 3 and EN 1993-1-9.
- For parallel and tapered flanges up to and including 10°.
- The tail spans slotted clearance holes.

► Lindapter recommends the use of DTI Washers when using A325 or A490 structural bolts with Type AF. For further information refer to page 70.

► For fatigue resistance please refer to ESR 3976 for appropriate stress category in accordance with AISC 360 Appendix 3 or contact our Technical Support team.

Material: SG iron, hot dip galvanized.

| Product Code | Bolt   |          | Safe Working Loads                    |   |                                 | Minimum Plate Thickness (see page 19) | Tightening Torque* | Tail Length <sup>4)</sup> |           | Y      | X      | T      | Width  |
|--------------|--------|----------|---------------------------------------|---|---------------------------------|---------------------------------------|--------------------|---------------------------|-----------|--------|--------|--------|--------|
|              | Size Z | Grade    | Tensile Resistance / 1 Bolt (FOS 5:1) | Slip Resistance <sup>1)</sup> / 2 Bolts (FOS 2:1) | Painted Steel <sup>2)</sup> lbs | Galv. Steel lbs                       |                    | Location Plate            | End Plate |        |        |        |        |
| LAF050       | 1/2"   | 5 / A325 | 1911                                  | 764   | 877                             | 1/2"                                  | 5/8"               | 66                        | 3/16"     | 1/2"   | 11/8"  | 11/16" | 11/16" |
| LAF062       | 5/8"   | 5 / A325 | 3597                                  | 1798  | 2248                            | 5/8"                                  | 3/4"               | 177                       | 5/16"     | 9/16"  | 13/8"  | 11/2"  | 7/8"   |
| LAF075       | 3/4"   | 5 / A325 | 5901                                  | 2922  | 3597                            | 3/4"                                  | 1"                 | 347                       | 3/8"      | 11/16" | 19/16" | 19/16" | 1"     |
| LAF100       | 1"     | 5 / A325 | 8892                                  | 5395  | 6774                            | 1"                                    | 1 1/4"             | 590                       | 9/16"     | 11/8"  | 17/8"  | 23/8"  | 11/4"  |
| LAF062       | 5/8"   | A490**   | 4383                                  | 2473  | 2698                            | 5/8"                                  | 1"                 | 221                       | 5/16"     | 9/16"  | 13/8"  | 11/2"  | 7/8"   |
| LAF075       | 3/4"   | A490**   | 6744                                  | 4496  | 5620                            | 3/4"                                  | 1"                 | 477                       | 3/8"      | 11/16" | 19/16" | 19/16" | 1"     |
| LAF100       | 1"     | A490**   | 14050 <sup>3)</sup>                   | 6295  | 7868                            | 1"                                    | 1 1/4"             | 737                       | 9/16"     | 11/8"  | 17/8"  | 23/8"  | 11/4"  |

1) Slip resistant values calculated against movement exceeding 0.004" / 0.1mm.

2) Shot blast and painted steel.

3) 3.2:1 Factor of Safety.

4) Packing pieces are available to increase the clamping range, see page 18.

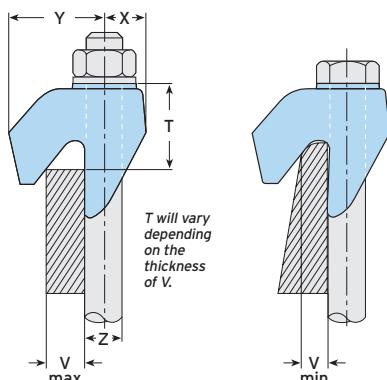
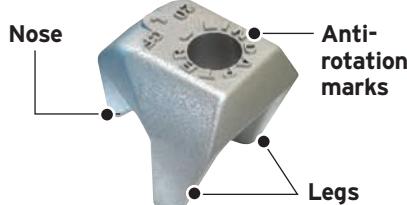
Note: Location plate and end plate details can be found on page 19.

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70. \*\* Limited availability of Grade A490 bolts - please check availability before specifying.

Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)

## Type CF

Hooks over the flanges of beams, angles and channels to connect steel sections that do not face, such as connecting horizontal beams with vertical columns.



- Suitable for parallel and tapered flanges up to and including 10°.
- Can be combined with other Lindapter High Slip Resistance clamps (Grd. 5 or A325 bolts only); see table below for safe working loads.
- Can also be used with Grd. B7 or A449 rods.

► Location plate / end plate details can be found on page 19.

Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)

Material: SG iron, hot dip galvanized.

| Product Code                                | Bolt Grd. 5 / A325 Z | Safe Working Loads                    |   |                                 | Minimum Plate Thickness (see page 19) | Tightening Torque* | Clamping Range V | Dimensions    |        |        |                 |
|---|----------------------|---------------------------------------|---|---------------------------------|---------------------------------------|--------------------|------------------|---------------|--------|--------|-----------------|
|   |                      | Tensile Resistance / 1 Bolt (FOS 5:1) | Slip Resistance <sup>1)</sup> / 2 Bolts (FOS 2:1) | Painted Steel <sup>2)</sup> lbs | Galv. Steel lbs                       |                    |                  | Y             | X      | T      | Width           |
| LCF050                                      | 1/2"                 | 1911                                  | 764   | 877                             | 1/2"                                  | 5/8"               | 66               | 1/4" - 1/2"   | 11/4"  | 9/16"  | 13/16" - 11/8"  |
| LCF2050                                     | 1/2"                 | 1911                                  | 764   | 877                             | 1/2"                                  | 5/8"               | 66               | 1/2" - 3/4"   | 19/16" | 5/8"   | 11/8" - 11/2"   |
| LCF062                                      | 5/8"                 | 3597                                  | 1798  | 2248                            | 5/8"                                  | 3/4"               | 177              | 5/16" - 5/8"  | 13/4"  | 11/16" | 1" - 11/4"      |
| LCF2062                                     | 5/8"                 | 3597                                  | 1798  | 2248                            | 5/8"                                  | 3/4"               | 177              | 5/8" - 1"     | 2"     | 13/16" | 13/8" - 17/8"   |
| LCF075                                      | 3/4"                 | 5901                                  | 2922  | 3597                            | 3/4"                                  | 1"                 | 347              | 3/8" - 3/4"   | 21/16" | 7/8"   | 13/16" - 19/16" |
| LCF2075                                     | 3/4"                 | 5901                                  | 2922  | 3597                            | 3/4"                                  | 1"                 | 347              | 3/4" - 13/16" | 21/2"  | 11/16" | 15/8" - 23/16"  |
| CF combinations with other Lindapter clamps | CF+A <sup>3)</sup>   | 1/2"                                  | 1304  | 202                             | 202                                   | 3/8"               | 1/2"             | 50            |        |        |                 |
|   | CF+A <sup>3)</sup>   | 5/8"                                  | 1911  | 382                             | 382                                   | 3/8"               | 5/8"             | 108           |        |        |                 |
|   | CF+A <sup>3)</sup>   | 3/4"                                  | 3305  | 674                             | 674                                   | 1/2"               | 7/8"             | 210           |        |        |                 |
|   | CF+AF/AAF            | 1/2"                                  | 1911  | 764                             | 877                                   | 1/2"               | 5/8"             | 66            |        |        |                 |
|   | CF+AF/AAF            | 5/8"                                  | 3597  | 1798                            | 2248                                  | 5/8"               | 3/4"             | 177           |        |        |                 |
|   | CF+AF/AAF            | 3/4"                                  | 5901  | 2922                            | 3597                                  | 3/4"               | 1"               | 347           |        |        |                 |

1) Slip resistant values calculated against movement exceeding 0.004" / 0.1mm.

2) Shot blast and painted steel.

3) Also applies to Type B, Type LR and Type BR.

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.



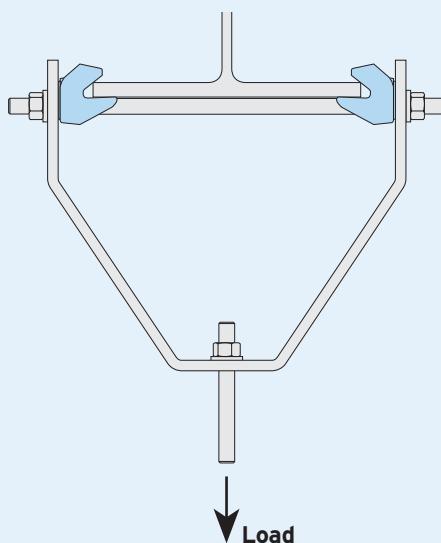
## Additional Applications for Type CF

Type CF is a versatile solution that has been tested in a wide range of applications, including suspending equipment from supporting sections. It can be easily adjusted for quick alignment of pipework, electrical cables and other building services equipment. Two popular connection arrangements are shown below.

**EXAMPLE 1**



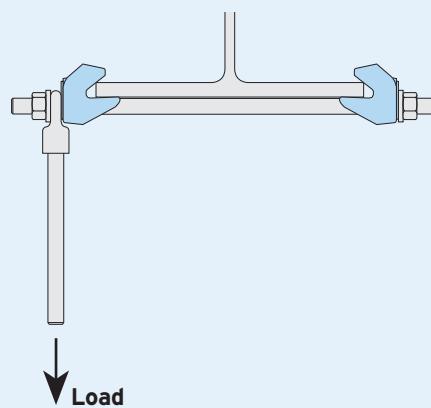
| Bolt Size | Product Code(s)  | Recommended Safe Working Load / bolt<br>5:1 Factor of Safety |
|-----------|------------------|--|
| 1/2"      | LCF050 / LCF2050 | 1125 lbs   |
| 5/8"      | LCF062 / LCF2062 | 2250 lbs   |
| 3/4"      | LCF075 / LCF2075 | 4500 lbs   |



**EXAMPLE 2**



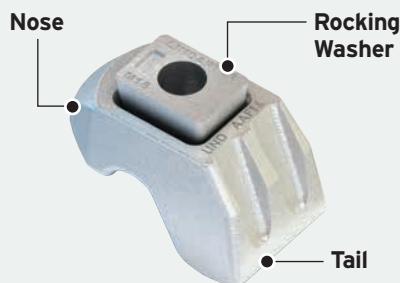
| Bolt Size | Product Code(s)  | Recommended Safe Working Load / bolt<br>5:1 Factor of Safety |
|-----------|------------------|--|
| 1/2"      | LCF050 / LCF2050 | 225 lbs  |
| 5/8"      | LCF062 / LCF2062 | 1350 lbs   |
| 3/4"      | LCF075 / LCF2075 | 2700 lbs   |



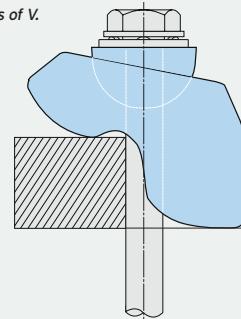
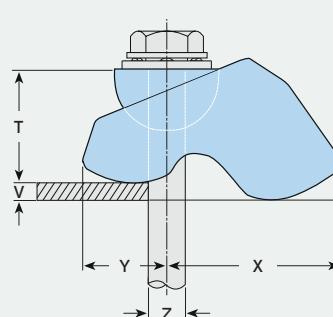
## Type AAF (data for applications requiring ICC approval)

Lindapter's Girder Clamp is the world's first and only approved structural steel clamping system that is compliant with the International Building Code for structural and seismic designs. Pages 14 to 17 include extracts from ESR-3976, visit [www.Lindapter.com](http://www.Lindapter.com) to view the full report.

### Dimension Data



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



Evaluated for fatigue resistance per ICC-ES ESR-3976

Code Compliance ✓ADIBC  
✓IBC ✓CBC ✓LABC  
✓IRC ✓CRC ✓LARC

Material: Low temperature SG iron, hot dip galvanized.

| Product Code | Bolt Size | Clamping Range <sup>1)</sup> | Dimensions     |                  |                  |         |
|--------------|-----------|------------------------------|----------------|------------------|------------------|---------|
|              |           |                              | Y              | X                | T                | Width   |
| LAAF050      | 1/2"      | 3/16" - 1"                   | 1" - 15/16"    | 11/16" - 115/16" | 11/32" - 13/8"   | 15/8"   |
| LAAF062      | 5/8"      | 1/4" - 13/16"                | 15/16" - 2"    | 11/4" - 2 5/16"  | 13/8" - 113/16"  | 2 3/16" |
| LAAF075      | 3/4"      | 1/4" - 19/16"                | 17/8" - 31/16" | 115/16" - 2 1/2" | 2 1/16" - 2 1/2" | 3"      |

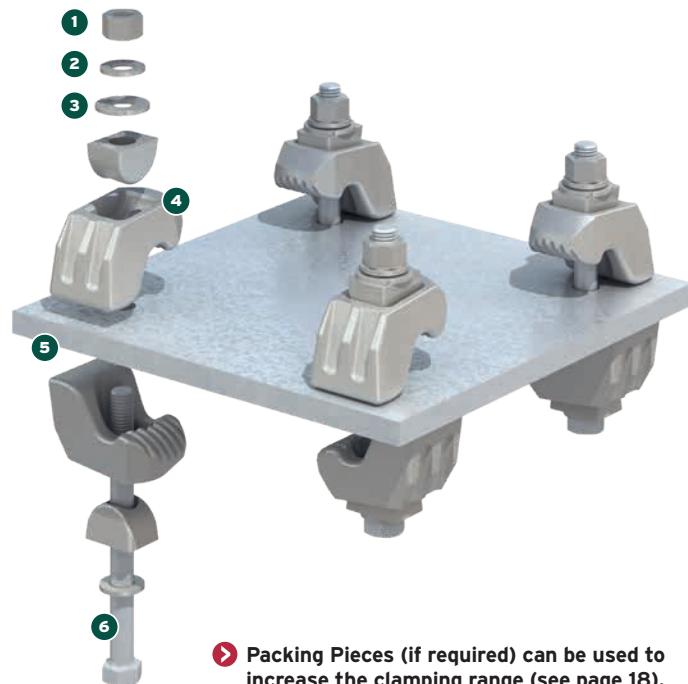
1) Packing pieces are available to increase the clamping range, see page 18. Location plate and end plate details can be found on page 19.

### ICC-ES Girder Clamp Components

The following components must be used for Type AAF ICC-ES approved connections:

- 1 Hexagon Nut to A563 Grade DH
- 2 Standard Hardened Washer to ASTM F436
- 3 DTI Washer to ASTM F959 (see page 70 for details)
- 4 Type AAF
- 5 Location Plate or End Plate (see page 19)
- 6 Standard ASTM F3125 A325 / A490 Hexagon Bolt

If using a Tension Control Bolt (ASTM F1852/F2280), DTI washer is not required.



► Packing Pieces (if required) can be used to increase the clamping range (see page 18).

## Type AAF (data for applications requiring ICC approval)

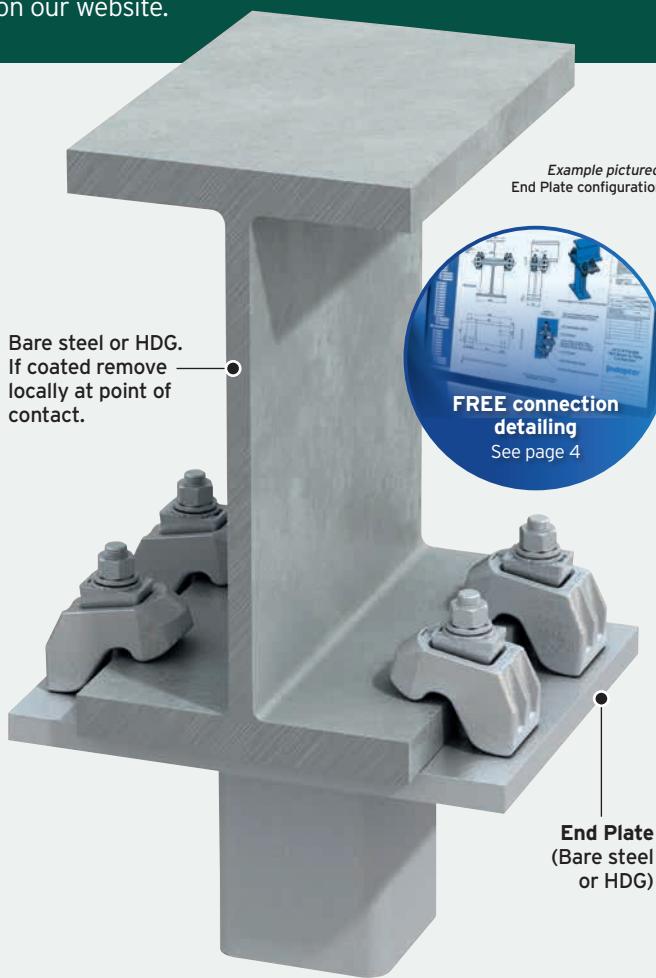
The data below is for use by Engineers designing a connection as per AISC 360, AISC 341 and ASCE / SEI 7 as referenced by the locally adopted building code. To comply with ICC-ES please also refer to Evaluation Report ESR-3976 and the Special Inspection Document which can be found on our website.

The Girder Clamp is approved for use in all Seismic Design Categories (SDC) A through F and can be configured with either a Location Plate or an End Plate (as shown in this example).

Design strengths are based on a four-bolt assembly and the correct data should be used for the required application. In this example, the LRFD design strength for an application in SDC A is shown.

### Connection Example

|                                     |            |
|-------------------------------------|------------|
| Bolt Size                           | 3/4"       |
| Bolt Grade                          | A490       |
| Design Method                       | LRFD       |
| Seismic Design Category             | A          |
| Tensile Design Strength of Assembly | 52,600 lbs |
| Slip Design Strength of Assembly    | 13,300 lbs |



### LRFD design strength & ASD allowable strength

LRFD and ASD strengths (taken from ESR-3976) are to be used when designing a connection per AISC 360, AISC 341 and ASCE/SEI 7 as referenced by the locally adopted building code.

| Product Code | Bolt Size | Grade | Static               |                   |                        |                   | Seismic Design Category A, B and C |                   |                        |                   | Seismic Design Category D, E and F |                   |                        |                   |
|--------------|-----------|-------|----------------------|-------------------|------------------------|-------------------|------------------------------------|-------------------|------------------------|-------------------|------------------------------------|-------------------|------------------------|-------------------|
|              |           |       | LRFD Design Strength |                   | ASD Allowable Strength |                   | LRFD Design Strength               |                   | ASD Allowable Strength |                   | LRFD Design Strength               |                   | ASD Allowable Strength |                   |
|              |           |       | Tension /4 bolts lbs | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs | Tension /4 bolts lbs               | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs | Tension /4 bolts lbs               | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs |
| LAAF050      | 1/2"      | A325  | 24100                | 2700              | 15000                  | 1690              | 19500                              | 2700              | 12200                  | 1690              | 18200                              | 2120              | 11400                  | 1330              |
| LAAF062      | 5/8"      | A325  | 36400                | 5400              | 22800                  | 3490              | 30200                              | 5400              | 18900                  | 3490              | 27200                              | 4250              | 17000                  | 2660              |
| LAAF075      | 3/4"      | A325  | 61200                | 8140              | 38300                  | 5080              | 44600                              | 8140              | 27900                  | 5080              | 40600                              | 8140              | 25400                  | 5080              |
| LAAF062      | 5/8"      | A490  | 39700                | 6300              | 24800                  | 3930              | 37200                              | 6300              | 23300                  | 3930              | 35600                              | 5670              | 22300                  | 3450              |
| LAAF075      | 3/4"      | A490  | 67400                | 13300             | 42100                  | 8300              | 52600                              | 13300             | 32900                  | 8300              | 50800                              | 11300             | 31800                  | 7080              |

Notes: • A girder clamp connection includes multiples of two, typically four, replicate girder clamp assemblies.  
• If using painted steel the coating must be removed at the point of contact to comply with ICC-ES ESR-3976.

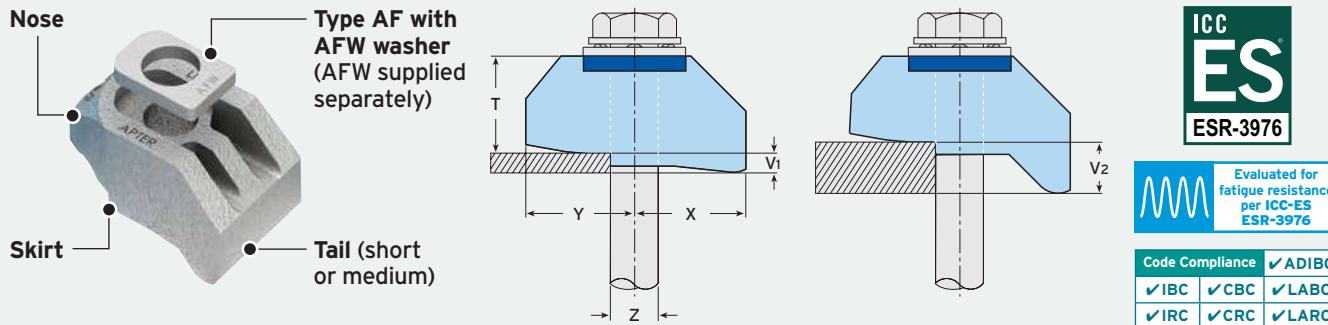
• Limited availability of Grade A490 bolts - please check availability before specifying.

- Refer to ESR-3976 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.
- For fatigue resistance please refer to ESR 3976 for appropriate stress category in accordance with AISC 360 Appendix 3 or contact our Technical Support team.

## Type AF (data for applications requiring ICC approval)

Lindapter's Girder Clamp is approved for use in all Seismic Design Categories (A through F) and is the only structural steel clamping system compliant with the International Building Code. Extracts of ICC Evaluation Service Report ESR-3976 can be found below, visit [www.Lindapter.com](http://www.Lindapter.com) to view the full report.

### Dimension Data



Material: SG iron, hot dip galvanized.

| Product Code  | Bolt Size | Tail Length Short <sup>1)</sup> | Tail Length Medium <sup>1)</sup> | Dimensions |         |        |          |
|---------------|-----------|---------------------------------|----------------------------------|------------|---------|--------|----------|
|               |           |                                 |                                  | Y          | X       | T      | Width    |
| <b>LAF050</b> | 1/2"      | 3/16"                           | 1/2"                             | 1 1/8"     | 1 1/16" | 7/8"   | 19/16"   |
| <b>LAF062</b> | 5/8"      | 5/16"                           | 9/16"                            | 1 3/8"     | 1 1/2"  | 11/16" | 1 15/16" |
| <b>LAF075</b> | 3/4"      | 3/8"                            | 11/16"                           | 1 9/16"    | 1 9/16" | 11/4"  | 2 3/16"  |
| <b>LAF100</b> | 1"        | 9/16"                           | 1 1/8"                           | 1 7/8"     | 2 3/8"  | 15/8"  | 3 1/4"   |

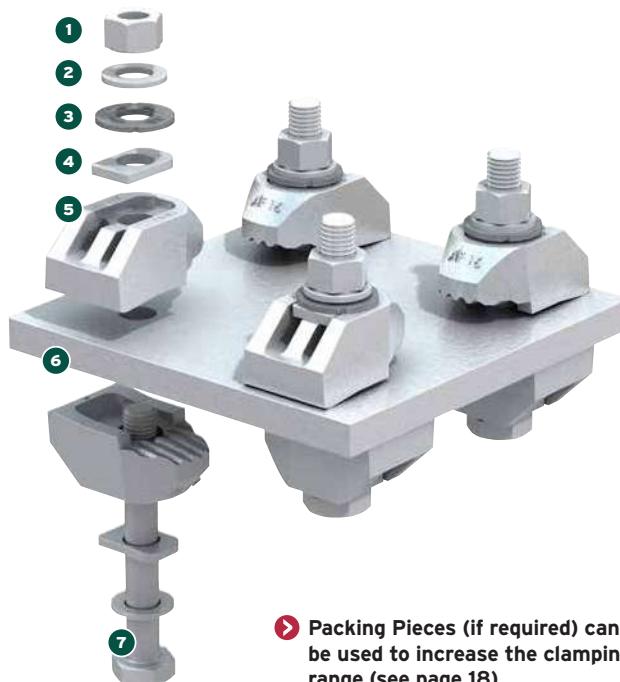
1) Packing pieces are available to increase the clamping range, see page 18. Location plate and end plate details can be found on page 19.

### ICC-ES Girder Clamp Components

The following components must be used for Type AF ICC-ES approved connections:

- 1 Hexagon Nut to A563 Grade DH
- 2 Standard Hardened Washer to ASTM F436
- 3 DTI Washer to ASTM F959 (see page 70 for details)
- 4 Type AFW Washer (see page 18)
- 5 Type AF
- 6 Location Plate or End Plate (see page 19)
- 7 Standard ASTM F3125 A325 / A490 Hexagon Bolt

If using a Tension Control Bolt (ASTM F1852/F2280), DTI washer is not required.



► Packing Pieces (if required) can be used to increase the clamping range (see page 18).

## Type AF (data for applications requiring ICC approval)

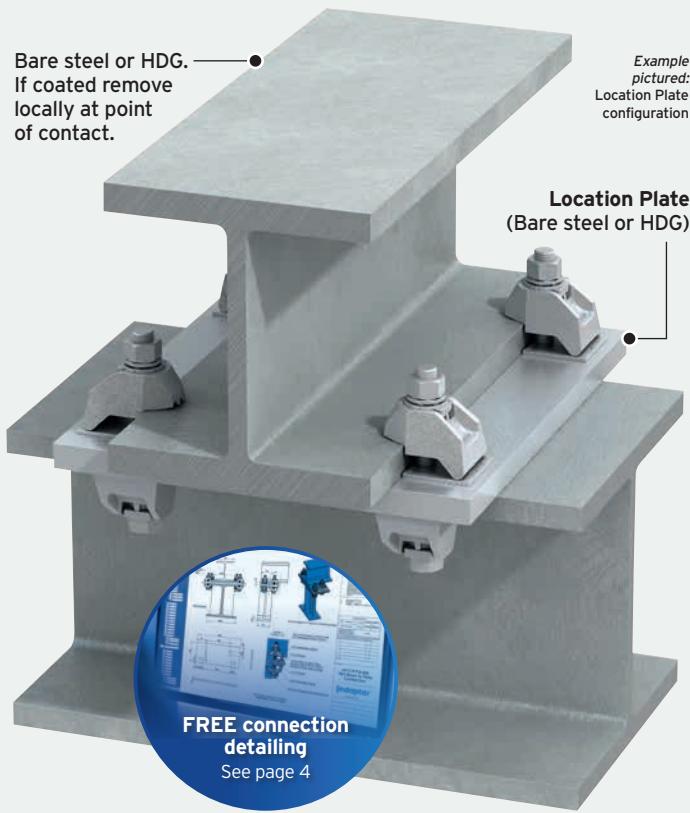
The data below is for use by Engineers designing a connection as per AISC 360, AISC 341 and ASCE / SEI 7 as referenced by the locally adopted building code. To comply with ICC-ES please also refer to Evaluation Report ESR-3976 and the Special Inspection Document which can be found on our website.

The Girder Clamp is approved for use in all Seismic Design Categories (SDC) A through F and can be configured with either a Location Plate (as shown in this example) or an End Plate.

Design strengths are based on a four-bolt assembly and the correct data should be used for the required application. In this example, the LRFD design strength for an application in SDC F is shown.

### Connection Example

|                                     |             |
|-------------------------------------|-------------|
| Bolt Size                           | 1"          |
| Bolt Grade                          | A490        |
| Design Method                       | LRFD        |
| Seismic Design Category             | F           |
| Tensile Design Strength of Assembly | 116,000 lbs |
| Slip Design Strength of Assembly    | 18,100 lbs  |



### LRFD design strength & ASD allowable strength

LRFD and ASD strengths (taken from ESR-3976) are to be used when designing a connection per AISC 360, AISC 341 and ASCE/SEI 7 as referenced by the locally adopted building code.

| Product Code | Bolt Size | Grade | Static               |                   |                        |                   | Seismic Design Category A, B and C |                   |                        |                   | Seismic Design Category D, E and F |                   |                        |                   |
|--------------|-----------|-------|----------------------|-------------------|------------------------|-------------------|------------------------------------|-------------------|------------------------|-------------------|------------------------------------|-------------------|------------------------|-------------------|
|              |           |       | LRFD Design Strength |                   | ASD Allowable Strength |                   | LRFD Design Strength               |                   | ASD Allowable Strength |                   | LRFD Design Strength               |                   | ASD Allowable Strength |                   |
|              |           |       | Tension /4 bolts lbs | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs | Tension /4 bolts lbs               | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs | Tension /4 bolts lbs               | Slip /4 bolts lbs | Tension /4 bolts lbs   | Slip /4 bolts lbs |
| LAF050       | 1/2"      | A325  | 24100                | 2700              | 15000                  | 1690              | 19500                              | 2700              | 12200                  | 1690              | 18200                              | 2120              | 11400                  | 1330              |
| LAF062       | 5/8"      | A325  | 36400                | 5400              | 22800                  | 3490              | 30200                              | 5400              | 18900                  | 3490              | 27200                              | 4250              | 17000                  | 2660              |
| LAF075       | 3/4"      | A325  | 61200                | 8140              | 38300                  | 5080              | 44600                              | 8140              | 27900                  | 5080              | 40600                              | 8140              | 25400                  | 5080              |
| LAF100       | 1"        | A325  | 103000               | 12700             | 64500                  | 7960              | 86700                              | 12700             | 54300                  | 7960              | 80300                              | 11700             | 50300                  | 7310              |
| LAF062       | 5/8"      | A490  | 39700                | 6300              | 24800                  | 3930              | 37200                              | 6300              | 23300                  | 3930              | 35600                              | 5670              | 22300                  | 3450              |
| LAF075       | 3/4"      | A490  | 67400                | 13300             | 42100                  | 8300              | 52600                              | 13300             | 32900                  | 8300              | 50800                              | 11300             | 31800                  | 7080              |
| LAF100       | 1"        | A490  | 137000               | 18100             | 85700                  | 11300             | 119000                             | 18100             | 74400                  | 11300             | 116000                             | 18100             | 72800                  | 11300             |

Notes: • A girder clamp connection includes multiples of two, typically four, replicate girder clamp assemblies.

• If using painted steel the coating must be removed at the point of contact to comply with ICC-ES ESR-3976.

• Limited availability of Grade A490 bolts - please check availability before specifying.

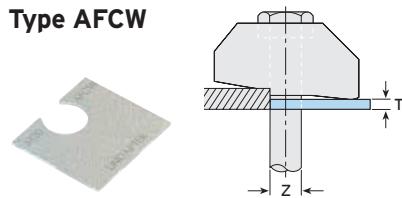
- Refer to ESR-3976 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.
- For fatigue resistance please refer to ESR 3976 for appropriate stress category in accordance with AISC 360 Appendix 3 or contact our Technical Support team.

## Packing Pieces for Types AF and AAF

Packing pieces are used to increase the clamping range to suit a range of flange thicknesses. The 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.

### Packing Pieces

#### Type AFCW



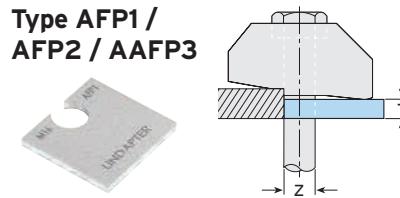
Mild steel, hot dip galvanized.

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

\* Not 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



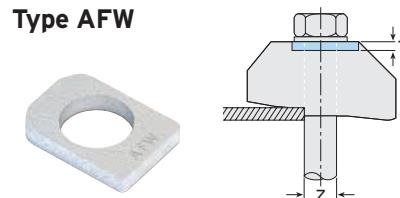
Mild steel, hot dip galvanized.

| 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"      |

\* Not compatible with Type AAF clamp.

### Also Available

#### Type AFW



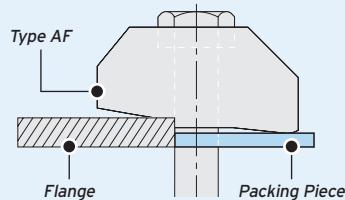
SG iron, mild steel, hot dip galvanized.

| 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 to enable the bolt head or nut to be rotated on a hardened washer and is required for A325, A490 and 1" Grade 5 structural bolts.

### Tail Length / Packing Piece Combinations for Type AF

Choose the correct combination for your configuration using the table on the right. Note these calculations are for parallel flanges and beams up to 10° slopes only. For example, a 3/4" Type AF on a 19/16" flange requires 1 x Type AF medium tail (M), 1 x Type AFCW and 2 x Type AFP2.



- For thicker flanges contact Lindapter.
- If your flange thickness exceeds the flange thickness listed in the table, use the packing piece combination from the next largest flange thickness. Interpolation of table values is not permitted.
- Other combinations than what is shown here may be possible. Please contact our Technical Support team to discuss your requirements.

| Flange Thickness | 1/2" |      |      |      | 5/8" |      |      |      | 3/4" |      |      |      | 1" |      |      |      |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|----|------|------|------|
|                  | AF   | AFCW | AFP1 | AFP2 | AF   | AFCW | AFP1 | AFP2 | AF   | AFCW | AFP1 | AFP2 | AF | AFCW | AFP1 | AFP2 |
| 3/16"            | S    | -    | -    | -    | X    | -    | -    | -    | X    | -    | -    | -    | X  | -    | -    | -    |
| 1/4"             | S    | -    | -    | -    | X    | -    | -    | -    | X    | -    | -    | -    | X  | -    | -    | -    |
| 5/16"            | S    | 1    | -    | -    | S    | -    | -    | -    | X    | -    | -    | -    | X  | -    | -    | -    |
| 3/8"             | S    | -    | 1    | -    | S    | 1    | -    | -    | S    | -    | -    | -    | X  | -    | -    | -    |
| 7/16"            | S    | -    | 1    | -    | S    | 1    | -    | -    | S    | -    | -    | -    | X  | -    | -    | -    |
| 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    |
| 11/16"           | S    | 1    | -    | 2    | M    | 1    | -    | 1    | M    | 2    | 1    | -    | S  | -    | -    | 1    |
| 11/8"            | M    | 3    | -    | 1    | S    | -    | -    | 2    | M    | -    | -    | 1    | S  | -    | -    | 1    |
| 13/16"           | S    | -    | 1    | 2    | M    | -    | 1    | 1    | M    | 1    | -    | 1    | M  | -    | -    | -    |
| 11/4"            | S    | 1    | 1    | 2    | M    | 1    | 1    | 1    | M    | 2    | -    | 1    | M  | -    | -    | -    |
| 15/16"           | M    | -    | -    | 2    | S    | -    | 1    | 2    | M    | -    | 1    | 1    | M  | -    | -    | -    |
| 13/8"            | S    | -    | -    | 3    | M    | -    | -    | 2    | M    | 1    | 1    | 1    | M  | -    | 1    | -    |
| 17/16"           | M    | 2    | -    | 2    | M    | 1    | -    | 2    | M    | 2    | 1    | 1    | M  | -    | 1    | -    |
| 11/2"            | M    | -    | 1    | 2    | S    | -    | -    | 3    | M    | -    | -    | 2    | M  | -    | -    | 1    |
| 19/16"           | M    | 1    | 1    | 2    | M    | -    | 1    | 2    | M    | 1    | -    | 2    | M  | -    | -    | 1    |
| 15/8"            | M    | 2    | 1    | 2    | M    | 1    | 1    | 2    | M    | 1    | -    | 2    | M  | -    | -    | 1    |
| 111/16"          | M    | -    | -    | 3    | S    | -    | 1    | 3    | M    | -    | 1    | 2    | M  | -    | 1    | 1    |
| 13/4"            | M    | 1    | -    | 3    | M    | 2    | 1    | 2    | M    | 1    | 1    | 2    | M  | -    | 1    | 1    |
| 113/16"          | S    | -    | -    | 4    | M    | -    | -    | 3    | S    | -    | 1    | 3    | M  | -    | 1    | 1    |
| 17/8"            | S    | 1    | -    | 4    | M    | 1    | -    | 3    | M    | -    | -    | 3    | M  | -    | 1    | 1    |
| 115/16"          | M    | 1    | 1    | 3    | M    | 2    | -    | 3    | S    | -    | -    | 4    | M  | -    | -    | 2    |
| 2"               | S    | -    | 1    | 4    | M    | -    | 1    | 3    | S    | -    | -    | 4    | M  | -    | -    | 2    |

AF = Type AF | AFCW = Type AFCW | AFP1 = Type AFP1 | AFP2 = Type AFP2 | S = AF short | M = AF medium | X = Not possible



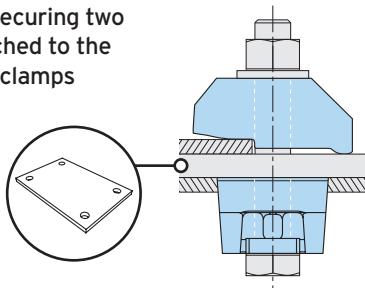
## Location and End Plates for Types AF, AAF and CF

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

Location plates are required when securing two sections together with clamps attached to the upper and lower sections with both clamps directly opposing each other.

The plate is positioned between the two sections to hold the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.



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

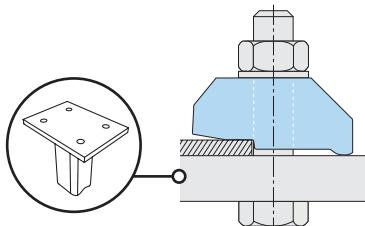
| Bolt Size | Hole Ø | Minimum Plate Thickness for Bolt Grade | Hole Centers | Length      | Hole Centers | Width                |
|-----------|--------|--|--------------|-------------|--------------|----------------------|
| d         | 5/A325 | A490                                   | C1           | 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 1/8" | 1"                                     | 1"           | B1 + 1 1/8" | B1 + 7"      | B2 + 1 1/8" B2 + 7"  |

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

### End Plate

End Plates should be used when clamps are attached to the supporting section only.

The End Plate holds the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.



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

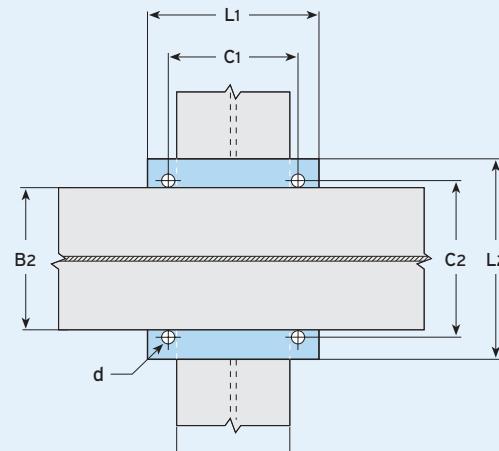
| Bolt Size | Hole Ø | Minimum Plate Thickness for Bolt Grade <sup>1)</sup> | Hole Centers | Length  | Hole Centers       | Width  |
|-----------|--------|--|--------------|---------|--------------------|--------|
| d         | 5/A325 | A490   | C1           | min L1  | min C2             | min L2 |
| 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 1/8" | 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 length for Type AF size 3/4" can be reduced to 5" if required.

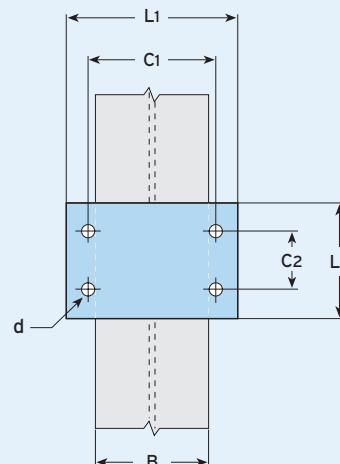
#### LOCATION PLATE DIMENSIONS

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



#### END PLATE DIMENSIONS

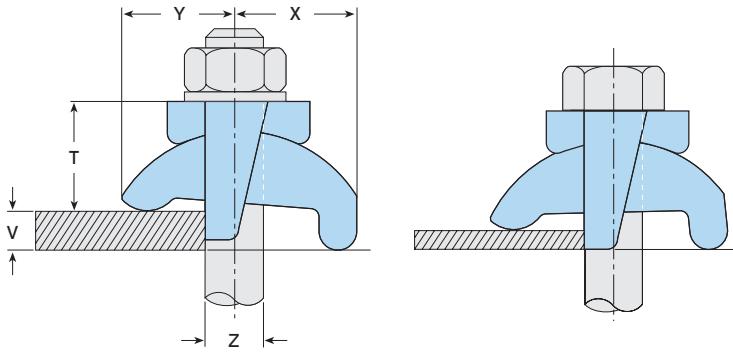
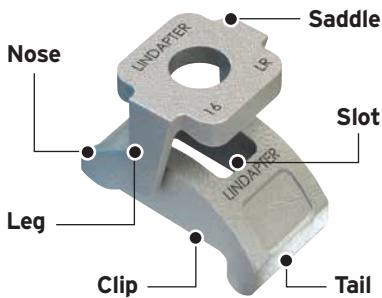
L1 = End Plate Length, L2 = End Plate Width, B = Flange Width, C1, C2 = Hole Centers, d = Hole Ø



- For ICC-ES approved connections the Location Plate or End Plate must be bare steel or HDG. Refer to ESR-3976 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.
- Use Lindapter's Bolt Length Calculator on page 8 to calculate the correct bolt length for your application.
- If drilling through the flange of the supported steel please contact Lindapter to ensure suitability.

## Type LR

A versatile, self-adjusting clamp designed to suit a range of flange thicknesses.



Note 1: When installing, ensure the straight (not tapered) leg of the saddle is in contact with the flange.  
 Note 2: Y, X and T will vary depending on the thickness of V.

Watch the installation video  
[at www.Lindapter.com](http://www.Lindapter.com)

- Clamping ranges from 1/8" - 1" (size 1").
- For parallel and tapered flanges up to and including 15°.
- The leg of the saddle prevents the clamp from rotating.
- The tail spans slotted clearance holes.

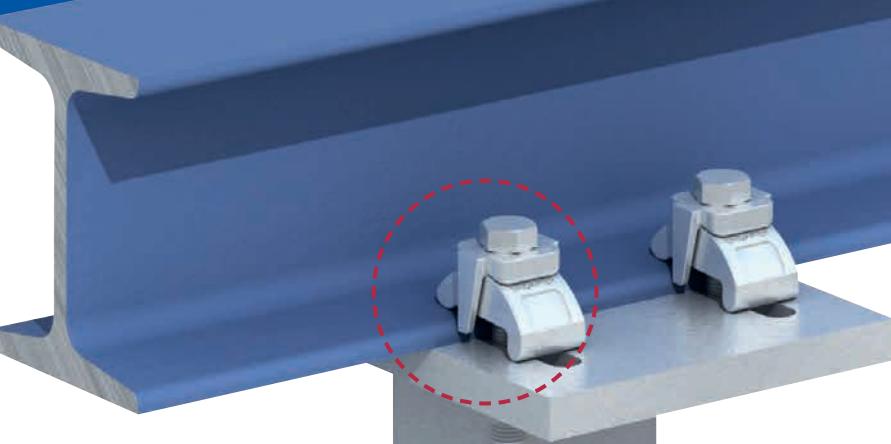
► Packing pieces are available to increase the clamping range, see page 21.  
 ► Location plate / end plate details can also be found on page 21.

Material: Malleable iron, zinc plated or hot dip galvanized.

| Product Code         | Bolt Grd. 5 / A325 Z | Safe Working Loads (FOS 5:1) |                           |                                       |       | Tightening Torque* | Clamping Range V | Dimensions      |                 |         |                   |
|----------------------|----------------------|------------------------------|---------------------------|---------------------------------------|-------|--------------------|------------------|-----------------|-----------------|---------|-------------------|
|                      |                      | Tensile Resistance / 1 Bolt  | Slip Resistance / 2 Bolts | Minimum Plate Thickness (see page 21) | ft lb |                    |                  | Y               | X               | T       | Width with Saddle |
| LLR037 <sup>1)</sup> | 3/8"                 | 337                          | -                         | 5/16"                                 | 15    | 1/8" - 3/8"        | 13/16" - 15/16"  | 15/16" - 1"     | 13/16" - 15/16" | 15/16"  |                   |
| LLR050               | 1/2"                 | 1304                         | 202                       | 1/2"                                  | 50    | 1/8" - 1/2"        | 1" - 11/8"       | 1" - 11/4"      | 1" - 11/8"      | 19/16"  |                   |
| LLR062               | 5/8"                 | 1911                         | 382                       | 5/8"                                  | 108   | 1/8" - 5/8"        | 13/16" - 13/8"   | 15/16" - 17/16" | 13/16" - 17/16" | 113/16" |                   |
| LLR075               | 3/4"                 | 3305                         | 674                       | 3/4"                                  | 210   | 1/8" - 3/4"        | 15/8" - 115/16"  | 113/16" - 2"    | 15/8" - 17/8"   | 21/4"   |                   |
| LLR100               | 1"                   | 4430                         | 1012                      | 3/4"                                  | 362   | 1/8" - 1"          | 17/8" - 21/4"    | 21/16" - 21/4"  | 13/4" - 21/8"   | 3"      |                   |

1) LLR037 available in Hot Dip Galvanized only.

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

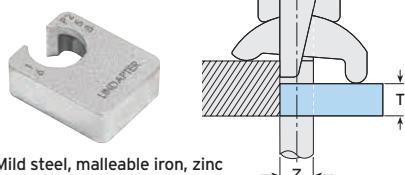


## Packing Pieces and Plate details for Type LR

Packing pieces are available to increase the clamping range of the Type LR, please select the correct packing combination from the table below. This page also contains information for designing location and end plates.

### Packing Pieces

Type P1 long /  
Type P2 long



Mild steel, malleable iron, zinc plated or hot dip galvanized.

| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LP1037L      | 3/8"        | 3/16"       |
| LP1050L      | 1/2"        | 1/4"        |
| LP1062L      | 5/8"        | 5/16"       |
| LP1075L      | 3/4"        | 3/8"        |
| LP1100L      | 1"          | 1/2"        |
| LP2037L      | 3/8"        | 3/8"        |
| LP2050L      | 1/2"        | 1/2"        |
| LP2062L      | 5/8"        | 5/8"        |
| LP2075L      | 3/4"        | 3/4"        |
| LP2100L      | 1"          | 1"          |

#### Tail Length / Packing Piece Combinations for Type LR

- For thicker flanges contact Lindapter.
- If your flange thickness exceeds the flange thickness listed in the table, use the packing piece combination from the next largest flange thickness. Interpolation of table values is not permitted.
- Other combinations than what is shown here may be possible. Contact our Technical Support team to discuss your requirements.

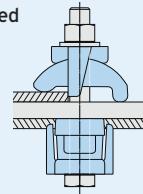
| Flange Thickness | 3/8" |     | 1/2" |     | 5/8" |     | 3/4" |     | 1"  |     |
|------------------|------|-----|------|-----|------|-----|------|-----|-----|-----|
|                  | PIL  | P2L | PIL  | P2L | PIL  | P2L | PIL  | P2L | PIL | P2L |
| 3/16"            | -    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 1/4"             | -    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 5/16"            | -    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 3/8"             | -    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 7/16"            | 1    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 1/2"             | 1    | -   | -    | -   | -    | -   | -    | -   | -   | -   |
| 9/16"            | 1    | -   | 1    | -   | -    | -   | -    | -   | -   | -   |
| 5/8"             | -    | 1   | 1    | -   | -    | -   | -    | -   | -   | -   |
| 11/16"           | -    | 1   | 1    | -   | 1    | -   | -    | -   | -   | -   |
| 3/4"             | -    | 1   | -    | 1   | 1    | -   | -    | -   | -   | -   |
| 13/16"           | 1    | 1   | -    | 1   | 1    | -   | 1    | -   | -   | -   |
| 7/8"             | 1    | 1   | -    | 1   | 1    | -   | 1    | -   | -   | -   |
| 15/16"           | 1    | 1   | -    | 1   | 1    | -   | 1    | -   | -   | -   |
| 1"               | 1    | 1   | 1    | 1   | -    | 1   | 1    | -   | -   | -   |
| 1 1/16"          | -    | 2   | 1    | 1   | -    | 1   | 1    | -   | 1   | -   |
| 1 1/8"           | -    | 2   | 1    | 1   | -    | 1   | 1    | -   | 1   | -   |
| 1 3/16"          | -    | 2   | 1    | 1   | -    | 1   | -    | 1   | 1   | -   |
| 1 1/4"           | 1    | 2   | -    | 2   | -    | 1   | -    | 1   | 1   | -   |

P1L = Type P1 long | P2L = Type P2 long

#### LOCATION AND END PLATE DIMENSIONS

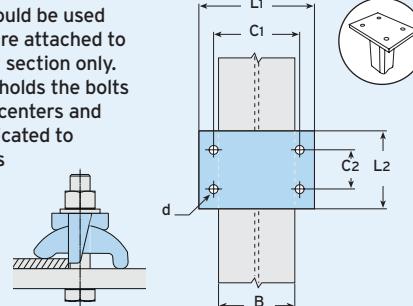
**Location Plates** are required when securing two sections together with clamps attached to the upper and lower sections with both clamps directly opposing each other.

The plate is positioned between the two sections to hold the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.



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

**End Plates** should be used when clamps are attached to the supporting section only. The End Plate holds the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.



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

| Bolt Size | Hole Ø d | Plate Thickness <sup>1)</sup> |
|-----------|----------|-------------------------------|
| 3/8"      | 7/16"    | 5/16"                         |
| 1/2"      | 9/16"    | 1/2"                          |
| 5/8"      | 11/16"   | 5/8"                          |
| 3/4"      | 13/16"   | 3/4"                          |
| 1"        | 1 1/16"  | 3/4"                          |

| LOCATION PLATE  |               |                 |              |
|-----------------|---------------|-----------------|--------------|
| Hole Centers C1 | Length min L1 | Hole Centers C2 | Width min L2 |
| B1 + 7/16"      | B1 + 2 5/8"   | B2 + 7/16"      | B2 + 2 5/8"  |
| B1 + 9/16"      | B1 + 3 3/8"   | B2 + 9/16"      | B2 + 3 3/8"  |
| B1 + 11/16"     | B1 + 4 1/8"   | B2 + 11/16"     | B2 + 4 1/8"  |
| B1 + 13/16"     | B1 + 4 7/8"   | B2 + 13/16"     | B2 + 4 7/8"  |
| B1 + 1 1/8"     | B1 + 6 3/4"   | B2 + 1 1/8"     | B2 + 6 3/4"  |

| END PLATE       |               |                     |              |
|-----------------|---------------|---------------------|--------------|
| Hole Centers C1 | Length min L1 | Hole Centers min C2 | Width min L2 |
| B + 7/16"       | B + 2 5/8"    | 2 3/4"              | C2 + 2"      |
| B + 9/16"       | B + 3 3/8"    | 3 1/8"              | C2 + 2 3/8"  |
| B + 11/16"      | B + 4 1/8"    | 4"                  | C2 + 2 3/4"  |
| B + 13/16"      | B + 4 7/8"    | 4 3/4"              | C2 + 3 1/2"  |
| B + 1 1/8"      | B + 6 3/4"    | 6"                  | C2 + 4 1/4"  |

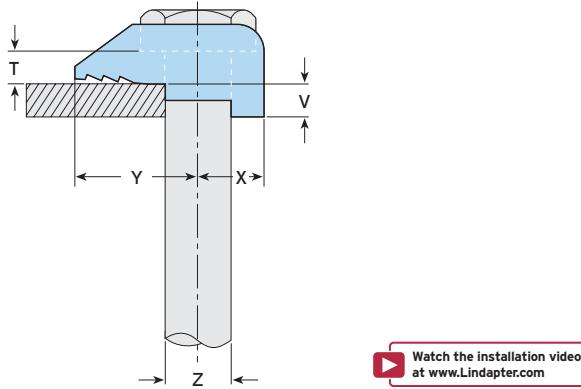
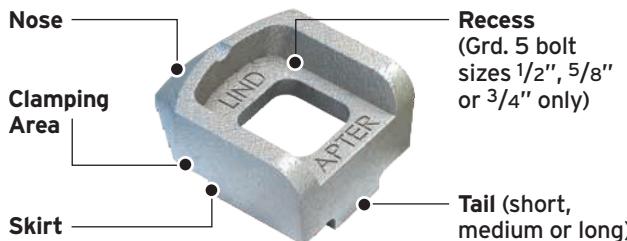
1) Depending on the type of connection and associated end plate use, the thickness may need to be modified to comply with accepted local design codes.

➤ Use Lindapter's Bolt Length Calculator on page 8 to calculate the correct bolt length for your application.

➤ If drilling through the flange of the supported steel please contact Lindapter to ensure suitability.

## Type A

Lindapter's standard clamp is used to resist moderate tensile loading. Can also be used with Type B in a Girder Clamp configuration.



- Recessed top holds the bolt captive while the nut is tightened (Grd. 5 bolt sizes  $1/2"$ ,  $5/8"$  or  $3/4"$  only).
- Supports up to 17,720lbs tensile load in a four-bolt configuration.
- Independently evaluated for fatigue resistance per EN 1993-1-9.
- For products suitable for tapered beams over  $4^{\circ}$ , see page 9.
- For higher loads the Type AF should be used, see page 11.

► Packing pieces are available to increase the clamping range, see page 24. ► For location plate / end plate details, see page 25.

Material: Malleable iron, zinc plated or hot dip galvanized.

| Product Code        | Bolt Grd. 5 Z | Safe Working Loads (FOS 5:1) |                           | Minimum Plate Thickness (see page 25) |           | Tightening Torque* | Y        | X       | Dimensions |         |         |         |                  |
|---------------------|---------------|------------------------------|---------------------------|---------------------------------------|-----------|--------------------|----------|---------|------------|---------|---------|---------|------------------|
|                     |               | Tensile Resistance / 1 Bolt  | Slip Resistance / 2 Bolts | Location Plate                        | End Plate |                    |          |         | short      | medium  | long    |         |                  |
|                     |               | lbs                          | lbs                       |                                       |           | ft lb              |          |         |            |         |         |         |                  |
| LA037 <sup>1)</sup> | $3/8"$        | 337                          | -                         | $5/16"$                               | $1/2"$    | 15                 | $13/16"$ | $7/16"$ | $5/32"$    | $3/16"$ | $9/32"$ | $3/16"$ | 1"               |
| LA050               | $1/2"$        | 1304                         | 202                       | $3/8"$                                | $1/2"$    | 50                 | 1"       | $1/2"$  | $3/16"$    | $1/4"$  | $3/8"$  | $1/4"$  | $1\frac{1}{8}"$  |
| LA062               | $5/8"$        | 1911                         | 382                       | $3/8"$                                | $5/8"$    | 108                | $13/16"$ | $5/8"$  | $1/4"$     | $5/16"$ | $7/16"$ | $5/16"$ | $1\frac{3}{8}"$  |
| LA075               | $3/4"$        | 3305                         | 674                       | $1/2"$                                | $7/8"$    | 210                | $17/16"$ | $3/4"$  | $5/16"$    | $3/8"$  | $1/2"$  | $3/8"$  | $1\frac{3}{16}"$ |
| LA100 <sup>1)</sup> | 1"            | 4430                         | 1012                      | $5/8"$                                | 1"        | 362                | $17/8"$  | $11/8"$ | $3/8"$     | $1/2"$  | $5/8"$  | $1/2"$  | $2\frac{1}{8}"$  |

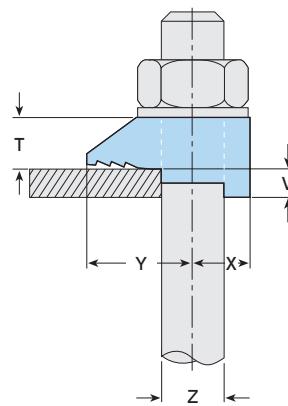
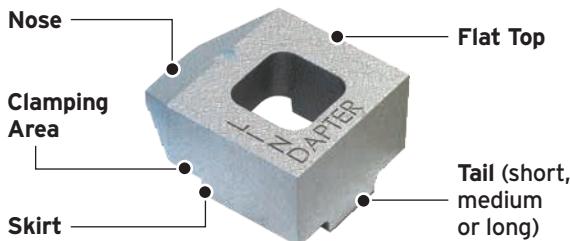
1) Requires Type W washer (product code LW037), see page 24.

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

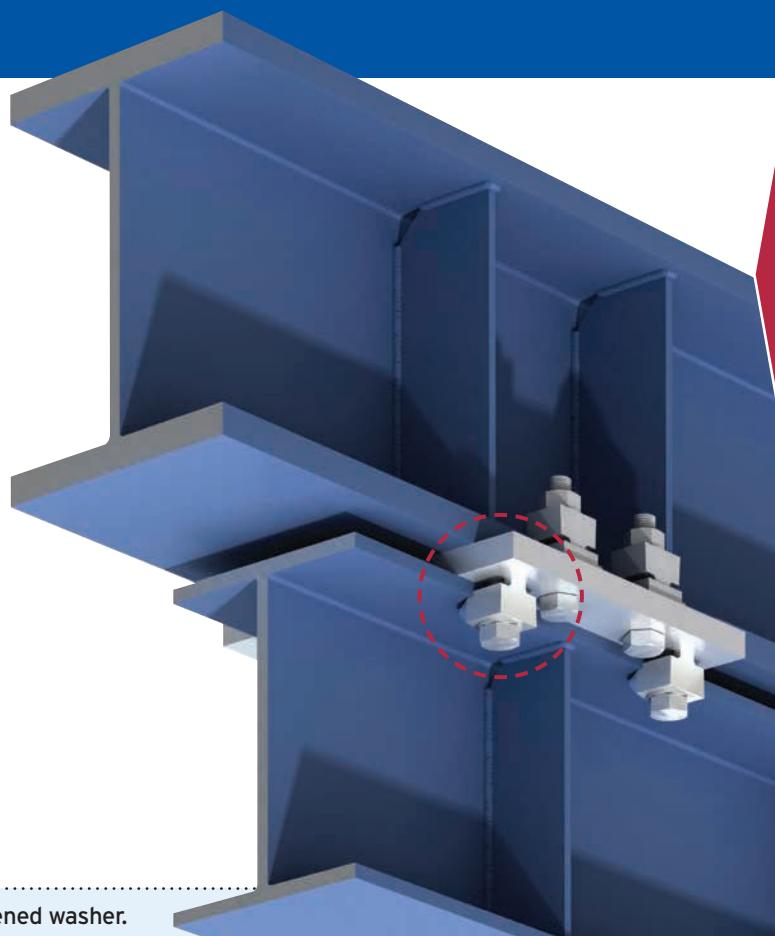
► If using A325 bolts, the Type B should be used (see page 23).

## Type B

The flat-top version of Lindapter's standard clamp, for moderate tensile loading. Can also be used with Type A in a Girder Clamp configuration.



Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



- Flat top allows the bolt head or nut to rotate on a hardened washer.
- Suitable for use with bolts, studs, tie rods and J-bolts.
- Supports up to 17,720lbs tensile load in a four-bolt configuration.
- Independently evaluated for fatigue resistance per EN 1993-1-9.
- For products suitable for tapered beams over 4°, see [page 9](#).
- For higher loads the Type AF should be used, see [page 11](#).

► **Packing pieces are available to increase the clamping range, see [page 24](#).** ► **For location plate / end plate details, see [page 25](#).**

Material: Malleable iron, zinc plated or hot dip galvanized.

| Product Code        | Bolt Grd. 5 / A325 Z | Safe Working Loads (FOS 5:1) |                           |                |           | Minimum Plate Thickness (see <a href="#">page 25</a> ) | Tightening Torque* | Y     | X     | Dimensions    |       |        |          |  |  |  |
|---------------------|----------------------|------------------------------|---------------------------|----------------|-----------|--|--------------------|-------|-------|---------------|-------|--------|----------|--|--|--|
|                     |                      | Tensile Resistance / 1 Bolt  | Slip Resistance / 2 Bolts | Location Plate | End Plate |  |                    |       |       | Tail Length V |       |        |          |  |  |  |
|                     |                      | lbs                          | lbs                       |                |           |  |                    |       |       | ft lb         | short | medium | long     |  |  |  |
| LB037 <sup>1)</sup> | 3/8"                 | 337                          | -                         | 5/16"          | 1/2"      | 15   | 13/16"             | 7/16" | 5/32" | 3/16"         | 9/32" | 3/8"   | 1"       |  |  |  |
| LB050               | 1/2"                 | 1304                         | 202                       | 3/8"           | 1/2"      | 50   | 1"                 | 1/2"  | 3/16" | 1/4"          | 3/8"  | 1/2"   | 1 1/8"   |  |  |  |
| LB062               | 5/8"                 | 1911                         | 382                       | 3/8"           | 5/8"      | 108  | 13/16"             | 5/8"  | 1/4"  | 5/16"         | 7/16" | 5/8"   | 1 3/8"   |  |  |  |
| LB075               | 3/4"                 | 3305                         | 674                       | 1/2"           | 7/8"      | 210  | 17/16"             | 3/4"  | 5/16" | 3/8"          | 1/2"  | 3/4"   | 1 13/16" |  |  |  |
| LB100               | 1"                   | 4430                         | 1012                      | 5/8"           | 1"        | 362  | 17/8"              | 1"    | 3/8"  | 1/2"          | 5/8"  | 1"     | 2 1/8"   |  |  |  |

1) Requires a hardened washer under the bolt head.

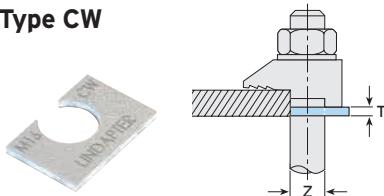
\* Torque figures based on fasteners in an unlubricated condition. For further information see [page 70](#).

## Packing Pieces for Types A and B

These packing pieces are compatible with the Type A and Type B clamps and are used to increase the clamping range to suit flange thicknesses. Types A and B are available with three different tail lengths (short, medium or long) and the correct combination of packing pieces should be used.

### Packing Pieces

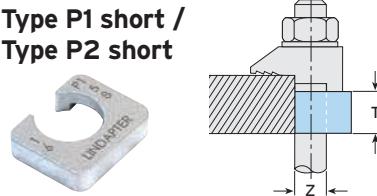
#### Type CW



Mild steel, zinc plated or hot dip galvanized.

| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LCW037       | 3/8"        | 1/16"       |
| LCW050       | 1/2"        | 1/8"        |
| LCW062       | 5/8"        | 1/8"        |
| LCW075       | 3/4"        | 3/16"       |
| LCW100       | 1"          | 3/16"       |

#### Type P1 short / Type P2 short

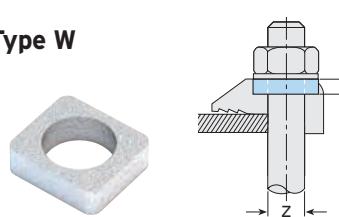


Mild steel, malleable iron, zinc plated or hot dip galv.

| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LP1037S      | 3/8"        | 3/16"       |
| LP1050S      | 1/2"        | 1/4"        |
| LP1062S      | 5/8"        | 5/16"       |
| LP1075S      | 3/4"        | 3/8"        |
| LP1100S      | 1"          | 1/2"        |
| LP2037S      | 3/8"        | 3/8"        |
| LP2050S      | 1/2"        | 1/2"        |
| LP2062S      | 5/8"        | 5/8"        |
| LP2075S      | 3/4"        | 3/4"        |
| LP2100S      | 1"          | 1"          |

### Also Available

#### Type W



Mild steel, malleable iron, zinc plated or hot dip galv.

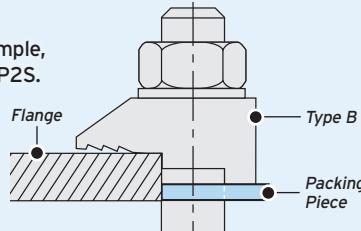
| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LW037        | 3/8"        | 3/16"       |
| LW050        | 1/2"        | 1/4"        |
| LW062        | 5/8"        | 5/16"       |
| LW075        | 3/4"        | 3/8"        |

Note: Type W is used to fill the recess in the Type A to convert it into a flat top clamp which enables an A325 structural bolt head or nut to be rotated on a hardened washer.

### Tail Length / Packing Piece Combinations for Types A and B

Choose the correct combination for your Type A/B configuration using the table below. For example, a 5/8" Type A/B on a 11/8" flange requires 1x Type A/B short tail (S), 2x Type CW and 1x Type P2S.

- For thicker flanges contact Lindapter. ➤ Other combinations than what is shown here may be possible. Contact our Technical Support team to discuss your requirements.
- If your flange thickness exceeds the flange thickness listed in the table, use the packing piece combination from the next largest flange thickness. Interpolation of table values is not permitted.



| Flange Thickness | 3/8" |    |     |     | 1/2" |    |     |     | 5/8" |    |     |     | 3/4" |    |     |     | 1"  |    |     |     |
|------------------|------|----|-----|-----|------|----|-----|-----|------|----|-----|-----|------|----|-----|-----|-----|----|-----|-----|
|                  | A/B  | CW | P1S | P2S | A/B | CW | P1S | P2S |
| 3/16"            | M    | -  | -   | -   | S    | -  | -   | -   | X    | -  | -   | -   | X    | -  | -   | -   | X   | -  | -   | -   |
| 1/4"             | S    | 1  | -   | -   | M    | -  | -   | -   | S    | -  | -   | -   | S    | -  | -   | -   | S   | -  | -   | -   |
| 5/16"            | L    | -  | -   | -   | M    | 1  | -   | -   | M    | -  | -   | -   | S    | -  | -   | -   | S   | -  | -   | -   |
| 3/8"             | S    | -  | 1   | -   | L    | -  | -   | -   | S    | 1  | -   | -   | M    | -  | -   | -   | S   | -  | -   | -   |
| 7/16"            | L    | 2  | -   | -   | M    | 2  | -   | -   | L    | -  | -   | -   | S    | 1  | -   | -   | M   | -  | -   | -   |
| 1/2"             | L    | 3  | -   | -   | S    | 1  | 1   | -   | S    | 2  | -   | -   | L    | -  | -   | -   | M   | -  | -   | -   |
| 9/16"            | S    | -  | -   | 1   | L    | 2  | -   | -   | L    | 1  | -   | -   | M    | 1  | -   | -   | S   | 1  | -   | -   |
| 5/8"             | S    | 1  | -   | 1   | L    | -  | 1   | -   | M    | -  | 1   | -   | L    | 1  | -   | -   | L   | -  | -   | -   |
| 11/16"           | L    | -  | -   | 1   | M    | 2  | 1   | -   | L    | 2  | -   | -   | S    | -  | 1   | -   | S   | 2  | -   | -   |
| 3/4"             | S    | -  | 1   | 1   | S    | 1  | -   | 1   | L    | -  | 1   | -   | S    | 3  | -   | -   | L   | 1  | -   | -   |
| 13/16"           | M    | -  | 1   | 1   | M    | 1  | -   | 1   | M    | 3  | -   | -   | M    | -  | 1   | -   | L   | 1  | -   | -   |
| 7/8"             | L    | -  | 1   | 1   | S    | -  | 1   | 1   | M    | 2  | 1   | -   | M    | 3  | -   | -   | S   | -  | 1   | -   |
| 15/16"           | S    | -  | -   | 2   | M    | -  | 1   | 1   | M    | -  | -   | 1   | M    | 1  | 1   | -   | M   | -  | 1   | -   |
| 1"               | M    | -  | -   | 2   | S    | 1  | 1   | 1   | L    | 2  | 1   | -   | S    | 2  | 1   | -   | S   | 1  | 1   | -   |
| 1 1/16"          | L    | -  | -   | 2   | M    | 1  | 1   | 1   | L    | -  | -   | 1   | S    | -  | -   | 1   | L   | -  | 1   | -   |
| 1 1/8"           | L    | 1  | -   | 2   | S    | -  | -   | 2   | S    | 2  | -   | 1   | M    | 2  | 1   | -   | L   | -  | 1   | -   |
| 1 3/16"          | -    | -  | -   | -   | M    | -  | -   | 2   | L    | 1  | -   | 1   | M    | -  | -   | 1   | S   | 2  | 1   | -   |
| 1 1/4"           | -    | -  | -   | -   | S    | 1  | -   | 2   | M    | -  | 1   | 1   | S    | 1  | -   | 1   | L   | 1  | 1   | -   |

A/B = Type A/B | S = Type A/B short | M = Type A/B medium | L = Type A/B long | CW = Type CW | P1S/P2S = Type P1/P2 short | X = Not possible

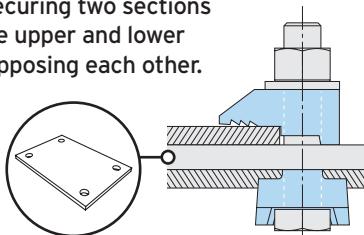
## Location and End Plates for Types A and B

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 .....

Location plates are required when securing two sections together with clamps attached to the upper and lower sections with both clamps directly opposing each other.

The plate is positioned between the two sections to hold the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.

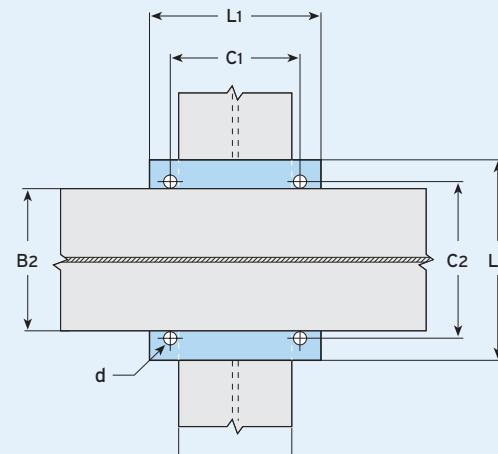


Material: Structural steel grade A36. For other grades contact Lindapter.

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

#### LOCATION PLATE DIMENSIONS

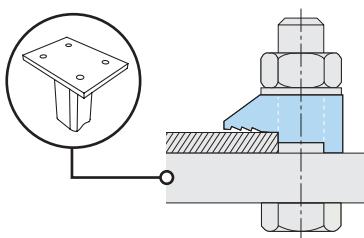
L1 = Location Plate Length, L2 = Location Plate Width, B1, B2 = Flange Width, C1, C2 = Hole Centers, d = Hole Ø



### End Plate .....

End Plates should be used when clamps are attached to the supporting section only.

The End Plate holds the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.



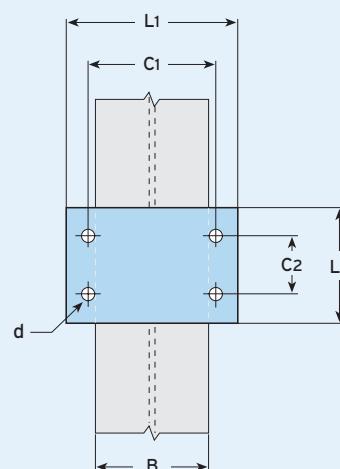
Material: Structural steel grade A36. For other grades contact Lindapter.

| Bolt Size | Hole Ø d | Plate Thickness <sup>1)</sup> | Hole Centers C1 | Length min L1 | Hole Centers min C2 | Width min L2 |
|-----------|----------|-------------------------------|-----------------|---------------|---------------------|--------------|
| 3/8"      | 7/16"    | 1/2"                          | B + 7/16"       | B + 1 3/4"    | 2"                  | C2 + 1 5/8"  |
| 1/2"      | 9/16"    | 1/2"                          | B + 9/16"       | B + 2 1/4"    | 2 3/8"              | C2 + 2"      |
| 5/8"      | 11/16"   | 5/8"                          | B + 11/16"      | B + 2 3/4"    | 2 7/8"              | C2 + 2 3/8"  |
| 3/4"      | 13/16"   | 7/8"                          | B + 13/16"      | B + 3 1/2"    | 3 5/8"              | C2 + 2 3/4"  |
| 1"        | 1 1/16"  | 1"                            | B + 1 1/8"      | B + 4 1/4"    | 4 3/8"              | C2 + 3 5/8"  |

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.

#### END PLATE DIMENSIONS

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

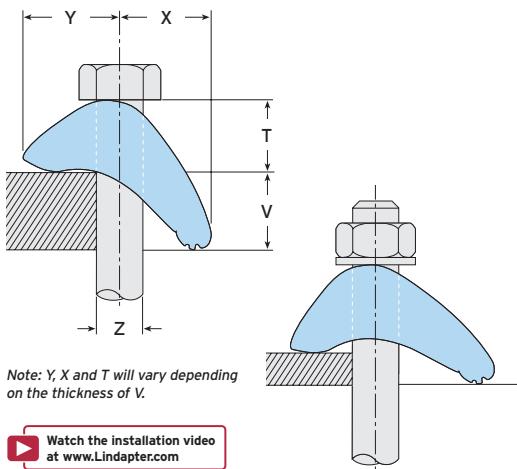
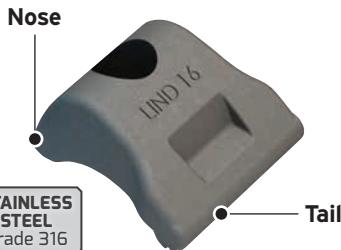


➤ Use Lindapter's Bolt Length Calculator on page 8 to calculate the correct bolt length for your application.

➤ If drilling through the flange of the supported steel please contact Lindapter to ensure suitability.

## Type LS

Providing excellent corrosion resistance, Lindapter's stainless steel clamp self-adjusts to suit a range of flange thicknesses.



Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



- Made from high strength stainless steel grade 316.
- Self-adjusts to suit a range of flange thicknesses.
- For parallel and tapered flanges up to and including 10°.
- The tail spans slotted clearance holes.

► See page 27 for the packing pieces available to increase the clamping range, as well as location and end plate details.

Material: Cast stainless steel grade 316.

| Product Code | Bolt <sup>1)</sup> Z | Safe Working Loads                    |   |                |           | Minimum Plate Thickness (see page 27) | Tightening Torque* | Clamping Range <sup>3)</sup> V | Dimensions      |               |        |       |
|--------------|----------------------|---------------------------------------|---|----------------|-----------|---------------------------------------|--------------------|--------------------------------|-----------------|---------------|--------|-------|
|              |                      | Tensile Resistance / 1 Bolt (FOS 5:1) | Slip Resistance <sup>2)</sup> / 2 Bolts (FOS 2:1) | Location Plate | End Plate |                                       |                    |                                | Y               | X             | T      | Width |
|              |                      | lbs                                   | lbs   |                |           | ft lb                                 |                    |                                |                 |               |        |       |
| LLS037       | 3/8"                 | 675                                   | 337   | 3/8"           | 3/8"      | 30                                    | 1/8" - 9/16"       | 5/8" - 3/4"                    | 11/16" - 15/16" | 5/8" - 13/16" | 11/2"  |       |
| LLS050       | 1/2"                 | 1574                                  | 450   | 1/2"           | 5/8"      | 60                                    | 1/8" - 13/16"      | 5/8" - 7/8"                    | 11/16" - 11/8"  | 5/8" - 7/8"   | 19/16" |       |
| LLS062       | 5/8"                 | 2248                                  | 675   | 5/8"           | 3/4"      | 148                                   | 1/8" - 1"          | 7/8" - 1"                      | 11/16" - 17/16" | 3/4" - 11/8"  | 23/16" |       |
| LLS075       | 3/4"                 | 4047                                  | 1124  | 3/4"           | 1"        | 295                                   | 1/8" - 13/16"      | 15/16" - 11/4"                 | 1" - 15/8"      | 7/8" - 11/4"  | 23/8"  |       |

1) LLS037: ASTM F593G (316) Stainless Steel / ASTM A320 B8M CL2 (316) Stainless Steel

2) LLS050, LLS062 & LLS075: ASTM A320 B8M CL2 (316) Stainless Steel / ASTM A193 B8M CL2 (316) Stainless Steel

2) Slip resistant values calculated against movement exceeding 0.004" / 0.1mm.

3) For thicker flanges, see the packing pieces on page 27.

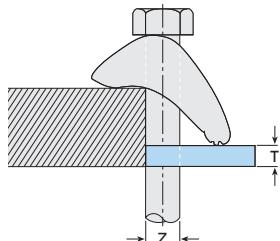
\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

## Packing Pieces and Plate Details for Type LS

Stainless steel packing pieces are available to increase the clamping range of the Type LS, please select the correct packing combination from the table below. This page also contains information for designing location / end plates.

### Packing Pieces

#### Type LSP2

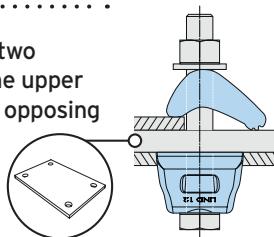


Material: Stainless steel grade 316.

| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LLS037P2     | 3/8"        | 3/8"        |
| LLS050P2     | 1/2"        | 3/8"        |
| LLS062P2     | 5/8"        | 3/8"        |
| LLS075P2     | 3/4"        | 3/8"        |

### Location Plate

**Location Plates** are required when securing two sections together with clamps attached to the upper and lower sections with both clamps directly opposing each other. The plate is positioned between the two sections to hold the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.

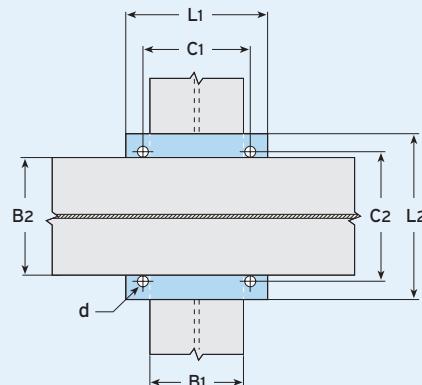


Material: Stainless steel grade 316.

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

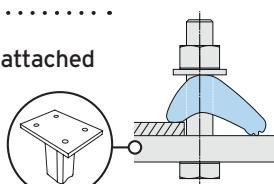
#### LOCATION PLATE DIMENSIONS

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



### End Plate

**End Plates** should be used when clamps are attached to the supporting section only. The End Plate holds the bolts at the correct centers and should be fabricated to the dimensions shown in the table below.

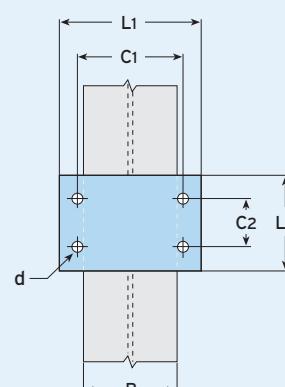


Material: Stainless steel grade 316.

| Bolt Size | Hole Ø d | Plate Thickness <sup>1)</sup> | Hole Centers C1 | Length min L1 | Hole Centers min C2 | Width min L2 |
|-----------|----------|-------------------------------|-----------------|---------------|---------------------|--------------|
| 3/8"      | 7/16"    | 3/8"                          | B + 7/16"       | B + 2 3/4"    | 3 1/8"              | C2 + 2 3/8"  |
| 1/2"      | 9/16"    | 5/8"                          | B + 9/16"       | B + 3 1/8"    | 3 1/8"              | C2 + 2 3/8"  |
| 5/8"      | 11/16"   | 3/4"                          | B + 11/16"      | B + 4"        | 4 3/8"              | C2 + 3 1/8"  |
| 3/4"      | 13/16"   | 1"                            | B + 13/16"      | B + 5 1/8"    | 4 3/4"              | C2 + 3 9/16" |

#### END PLATE DIMENSIONS

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



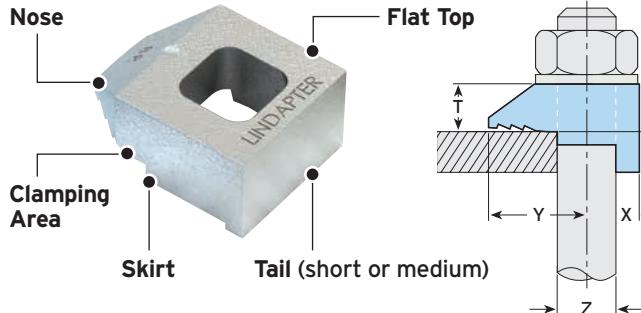
1) Depending on the type of connection and associated end plate use, the thickness may need to be modified to comply with accepted local design codes.

➤ Use Lindapter's Bolt Length Calculator on page 8 to calculate the correct bolt length for your application.

➤ If drilling through the flange of the supported steel please contact Lindapter to ensure suitability.

## Type BR

Primarily a steel connection for use with either parallel or tapered flanges up to and including 8°. The tail is available in two lengths and spans slotted clearance holes.



Material: Malleable iron, zinc plated or hot dip galvanized.

| Product Code | Bolt Grd. 5 / A325 Z | Safe Working Loads (FOS 5:1)    |                               |                          | Reduced Torque / Loads (not suitable for slip conditions) |                          | Dimensions |      |               |       |      |        |
|--------------|----------------------|---------------------------------|-------------------------------|--------------------------|---|--------------------------|------------|------|---------------|-------|------|--------|
|              |                      | Tensile Resistance / 1 Bolt lbs | Slip Resistance / 2 Bolts lbs | Tightening Torque* ft lb | Tensile Resistance / 1 Bolt lbs                           | Tightening Torque* ft lb | Y          | X    | Tail Length V |       | T    | Width  |
| LBR050       | 1/2"                 | 1304                            | 202                           | 50                       | 832   | 29                       | 1"         | 1/2" | 5/32"         | 1/4"  | 1/2" | 1 1/8" |
| LBR062       | 5/8"                 | 1911                            | 382                           | 108                      | 1169  | 69                       | 13/16"     | 5/8" | 1/4"          | 5/16" | 5/8" | 1 3/8" |
| LBR075       | 3/4"                 | 3305                            | 674                           | 210                      | 1933  | 131                      | 13/8"      | 7/8" | 9/32"         | 3/8"  | 3/4" | 1 5/8" |

\* Torque figures based on fasteners in an unlubricated condition.  
For further information see page 70.

- Please ensure the anchor device is suitable for the torque value shown above.
- Contact Lindapter to ensure suitability of the component for application.

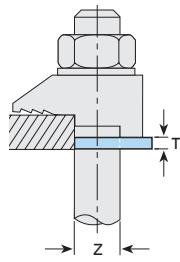
## Packing Pieces

### Type CW

Mild steel, zinc plated or hot dip galvanized.



| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LCW050       | 1/2"        | 1/8"        |
| LCW062       | 5/8"        | 1/8"        |
| LCW075       | 3/4"        | 3/16"       |

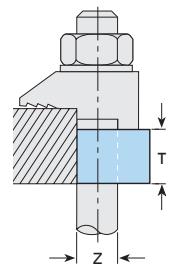


### Type P1 / P2 short

Mild steel, malleable iron, zinc plated or hot dip galvanized.



| Product Code | Bolt Size Z | Dimension T |
|--------------|-------------|-------------|
| LP1050S      | 1/2"        | 1/4"        |
| LP1062S      | 5/8"        | 5/16"       |
| LP1075S      | 3/4"        | 3/8"        |
| LP2050S      | 1/2"        | 1/2"        |
| LP2062S      | 5/8"        | 5/8"        |
| LP2075S      | 3/4"        | 3/4"        |



### Packing Piece Combinations for Type BR

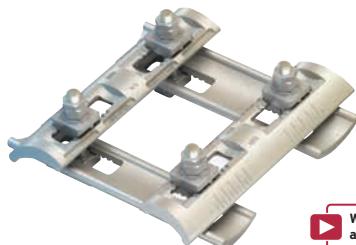
- If your flange thickness exceeds the flange thickness listed in the table, use the packing piece combination from the next largest flange thickness. Interpolation of table values is not permitted.
- For thicker flanges contact Lindapter.
- Other combinations than what is shown here may be possible. Please contact our Technical Support team to discuss your requirements.

| Flange Thickness | 1/2" |    |     |     | 5/8" |    |     |     | 3/4" |    |     |     |
|------------------|------|----|-----|-----|------|----|-----|-----|------|----|-----|-----|
|                  | BR   | CW | P1S | P2S | BR   | CW | P1S | P2S | BR   | CW | P1S | P2S |
| 3/16"            | S    | -  | -   | -   | X    | -  | -   | -   | X    | -  | -   | -   |
| 1/4"             | M    | -  | -   | -   | S    | -  | -   | -   | S    | -  | -   | -   |
| 5/16"            | M    | 1  | -   | -   | M    | -  | -   | -   | S    | -  | -   | -   |
| 3/8"             | S    | 2  | -   | -   | S    | 1  | -   | -   | M    | -  | -   | -   |
| 7/16"            | M    | 2  | -   | -   | M    | 1  | -   | -   | S    | 1  | -   | -   |
| 1/2"             | S    | 1  | 1   | -   | S    | 2  | -   | -   | S    | 1  | -   | -   |
| 9/16"            | M    | 1  | 1   | -   | S    | -  | 1   | -   | M    | 1  | -   | -   |
| 5/8"             | S    | 2  | 1   | -   | M    | -  | 1   | -   | S    | 2  | -   | -   |
| 11/16"           | M    | 2  | 1   | -   | S    | 1  | 1   | -   | S    | -  | 1   | -   |
| 3/4"             | S    | 1  | -   | 1   | M    | 1  | 1   | -   | S    | 3  | -   | -   |
| 13/16"           | M    | 1  | -   | 1   | S    | 2  | 1   | -   | M    | -  | 1   | -   |
| 7/8"             | S    | -  | 1   | 1   | M    | 2  | 1   | -   | M    | 3  | -   | -   |
| 15/16"           | M    | -  | 1   | 1   | M    | -  | -   | 1   | M    | 1  | 1   | -   |
| 1"               | S    | 1  | 1   | 1   | S    | 1  | -   | 1   | S    | 2  | 1   | -   |
| 11/16"           | M    | 1  | 1   | 1   | M    | 1  | -   | 1   | S    | -  | -   | 1   |
| 1 1/8"           | S    | -  | -   | 2   | S    | 2  | -   | 1   | M    | 2  | 1   | -   |
| 1 3/16"          | M    | -  | -   | 2   | M    | 2  | -   | 1   | M    | -  | -   | 1   |
| 1 1/4"           | S    | 1  | -   | 2   | M    | -  | 1   | 1   | S    | 1  | -   | 1   |

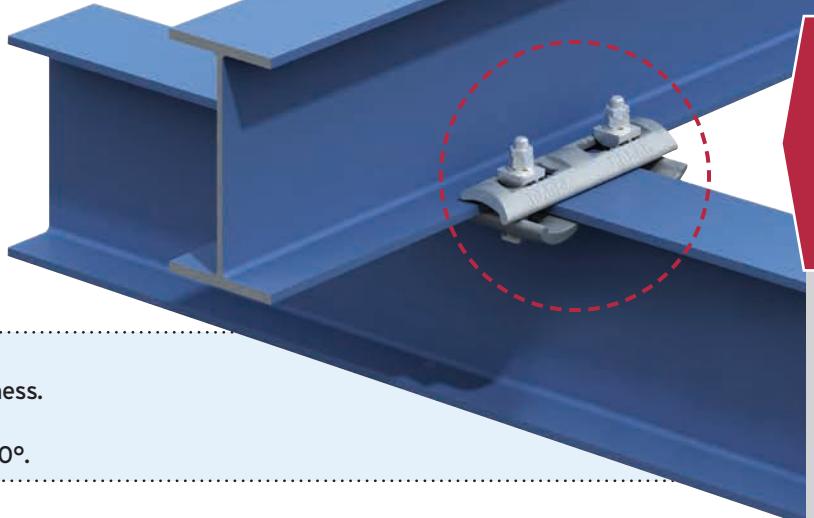
S = Type BR short | M = Type BR medium | CW = Type CW | P1S = P1 short | P2S = P2 short | X = Not possible

## Type FC - Flush Clamp

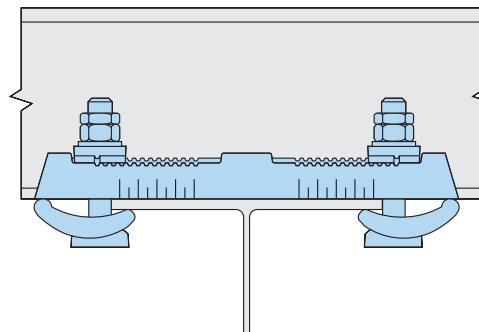
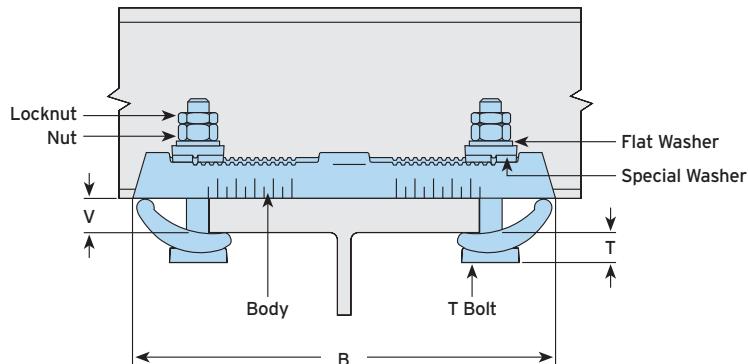
A full connection system that adjusts to fit a variety of beam types. This pre-configured assembly does not require a location plate and is ready for assembly 'out of the box'.



Watch the installation video  
at [www.Lindapter.com](http://www.Lindapter.com)



- 'All-in-one' device for connecting steel sections.
- Adjustable to suit both beam width and flange thickness.
- Quick and easy to install.
- For parallel and tapered flanges up to and including 10°.



Material: Forged steel, zinc plated plus JS500.

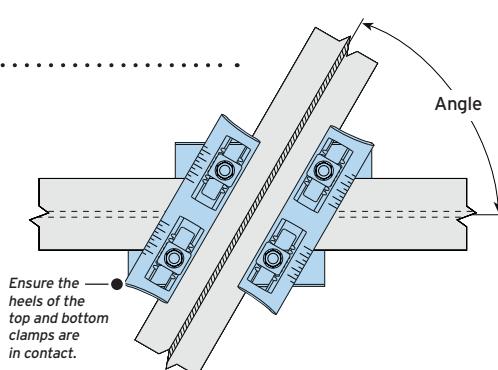
| Product Code | Special Bolt Size Z | Safe Working Loads (FOS 5:1)     |                               | Tightening Torque* | Clamping Range     |                            | Dimensions     |     |
|--------------|---------------------|----------------------------------|-------------------------------|--------------------|--------------------|----------------------------|----------------|-----|
|              |                     | Tensile Resistance / 4 Bolts lbs | Slip Resistance / 4 Bolts lbs |                    | Flange Thickness V | Flange Width <sup>1)</sup> | T              | B   |
| LFCM16       | M16 (5/8")          | 6744                             | 1686                          | 108                | 3/16" - 3/4"       | 3" - 7"                    | 7/8" - 1 1/16" | 12" |

1) Depending on beam connection angles (see table below).

\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

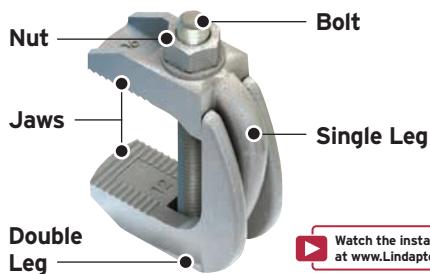
## Minimum Possible Beam Connection Angles

| Bottom Beam | Flange Width | Top Beam |     |     |     |    |
|-------------|--------------|----------|-----|-----|-----|----|
|             |              | 3"       | 4"  | 5"  | 6"  | 7" |
| 3"          | 45°          | 50°      | 55° | 65° | 75° |    |
| 4"          | 50°          | 50°      | 55° | 65° | 75° |    |
| 5"          | 55°          | 55°      | 55° | 65° | 75° |    |
| 6"          | 65°          | 65°      | 65° | 65° | 75° |    |
| 7"          | 75°          | 75°      | 75° | 75° | 80° |    |

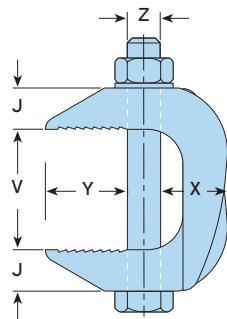


## Type F9

A flange clamp for connecting parallel running steel sections with flanges of the same width. Can be used with bolts or threaded rod.



Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



- Fast, cost effective installation.
- Perfect for temporary or permanent use.
- Large clamping range.
- Available zinc plated or hot dip galvanized.
- Can be used with threaded rod for supporting pipes.
- Supplied with or without a metric bolt.

FREE connection detailing  
See page 4

Material: Malleable iron, zinc plated or hot dip galvanized.

| Without Bolt              |                    | With Bolt                 |            | Safe Working Loads<br>(FOS 5:1) | Tightening<br>Torque* | Clamping<br>Range<br>V | Dimensions |        |         |        |
|---------------------------|--------------------|---------------------------|------------|---------------------------------|-----------------------|------------------------|------------|--------|---------|--------|
| Product<br>Code           | Bolt<br>/ Rod<br>Z | Product<br>Code           | Bolt<br>Z  |                                 |                       |                        | Y          | J      | X       | Width  |
| LF9037NB                  | 3/8"               | LF9037WB                  | M10 (3/8") | 440                             | 15                    | 3/4" - 1 11/16"        | 1"         | 1/2"   | 3/4"    | 15/16" |
| LF9050NB                  | 1/2"               | LF9050WB                  | M12 (1/2") | 630                             | 29                    | 1" - 2 3/8"            | 13/8"      | 11/16" | 15/16"  | 13/16" |
| LF9062NB                  | 5/8"               | LF9062WB                  | M16 (5/8") | 1260                            | 69                    | 1 1/8" - 2 3/4"        | 11/16"     | 13/16" | 1 1/8"  | 13/8"  |
| LF9075NB                  | 3/4"               | LF9075WB                  | M20 (3/4") | 1880                            | 131                   | 1 1/4" - 3 1/4"        | 2"         | 1"     | 17/8"   | 13/4"  |
| LF9100NBHDG <sup>1)</sup> | 1"                 | LF9100WBHDG <sup>1)</sup> | M24 (1")   | 3147                            | 173                   | 1 3/4" - 3 3/4"        | 3"         | 1 1/2" | 2 3/16" | 2 1/2" |

1) Available in Hot Dip Galvanized only.

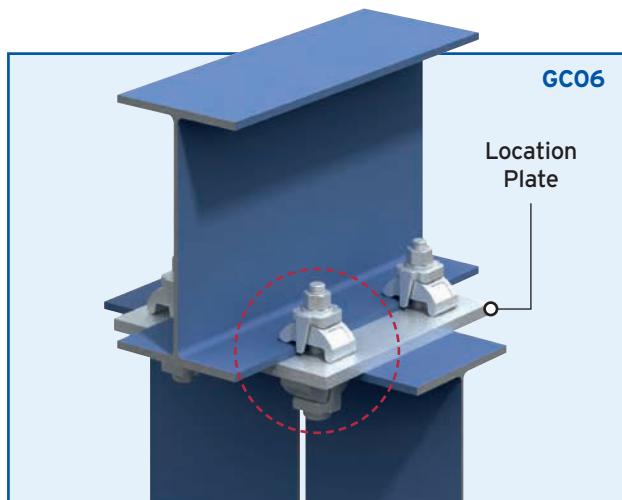
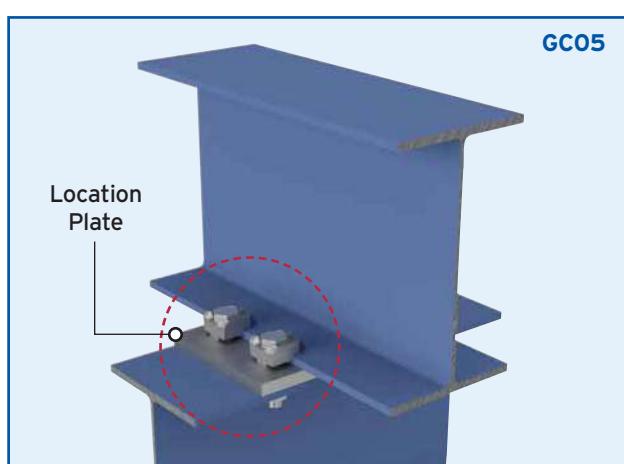
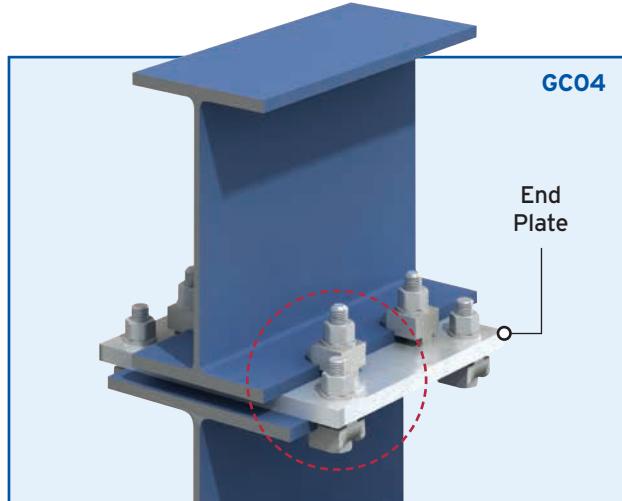
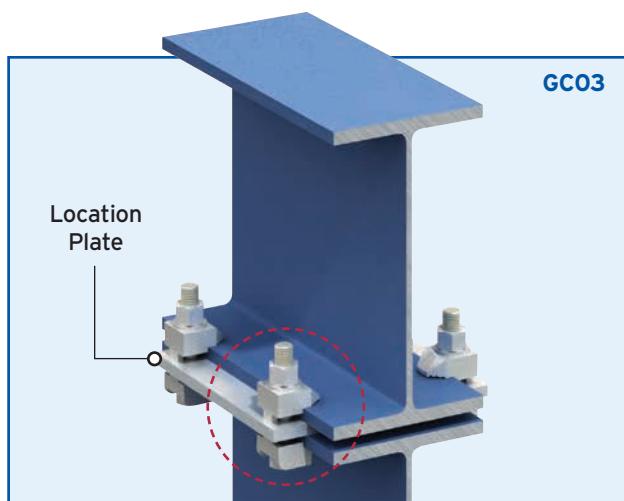
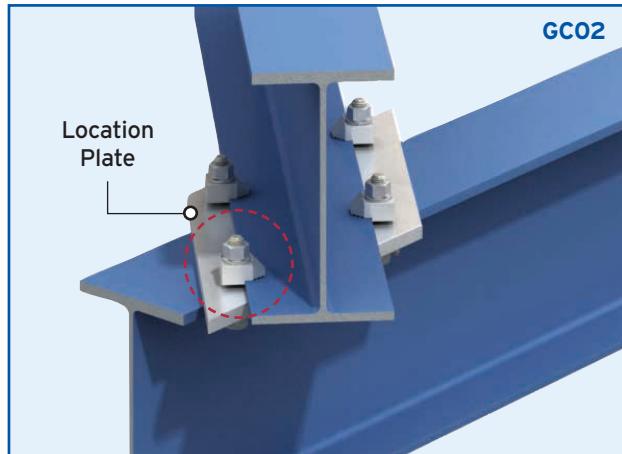
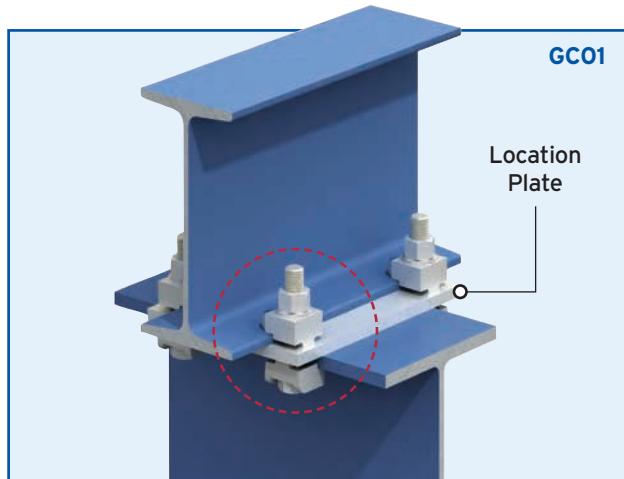
\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

➤ Not suitable for tapered flanges.

➤ Supplied without bolt or with bolt (contact your local distributor for details / options).

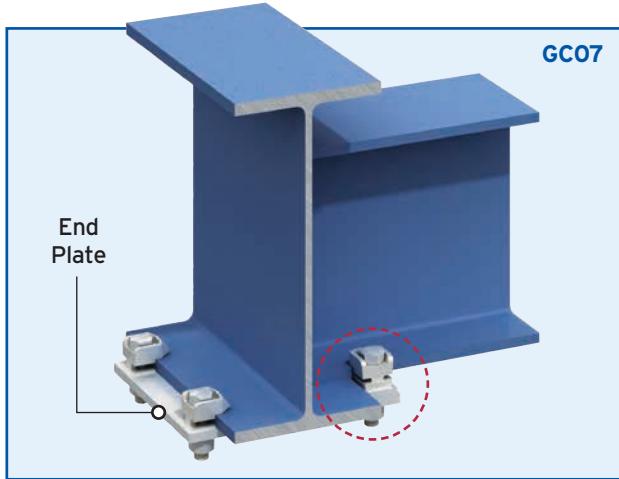
## Typical Applications for Girder Clamps

Popular connection assemblies are shown below. They represent a fraction of the possibilities as Lindapter's clamps are used all over the world to connect almost every type of steel section. Please contact Lindapter to discuss your connection requirement.

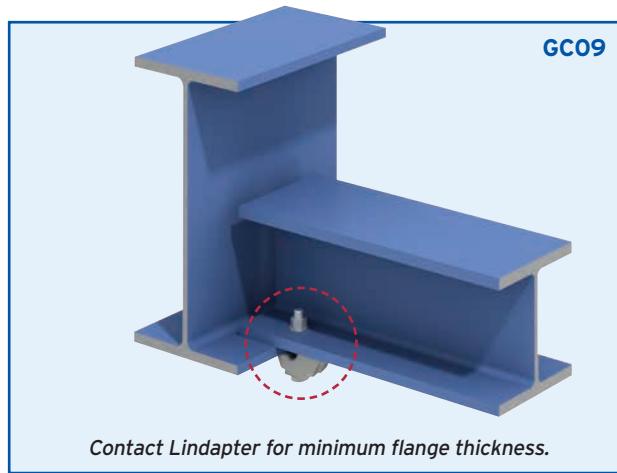


## Typical Applications for Girder Clamps

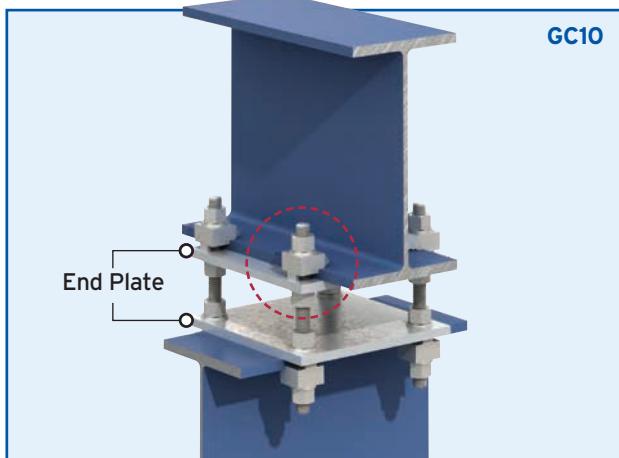
Examples of popular connection arrangements are continued below:



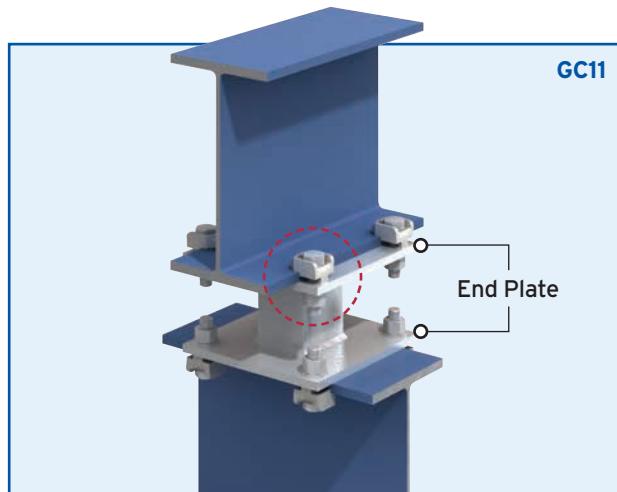
GC07



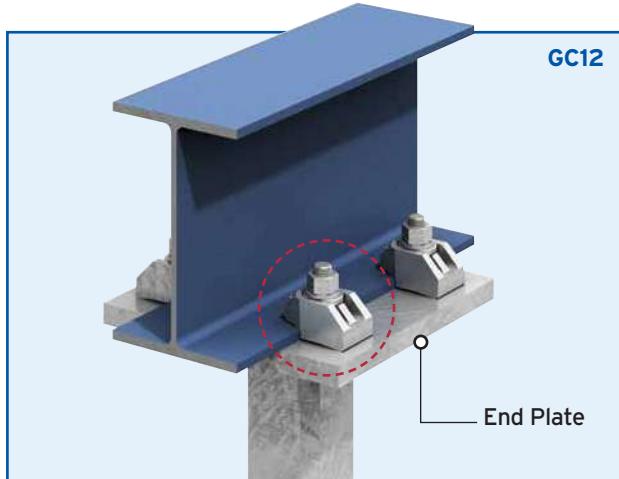
GC09



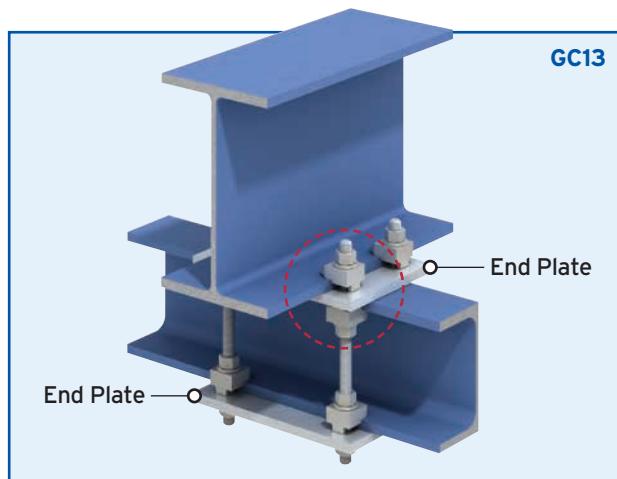
GC10



GC11



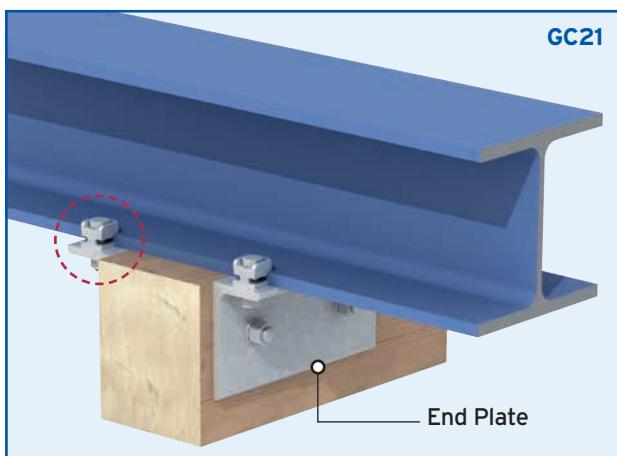
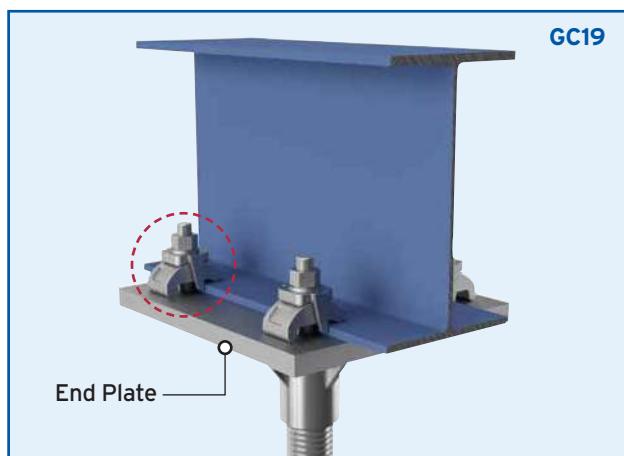
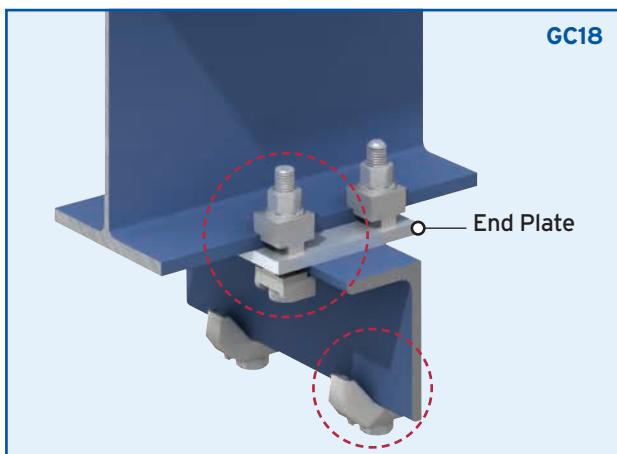
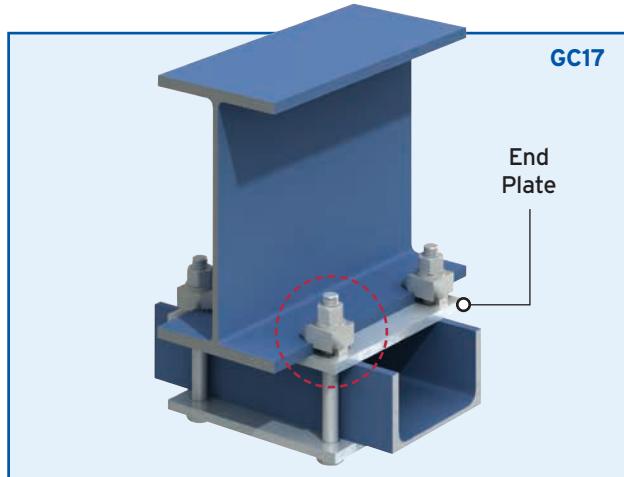
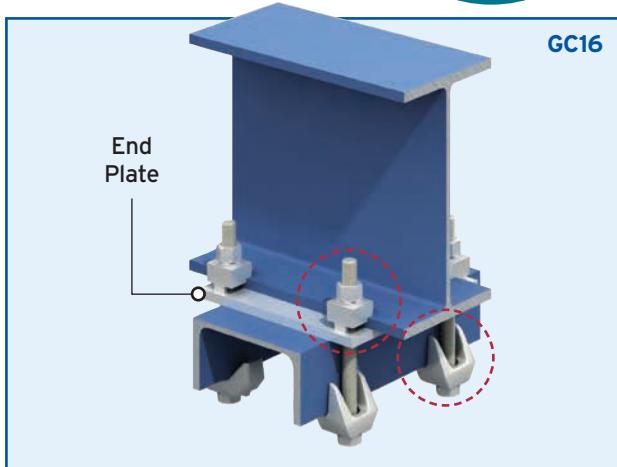
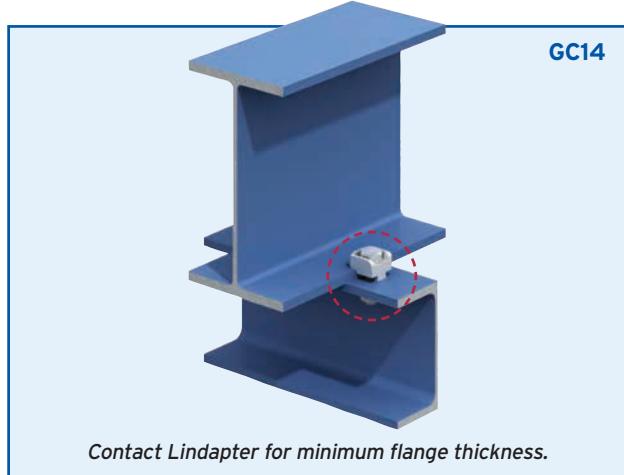
GC12



GC13

## Typical Applications for Girder Clamps

Examples of popular connection arrangements are continued below:



## Typical Applications for Girder Clamps

More examples of popular connection assemblies are shown below:

GIRDER CLAMPS

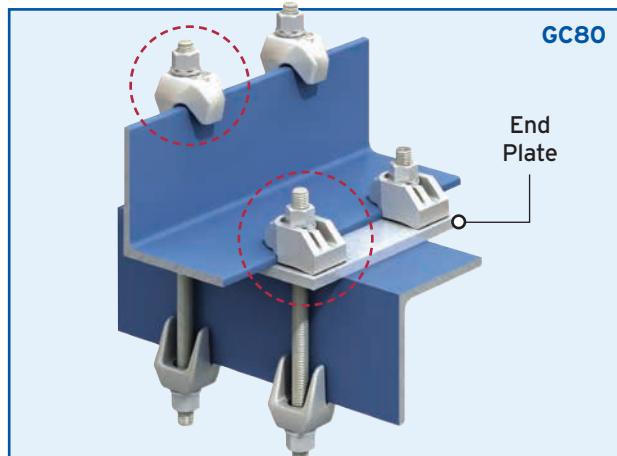
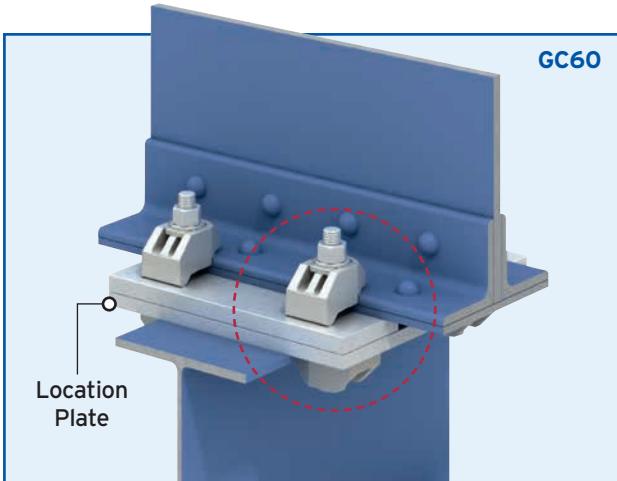
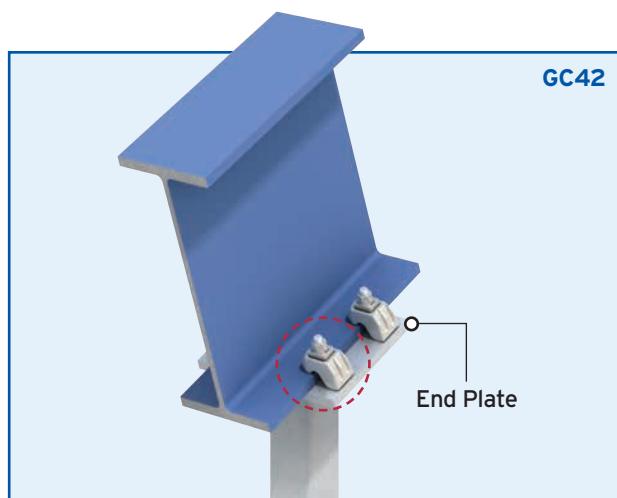
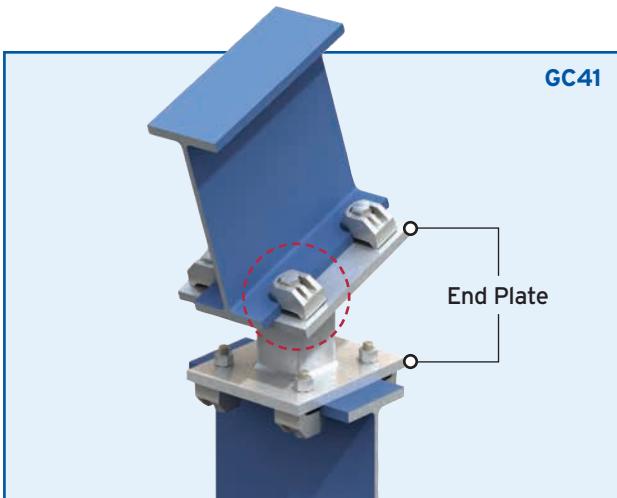
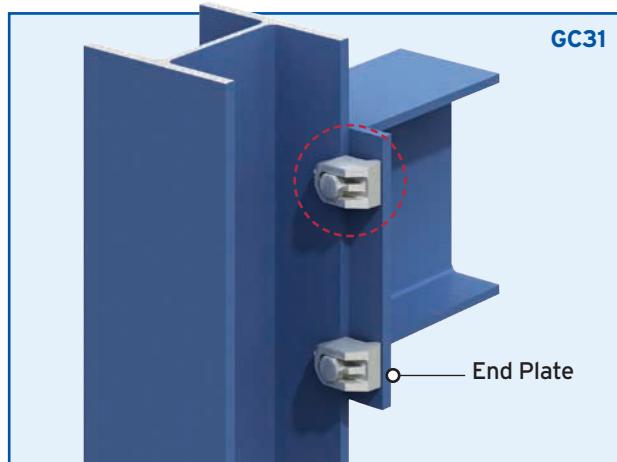
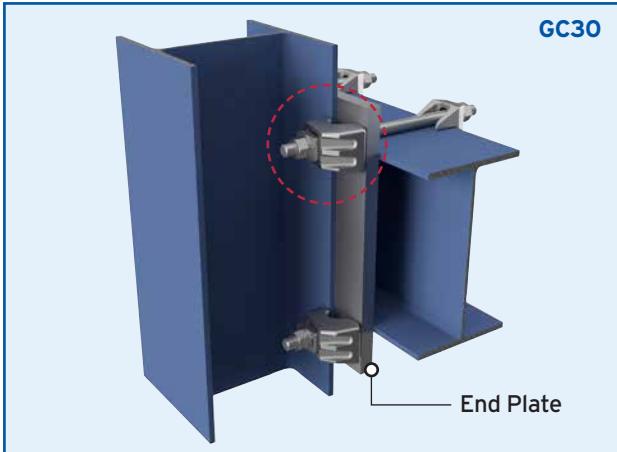
LIFTING POINTS

HOLLOW-BOLT

FLOOR CONNECTIONS

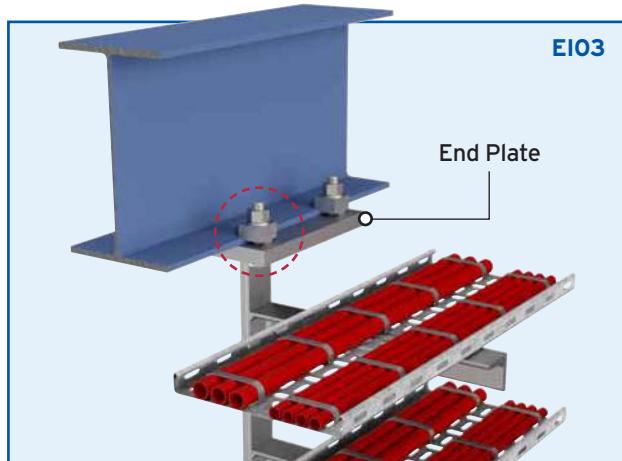
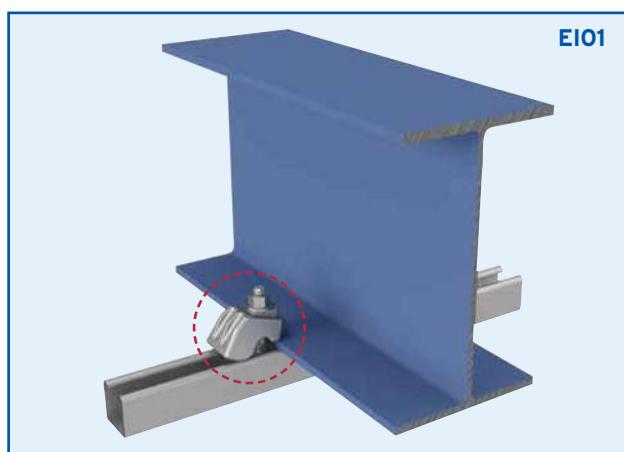
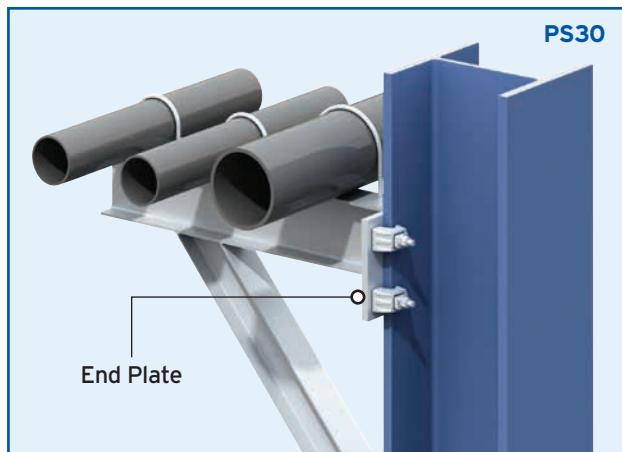
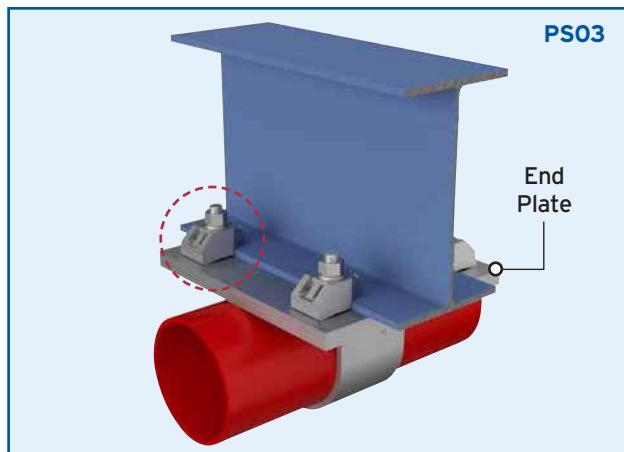
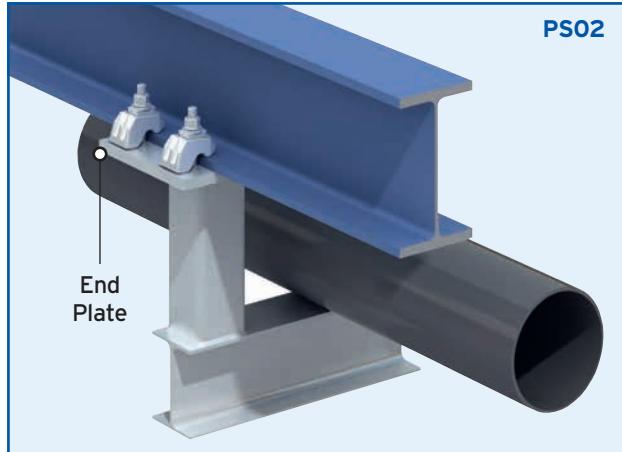
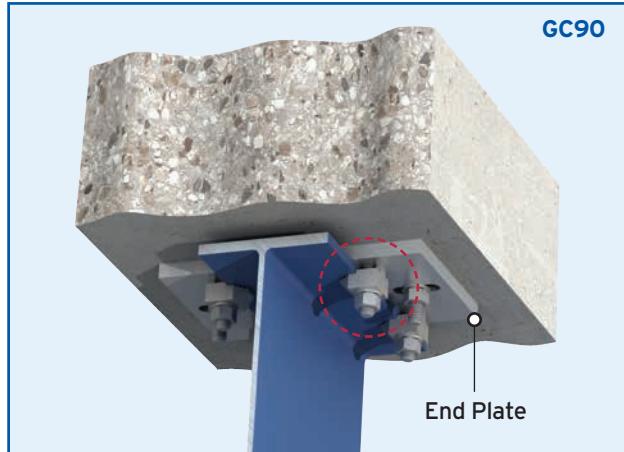
PIPE SUPPORTS

FAQS &amp; CASE STUDIES



## Typical Applications for Girder Clamps

Examples of popular connection arrangements are continued below.  
Please contact Lindapter to discuss your connection requirement.





FREE connection  
detailing  
See page 4

The versatile Type ALP not only provides lateral adjustability, it also adjusts to suit different beam sizes and the orientation of the lift (see page 38).

# Lifting Points

Lindapter's lifting points are used in a variety of industries to support the lifting and rigging of heavy equipment. Applications vary from suspending overhead audio-visual kit in theaters to lifting drilling risers onto offshore oil platforms.

## Type ALP (Standard)

page 38



## Type LP (Custom)

page 39



## Lifting Point Configuration

Lindapter manufactures Lifting Points that are configured with adjustable, high strength components to suit heavy loads up to 45,000lbs SWL. Take advantage of Lindapter's free connection detailing for advice on the best solution for your connection.

### Quick and easy to install

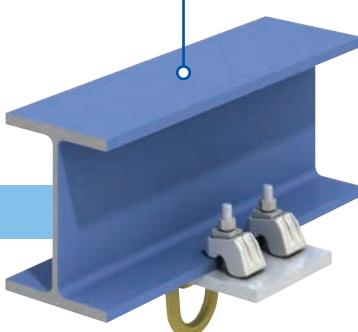
#### Step 1

Offer the pre-assembled location plate up to the beam ensuring it is positioned centrally to it.



#### Step 2

Assemble the clamps and tighten to the recommended torque.



### 6 reasons to use

- ✓ Quick and easy to install using standard hand tools.
- ✓ Easy to align and reposition.
- ✓ Maximum safe working load up to 45,000lbs (Type LP).
- ✓ For parallel and tapered flanges up to 10°.
- ✓ Utilizes ICC-ES approved Lindapter clamps.
- ✓ Free Connection Detailing available.

Email your connection details to [support@Lindapter.com](mailto:support@Lindapter.com) and Lindapter's experienced Engineers will do the rest!

STANDARD

### Type ALP

Ideal for most applications up to 6,600lbs, this assembly self-adjusts to suit a range of flange thicknesses. For further convenience, the slotted holes in the location plate allow the clamp to adapt to different beam widths, often allowing contractors to use just one type of lifting point throughout a project. Lindapter's standard lifting point is immediately available off-the-shelf.

See the Type ALP and its components in more detail on page 38.

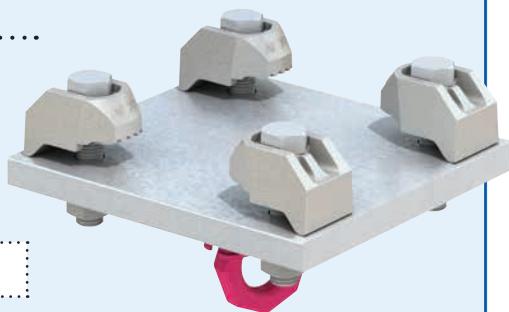


CUSTOM

### Type LP

For large steel sections or loads up to 45,000lbs, Lindapter manufactures custom-made solutions for specific application requirements. Whatever the application, Lindapter's durable products are valued for their quality and reliability, and provide contractors with a safe, quick and convenient lifting system.

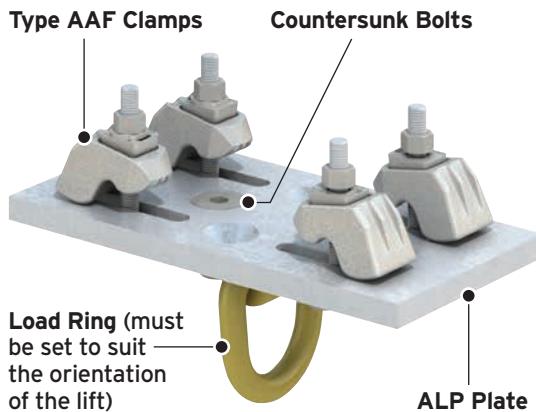
See the Type LP and its components in more detail on page 39.



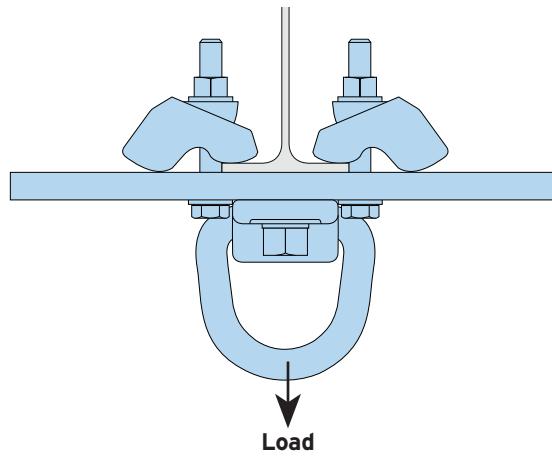
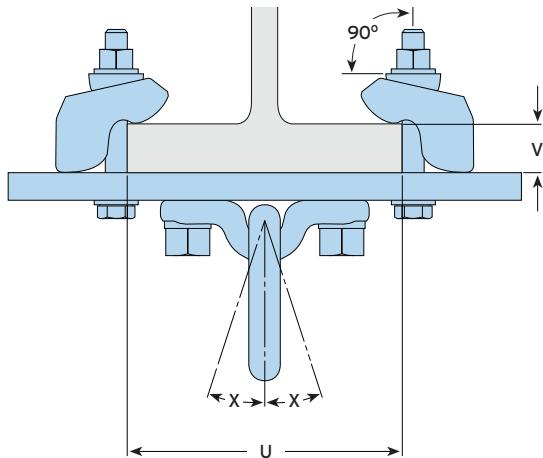
## Type ALP

Lindapter's standard rigging and lifting solution adjusts to suit the beam width, flange thickness and orientation of the lift. Safely supports loads up to 6,600lbs.

**STANDARD  
SOLUTION**



Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



- Available 'off-the-shelf' with a safe working load up to 6,600lbs.
- Adjusts to fit different sized beams and can be easily repositioned.
- Suitable for parallel and tapered beams up to and including 10°.
- Large load ring can be repositioned at 90° to suit the orientation of the lift.

- Suitable for supporting the lifting and rigging of equipment only.
- The ALP assembly must be regularly inspected for signs of wear or damage, in accordance with the standards / regulations of the country of use.
- Static Safe Working Load values are subject to the capacity of the supporting sections. Please refer to the ALP user guide for guidance.

Material: Type AAF clamps (low temperature SG iron, hot dip galvanized), Location Plate (mild steel or hot dip galvanized) and Load Ring (forged steel, painted).

| Product Code     | Torque Figures*             |                         |              |                     | Clamping Range                   |                    | Safe Working Loads (FOS 4:1) | Max Angle of Load X |
|------------------|-----------------------------|-------------------------|--------------|---------------------|----------------------------------|--------------------|------------------------------|---------------------|
|                  | Load Ring Countersunk Bolts | 10.9 Bolt <sup>1)</sup> | Torque ft lb | Type AAF Set Screws | Flange Thickness <sup>2)</sup> V | Beam Width U       |                              |                     |
| <b>LALP 3T-1</b> | M16 (5/8")                  | 74                      | M12 (1/2")   | 66                  | 3/16" - 1"                       | 2 3/4" - 8 1/4"    | 6600                         | 18°                 |
| <b>LALP 3T-2</b> | M16 (5/8")                  | 74                      | M12 (1/2")   | 66                  | 3/16" - 1"                       | 7 1/2" - 13"       | 6600                         | 18°                 |
| <b>LALP 3T-3</b> | M16 (5/8")                  | 74                      | M12 (1/2")   | 66                  | 3/16" - 1"                       | 12 3/16" - 17 3/4" | 6600                         | 18°                 |

1) Metric bolts, nearest imperial / UNC equivalent shown in brackets.

2) Packing pieces can be used to increase the clamping range. Please contact Lindapter Technical Support for more details.

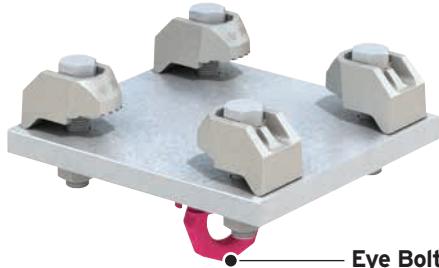
\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

## Type LP

Utilizing Lindapter's high strength Type AF or AAF clamps for heavy loads, the Type LP is available in custom configurations up to 45,000lbs SWL.

### LP4 (up to 10,000lbs SWL)

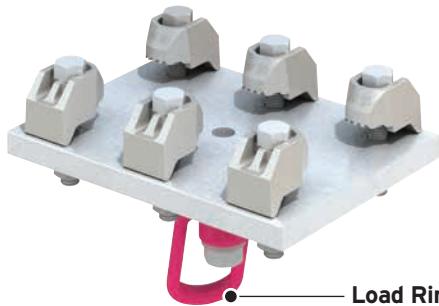
Lifting Point with 4 Type AF or AAF clamps



Eye Bolt

### LP6 (up to 22,500lbs SWL)

Lifting Point with 6 Type AF or AAF clamps



Load Ring

➤ Lifting Points must be regularly inspected for signs of wear or damage, in accordance with the standards / regulations of the country of use.

➤ Static Safe Working Loads are subject to the capacity of the supporting section.

**CUSTOM  
SOLUTION**

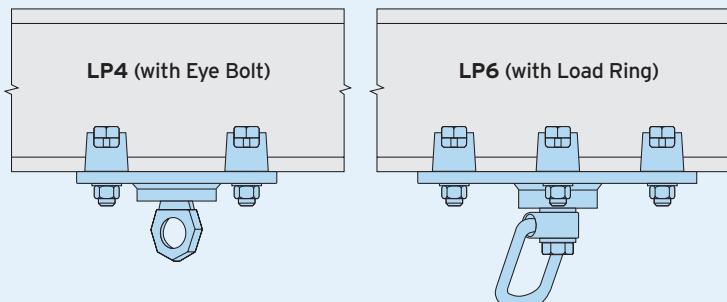


The Type LP can be supplied with either an Eye Bolt or Load Ring. Please state your requirement when ordering.

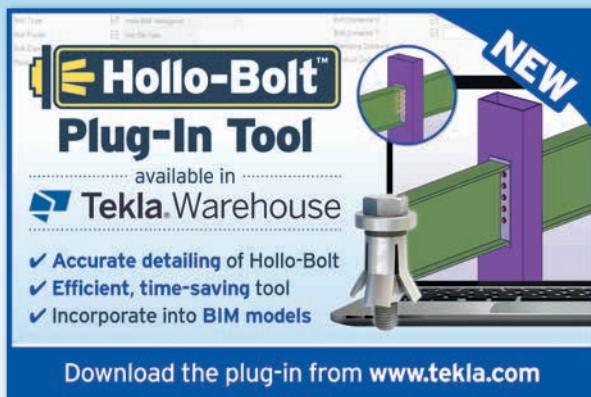
**FREE connection detailing**  
See page 4

### Custom configurations up to 45,000lbs are also available

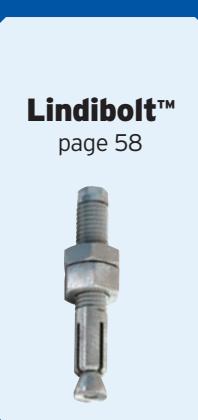
Lindapter manufactures customized Lifting Points to meet individual requirements, two examples are shown on the right. These custom connections are designed to specific application requirements, such as vertical loads, loads at an angle and orientation of up to 360°. The product designation, i.e. LP(#), determines the number of Type AF or AAF clamps.



For example, the LP6 has six M24 Type AF or AAF clamps to create a Safe Working Load of up to 22,500lbs (4:1 Factor of Safety). Provide details of the loading, orientation, angle and beam dimensions and Lindapter's team of Engineers will detail a connection solution to suit your needs.

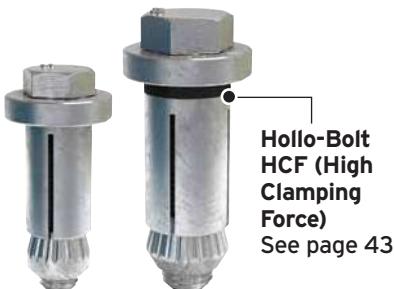


Lindapter's expansion bolts require installation access to only one side of the Hollow Structural Section (HSS), and offer a faster alternative to welding or through-bolting, enabling contractors to reduce construction time and labor costs.



## Hollo-Bolt™

Installation is quickly carried out by inserting into pre-drilled steel and tightening with a torque wrench. Recognized in the AISC Steel Construction Manual and approved by ICC-ES, see pages 49-55 for details. Fire-resistance rated for up to 120 minutes, F(120).



**Hollo-Bolt is ICC-ES for all Seismic Design Categories A through F, in compliance with the International Building Code.**

- Fast, cost saving installation from one side.
- For square, rectangular and circular hollow sections.
- High resistance to tensile and shear loads.
- High Clamping Force design (sizes 5/8" and 3/4").

- Carbon steel Hexagonal Head Hollo-Bolts have been independently evaluated for **fatigue resistance** per AISC 360 Appendix 3.
- Carbon Steel Hexagonal Head Hollo-Bolts have been independently **fire tested** per ASTM E-119.
- Low temperature tested to -50°F (carbon steel variants).
- **NEW** Hollo-Bolt plug-in tool available in Tekla Warehouse.

## Hollo-Bolt Options

Hollo-Bolts are available in a range of head types for a variety of architectural finishes.

**KEY**

- Standard Option
- Available on request

### Sizes Available

| Core Bolt Ø | 5/16"                          | ✓ <small>Fire Tested</small> | ✓ | ✓ |
|-------------|--------------------------------|------------------------------|---|---|
|             | 3/8"                           | ✓ <small>Fire Tested</small> | ✓ | ✓ |
|             | 1/2"                           | ✓ <small>Fire Tested</small> | ✓ | ✓ |
|             | 5/8" HCF (High Clamping Force) | ✓ <small>Fire Tested</small> | ✓ | - |
|             | 3/4" HCF (High Clamping Force) | ✓ <small>Fire Tested</small> | - | - |

### Head Variants



### Corrosion Protection

| Carbon Steel with finish | Zinc Plated + JS500              | ✓ <small>Fire Tested</small> | ✓ | ✓ |
|--------------------------|----------------------------------|------------------------------|---|---|
|                          | Hot Dip Galvanized               | ✓ <small>Fire Tested</small> | - | - |
|                          | Sheraplex                        | ✓ <small>Fire Tested</small> | ✓ | ✓ |
|                          | Stainless Steel (316 equivalent) | ✓                            | ✓ | ✓ |

► Carbon steel Hexagonal Head Hollo-Bolts have been independently fire tested under tensile and shear loading with simultaneous exposure to standard fire conditions in accordance with ASTM E-119 for 120 minutes. For load data contact Lindapter.

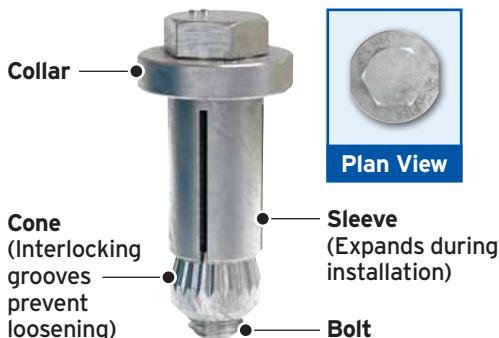
Sizes 5/8" and 3/4", known as the Hollo-Bolt HCF, feature a High Clamping Force mechanism to produce three times more clamping force than the same sized product without the mechanism. See page 43 for more information.



## Hollo-Bolt Options

Two versions are available; the original design for general hollow section connections (see below) and the larger sized High Clamping Force (HCF) for higher strength structural connections (see page 43).

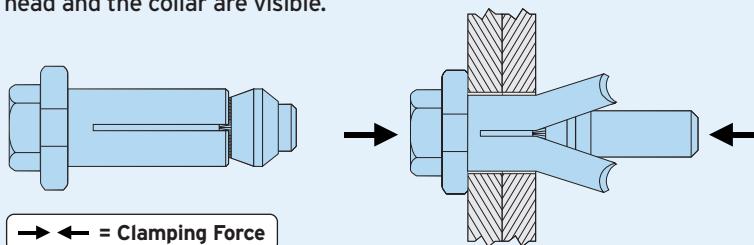
### Hollo-Bolt (sizes 5/16", 3/8" and 1/2")



### The Connection Concept

A typical connection is made by inserting the Hollo-Bolt into the pre-drilled holes of the fixture and hollow section. As the bolt head is tightened, the cone is pulled up the bolt thread, causing the sleeve to expand until the cone locks the sleeve against the hollow section's inner wall.

At full tightening torque, a clamping force is established between the fixture and the steel section to form a secure connection. Once installed, only the head and the collar are visible.



### Case Study: Tobin Memorial Bridge (Boston, MA)

50,000 Hollo-Bolts provided a quick, secure, and easy to install solution for the refurbishment of the bridge, which is over 11,000ft long.

A solution was required for repairs and improvements to safety walkways used by maintenance personnel.

Checker plate covers were formed off-field into "S" shapes and then installed onto the safety curbs using 5/16" and 1/2" stainless steel Hollo-Bolts.



Read more on page 85

## Hollo-Bolt HCF

The larger 5/8" and 3/4" Hollo-Bolts are optimized for high strength structural connections and feature a High Clamping Force mechanism for superior performance.

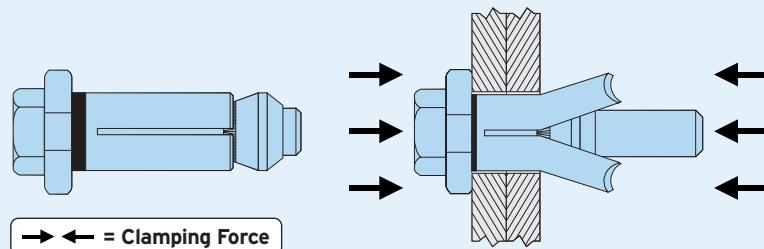
### Hollo-Bolt HCF (sizes 5/8" and 3/4")



#### The Connection Concept

The HCF mechanism consists of a special rubber washer that compresses during installation to significantly increase the clamping force between the connecting steel, thereby reducing displacement to achieve a higher strength connection.

The typical clamping force of Hollo-Bolt HCF is over **three times** higher than the same sized product without the mechanism.



#### Case Study: Wilshire Grand Center (Los Angeles, CA)

3,000 Hollo-Bolts were used to connect primary steel tubes (HSS), which form the curved canopy structure of this skyscraper in Los Angeles.

They were installed from just one side, rapidly achieving discreet splice connections without drilling or welding in the field.

The cost-effective installation did not require specialist equipment or labor and reduced the amount of work at height in comparison to welding or through-bolting.



Read more on page 84

## Typical Applications for Hollo-Bolt™

Popular connection assemblies are shown below. They represent a fraction of the possibilities as Lindapter's clamps are used all over the world to connect almost every type of steel section. Please contact Lindapter to discuss your connection requirement.

GIRDER CLAMPS

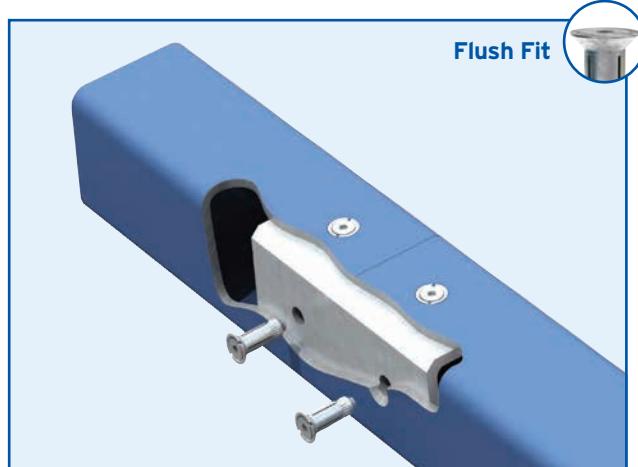
LIFTING POINTS

HOLLO-BOLT

FLOOR CONNECTIONS

PIPE SUPPORTS

FAQS &amp; CASE STUDIES



## Hollo-Bolt Product Codes

Hollo-Bolts are identified by a product code made up of a series of letters and numbers. The product code decoder below explains what each part of the code denotes. When specifying Hollo-Bolts the full product code along with the finish code at the end should be used. Refer to page 41 for which sizes, head types and finishes are available.



Example Product Code

**LHBMO8HEX#1ZN**

| Manufacturer | Product   | Bolt Ø     | Head Type  | Length    | Finish    |
|--------------|-----------|------------|------------|-----------|-----------|
| <b>L</b>     | <b>HB</b> | <b>M08</b> | <b>HEX</b> | <b>#1</b> | <b>ZN</b> |

**Lindapter Hollo-Bolt**

$5/16''$  = **M08**

$3/8''$  = **M10**

$1/2''$  = **M12**

$5/8''$  = **M16**

$3/4''$  = **M20**

*Product supplied with metric bolts*

**#1**

**#2**

**#3**

*Refer to data tables for specific lengths of each size*

Zinc Plated + JS500 = **ZN**

Hot Dip Galvanized = **HDG**

Sheraplex = **SP**

Stainless Steel = **ST**

Hexagonal = **HEX**

Countersunk = **CSK**

Flush Fit = **FF**

# Hollo-Bolt™ Hexagonal Head Safe Working Loads



**IMPORTANT: If you are designing a connection to the IBC, refer to the ICC-ES data on pages 50-51.**

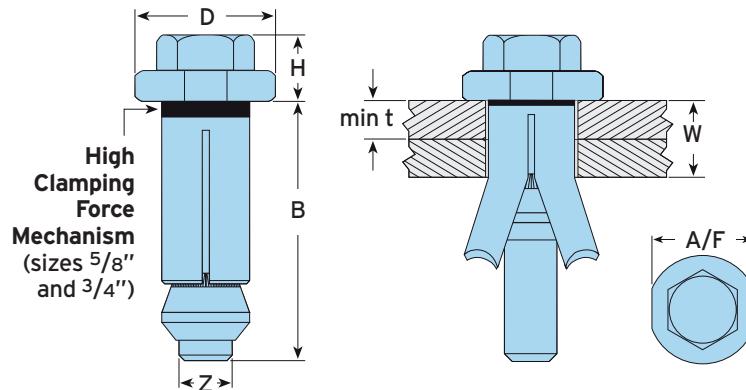
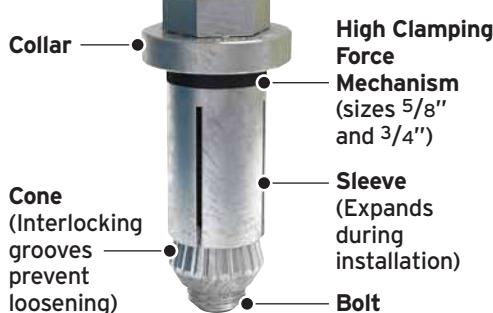


Evaluated for fatigue  
resistance per  
ICC-ES ESR-3330



## Hexagonal Head Data

(Available in sizes 5/16", 3/8", 1/2", 5/8" and 3/4")



Material: Carbon steel or stainless steel (see page 41 for corrosion protection options).

### HEXAGONAL HEAD DATA

| Product Code   | Bolt Ø<br>Z | Height<br>H | Length<br>B | Clamping<br>Thickness<br>W | Outer<br>Ply<br>min t | Drill Hole<br>Diameter Ø | Collar |        | Tightening<br>Torque<br>ft lb | Safe Working Loads<br>(FoS 5:1) |                        |      |
|----------------|-------------|-------------|-------------|----------------------------|-----------------------|--------------------------|--------|--------|-------------------------------|---------------------------------|------------------------|------|
|                |             |             |             |                            |                       |                          | Ø<br>D | A/F    |                               | Tensile<br>lbs                  | Single<br>Shear<br>lbs |      |
| LHBM08HEX#1    | 5/16"       | 3/8"        | 13/4"       | 1/8" - 7/8"                | -                     | 9/16"                    | 7/8"   | 3/4"   | 17                            | 899                             | 1124                   |      |
| LHBM08HEX#2    | 5/16"       | 3/8"        | 29/16"      | 7/8" - 15/8"               | -                     | 9/16"                    | 7/8"   | 3/4"   | 17                            | 899                             | 1124                   |      |
| LHBM08HEX#3    | 5/16"       | 3/8"        | 33/8"       | 15/8" - 23/8"              | -                     | 9/16"                    | 7/8"   | 3/4"   | 17                            | 899                             | 1124                   |      |
| LHBM10HEX#1    | 3/8"        | 1/2"        | 2"          | 1/8" - 7/8"                | -                     | 3/4"                     | 11/8"  | 15/16" | 33                            | 1910                            | 2248                   |      |
| LHBM10HEX#2    | 3/8"        | 1/2"        | 21/2"       | 7/8" - 15/8"               | -                     | 3/4"                     | 11/8"  | 15/16" | 33                            | 1910                            | 2248                   |      |
| LHBM10HEX#3    | 3/8"        | 1/2"        | 35/16"      | 15/8" - 23/8"              | -                     | 3/4"                     | 11/8"  | 15/16" | 33                            | 1910                            | 2248                   |      |
| LHBM12HEX#1    | 1/2"        | 9/16"       | 21/8"       | 1/8" - 1"                  | -                     | 13/16"                   | 11/4"  | 13/16" | 59                            | 2360                            | 3372                   |      |
| LHBM12HEX#2    | 1/2"        | 9/16"       | 27/8"       | 1" - 113/16"               | -                     | 13/16"                   | 11/4"  | 13/16" | 59                            | 2360                            | 3372                   |      |
| LHBM12HEX#3    | 1/2"        | 9/16"       | 33/4"       | 113/16" - 23/4"            | -                     | 13/16"                   | 11/4"  | 13/16" | 59                            | 2360                            | 3372                   |      |
| Hollo-Bolt HCF | LHBM16HEX#1 | 5/8"        | 3/4"        | 25/8"                      | 1/2" - 11/8"          | 5/16"                    | 11/16" | 11/2"  | 17/16"                        | 140                             | 4720                   | 6744 |
|                | LHBM16HEX#2 | 5/8"        | 3/4"        | 35/8"                      | 11/8" - 2"            | 5/16"                    | 11/16" | 11/2"  | 17/16"                        | 140                             | 4720                   | 6744 |
|                | LHBM16HEX#3 | 5/8"        | 3/4"        | 47/16"                     | 2" - 213/16"          | 5/16"                    | 11/16" | 11/2"  | 17/16"                        | 140                             | 4720                   | 6744 |
|                | LHBM20HEX#1 | 3/4"        | 7/8"        | 31/8"                      | 1/2" - 15/16"         | 5/16"                    | 15/16" | 2"     | 113/16"                       | 221                             | 7868                   | 8992 |
|                | LHBM20HEX#2 | 3/4"        | 7/8"        | 45/16"                     | 15/16" - 23/8"        | 5/16"                    | 15/16" | 2"     | 113/16"                       | 221                             | 7868                   | 8992 |
|                | LHBM20HEX#3 | 3/4"        | 7/8"        | 51/2"                      | 23/8" - 33/8"         | 5/16"                    | 15/16" | 2"     | 113/16"                       | 221                             | 7868                   | 8992 |

- Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Safe working loads shown are applicable to the Hollo-Bolt only. Failure of the section could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.
- Fatigue resistance testing has been performed for Carbon Steel Hollo-Bolts in accordance with AISC 360 Appendix 3. Contact our Technical Support team or refer to ESR-3330 for more information.

### HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

LHBM08HEX#1\_\_\_\_\_

Choose your finish and add the finish code

|                     |     |                 |    |
|---------------------|-----|-----------------|----|
| Zinc Plated + JS500 | ZN  | Sheraplex       | SP |
| Hot Dip Galvanized  | HDG | Stainless Steel | ST |

Final Product Code

LHBM08HEX#1HDG



# Hollo-Bolt™ Countersunk Head Safe Working Loads

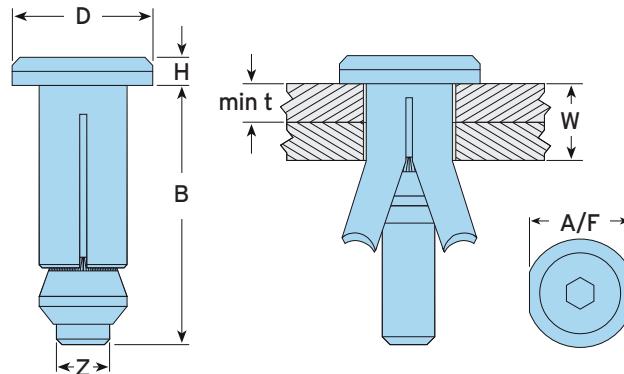


**IMPORTANT:** If you are designing a connection to the IBC, refer to the ICC-ES data on pages 52-53.



## Countersunk Head Data

(Available in sizes 5/16", 3/8", 1/2" and 5/8")



Material: Carbon steel or stainless steel (see page 41 for corrosion protection options).

| COUNTERSUNK HEAD DATA |             |        |         |                    |                 |                       |        |        |                         |                              |                  |      |
|-----------------------|-------------|--------|---------|--------------------|-----------------|-----------------------|--------|--------|-------------------------|------------------------------|------------------|------|
| Product Code          | Bolt Ø      | Height | Length  | Clamping Thickness | Outer Ply min t | Drill Hole Diameter Ø | Collar |        | Tightening Torque ft lb | Safe Working Loads (FoS 5:1) |                  |      |
|                       | Z           | H      | B       | W                  |                 |                       | Ø D    | A/F    |                         | Tensile lbs                  | Single Shear lbs |      |
| LHBM08CSK#1           | 5/16"       | 3/16"  | 13/4"   | 1/8" - 7/8"        | -               | 9/16"                 | 7/8"   | 3/4"   | 17                      | 899                          | 1124             |      |
| LHBM08CSK#2           | 5/16"       | 3/16"  | 29/16"  | 7/8" - 15/8"       | -               | 9/16"                 | 7/8"   | 3/4"   | 17                      | 899                          | 1124             |      |
| LHBM08CSK#3           | 5/16"       | 3/16"  | 33/8"   | 15/8" - 23/8"      | -               | 9/16"                 | 7/8"   | 3/4"   | 17                      | 899                          | 1124             |      |
| LHBM10CSK#1           | 3/8"        | 1/4"   | 13/4"   | 1/8" - 7/8"        | -               | 3/4"                  | 11/8"  | 15/16" | 33                      | 1910                         | 2248             |      |
| LHBM10CSK#2           | 3/8"        | 1/4"   | 21/2"   | 7/8" - 15/8"       | -               | 3/4"                  | 11/8"  | 15/16" | 33                      | 1910                         | 2248             |      |
| LHBM10CSK#3           | 3/8"        | 1/4"   | 35/16"  | 15/8" - 23/8"      | -               | 3/4"                  | 11/8"  | 15/16" | 33                      | 1910                         | 2248             |      |
| LHBM12CSK#1           | 1/2"        | 1/4"   | 17/8"   | 1/8" - 1"          | -               | 13/16"                | 11/4"  | 13/16" | 59                      | 2360                         | 3372             |      |
| LHBM12CSK#2           | 1/2"        | 1/4"   | 27/8"   | 1" - 113/16"       | -               | 13/16"                | 11/4"  | 13/16" | 59                      | 2360                         | 3372             |      |
| LHBM12CSK#3           | 1/2"        | 1/4"   | 311/16" | 113/16" - 23/4"    | -               | 13/16"                | 11/4"  | 13/16" | 59                      | 2360                         | 3372             |      |
| HCF                   | LHBM16CSK#1 | 5/8"   | 5/16"   | 27/16"             | 1/2" - 11/8"    | 5/16"                 | 11/16" | 11/2"  | 17/16"                  | 140                          | 4720             | 6744 |
|                       | LHBM16CSK#2 | 5/8"   | 5/16"   | 35/8"              | 11/8" - 2"      | 5/16"                 | 11/16" | 11/2"  | 17/16"                  | 140                          | 4720             | 6744 |
|                       | LHBM16CSK#3 | 5/8"   | 5/16"   | 47/16"             | 2" - 213/16"    | 5/16"                 | 11/16" | 11/2"  | 17/16"                  | 140                          | 4720             | 6744 |

➤ Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Safe working loads shown are applicable to the Hollo-Bolt only. Failure of the section could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

### HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

**LHBM10CSK#1** \_\_

Choose your finish and add the finish code

Zinc Plated + JS500 **ZN**    Stainless Steel **ST**    Sheraplex **SP**

Final Product Code

**LHBM10CSK#1ST**

# Hollo-Bolt™ Flush Fit Safe Working Loads

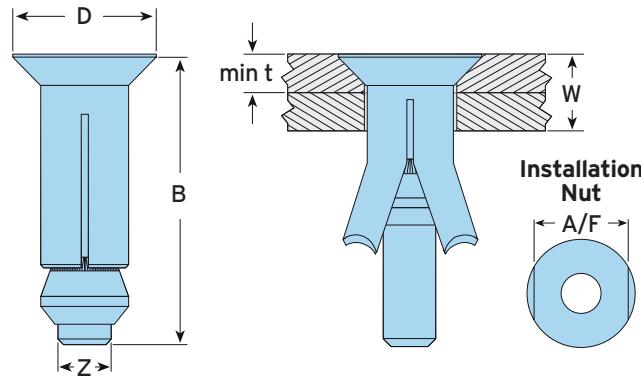
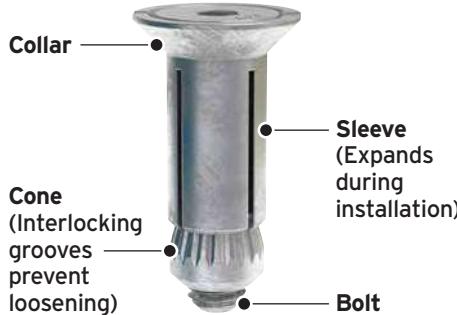


**IMPORTANT: If you are designing a connection to the IBC, refer to the ICC-ES data on pages 54-55.**



## Flush Fit Data

(Available in sizes 5/16", 3/8" and 1/2")



Material: Carbon steel or stainless steel (see page 41 for corrosion protection options).

| FLUSH FIT DATA |                      |          |                      |                 |                       |        |             |                      |                         |                              |
|----------------|----------------------|----------|----------------------|-----------------|-----------------------|--------|-------------|----------------------|-------------------------|------------------------------|
| Product Code   | Countersunk Bolt Ø Z | Length B | Clamping Thickness W | Outer Ply min t | Drill Hole Diameter Ø | Ø D    | Collar      | Installation Nut A/F | Tightening Torque ft lb | Safe Working Loads (FoS 5:1) |
|                |                      |          |                      |                 |                       |        | Tensile lbs | Single Shear lbs     |                         |                              |
| LHBM08FF#1     | 5/16"                | 2"       | 3/8" - 11/16"        | 5/16"           | 9/16"                 | 15/16" | 3/4"        | 17                   | 899                     | 1124                         |
| LHBM08FF#2     | 5/16"                | 2 3/4"   | 11/16" - 13/4"       | 5/16"           | 9/16"                 | 15/16" | 3/4"        | 17                   | 899                     | 1124                         |
| LHBM08FF#3     | 5/16"                | 3 9/16"  | 13/4" - 2 1/2"       | 5/16"           | 9/16"                 | 15/16" | 3/4"        | 17                   | 899                     | 1124                         |
| LHBM10FF#1     | 3/8"                 | 2"       | 1/2" - 11/16"        | 3/8"            | 3/4"                  | 13/16" | 15/16"      | 33                   | 1910                    | 2248                         |
| LHBM10FF#2     | 3/8"                 | 2 3/4"   | 11/16" - 13/4"       | 3/8"            | 3/4"                  | 13/16" | 15/16"      | 33                   | 1910                    | 2248                         |
| LHBM10FF#3     | 3/8"                 | 3 9/16"  | 13/4" - 2 1/2"       | 3/8"            | 3/4"                  | 13/16" | 15/16"      | 33                   | 1910                    | 2248                         |
| LHBM12FF#1     | 1/2"                 | 2 3/16"  | 1/2" - 13/16"        | 3/8"            | 13/16"                | 15/16" | 13/16"      | 59                   | 2360                    | 3372                         |
| LHBM12FF#2     | 1/2"                 | 3 1/8"   | 13/16" - 2 1/32"     | 3/8"            | 13/16"                | 15/16" | 13/16"      | 59                   | 2360                    | 3372                         |
| LHBM12FF#3     | 1/2"                 | 4"       | 2 1/32" - 2 7/8"     | 3/8"            | 13/16"                | 15/16" | 13/16"      | 59                   | 2360                    | 3372                         |

► Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Safe working loads shown are applicable to the Hollo-Bolt only. Failure of the section could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

## HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

**LHBM12FF#3**       

Choose your finish and add the finish code

Zinc Plated + JS500 **ZN**

Stainless Steel **ST**

Sheraplex **SP**

Final Product Code

**LHBM12FF#3ZN**





“

We recommend using Hollo-Bolts due to the ICC-ES approved capacities for use in all Seismic Design Categories.

John S. McDonald, Principal at Catena Consulting Engineers  
Project: Wilshire Grand Center, CA (see the case study on page 84)



# ICC-ES Approved Hollo-Bolt™

The following pages are for use by Engineers designing a connection as per AISC 360, AISC 341 and ASCE/SEI 7 as referenced by the locally adopted building code. To comply with ICC-ES please also refer to our Evaluation Report ESR 3330 and the Special Inspection Document which can be found on our website.



**Hollo-Bolt™ Hexagonal Head**  
pages 50 - 51



**Hollo-Bolt™ Countersunk Head**  
pages 52 - 53



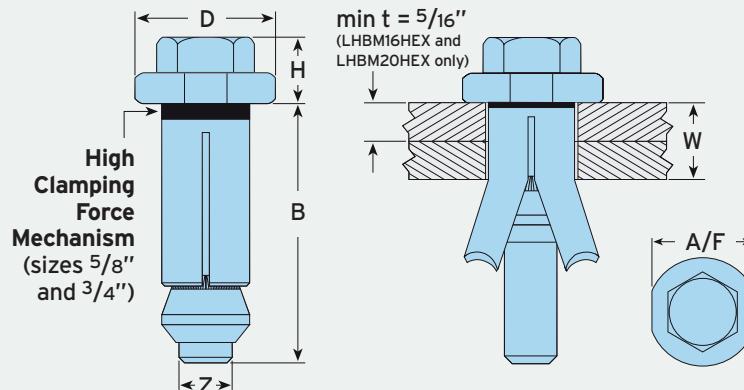
**Hollo-Bolt™ Flush Fit Head**  
pages 54 - 55



# Hollo-Bolt™ Hexagonal Head (data for applications requiring ICC approval)

## LRFD design strength and ASD allowable strength

LRFD and ASD strengths (taken from ESR-3330) are to be used when designing a connection per AISC 360, AISC 341, and ASCE/SEI 7 as referenced by the locally adopted building code.



## Data for Zinc + JS500, HDG and Sheraplex

| Material: Carbon steel. | Product Code | Bolt Ø | Clamping Range  | Length | Height | Drill Hole Diameter Ø | Collar Ø | Tightening Torque | Allowable Loading     |       |                        |       |                      |       |                        |       |      |
|-------------------------|--------------|--------|-----------------|--------|--------|-----------------------|----------|-------------------|-----------------------|-------|------------------------|-------|----------------------|-------|------------------------|-------|------|
|                         |              |        |                 |        |        |                       |          |                   | Static and Wind Loads |       |                        |       | Seismic Loads        |       |                        |       |      |
|                         |              |        |                 |        |        |                       |          |                   | LRFD Design Strength  |       | ASD Allowable Strength |       | LRFD Design Strength |       | ASD Allowable Strength |       |      |
| Hollo-Bolt HCF          | LHBMO8HEX#1  | 5/16"  | 1/4" - 7/8"     | 13/4"  | 3/8"   | 9/16"                 | 7/8"     | 3/4"              | 17                    | 3780  | 3220                   | 2340  | 2000                 | 3310  | 2680                   | 2045  | 1670 |
|                         | LHBMO8HEX#2  | 5/16"  | 7/8" - 15/8"    | 29/16" | 3/8"   | 9/16"                 | 7/8"     | 3/4"              | 17                    | 3780  | 3220                   | 2340  | 2000                 | 3310  | 2680                   | 2045  | 1670 |
|                         | LHBMO8HEX#3  | 5/16"  | 15/8" - 23/8"   | 33/8"  | 3/8"   | 9/16"                 | 7/8"     | 3/4"              | 17                    | 3780  | 3220                   | 2340  | 2000                 | 3310  | 2680                   | 2045  | 1670 |
|                         | LHBMO10HEX#1 | 3/8"   | 5/16" - 7/8"    | 2"     | 1/2"   | 3/4"                  | 11/8"    | 15/16"            | 33                    | 6160  | 5490                   | 3820  | 3420                 | 5490  | 4570                   | 3400  | 2830 |
|                         | LHBMO10HEX#2 | 3/8"   | 7/8" - 15/8"    | 21/2"  | 1/2"   | 3/4"                  | 11/8"    | 15/16"            | 33                    | 6160  | 5490                   | 3820  | 3420                 | 5490  | 4570                   | 3400  | 2830 |
|                         | LHBMO10HEX#3 | 3/8"   | 15/8" - 23/8"   | 35/16" | 1/2"   | 3/4"                  | 11/8"    | 15/16"            | 33                    | 6160  | 5490                   | 3820  | 3420                 | 5490  | 4570                   | 3400  | 2830 |
|                         | LHBMO12HEX#1 | 1/2"   | 5/16" - 1"      | 21/8"  | 9/16"  | 13/16"                | 11/4"    | 13/16"            | 59                    | 8550  | 7490                   | 5310  | 4680                 | 7470  | 6250                   | 4630  | 3890 |
|                         | LHBMO12HEX#2 | 1/2"   | 1" - 113/16"    | 27/8"  | 9/16"  | 13/16"                | 11/4"    | 13/16"            | 59                    | 8550  | 7490                   | 5310  | 4680                 | 7470  | 6250                   | 4630  | 3890 |
|                         | LHBMO12HEX#3 | 1/2"   | 113/16" - 23/4" | 33/4"  | 9/16"  | 13/16"                | 11/4"    | 13/16"            | 59                    | 8550  | 7490                   | 5310  | 4680                 | 7470  | 6250                   | 4630  | 3890 |
|                         | LHBMO16HEX#1 | 5/8"   | 1/2" - 11/8"    | 25/8"  | 3/4"   | 11/16"                | 11/2"    | 17/16"            | 140                   | 13900 | 11600                  | 8640  | 7290                 | 13300 | 9780                   | 8270  | 6090 |
|                         | LHBMO16HEX#2 | 5/8"   | 11/8" - 2"      | 35/8"  | 3/4"   | 11/16"                | 11/2"    | 17/16"            | 140                   | 13900 | 11600                  | 8640  | 7290                 | 13300 | 9780                   | 8270  | 6090 |
|                         | LHBMO16HEX#3 | 5/8"   | 2" - 213/16"    | 41/2"  | 3/4"   | 11/16"                | 11/2"    | 17/16"            | 140                   | 13900 | 11600                  | 8640  | 7290                 | 13300 | 9780                   | 8270  | 6090 |
|                         | LHBMO20HEX#1 | 3/4"   | 1/2" - 15/16"   | 31/8"  | 7/8"   | 15/16"                | 2"       | 113/16"           | 221                   | 20000 | 18400                  | 12400 | 11500                | 19400 | 15300                  | 12000 | 9560 |
|                         | LHBMO20HEX#2 | 3/4"   | 15/16" - 23/8"  | 45/16" | 7/8"   | 15/16"                | 2"       | 113/16"           | 221                   | 20000 | 18400                  | 12400 | 11500                | 19400 | 15300                  | 12000 | 9560 |
|                         | LHBMO20HEX#3 | 3/4"   | 23/8" - 33/8"   | 51/2"  | 7/8"   | 15/16"                | 2"       | 113/16"           | 221                   | 20000 | 18400                  | 12400 | 11500                | 19400 | 15300                  | 12000 | 9560 |

► Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

► Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.

### HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

LHBMO8HEX#1

Choose your finish and add the finish code

Zinc Plated + JS500 **ZN** Sheraplex **SP**  
Hot Dip Galvanized **HDG** Stainless Steel **ST**

Final Product Code

**LHBMO8HEX#1HDG**



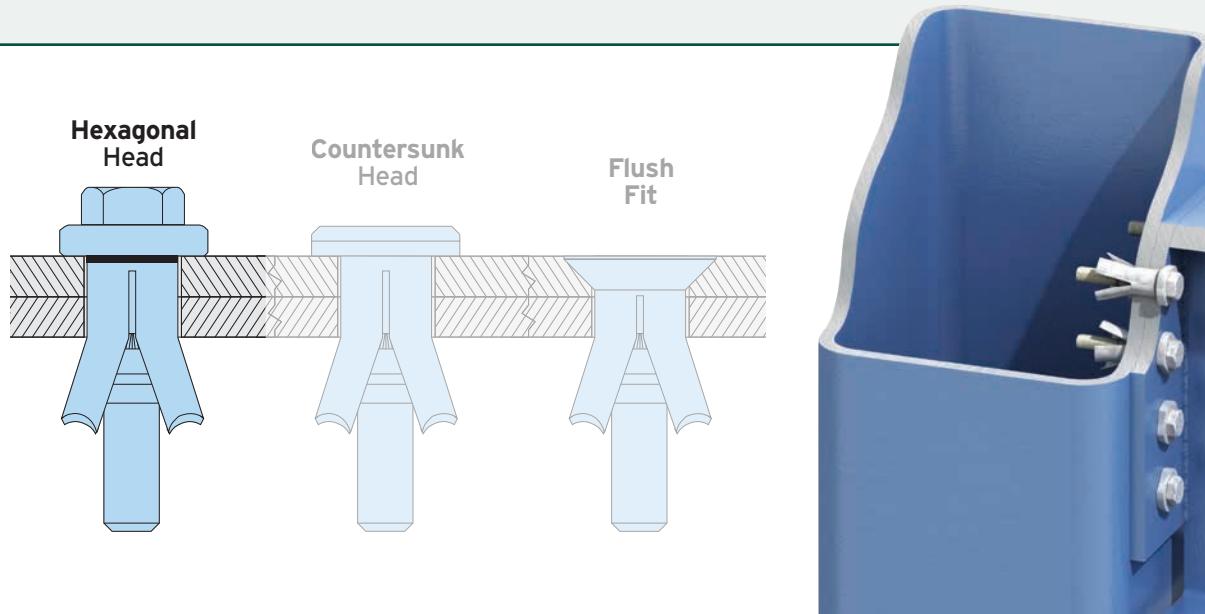
## Hollo-Bolt™ Hexagonal Head (data for applications requiring ICC approval)

### Data for Stainless Steel

| Product Code   | Bolt Ø        | Clamping Range  | Length         | Height | Drill Hole Diameter Ø | Collar |        | Tightening Torque | Allowable Loading |       | Static and Wind Loads |       | Seismic Loads |       |       |       |       |
|----------------|---------------|-----------------|----------------|--------|-----------------------|--------|--------|-------------------|-------------------|-------|-----------------------|-------|---------------|-------|-------|-------|-------|
|                |               |                 |                |        |                       | Ø      | D      |                   | Tensile           | Shear | Tensile               | Shear | Tensile       | Shear |       |       |       |
|                |               |                 |                |        |                       | Z      | W      |                   | lbs               | lbs   | lbs                   | lbs   | lbs           | lbs   |       |       |       |
| LHBM08HEX#1ST  | 5/16"         | 1/4" - 7/8"     | 13/4"          | 3/8"   | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970  |       |
| LHBM08HEX#2ST  | 5/16"         | 7/8" - 15/8"    | 29/16"         | 3/8"   | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970  |       |
| LHBM08HEX#3ST  | 5/16"         | 15/8" - 23/8"   | 33/8"          | 3/8"   | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970  |       |
| LHBM10HEX#1ST  | 3/8"          | 5/16" - 7/8"    | 2"             | 1/2"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760  |       |
| LHBM10HEX#2ST  | 3/8"          | 7/8" - 15/8"    | 21/2"          | 1/2"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760  |       |
| LHBM10HEX#3ST  | 3/8"          | 15/8" - 23/8"   | 35/16"         | 1/2"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760  |       |
| LHBM12HEX#1ST  | 1/2"          | 5/16" - 1"      | 21/8"          | 9/16"  | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640  |       |
| LHBM12HEX#2ST  | 1/2"          | 1" - 113/16"    | 27/8"          | 9/16"  | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640  |       |
| LHBM12HEX#3ST  | 1/2"          | 113/16" - 23/4" | 33/4"          | 9/16"  | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640  |       |
| Hollo-Bolt HCF | LHBM16HEX#1ST | 5/8"            | 1/2" - 11/8"   | 25/8"  | 3/4"                  | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210  | 9490  |
|                | LHBM16HEX#2ST | 5/8"            | 11/8" - 2"     | 35/8"  | 3/4"                  | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210  | 9490  |
|                | LHBM16HEX#3ST | 5/8"            | 2" - 213/16"   | 41/2"  | 3/4"                  | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210  | 9490  |
| Hollo-Bolt HCF | LHBM20HEX#1ST | 3/4"            | 1/2" - 15/16"  | 31/8"  | 7/8"                  | 15/16" | 2"     | 113/16"           | 221               | 23040 | 26750                 | 14410 | 16700         | 19510 | 25850 | 12190 | 16140 |
|                | LHBM20HEX#2ST | 3/4"            | 15/16" - 23/8" | 45/16" | 7/8"                  | 15/16" | 2"     | 113/16"           | 221               | 23040 | 26750                 | 14410 | 16700         | 19510 | 25850 | 12190 | 16140 |
|                | LHBM20HEX#3ST | 3/4"            | 23/8" - 33/8"  | 51/2"  | 7/8"                  | 15/16" | 2"     | 113/16"           | 221               | 23040 | 26750                 | 14410 | 16700         | 19510 | 25850 | 12190 | 16140 |

➤ Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

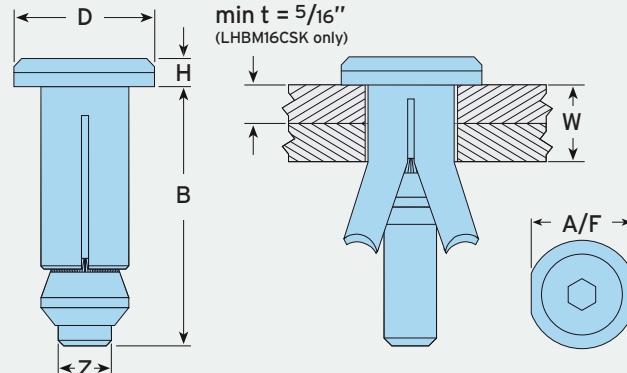
➤ Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.



## Hollo-Bolt™ Countersunk Head (data for applications requiring ICC approval)

### LRFD design strength and ASD allowable strength

LRFD and ASD strengths (taken from ESR-3330) are to be used when designing a connection per AISC 360, AISC 341, and ASCE/SEI 7 as referenced by the locally adopted building code.



### Data for Zinc + JS500 and Sheraplex

| Allowable Loading       |        |                 |         |        |                       |        |        |                   |                      |       |                        |       |                      |       |                        |       |
|-------------------------|--------|-----------------|---------|--------|-----------------------|--------|--------|-------------------|----------------------|-------|------------------------|-------|----------------------|-------|------------------------|-------|
| Material: Carbon steel. |        |                 |         |        |                       |        |        |                   |                      |       |                        |       |                      |       |                        |       |
| Product Code            | Bolt Ø | Clamping Range  | Length  | Height | Drill Hole Diameter Ø | Collar |        | Tightening Torque | LRFD Design Strength |       | ASD Allowable Strength |       | LRFD Design Strength |       | ASD Allowable Strength |       |
|                         |        |                 |         |        |                       | Ø      | D      |                   | A/F                  | ft lb | Tensile                | Shear | Tensile              | Shear | Tensile                | Shear |
| LHBM08CSK#1             | 5/16"  | 1/4" - 7/8"     | 13/4"   | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 3780                 | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM08CSK#2             | 5/16"  | 7/8" - 15/8"    | 29/16"  | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 3780                 | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM08CSK#3             | 5/16"  | 15/8" - 23/8"   | 33/8"   | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 3780                 | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM10CSK#1             | 3/8"   | 5/16" - 7/8"    | 13/4"   | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 6160                 | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM10CSK#2             | 3/8"   | 7/8" - 15/8"    | 21/2"   | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 6160                 | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM10CSK#3             | 3/8"   | 15/8" - 23/8"   | 35/16"  | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 6160                 | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM12CSK#1             | 1/2"   | 5/16" - 1"      | 17/8"   | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 8550                 | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |
| LHBM12CSK#2             | 1/2"   | 1" - 113/16"    | 27/8"   | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 8550                 | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |
| LHBM12CSK#3             | 1/2"   | 113/16" - 23/4" | 311/16" | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 8550                 | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |
| LHBM16CSK#1             | 5/8"   | 1/2" - 11/8"    | 27/16"  | 5/16"  | 11/16"                | 11/2"  | 17/16" | 140               | 13900                | 11600 | 8640                   | 7290  | 13300                | 9780  | 8270                   | 6090  |
| LHBM16CSK#2             | 5/8"   | 11/8" - 2"      | 35/8"   | 5/16"  | 11/16"                | 11/2"  | 17/16" | 140               | 13900                | 11600 | 8640                   | 7290  | 13300                | 9780  | 8270                   | 6090  |
| LHBM16CSK#3             | 5/8"   | 2" - 213/16"    | 47/16"  | 5/16"  | 11/16"                | 11/2"  | 17/16" | 140               | 13900                | 11600 | 8640                   | 7290  | 13300                | 9780  | 8270                   | 6090  |

► Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

► Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.

#### HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

**LHBM16CSK#1**

Choose your finish and add the finish code

Zinc Plated + JS500

**ZN**

Stainless Steel

**ST**

Sheraplex

**SP**

Final Product Code

**LHBM16CSK#1SP**



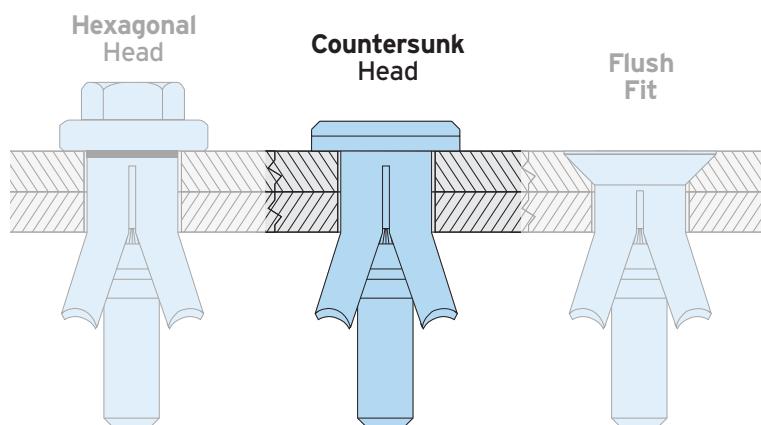
## Hollo-Bolt™ Countersunk Head (data for applications requiring ICC approval)

### Data for Stainless Steel

| Product Code  | Bolt Ø        | Clamping Range  | Length       | Height | Drill Hole Diameter Ø | Collar |        | Tightening Torque | Allowable Loading |       | Static and Wind Loads |       | Seismic Loads |       |       |      |      |
|---------------|---------------|-----------------|--------------|--------|-----------------------|--------|--------|-------------------|-------------------|-------|-----------------------|-------|---------------|-------|-------|------|------|
|               |               |                 |              |        |                       | Ø      | D      |                   | Tensile           | Shear | Tensile               | Shear | Tensile       | Shear |       |      |      |
|               |               |                 |              |        |                       | Z      | W      |                   | lbs               | lbs   | lbs                   | lbs   | lbs           | lbs   |       |      |      |
| LHBM08CSK#1ST | 5/16"         | 1/4" - 7/8"     | 13/4"        | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970 |      |
| LHBM08CSK#2ST | 5/16"         | 7/8" - 15/8"    | 29/16"       | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970 |      |
| LHBM08CSK#3ST | 5/16"         | 15/8" - 23/8"   | 33/8"        | 3/16"  | 9/16"                 | 7/8"   | 3/4"   | 17                | 5980              | 6430  | 3730                  | 4020  | 4790          | 4770  | 2990  | 2970 |      |
| LHBM10CSK#1ST | 3/8"          | 5/16" - 7/8"    | 13/4"        | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760 |      |
| LHBM10CSK#2ST | 3/8"          | 7/8" - 15/8"    | 21/2"        | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760 |      |
| LHBM10CSK#3ST | 3/8"          | 15/8" - 23/8"   | 35/16"       | 1/4"   | 3/4"                  | 11/8"  | 15/16" | 33                | 9730              | 10930 | 6070                  | 6830  | 8120          | 9220  | 5080  | 5760 |      |
| LHBM12CSK#1ST | 1/2"          | 5/16" - 1"      | 17/8"        | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640 |      |
| LHBM12CSK#2ST | 1/2"          | 1" - 113/16"    | 27/8"        | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640 |      |
| LHBM12CSK#3ST | 1/2"          | 113/16" - 23/4" | 311/16"      | 1/4"   | 13/16"                | 11/4"  | 13/16" | 59                | 12190             | 13440 | 7620                  | 8430  | 10250         | 12250 | 6410  | 7640 |      |
| HF            | LHBM16CSK#1ST | 5/8"            | 1/2" - 11/8" | 27/16" | 5/16"                 | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210 | 9490 |
|               | LHBM16CSK#2ST | 5/8"            | 11/8" - 2"   | 35/8"  | 5/16"                 | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210 | 9490 |
|               | LHBM16CSK#3ST | 5/8"            | 2" - 213/16" | 47/16" | 5/16"                 | 11/16" | 11/2"  | 17/16"            | 140               | 15270 | 17330                 | 9530  | 10840         | 13130 | 15200 | 8210 | 9490 |

➤ Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.

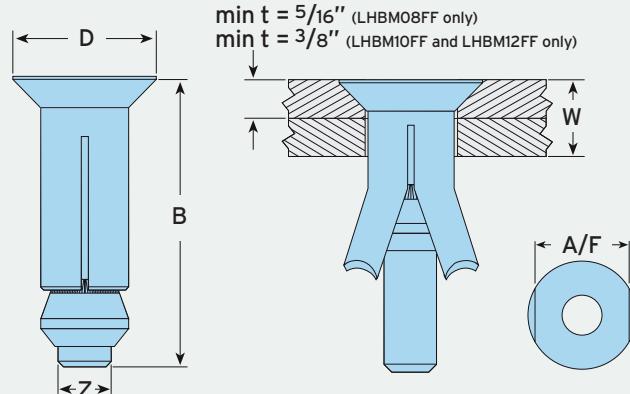
➤ Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.



## Hollo-Bolt™ Flush Fit (data for applications requiring ICC approval)

### LRFD design strength and ASD allowable strength

LRFD and ASD strengths (taken from ESR-3330) are to be used when designing a connection per AISC 360, AISC 341, and ASCE/SEI 7 as referenced by the locally adopted building code.



### Data for Zinc + JS500 and Sheraplex

| Allowable Loading       |                    |                |        |        |        |                   |                       |       |                        |       |                      |       |                        |       |
|-------------------------|--------------------|----------------|--------|--------|--------|-------------------|-----------------------|-------|------------------------|-------|----------------------|-------|------------------------|-------|
| Material: Carbon steel. |                    |                |        |        |        |                   | Static and Wind Loads |       |                        |       | Seismic Loads        |       |                        |       |
| Product Code            | Countersunk Bolt Ø | Clamping Range | Length | Collar |        | Tightening Torque | LRFD Design Strength  |       | ASD Allowable Strength |       | LRFD Design Strength |       | ASD Allowable Strength |       |
|                         |                    |                |        | Ø      | A/F    |                   | Tensile               | Shear | Tensile                | Shear | Tensile              | Shear | Tensile                | Shear |
| LHBM08FF#1              | 5/16"              | 3/8" - 11/16"  | 2"     | 15/16" | 3/4"   | 17                | 3780                  | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM08FF#2              | 5/16"              | 11/16" - 13/4" | 23/4"  | 15/16" | 3/4"   | 17                | 3780                  | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM08FF#3              | 5/16"              | 13/4" - 21/2"  | 39/16" | 15/16" | 3/4"   | 17                | 3780                  | 3220  | 2340                   | 2000  | 3310                 | 2680  | 2045                   | 1670  |
| LHBM10FF#1              | 3/8"               | 1/2" - 11/16"  | 2"     | 13/16" | 15/16" | 33                | 6160                  | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM10FF#2              | 3/8"               | 11/16" - 13/4" | 23/4"  | 13/16" | 15/16" | 33                | 6160                  | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM10FF#3              | 3/8"               | 13/4" - 21/2"  | 39/16" | 13/16" | 15/16" | 33                | 6160                  | 5490  | 3820                   | 3420  | 5490                 | 4570  | 3400                   | 2830  |
| LHBM12FF#1              | 1/2"               | 1/2" - 13/16"  | 23/16" | 15/16" | 13/16" | 59                | 8550                  | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |
| LHBM12FF#2              | 1/2"               | 13/16" - 2"    | 31/8"  | 15/16" | 13/16" | 59                | 8550                  | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |
| LHBM12FF#3              | 1/2"               | 2" - 27/8"     | 4"     | 15/16" | 13/16" | 59                | 8550                  | 7490  | 5310                   | 4680  | 7470                 | 6250  | 4630                   | 3890  |

- Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.
- Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.
- For drilling hole preparation please refer to page 57.

### HOW TO SPECIFY THE FINISH TO THE PRODUCT CODE

Example Product Code

**LHBM08FF#2**       

Choose your finish and add the finish code

Zinc Plated + JS500 **ZN**

Stainless Steel **ST**

Sheraplex **SP**

Final Product Code

**LHBM08FF#2ZN**



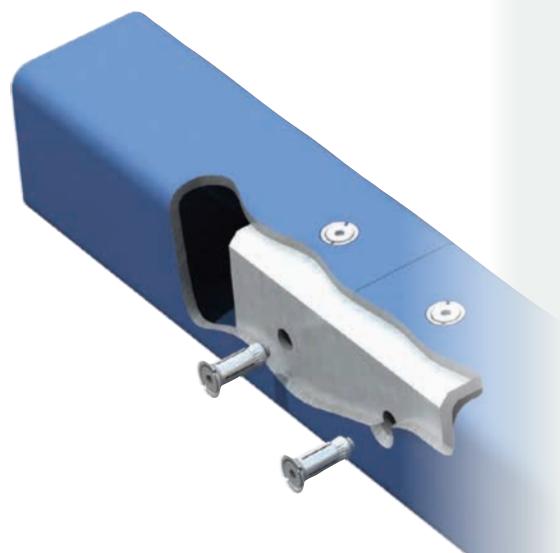
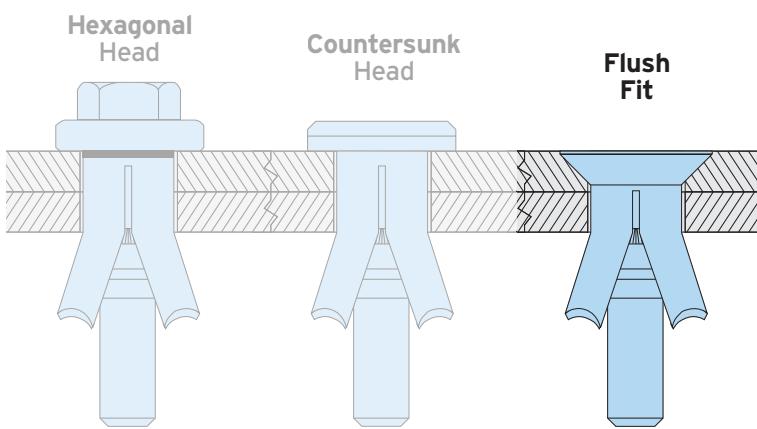
## Hollo-Bolt™ Flush Fit

(data for applications requiring ICC approval)

### Data for Stainless Steel

| Product Code | Countersunk Bolt Ø | Clamping Range | Length | Collar |                  | Tightening Torque | Allowable Loading     |         |       |         |               |         |       |      |
|--------------|--------------------|----------------|--------|--------|------------------|-------------------|-----------------------|---------|-------|---------|---------------|---------|-------|------|
|              |                    |                |        | Ø      | Installation Nut |                   | Static and Wind Loads |         |       |         | Seismic Loads |         |       |      |
|              |                    |                |        |        |                  |                   | ft lb                 | Tensile | Shear | Tensile | Shear         | Tensile | Shear |      |
| LHBM08FF#1ST | 5/16"              | 3/8" - 11/16"  | 2"     | 15/16" | 3/4"             | 17                | 5980                  | 6430    | 3730  | 4020    | 4790          | 4770    | 2990  | 2970 |
| LHBM08FF#2ST | 5/16"              | 11/16" - 13/4" | 23/4"  | 15/16" | 3/4"             | 17                | 5980                  | 6430    | 3730  | 4020    | 4790          | 4770    | 2990  | 2970 |
| LHBM08FF#3ST | 5/16"              | 13/4" - 21/2"  | 39/16" | 15/16" | 3/4"             | 17                | 5980                  | 6430    | 3730  | 4020    | 4790          | 4770    | 2990  | 2970 |
| LHBM10FF#1ST | 3/8"               | 1/2" - 11/16"  | 2"     | 13/16" | 15/16"           | 33                | 9730                  | 10930   | 6070  | 6830    | 8120          | 9220    | 5080  | 5760 |
| LHBM10FF#2ST | 3/8"               | 11/16" - 13/4" | 23/4"  | 13/16" | 15/16"           | 33                | 9730                  | 10930   | 6070  | 6830    | 8120          | 9220    | 5080  | 5760 |
| LHBM10FF#3ST | 3/8"               | 13/4" - 21/2"  | 39/16" | 13/16" | 15/16"           | 33                | 9730                  | 10930   | 6070  | 6830    | 8120          | 9220    | 5080  | 5760 |
| LHBM12FF#1ST | 1/2"               | 1/2" - 13/16"  | 23/16" | 15/16" | 13/16"           | 59                | 12190                 | 13440   | 7620  | 8430    | 10250         | 12250   | 6410  | 7640 |
| LHBM12FF#2ST | 1/2"               | 13/16" - 2"    | 31/8"  | 15/16" | 13/16"           | 59                | 12190                 | 13440   | 7620  | 8430    | 10250         | 12250   | 6410  | 7640 |
| LHBM12FF#3ST | 1/2"               | 2" - 27/8"     | 4"     | 15/16" | 13/16"           | 59                | 12190                 | 13440   | 7620  | 8430    | 10250         | 12250   | 6410  | 7640 |

- Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Limit States of the section, could occur at a lower figure and therefore its strength should be checked by a qualified Structural Engineer. Contact Lindapter for equivalent bearing area and diameter under cone.
- Refer to ESR-3330 and Lindapter's Special Inspection Document for details of connection design, installation and conditions of use.
- For drilling hole preparation please refer to page 57.

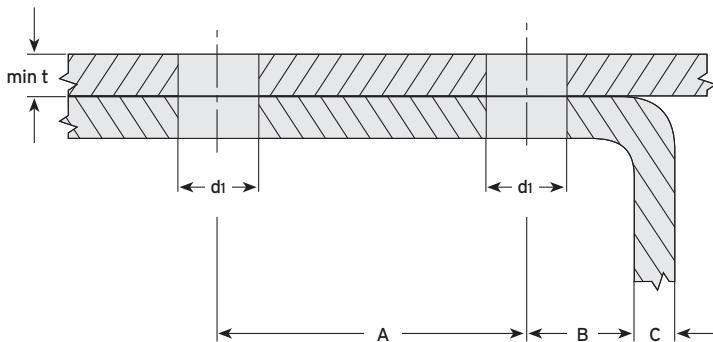


## Hollo-Bolt Hexagonal and Countersunk - Drilling and Installation

To comply with ICC-ES ESR-3330 Section 4.2 ensure that the holes are drilled into both the fixture and the section according to the drilling guidelines below. Please note that the holes are slightly larger than standard bolt drill diameters to accommodate the sleeve and cone.



### Preparation for installing Hollo-Bolt Hexagonal and Countersunk



| Product Code | Outer Ply | Drill Diameter Ø | Hole Distances* |             | Edge Distances* |          |
|--------------|-----------|------------------|-----------------|-------------|-----------------|----------|
|              |           |                  | Hexagonal       | Countersunk |                 |          |
|              |           |                  | min t           | d1          | min A           | min B    |
| LHBM08HEX    | LHBM08CSK | -                | 9/16"           | 13/8"       | 1/2"            | ≥ 11/16" |
| LHBM10HEX    | LHBM10CSK | -                | 3/4"            | 19/16"      | 9/16"           | ≥ 7/8"   |
| LHBM12HEX    | LHBM12CSK | -                | 13/16"          | 2"          | 11/16"          | ≥ 1"     |
| LHBM16HEX    | LHBM16CSK | 5/16"            | 11/16"          | 2 3/16"     | 13/16"          | ≥ 15/16" |
| LHBM20HEX    | -         | 5/16"            | 15/16"          | 2 3/4"      | 1"              | ≥ 15/16" |

\* Ensure holes do not cut through outer radius.

► Sizes 5/8" and 3/4" require outer ply thickness (min t) to be at least 5/16".



### Tool sizes for installing Hollo-Bolt Hexagonal

| Hollo-Bolt Hexagonal |              |             |                         |
|----------------------|--------------|-------------|-------------------------|
| Product Code         | Wrench mm    | Socket mm   | Tightening Torque ft lb |
| LHBM08HEX            | 19 (3/4")    | 13 (1/2")   | 17                      |
| LHBM10HEX            | 24 (15/16")  | 17 (11/16") | 33                      |
| LHBM12HEX            | 30 (13/16")  | 19 (3/4")   | 59                      |
| LHBM16HEX            | 36 (17/16")  | 24 (15/16") | 140                     |
| LHBM20HEX            | 46 (113/16") | 30 (13/16") | 221                     |

\* Note: Metric, nearest equivalent shown in brackets.



### Tool sizes for installing Hollo-Bolt Countersunk

| Hollo-Bolt Countersunk |             |                 |                         |
|------------------------|-------------|-----------------|-------------------------|
| Product Code           | Wrench mm   | Allen Wrench mm | Tightening Torque ft lb |
| LHBM08CSK              | 19 (3/4")   | 5               | 17                      |
| LHBM10CSK              | 24 (15/16") | 6               | 33                      |
| LHBM12CSK              | 30 (13/16") | 8               | 59                      |
| LHBM16CSK              | 36 (17/16") | 10              | 140                     |

\* Note: Metric, nearest equivalent shown in brackets.



#### How to install...

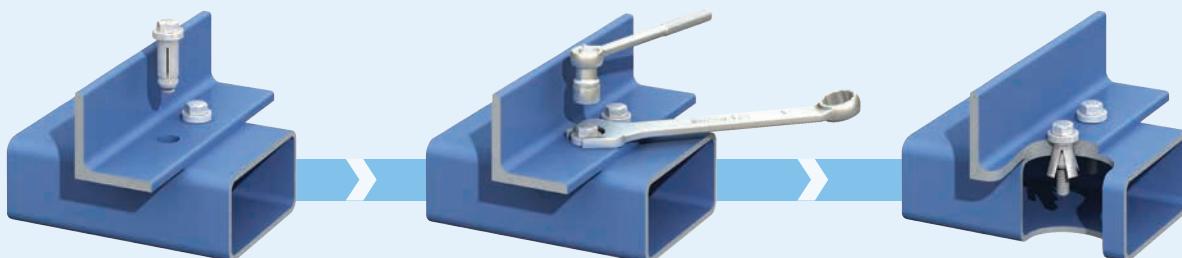


#### Watch the Hollo-Bolt installation video at [www.Lindapter.com](http://www.Lindapter.com)

1) Align pre-drilled fixture and section then insert the Hollo-Bolt<sup>a)</sup>.

2) Grip Hollo-Bolt collar with an open ended wrench.

3) Using a calibrated torque wrench, tighten the central bolt to the recommended torque<sup>b)</sup>.



#### Notes:

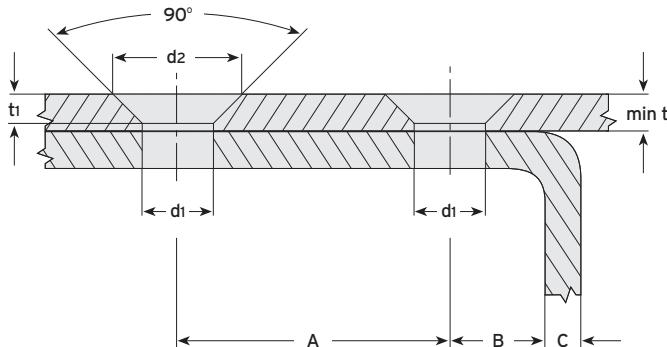
- a) Before tightening, ensure that the materials that are to be connected together are touching.
- b) Rotate the torque wrench only. See table above for tightening torque.
- c) Power tools, such as an impact wrench, may be used to speed up the tightening of the Hollo-Bolt. However, when using power tools, always complete the tightening process with a calibrated torque wrench to ensure the correct torque is applied to the Hollo-Bolt.

## Hollo-Bolt Flush Fit - Drilling and Installation

To comply with ICC-ES ESR-3330 Section 4.2 ensure that the holes are drilled into both the fixture and the section according to the drilling guidelines below. Please note that the holes are slightly larger than standard bolt drill diameters to accommodate the sleeve and cone.



### Preparation for installing Hollo-Bolt Flush Fit



### Tool sizes for installing Hollo-Bolt Flush Fit

| Hollo-Bolt Flush Fit |             |                 |                         |
|----------------------|-------------|-----------------|-------------------------|
| Product Code         | Wrench mm   | Allen Wrench mm | Tightening Torque ft lb |
| LHBM08FF             | 19 (3/4")   | 5               | 17                      |
| LHBM10FF             | 24 (15/16") | 6               | 33                      |
| LHBM12FF             | 30 (13/16") | 8               | 59                      |

\* Note: Metric, nearest equivalent shown in brackets.



| Product Code | Outer Ply min t | Drill Diameter Ø d1 | Countersunk |       | Hole Distances* |        | Edge Distances* B + C |
|--------------|-----------------|---------------------|-------------|-------|-----------------|--------|-----------------------|
|              |                 |                     | d2          | t1    | min A           | min B  |                       |
| LHBM08FF     | 5/16"           | 9/16"               | 1 1/16"     | 1/4"  | 1 3/8"          | 1/2"   | ≥ 11/16"              |
| LHBM10FF     | 3/8"            | 3/4"                | 1 1/4"      | 1/4"  | 19/16"          | 9/16"  | ≥ 7/8"                |
| LHBM12FF     | 3/8"            | 13/16"              | 1 3/8"      | 5/16" | 2"              | 11/16" | ≥ 1"                  |

\* Ensure holes do not cut through outer radius.



### How to install...

1) Align pre-drilled fixture and section then insert Hollo-Bolt<sup>a)</sup>.



2) Apply the installation nut and grip with an open ended wrench.



3) Using a calibrated torque wrench, tighten the central countersunk bolt to the recommended torque<sup>b)</sup>.



#### Notes:

- a) Before tightening, ensure that the materials that are to be connected together are touching.
- b) Rotate the torque wrench only (the installation nut is for restraining only). See table above for tightening torque.
- c) Power tools, such as an impact wrench, may be used to speed up the tightening of the Hollo-Bolt. However, when using power tools, always complete the tightening process with a calibrated torque wrench to ensure the correct torque is applied to the Hollo-Bolt.

Watch the Hollo-Bolt installation video at [www.Lindapter.com](http://www.Lindapter.com)



866 566-2658 (BOLT)



[inquiries@Lindapter.com](mailto:inquiries@Lindapter.com)



[www.Lindapter.com](http://www.Lindapter.com)

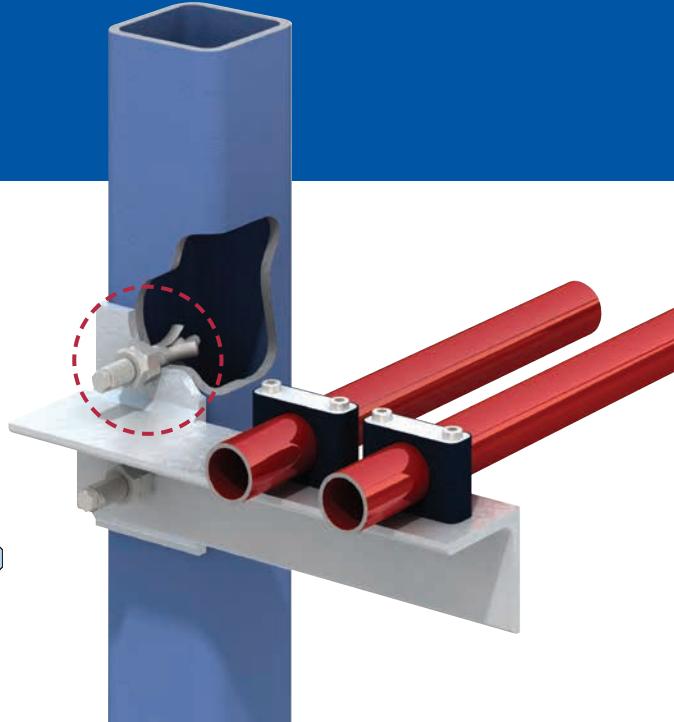
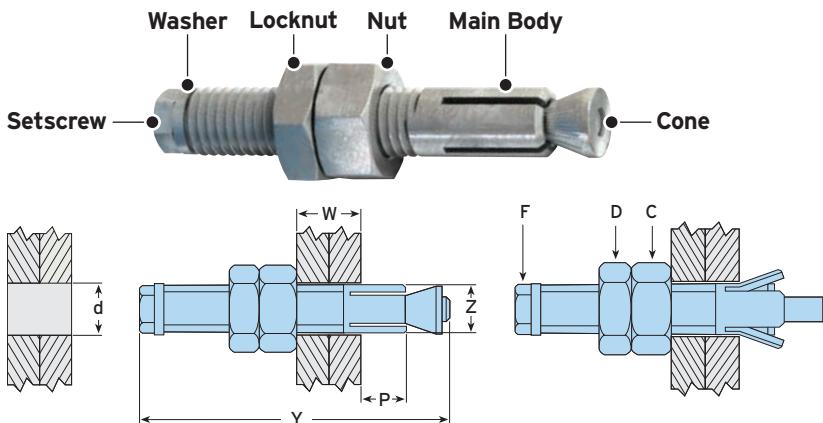


Lindapter 2024

**lindapter**<sup>®</sup>

## Type LB2 - Lindibolt™ 2

A self-heading bolt suitable for connecting steel to hollow sections where access is only available from one side.  
The Lindibolt uses a standard metric drill diameter.



Material: Steel, zinc plated. Stainless steel grade 316.

| Code   | Lindibolt  |                                   | Drill Hole Diameter Ø<br>d | Safe Working Loads (FOS 5:1) |                        | Clamping Length W                          | Projection P    | Setscrew (F)    |            | Nut (C) and Locknut (D) |            |
|--------|------------|-----------------------------------|----------------------------|------------------------------|------------------------|--|-----------------|-----------------|------------|-------------------------|------------|
|        | Bolt*<br>Z | Length<br>Y                       |                            | Tensile<br>lbs               | Single<br>Shear<br>lbs |  |                 | Torque<br>ft lb | Nut<br>A/F | Torque<br>ft lb         | Nut<br>A/F |
| LLB037 | M10 (3/8") | 2 <sup>15</sup> / <sub>16</sub> " | 7/16"                      | 674                          | 764                    | 1/4" - 13/16"                              | 5/16" - 3/8"    | 4               | 3/8"       | 15                      | 11/16"     |
| LLB050 | M12 (1/2") | 3 <sup>3</sup> / <sub>8</sub> "   | 9/16"                      | 1124                         | 1124                   | 3/8" - 17/16"                              | 3/8" - 1/2"     | 8               | 7/16"      | 23                      | 3/4"       |
| LLB062 | M16 (5/8") | 4 <sup>1</sup> / <sub>8</sub> "   | 11/16"                     | 1798                         | 2203                   | 1/2" - 17/8"                               | 1/2" - 5/8"     | 17              | 9/16"      | 60                      | 1"         |
| LLB075 | M20 (3/4") | 5 <sup>1</sup> / <sub>16</sub> "  | 13/16"                     | 3147                         | 3417                   | 9/16" - 2 <sup>3</sup> / <sub>8</sub> "    | 9/16" - 13/16"  | 33              | 11/16"     | 95                      | 13/16"     |
| LLB100 | M24 (1")   | 6 <sup>1</sup> / <sub>4</sub> "   | 1"                         | 4496                         | 5058                   | 11/16" - 2 <sup>13</sup> / <sub>16</sub> " | 11/16" - 15/16" | 59              | 3/4"       | 150                     | 17/16"     |

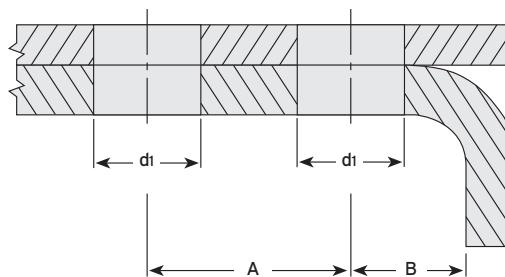
\* Metric bolts, nearest equivalent shown in brackets.

► The safe working loads, in both tension and shear shown, are applicable to the Lindibolt only. Failure of the section, particularly on those with thin walls and a wide chord face, could occur at a lower figure and its strength should be checked by a qualified Structural Engineer.

## Lindibolt - Drilling and Installation

Please ensure that the holes are drilled into both the fixture and the section according to the drilling guidance below.

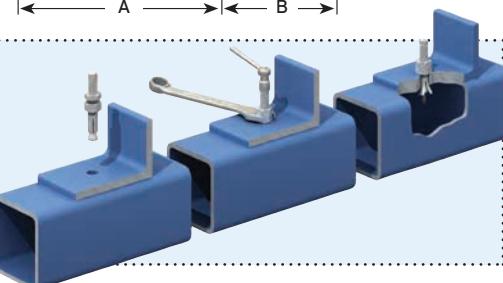
| Product Code | Drill Hole Diameter Ø<br>d <sub>1</sub> | Hole Distances                    |        |
|--------------|---|-----------------------------------|--------|
|              |   | min A                             | min B  |
| LLB037       | 7/16" (+3/64")                          | 1"                                | 19/32" |
| LLB050       | 9/16" (+3/64")                          | 13/16"                            | 13/16" |
| LLB062       | 11/16" (+3/64")                         | 1 <sup>19</sup> / <sub>32</sub> " | 1"     |
| LLB075       | 13/16" (+3/64")                         | 1 <sup>31</sup> / <sub>32</sub> " | 13/16" |
| LLB100       | 1" (+3/64")                             | 2 <sup>3</sup> / <sub>8</sub> "   | 13/8"  |



How to install...

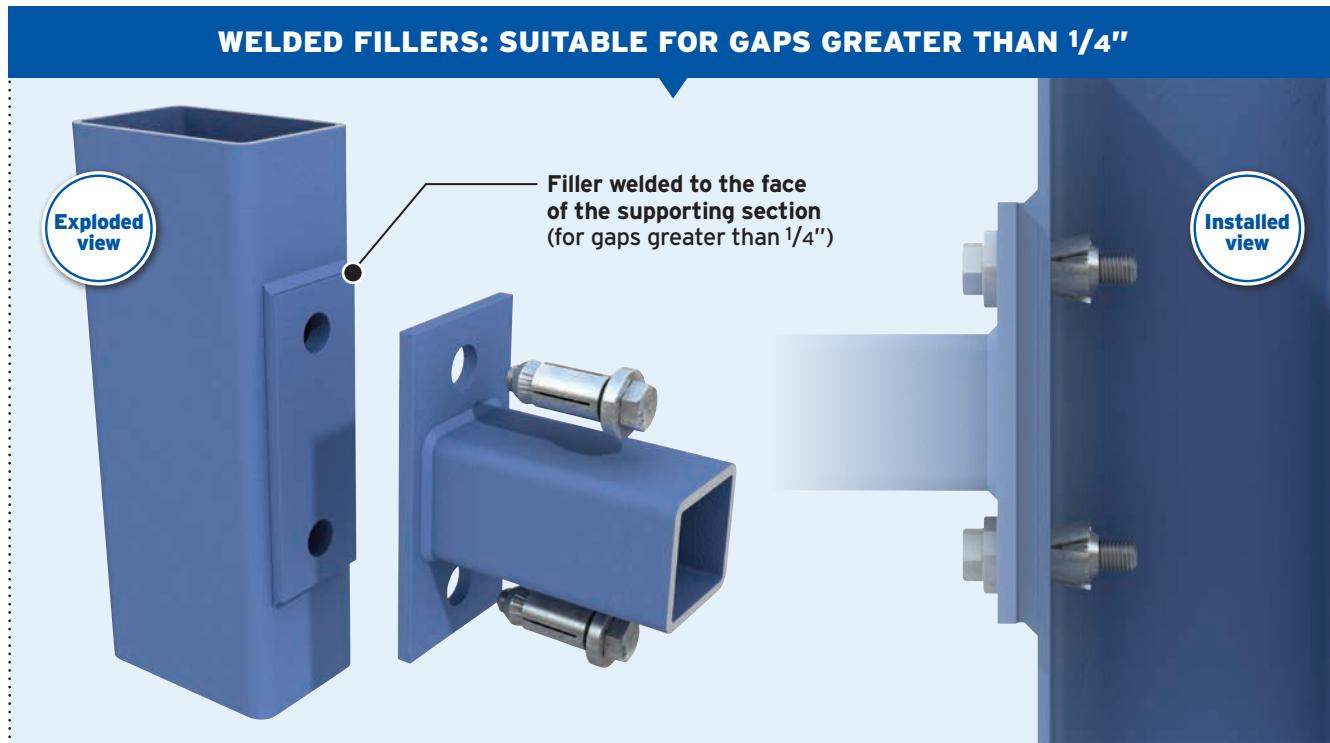
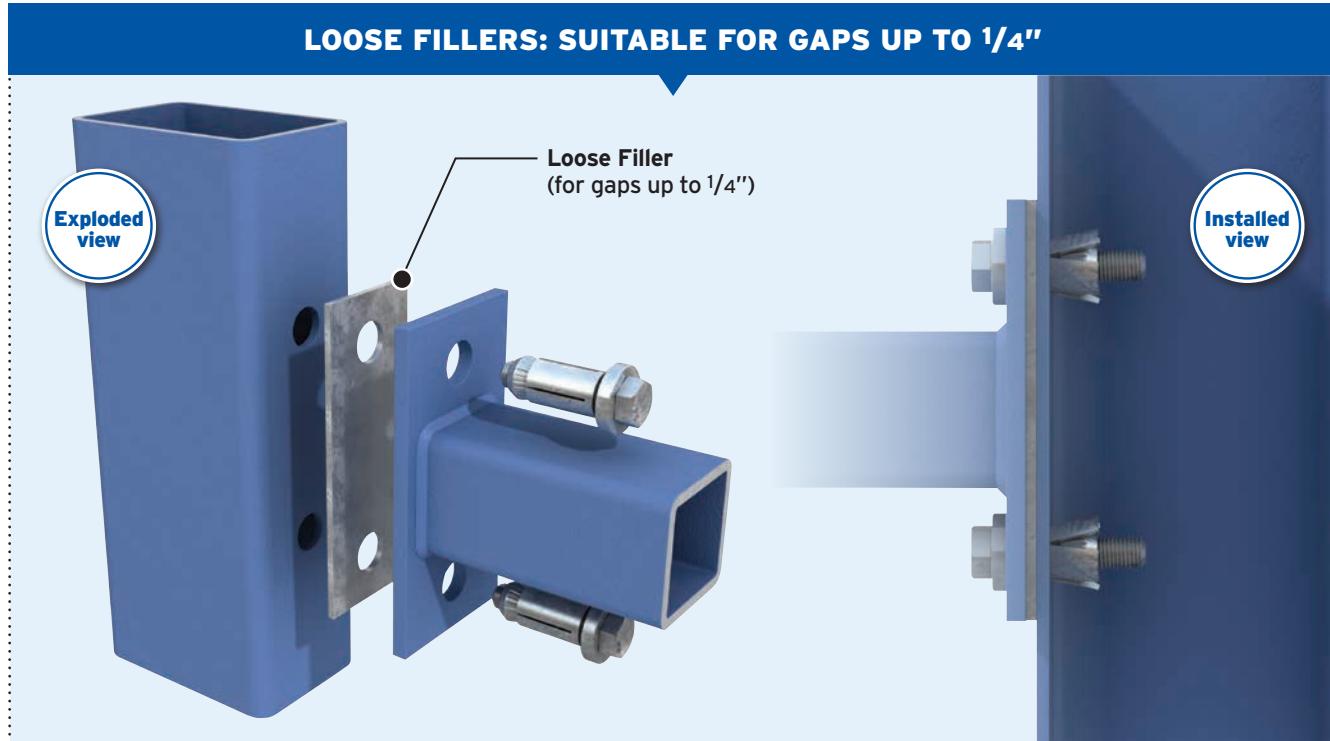
► Watch the installation at [www.Lindapter.com](http://www.Lindapter.com)

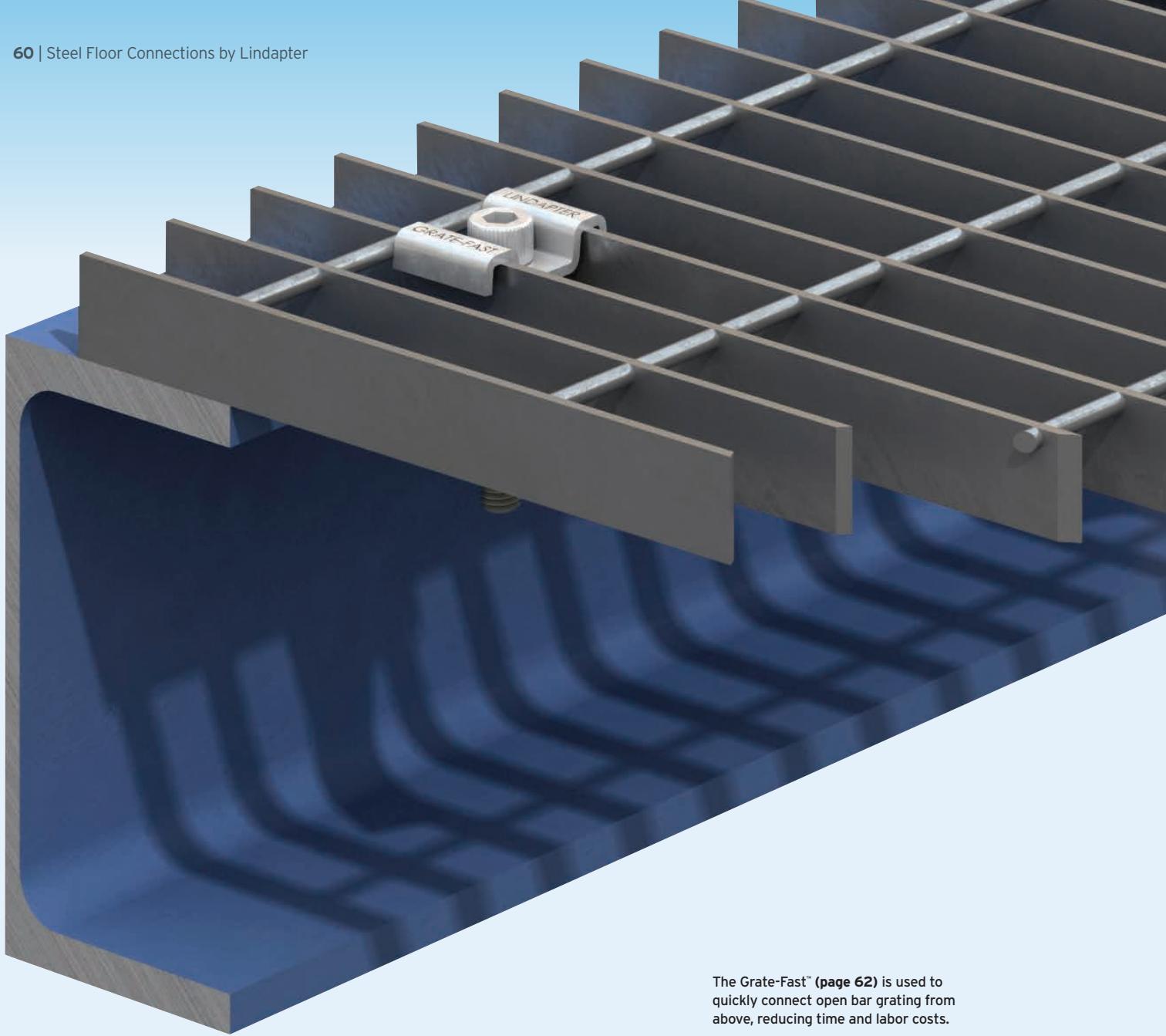
- 1) Set nut (C) at (W) plus projection (P) then tighten the locknut (D).
- 2) Align pre-drilled fixtures. Insert Lindibolt cone end first through both fixtures.
- 3) Hold nut (C) with a spanner and tighten the bolt (F). Loosen off the locknut (D) and tighten the nut (C). Secure by re-tightening the locknut (D).



## Fillers for Hollo-Bolt applications

Fillers or shims are steel strips or plates used in bolted connections to fill gaps in the connecting steel. For guidance regarding the use of fillers/shims in Bolted-Bearing Type connections please refer to AISC 360 - Specification for Structural Steel Buildings Section J5 fillers.





The Grate-Fast™ (page 62) is used to quickly connect open bar grating from above, reducing time and labor costs.

# Steel Floor Connections

A range of innovative connections for securing steel flooring to supporting steel without drilling or welding in the field. Access to the underside is not required, eliminating the need for costly scaffolding or elevated floors.



**Type FF  
FloorFast™**  
page 61



**Type GF  
Grate-Fast™**  
page 62

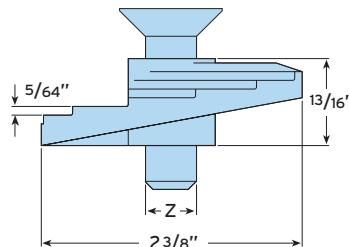
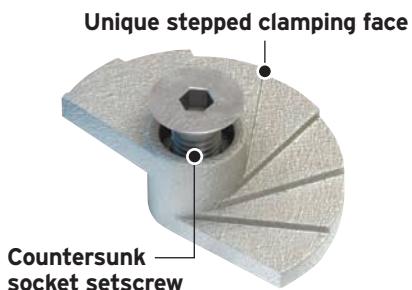


**Type  
1055**  
page 63

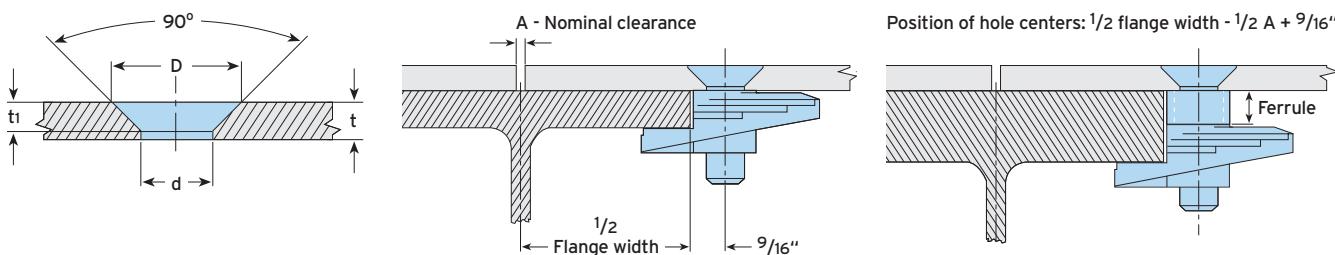
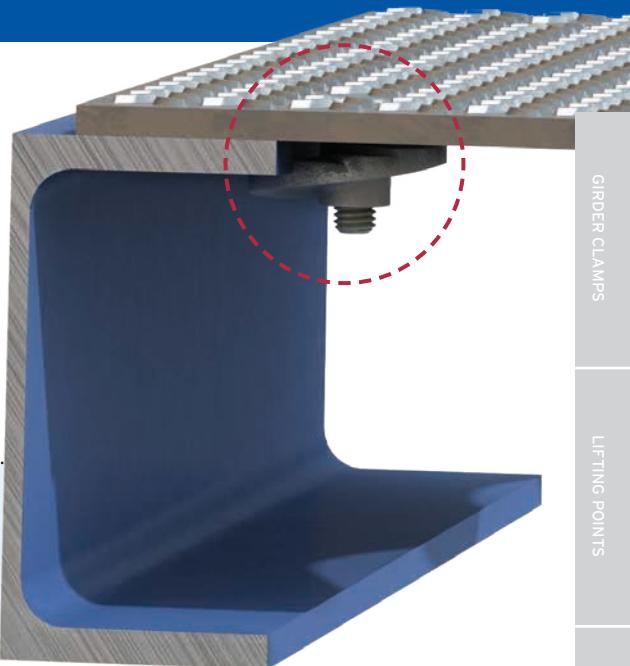


## Type FF - FloorFast™

Securing checker plate flooring to supporting steel can be carried out quickly and safely from above, often by one person, significantly reducing costs. The stepped clamping face locks under the steel to provide a secure connection.



- Superior clamping force from the cast body.
- Lloyd's Register Type Approval for resistance to shock and vibration.
- Zero protrusion above the surface of the floor plate.
- Easy to remove for maintenance access.
- Available in malleable iron or stainless steel grade 316.



Material: Malleable iron, zinc plated or hot dip galvanized. Also available in stainless steel grade 316.

| Product Code | Bolt <sup>1)</sup> | Floorplate Thickness | Floorfast   | Flange Thickness |               |                  | Hole Ø | Dimensions             |                            |                    |                    | Tight. Torque | Hexagon Key |
|--------------|--------------------|----------------------|-------------|------------------|---------------|------------------|--------|------------------------|----------------------------|--------------------|--------------------|---------------|-------------|
|              |                    |                      |             | 10mm (3/8")      | 20mm (13/16") | 30mm (13/16")    |        | Countersunk Ø for Bolt | Countersunk Depth for Bolt |                    |                    |               |             |
| Z            | t                  |                      |             |                  |               |                  | d      | BZP D                  | HDG D                      | BZP t <sub>1</sub> | HDG t <sub>1</sub> | ft lb         | mm          |
| LFF031       | M8 (5/16")         | 3/16" - 1/2"         | 1/8" - 5/8" | 1/2" - 1"        | 7/8" - 13/8"  | 15/16" - 113/16" | 3/8"   | 11/16"                 | -                          | 3/16"              | -                  | 8             | 5 (3/16")   |
| LFF037       | M10 (3/8")         | 3/16" - 1/2"         | 1/8" - 5/8" | 1/2" - 1"        | 7/8" - 13/8"  | 15/16" - 113/16" | 7/16"  | 13/16"                 | 3/4"                       | 3/16"              | 3/16"              | 16            | 6 (7/32")   |
| LFF050       | M12 (1/2")         | 1/4" - 1/2"          | 1/8" - 5/8" | 1/2" - 1"        | 7/8" - 13/8"  | 15/16" - 113/16" | 9/16"  | 1"                     | 15/16"                     | 1/4"               | 3/16"              | 16            | 8 (5/16")   |

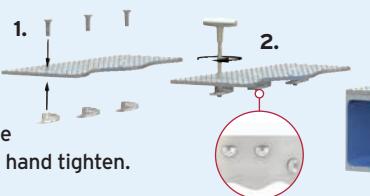
1) Hot dip galvanized M10 and M12 versions are supplied with a slotted countersunk screw. 2) To order FloorFast with a ferrule, simply add ferrule size to product code (eg. LFF050 with 10mm (3/8") ferrule).

► Safe Working Loads (LFF031/LFF037/LFF050): Tensile = 450lbs/bolt (4:1 FoS) Slip = 112lbs/4 bolts (4:1 FoS) ► Designed for pedestrian walkways only.



### How to install...

- 1) Assemble bolt and FloorFast through the checker plate.
- 2) Align castings with the straight edge parallel to the edge of the plate and hand tighten.
- 3) Lay the floorplate into position.
- 4) Using a hexagon key release countersunk screw one full turn.
- 5) Tighten down the countersunk socket screw.



### Watch the installation at [www.Lindapter.com](http://www.Lindapter.com)

**Removal:** Using a hexagon key, give the FloorFast one full anti-clockwise turn to release the connection from the flange.



866 566-2658 (BOLT)



[inquiries@Lindapter.com](mailto:inquiries@Lindapter.com)



[www.Lindapter.com](http://www.Lindapter.com)

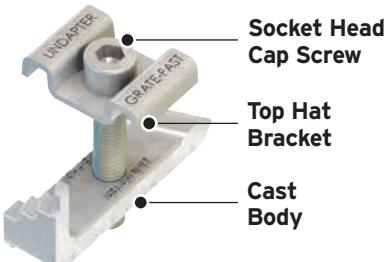
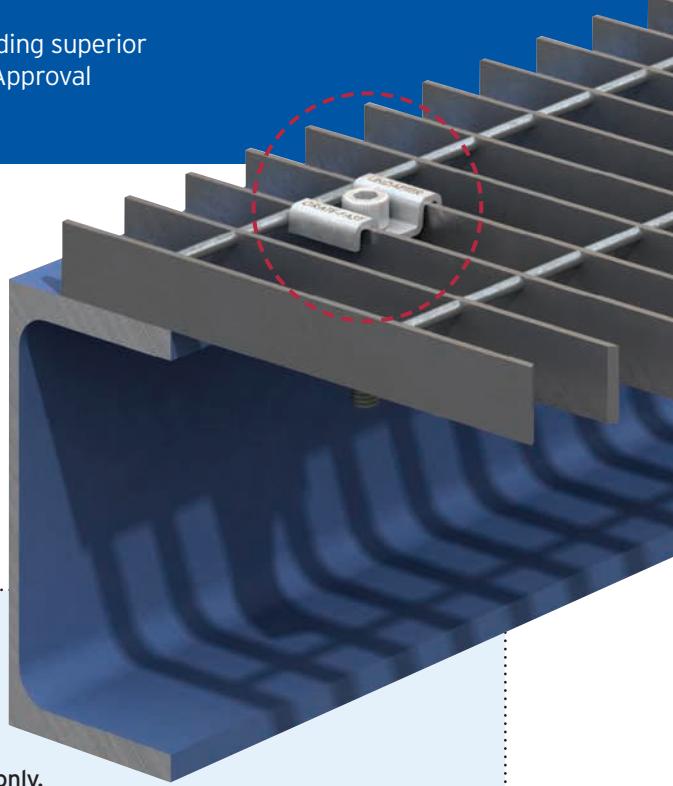


Lindapter 2024

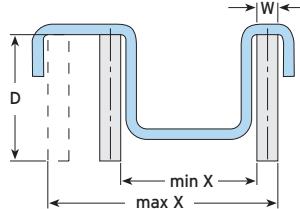
**lindapter**®

## Type GF - Grate-Fast™

A high strength floor connection for rectangular open bar grating, providing superior clamping force due to a malleable iron cast body. Lloyd's Register Type Approval for resistance to shock and vibration.

**LGF037****LGF025-11W**

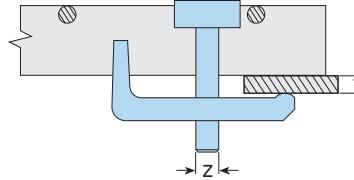
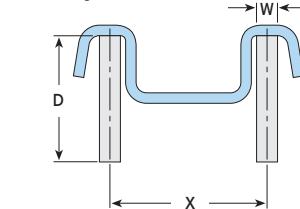
- Easy to remove for maintenance access.
- LGF025-11W for 11-W or 11-P series of close mesh bar grating.
- LGF031 for GRP grating with stainless steel top hat bracket, Sheraplex coated body and socket head screw.
- LGF037 (OSB) is hot dip galvanized for increased corrosion resistance.
- LGF037 is hot dip galvanized for use with 13/16" width floor grating bars only.

**LGF031 / LGF037 (OSB)****Top Hat Material:**

Stainless steel (LGF031 only). Mild Steel, hot dip galvanized (LGF025-11W, LGF037 (OSB) and LGF037 only).

**Body Material:**

Malleable iron, Sheraplex (LGF031 only). Malleable iron, hot dip galvanized (LGF025-11W, LGF037 (OSB) and LGF037 only).

**LGF037 / LGF025-11W**

| Product Code                     | Bolt Z     | Flange T    | Grating Bar Depth D | Grating Bar Width W | Bar Distance X | Tightening Torque ft lb | Hex. Key / Socket mm |
|----------------------------------|------------|-------------|---------------------|---------------------|----------------|-------------------------|----------------------|
| <b>LGF025-11W</b>                | M6 (1/4")  | 1/4" - 3/4" | 1" - 2"             | 1/8" - 3/16"        | 11/16"         | 3                       | 5 (3/16")            |
| <b>LGF031<sup>1)</sup></b>       | M8 (5/16") | 1/8" - 3/4" | 7/8" - 11/2"        | 3/16" - 3/8"        | 3/4" - 17/8"   | 4                       | 6 (7/32")            |
| <b>LGF037 (OSB)<sup>2)</sup></b> | M10 (3/8") | 1/8" - 3/4" | 13/16" - 2"         | 1/8" - 1/4"         | 1" - 13/4"     | 8                       | 10 (3/8")            |
| <b>LGF037<sup>1)</sup></b>       | M10 (3/8") | 1/8" - 3/4" | 3/4" - 19/16"       | 1/8" - 1/4"         | 13/16"         | 8                       | 8 (5/16")            |

1) Supplied with socket head cap screw. 2) Supplied with hex head screw.

► **Safe Working Loads (LGF031/LGF037 (OSB)/LGF037):** Tensile = 360lbs/bolt (4:1 FoS) Slip = 112lbs/4 bolts (4:1 FoS)

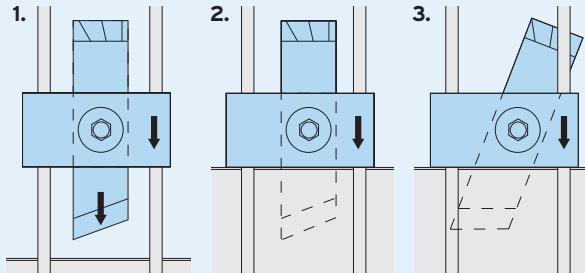
► **Safe Working Loads (LGF025-11W):** Slip = 24lbs/4 bolts (4:1 FoS) ► **Designed for pedestrian walkways only.**



### How to install...

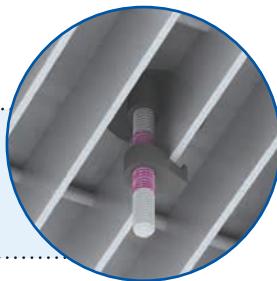
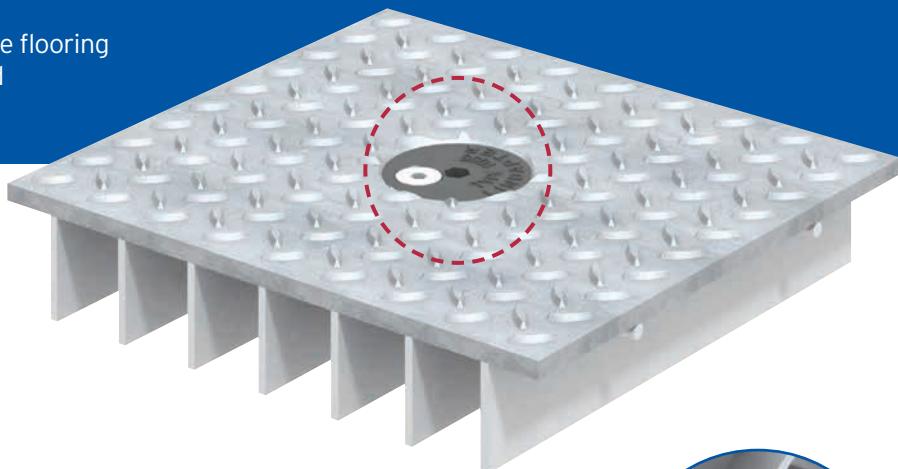
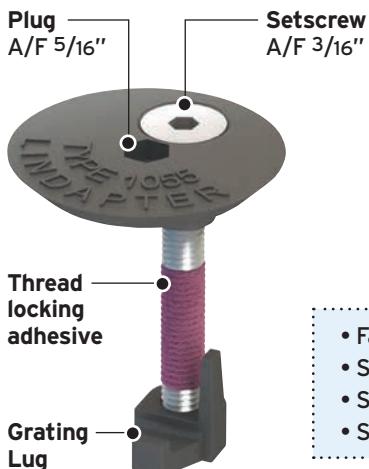
- 1) Position pre-assembled Grate-Fast with the body between the grating bars and the nose pointing towards the steel. The arrows on the top hat bracket should also be point towards the supporting steel and the bracket itself resting on the bearing bars.
- 2) Slide the Grate-Fast towards the steel until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

### Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)

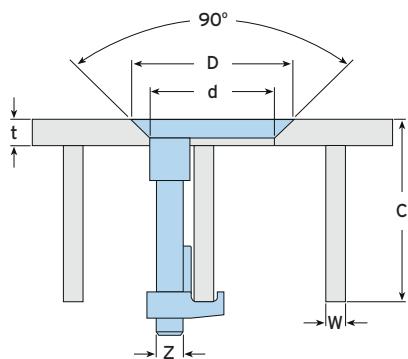


## Type 1055

This unique solution enables solid plate flooring to be fitted to open-mesh or open-grid flooring using simple hand tools.



- Fast installation from above, no expensive scaffolding needed.
- Stainless steel for high corrosion resistance.
- Superior clamping force from high quality castings.
- Safely retrofit without welding.



Material: Cast stainless steel, self colour.

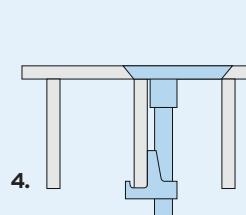
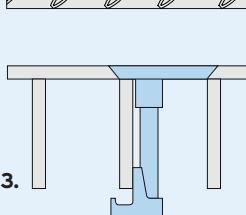
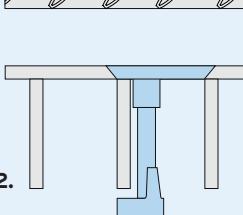
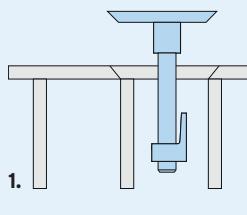
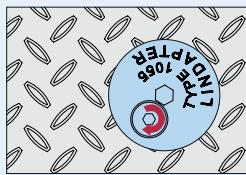
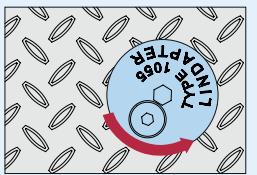
| Product Code | A4-70 Bolt Z | Floorplate Thickness t | Clamping Range C | Grating Bar Width W | Hole Ø d | Csk Ø D | Setscrew Tight Torque ft lb | Hexagon Key mm |
|--------------|--------------|------------------------|------------------|---------------------|----------|---------|-----------------------------|----------------|
| LFG1055      | M8 (5/16")   | min 1/4"               | 13/8" - 2 3/16"  | 1/8" - 5/16"        | 15/8"    | 2"      | 8                           | 5 (3/16")      |

► Safe Working Loads (LFG1055): Tensile = 225lbs/bolt (4:1 FoS) Slip = 34lbs/4 bolts (4:1 FoS)

► Designed for pedestrian walkways only.



### How to install...



- 1) Insert the pre-assembled Type 1055 into the countersunk hole between the grating bars.
- 2) Use an 5/16" hexagon key to rotate the plug anti-clockwise until the underside of the plug locates against the grating bar.
- 3) Use a 3/16" hexagon key to rotate the countersunk setscrew clockwise until the grating lug makes contact with the grating bar.
- 4) Tighten the setscrew to 8ft lb; the grating lug will be drawn up the screw and will activate the thread locking adhesive.

► Watch the installation video at [www.Lindapter.com](http://www.Lindapter.com)



The Type F3 has a large clamping range to suit various flange thicknesses (see page 68).

# Pipe / Conduit Supports

Easy-to-install connections for suspending building services from structural or secondary beams. Typical applications include supporting HVAC equipment, pipe work, fire protection and sprinkler systems. Adjustable to allow a fast, precise alignment of building services.



**Type FLS**  
page 65



**Type FL**  
page 66



**Type LC**  
page 67



**Type SW**  
page 67



**Type F3**  
page 68



**Type HW/HC**  
page 69

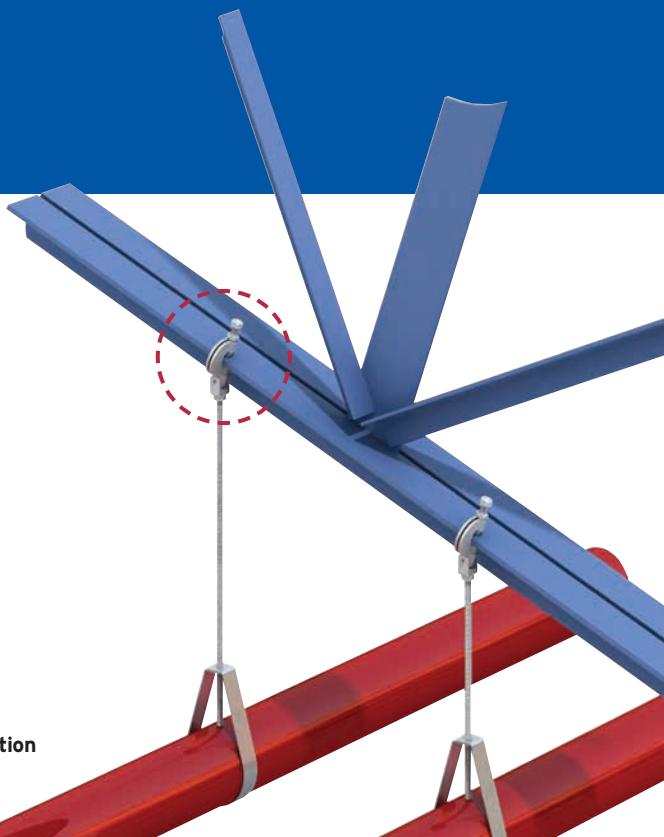
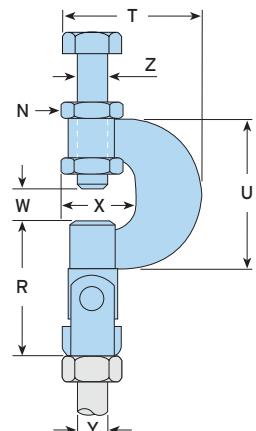
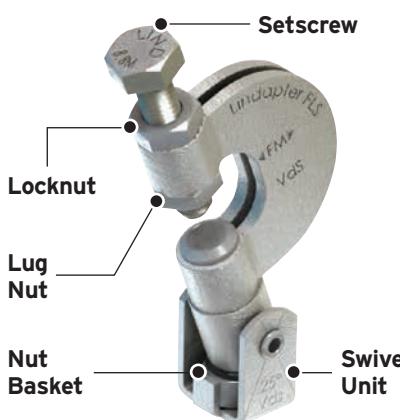


**Type TC**  
page 69



## Type FLS

A versatile flange clamp with a swivel unit for inclined applications. Supplied with a high tensile setscrew for a secure grip on both parallel and tapered flanges.



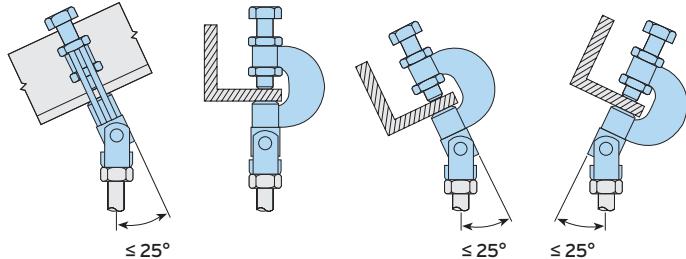
► NEW: Independently fire tested in accordance with ASTM E-119 for a duration of 120 minutes. For fire-resistance load limits please contact Lindapter.

Material: High grade alloy steel, zinc plated.

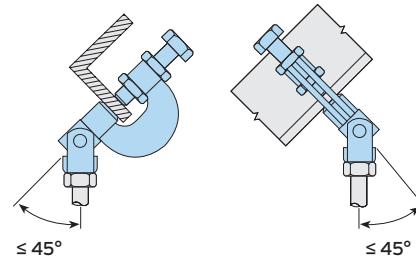
| Product Code | Rod Y    | Safe Working Load (FOS 4:1) |                        | Clamping Range W | Setscrew* Z | Tightening Torque |                 | Dimensions |        |        |         |        |
|--------------|----------|-----------------------------|------------------------|------------------|-------------|-------------------|-----------------|------------|--------|--------|---------|--------|
|              |          | Tensile $\leq 25^\circ$ lbs | Tensile 25° to 45° lbs |                  |             | Setscrew Z ft lb  | Locknut N ft lb | R          | T      | U      | X       | Width  |
| LFLS037      | 3/8" UNC | 550                         | 330                    | 1/8" - 11/16"    | M10 (3/8")  | 13                | 13              | 2 3/16"    | 2 1/8" | 2 1/4" | 1 1/16" | 1 1/8" |

\* Metric setscrew supplied.

### Independently Approved Applications



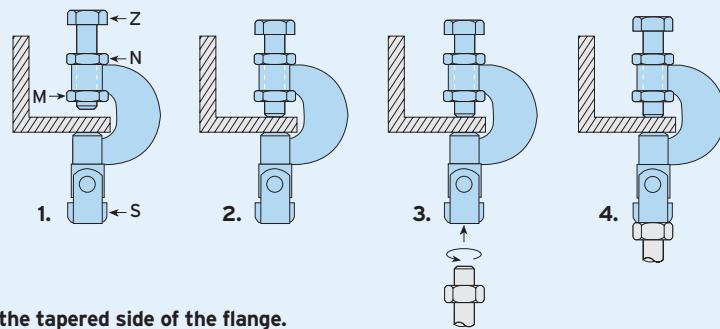
### General Applications (Parallel Flanges only)



#### How to install...

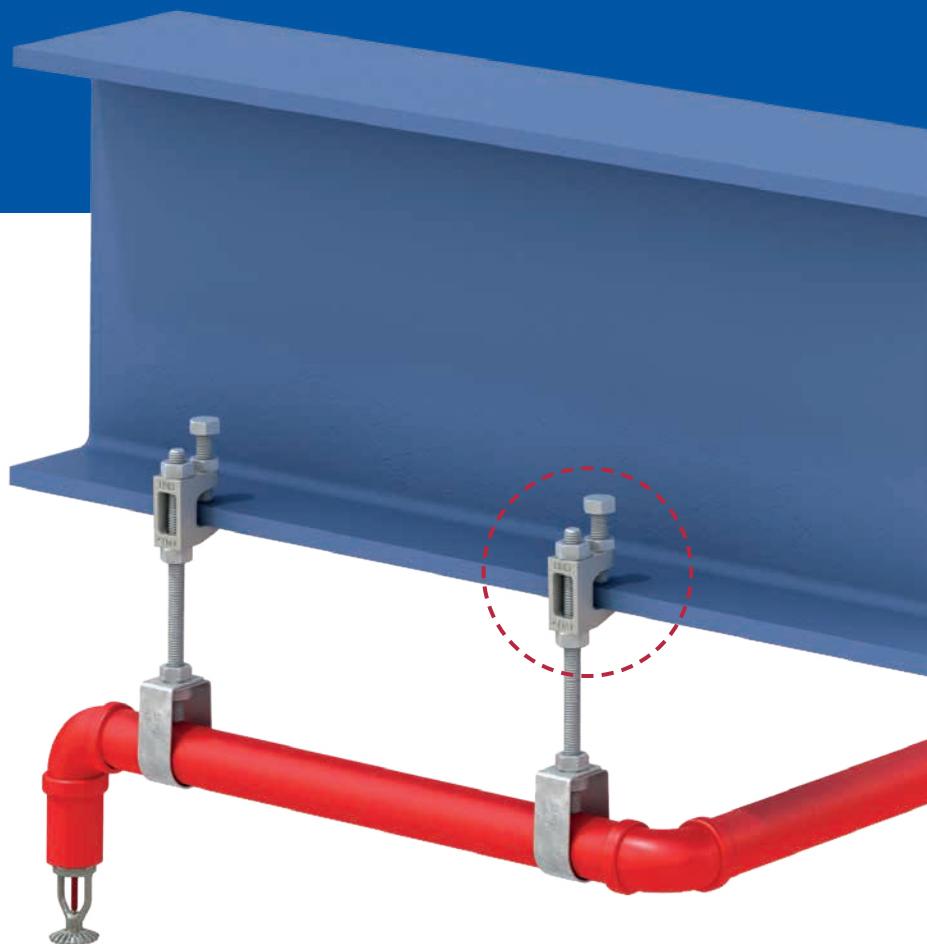
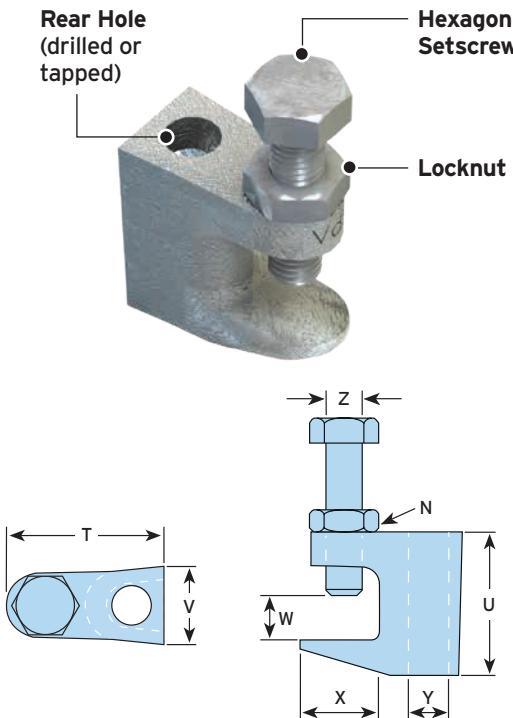
- 1) Locate the FLS onto the flange.
- 2) Ensuring the lug nut (M) locates into the main body, tighten down the setscrew (Z) and locknut (N).
- 3) Install the 3/8" UNC threaded rod by screwing into the nut located in the nut basket (S). Ensure full thread capture.
- 4) Secure assembly in nut basket (S) from beneath using a nut (not supplied).

► Ensure that the cup point setscrew always grips on the tapered side of the flange.



## Type FL

FM and VdS approved flange clamp for use with parallel or tapered flange beams, supplied with the rear hole drilled or tapped.



► NEW: Independently fire tested in accordance with ASTM E-119 for a duration of 120 minutes. For fire-resistance load limits please contact Lindapter.

Material: Malleable iron, zinc plated.

| Product Code    |                | Drilled Hole | Tapped Hole | Drilled Hole Ø Y | Tapped Thread Y | Safe Working Load (FOS 4:1)<br>Tensile lbs | Clamping Range W     | Setscrew <sup>1)</sup> Z | Tightening Torque |           | Dimensions   |                |              |             |
|-----------------|----------------|--------------|-------------|------------------|-----------------|--|----------------------|--------------------------|-------------------|-----------|--------------|----------------|--------------|-------------|
|                 |                |              |             |                  |                 |  |                      |                          | ft lb             | ft lb     | T            | U              | X            | Width V     |
| <b>LFL037C*</b> | <b>LFL037T</b> | <b>7/16"</b> |             | <b>3/8" UNC</b>  |                 | <b>540</b>                                 | <b>1/8" - 25/32"</b> | <b>M10 (3/8")</b>        | <b>6</b>          | <b>16</b> | <b>13/4"</b> | <b>19/16"</b>  | <b>7/8"</b>  | <b>7/8"</b> |
| <b>LFL050C</b>  | <b>LFL050T</b> | <b>1/2"</b>  |             | <b>1/2" UNC</b>  |                 | <b>700</b>                                 | <b>1/8" - 15/16"</b> | <b>M10 (3/8")</b>        | <b>6</b>          | <b>16</b> | <b>2"</b>    | <b>113/16"</b> | <b>11/8"</b> | <b>1"</b>   |

\* Also available in stainless steel.

1) Metric setscrew supplied.

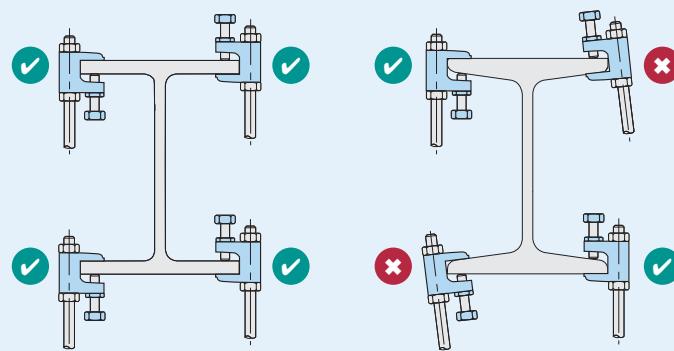
► The Type FL can be used with Type SW (page 67) when connecting to inclined sections.



### How to install...

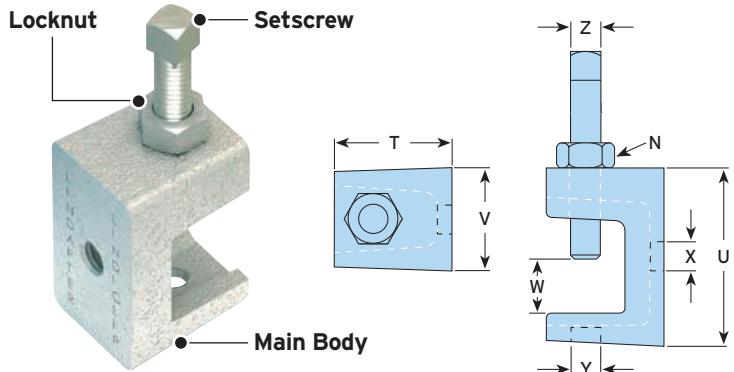
- 1) Slide the Type FL onto the beam flange and tighten setscrew to the recommended torque. As a guide, tighten the setscrew finger tight and then apply an additional quarter turn (90°) with a 11/16" wrench.
- 2) Tighten the locknut (N) to the recommended torque.

► On tapered flanges, the cup point setscrew has to grip on the inside of the flange.



## Type LC

A flange clamp with tapped holes to accept threaded rod or cable clips. Supplied with a high tensile cup point setscrew for parallel or tapered flanges.



Material: Malleable iron, zinc plated.

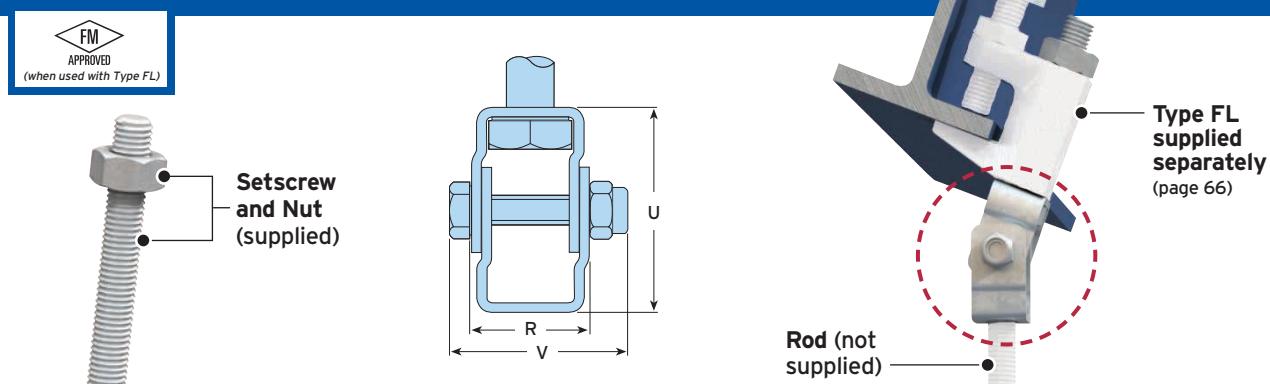
| Product Code | Tapped Thread |          | Safe Working Load (FOS 4:1) |                           |                  | Clamping Range W | Setscrew* Z | Tightening Torque |                 | Dimensions |      |         |
|--------------|---------------|----------|-----------------------------|---------------------------|------------------|------------------|-------------|-------------------|-----------------|------------|------|---------|
|              | X             | Y        | Tensile in Position X lbs   | Tensile in Position Y lbs | Setscrew Z ft lb |                  |             | Setscrew Z ft lb  | Locknut N ft lb | T          | U    | Width V |
| LLC025       | 1/4" UNC      | 1/4" UNC | 40                          | 135                       | 1/8" - 11/16"    | M6 (1/4")        | 3           | 3                 | 1"              | 17/16"     | 7/8" |         |

\* Metric setscrew supplied.

▶ Installation is the same as Type FL (page 66).

## Type SW

A swivel unit for applications on inclined beams complete with a M10 (3/8" x 3 9/16") Grd. 5 setscrew and nut. Can be supplied with Type FL.



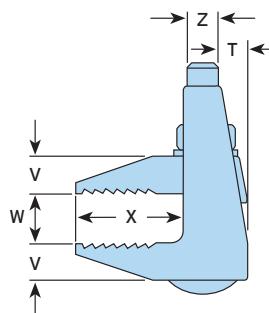
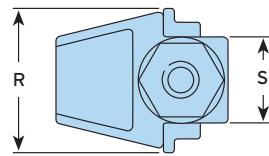
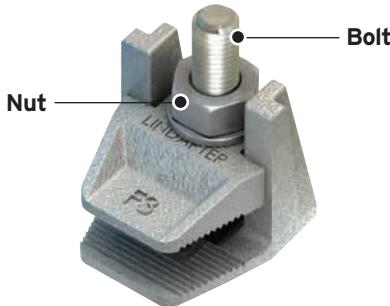
Material: High grade alloy steel, zinc plated.

| Product Code | Rod*        | Safe Working Load (FOS 4:1) |     | Maximum Inclination | Rotation | Tightening Torque ft lb | Dimensions |                   |       |
|--------------|-------------|-----------------------------|-----|---------------------|----------|-------------------------|------------|-------------------|-------|
|              |             | Tensile lbs                 | U   |                     |          |                         | R          | Width with Bolt V |       |
| LSW037       | M10 or 3/8" | 540                         | 18° | 360°                | 8        | 8                       | 13/4"      | 1"                | 13/8" |

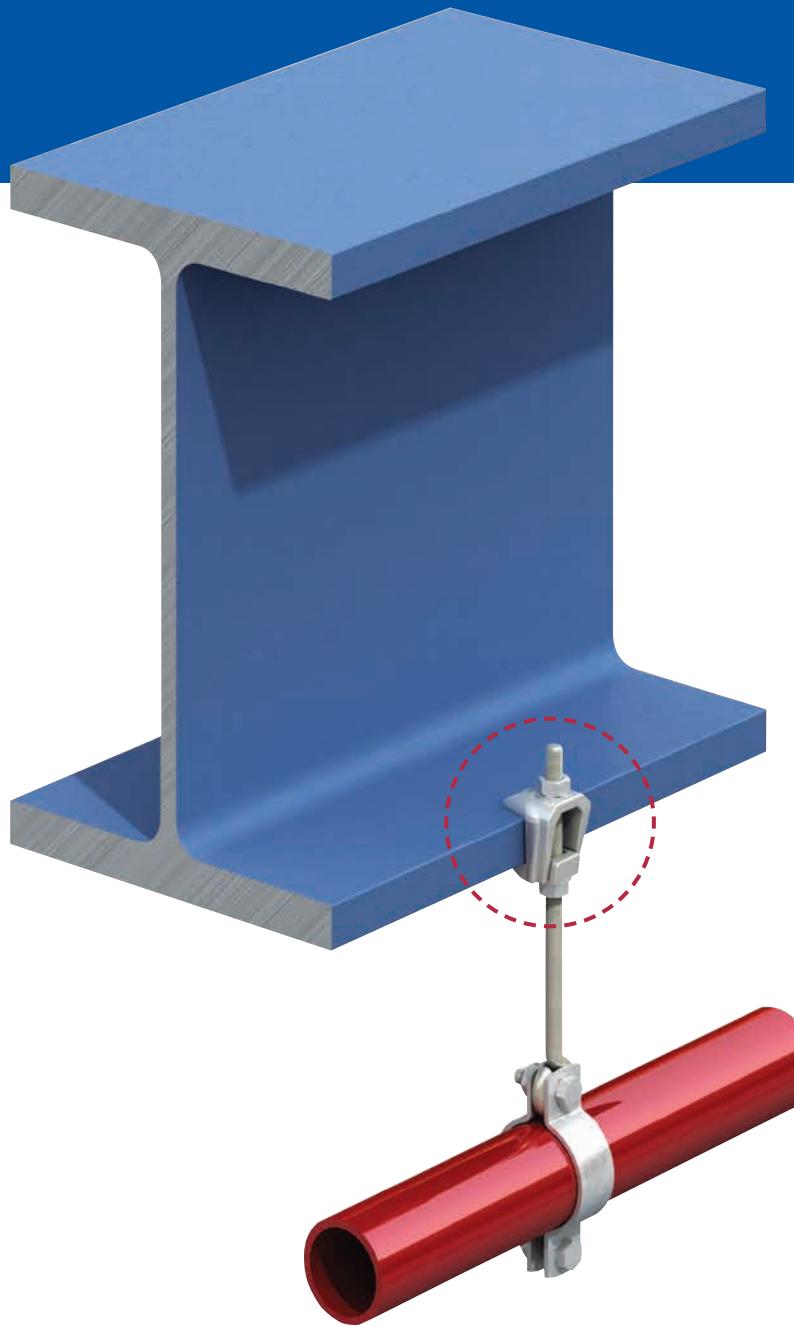
\* Secure threaded rod (either M10 or 3/8") to the Type SW using a standard nut.

## Type F3

An FM approved, high strength flange clamp with a large clamping range.



For heavier loads or wider clamping range, please see the Type F9 on page 30.



Material: Malleable iron, hot dip galvanized.

| Without Bolt |              | With Bolt       |  | Safe Working Load (FOS 4:1) | Clamping Range W | Tensile lbs | Tightening Torque* ft lb | Dimensions |      |          |          |
|--------------|--------------|-----------------|--|-----------------------------|------------------|-------------|--------------------------|------------|------|----------|----------|
| Product Code | Product Code | Bolt Supplied Z |  |                             |                  |             |                          | S          | T    | V        | X        |
| LF3037NB     | LF3037WB     | M10 (3/8")      |  | 270                         | 1/16" - 13/16"   | 15          | 7/8"                     | 5/16"      | 3/8" | 1"       | 1 1/2"   |
| LF3050NB     | LF3050WB     | M12 (1/2")      |  | 450                         | 1/16" - 19/16"   | 29          | 1 1/8"                   | 3/8"       | 1/2" | 1 3/8"   | 1 15/16" |
| LF3062NB     | LF3062WB     | M16 (5/8")      |  | 900                         | 1/8" - 2 3/16"   | 69          | 17/16"                   | 1/2"       | 5/8" | 1 13/16" | 2 3/8"   |
| LF3075NB     | LF3075WB     | M20 (3/4")      |  | 1350                        | 3/16" - 2 3/4"   | 130         | 13/4"                    | 9/16"      | 3/4" | 2 3/16"  | 3"       |

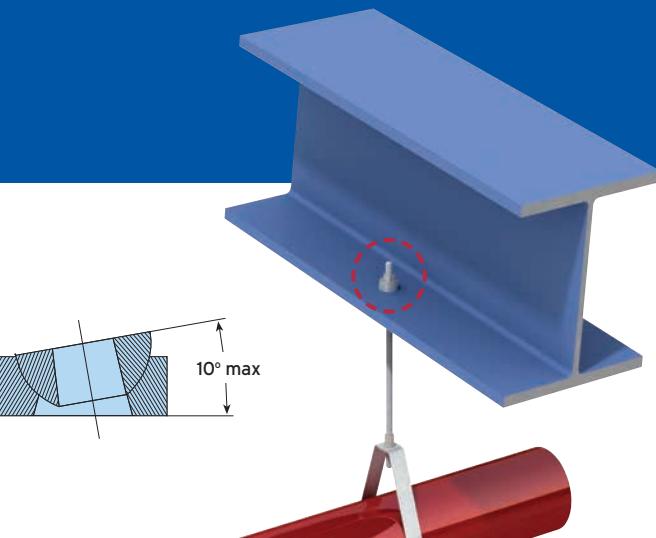
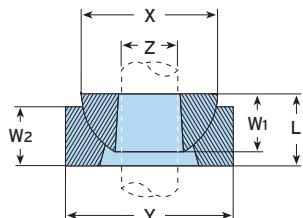
\* Torque figures based on fasteners in an unlubricated condition. For further information see page 70.

➤ For parallel flanges only.

➤ Supplied without bolt or with bolt (contact your local distributor for details / options).

## Type HW / HC

For vertical suspension on angled surfaces of up to 10° swing either side of the vertical.

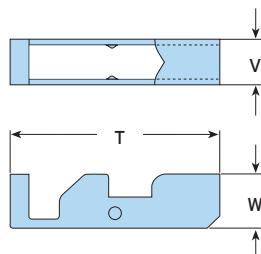


Material: Malleable iron, zinc plated or hot dip galvanized.

| Product Code                                   |                   | Rod Z | Dimensions             |        |                     |      |                              |
|--|-------------------|-------|------------------------|--------|---------------------|------|------------------------------|
| Hemispherical Washer (can be used without cup) | Hemispherical Cup |       | Hemispherical Washer X | W1     | Hemispherical Cup Y | W2   | Hemispherical Washer & Cup L |
| LHW037   | LHC037            | 3/8"  | 1 1/32"                | 7/16"  | 19/32"              | 1/2" | 5/8"                         |
| LHW050   | LHC050            | 1/2"  | 1 1/8"                 | 1/2"   | 1 11/32"            | 1/2" | 11/16"                       |
| LHW062   | LHC062            | 5/8"  | 1 3/8"                 | 5/8"   | 15/8"               | 5/8" | 7/8"                         |
| LHW075   | LHC075            | 3/4"  | 1 3/4"                 | 23/32" | 2 5/32"             | 3/4" | 29/32"                       |

## Type TC - Toggle Clamp

Designed for service suspension from pre-cast hollow core slabs (minimum core depth 3").



Material:  
Steel strip,  
zinc plated.

✖ Safe Working Loads subject to the strength of the supporting section.



| Product Code | Drop Rod | Hole Ø | Safe Working Load (FOS 4:1) |  | Tightening Torque | Dimensions |        |         |
|--------------|----------|--------|-----------------------------|--|-------------------|------------|--------|---------|
|              |          |        | Tensile / 1 Rod lbs         |  | ft lb             | T          | W      | Width V |
| LTC037       | 3/8" UNC | 1"     | 550                         |  | 7                 | 2 11/16"   | 11/16" | 9/16"   |

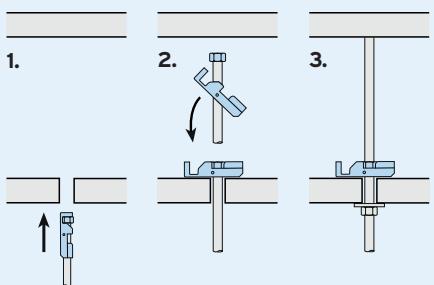


How to install...

Watch the installation at [www.Lindapter.com](http://www.Lindapter.com)

### Instructions for hollow core slab:

- 1) Pre-assemble the clamp on the rod and insert into the hole (ensure it is central to the hollow core).
- 2) Shake the rod to allow the toggle body to locate horizontally across the hole, then lower the rod so that the nut locates in the toggle body.
- 3) Wind up the rod to the top of the section so it is as high as possible. Secure the assembly with a nut and washer.



## Tightening Torque and DTI Washers

Important information about the tightening torque values published in this catalog can be found below. Additional information about the use of DTI Washers is also provided.

### Tightening Torque Values

**All torque figures given in this catalog are for fasteners in an unlubricated condition.** The use of these torque figures with lubricated or greased threaded fasteners and hexagon nuts will apply a much higher preload and may result in damage to the clamp and fastener. When using lubricated fasteners with a Lindapter component, a reduced torque value should be used. Please contact your bolt and nut supplier for information on the alternative torque for the selected lubricant to ensure the correct preload is generated.

### Using DTI Washers

If preferred, DTI washers can be used as part of the fastener assembly with the components shown in the table below. The use of this type of washer can be used with lubricated fasteners and provides a visual indication that the correct preload has been achieved in the bolt. Alternatively, Tension Control Bolts in accordance with ASTM F959 may be used with the Type AF/AAF.

| Lindapter Product | Bolt Grade   | DTI Washer (ASTM F959) |                            |
|-------------------|--------------|------------------------|----------------------------|
|                   |              | Standard Connection    | ICC-ES Approved Connection |
| Type AAF          | A325 or A490 | Recommended            | Required                   |
| Type AF           | A325 or A490 | Recommended            | Required                   |
| Type CF           | A325         | Recommended            | Not Applicable             |

► Other Lindapter products have lower torque values to limit the amount of preload on unlubricated bolts and cannot be used with DTI washers.



### Product Durability

The durability of the Lindapter product is achieved by coating or by use of stainless steel and is categorized by Corrosivity Class in accordance with ISO 9223. For Corrosivity Class C4 and C5 please contact Lindapter.

| Corrosivity Class | Galvanized Steel   | Steel with Sheraplex finish | Electro-plated Steel + JS500 | Electro-plated Steel | Stainless Steel    |
|-------------------|--------------------|-----------------------------|------------------------------|----------------------|--------------------|
| C1                | more than 50 years | more than 50 years          | more than 50 years           | more than 20 years   | more than 50 years |
| C2                | more than 50 years | more than 50 years          | more than 20 years           | more than 5 years    | more than 50 years |
| C3                | more than 20 years | more than 20 years          | more than 10 years           | Not suitable         | more than 50 years |

► For Corrosivity Class information, see [www.steelconstruction.info/Standard\\_corrosion\\_protection\\_systems\\_for\\_buildings](http://www.steelconstruction.info/Standard_corrosion_protection_systems_for_buildings)

## FAQs about Lindapter Girder Clamps

Below you'll find answers to the questions we get asked the most about Lindapter Girder Clamps. If your question is not answered here please contact Lindapter's Technical Support team.

### Can location plates be made to any dimensions?

No. Details of the minimum sizes are shown in this catalog and on the website.

### Are Lindapter assemblies reusable?

If an assembly which has not been subjected to dynamic or fatigue loading is repositioned and reused, a visual inspection should be carried out to check the condition of the components and the protective coating.

If any signs of physical damage or corrosion to the clamps or plates can be seen, the full assembly should be replaced.

### Do tail length and packing combination calculations have to be exact?

The tables within the catalog or on the website should be used for guidance on tail lengths and packing combinations; there is a tolerance which varies depending on the bolt diameter.

### Is it possible to use Lindapter products with proprietary concrete anchors?

Yes, but it may be necessary to reduce Lindapter's recommended bolt tightening torque to comply with the anchor bolt manufacturers figures; if so, this is likely to affect the connection capacity.

### Will clamps damage my steel surface coating?

The material from which Lindapter clamps are manufactured should not damage the structure although removal marks could be in evidence on some surface coatings.

### Can Lindapter connections be used in a combined tension and friction / slip resistance load?

For Lindapter products with both tension and slip loads published, combined loading is permitted. Please refer to AISC 360 for details.

### Why do location and end plates have to be made to a certain minimum thickness?

As well as positioning all the components, the location plate supports the tail of the clamp. On girder clamp assemblies the plate does not have to be as thick as it does for end plates; the reason for this is that the tail of the clamp on the bottom beam is trying to bend the plate but this is counteracted by the clamp's tail on the top beam.

With end plates there is no counteracting clamp, hence the plate needs to be thicker to support the tail. Plate thicknesses may be able to be reduced by using higher grade/strength material.

### Are Lindapter assemblies affected by vibration?

Although tested and approved for situations where they will be subject to vibration conditions, we would recommend that, in circumstances where this could be extreme, a proprietary locking device / anti-vibration washer can be used.

### Can Lindapter Type F9 be used to connect beams together?

It is possible if the beams are running parallel to each other but they must be of the same type and width although a Lindapter Girder Clamp is a much better option; the Type F9 must never be used to connect beams together which are crossing at 90° to each other or have tapered flanges.

### Can Lindapter assemblies be used as permanent connections or are they only for temporary use?

They can be used in temporary and permanent applications. Lindapter has details of applications that have been installed for 50 years or more.

## FAQs about Lindapter Girder Clamps (continued)

Below you'll find more answers to the questions we get asked the most about Lindapter Girder Clamps. If your question is not answered here please contact Lindapter's Technical Support team.

### How long will Lindapter assemblies last in an exterior environment?

The best coating would be Hot Dip Galvanizing. Longevity would depend on the background corrosion rate evident in the location it is intended they be used; guidance should be sought from the galvanizers association of the relevant country.

### Why is there such a high 'Factor of Safety', typically 5:1, on Lindapter connections?

This recommended 'Factor of Safety' is to ensure that the components are subject to loads well within their capacity range in normal working condition but in event of an unintentional overload of the component / assembly there is sufficient strength within the clamps to avoid damage and / or failure of the connection. A lower FOS must not be used without first seeking advice.

### Do I need to use a torque wrench when assembling a Lindapter connection?

Yes, we always recommend the use of a calibrated torque wrench. It is important to tighten up the fasteners to our published torque figures to ensure it replicates test conditions so that the Safe Working Loads can be achieved.

### Is it possible to use Lindapter products either sub-sea or within the splash zone?

Yes, although consideration has to be given to the proposed material or coating used; splash zones can be more aggressive than total submersion.

### What should be considered when connecting a pre-drilled section to an existing beam?

Make sure the section is thick enough to counter the reaction from the tail of the clamp. The thickness shall be at least as thick as the designated end plate thickness for the specified clamp.

### Is it possible to use stainless steel fasteners with Lindapter products?

It is not recommended as it is likely to create a mechanism for the onset of bi-metallic corrosion. They can however be used with the Lindapter Type LS which is manufactured in stainless steel.

### Why is the frictional Factor of Safety on Lindapter Type AF only 2:1 and not 5:1 as it is on the tensile Safe Working Loads?

The published safe working load and 2:1 factor of safety is a recognized method of determining slip and is defined according to the Eurocode as the load corresponding to 0.004" (0.1mm) of movement. As the safe working load is based on movement of 0.004" it is acceptable to use a reduced factor of safety of 2:1.

### Can I use Lindapter clamps in slotted hole connections?

Yes, but it is important that the slot is 'bridged' to ensure that the tail of the clamp does not fit into it. This can be done by using a product with a full width tail such as Types AAF, AF, LR or LS.

For additional guidance on slotted holes, please refer to AISC Section J3 and the RCSC.

### What is the recommended Lindapter safe working temperature range?

As a general rule -22°F to +662°F; however, this can increase or decrease in certain situations. For example, the Type AAF clamp is tested to -76°F. Carbon steel Hollo-Bolts have been tested to -50°F.

## FAQs about Lindapter Hollo-Bolts

Below you'll find answers to the questions we get asked the most about Lindapter Hollo-Bolts. If your question is not answered here please contact Lindapter's Technical Support team.

### Can the Hollo-Bolt be used in concrete?

No. It is designed as an expansion bolt for HSS of all shapes and sizes or where access is available from one side only.

### Why is there a minimum outer ply requirement when using 5/8" and 3/4" Hollo-Bolts?

To ensure the unique collapse mechanism (rubber washer) does not compromise the shear capacity of the Hollo-Bolt by being within the shear plane.

### Is it possible to reuse the Hollo-Bolt?

No, although a new Hollo-Bolt can be inserted in the existing hole.

### Is it necessary to seal the Hollo-Bolt to prevent ingress of water?

This is not always necessary especially on the larger size 5/8" and 3/4" Hollo-Bolt HCFs where the collapse mechanism (rubber washer) expands to fill the void. Sealing washers are available; however, it is important the interface between the HSS face and plate or bracket is not ignored.

### Can I use slotted holes in Hollo-Bolt connections?

Yes, as long as the slot is in the outer ply only and is perpendicular to the shear load. Refer to the RCSC for additional washer requirements. Please note the Hollo-Bolt has not been tested in slip-critical connections.

### Which Hollo-Bolt load table should I use?

For simple connections with unfactored loads use the capacity figures shown on pages 46-48 (5:1 Factor of Safety). The Hollo-Bolt LRFD and ASD Design Strengths figures on pages 50-55 (taken from ESR-3330) are to be used only when designing a bolted connection to AISC 360, AISC 341, and ASCE/SEI 7 as referenced by the locally adopted building code.

### Can the Hollo-Bolt be used in all shapes and sizes of HSS?

Yes. It can be used in square, rectangular, circular, and other profiles where access is restricted to the outer face. In all cases however the suitability of the component is subject to the available void space, the total thickness of the material to be clamped and in the case of circular sections, the radius of the outer face.

### Is it possible, however slightly, to exceed the maximum Hollo-Bolt clamping thicknesses published in the catalog?

No. The figures are accurate depictions and should not be exceeded under any circumstances.

### How do I remove a Hollo-Bolt?

**Using a power / hand tool to remove a pre-installed Hexagonal or Countersunk Hollo-Bolt (sizes 5/16", 3/8" and 1/2"):**

- 1) Set the power / hand tool to reverse mode (anti-clockwise rotation).
- 2) Place a suitable size wrench (depending on collar size) on the flats of the collar to hold in place.
- 3) Use the power / hand tool to loosen the bolt.
- 4) Continue in reverse mode until the cone on the inside of the HSS at the other end of the bolt, is released to drop inside the HSS.
- 5) The bolt can now be removed as can the sleeve by prying the collar with a pinch or crow bar.

**Using a power / hand tool to remove a pre-installed Hollo-Bolt High Clamping Force (sizes 5/8" and 3/4"):**

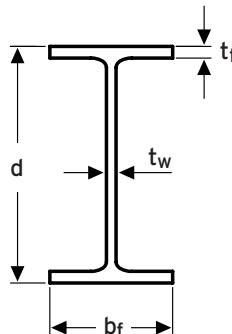
Steps 1) to 3) same as above.

- 4) Continue in reverse mode until the cone, expanded sleeve, and rubber washer on the inside of the HSS, at the other end of the bolt are released to drop inside the HSS.
- 5) The bolt and loose collar can now be removed.

## Structural Sections

Lindapter's products are compatible with almost any type of steel section. Properties of popular beams and channels are included over the next six pages. While this is not a definitive list of all steel sections, it may be a convenient reference point for Engineers.

### Wide Flange Beams



| Section Designation | Nominal Weight | Section        |        |                            |        | Thickness                |                             |                |         | Section Designation | Nominal Weight | Section                    |        |                          |                             | Thickness |       |       |         |
|---------------------|----------------|----------------|--------|----------------------------|--------|--------------------------|-----------------------------|----------------|---------|---------------------|----------------|----------------------------|--------|--------------------------|-----------------------------|-----------|-------|-------|---------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Depth <i>d</i> |         |                     |                | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> |           |       |       |         |
|                     | lb/ft          | in.            | in.    | in.                        | in.    | in.                      | in.                         |                | lb/ft   | in.                 | in.            | in.                        | in.    | in.                      | in.                         | in.       | in.   | in.   |         |
| W44X335             | 335            | 44.0           | 44     | 15.9                       | 16     | 1.03                     | 1                           | 1.77           | 13/4    | W36X652             | 652            | 41.1                       | 41     | 17.6                     | 17 5/8                      | 1.97      | 2     | 3.54  | 3 9/16  |
| W44X290             | 290            | 43.6           | 43 5/8 | 15.8                       | 15 7/8 | 0.865                    | 7/8                         | 1.58           | 19/16   | W36X529             | 529            | 39.8                       | 39 3/4 | 17.2                     | 17 1/4                      | 1.61      | 15/8  | 2.91  | 2 15/16 |
| W44X262             | 262            | 43.3           | 43 1/4 | 15.8                       | 15 3/4 | 0.785                    | 13/16                       | 1.42           | 17/16   | W36X487             | 487            | 39.3                       | 39 3/8 | 17.1                     | 17 1/8                      | 1.50      | 11/2  | 2.68  | 2 11/16 |
| W44X230             | 230            | 42.9           | 42 7/8 | 15.8                       | 15 3/4 | 0.710                    | 11/16                       | 1.22           | 11/4    | W36X441             | 441            | 38.9                       | 38 7/8 | 17.0                     | 17                          | 1.36      | 13/8  | 2.44  | 2 7/16  |
| W40X655             | 655            | 43.6           | 43 5/8 | 16.9                       | 16 7/8 | 1.97                     | 2                           | 3.54           | 3 9/16  | W36X395             | 395            | 38.4                       | 38 3/8 | 16.8                     | 16 7/8                      | 1.22      | 11/4  | 2.20  | 2 3/16  |
| W40X593             | 593            | 43.0           | 43     | 16.7                       | 16 3/4 | 1.79                     | 1 13/16                     | 3.23           | 3 1/4   | W36X361             | 361            | 38.0                       | 38     | 16.7                     | 16 3/4                      | 1.12      | 11/8  | 2.01  | 2       |
| W40X503             | 503            | 42.1           | 42     | 16.4                       | 16 3/8 | 1.54                     | 19/16                       | 2.76           | 2 3/4   | W36X330             | 330            | 37.7                       | 37 5/8 | 16.6                     | 16 5/8                      | 1.02      | 1     | 1.85  | 17/8    |
| W40X431             | 431            | 41.3           | 41 1/4 | 16.2                       | 16 1/4 | 1.34                     | 15/16                       | 2.36           | 2 3/8   | W36X302             | 302            | 37.3                       | 37 3/8 | 16.7                     | 16 5/8                      | 0.945     | 15/16 | 1.68  | 11/16   |
| W40X397             | 397            | 41.0           | 41     | 16.1                       | 16 1/8 | 1.22                     | 1 1/4                       | 2.20           | 2 3/16  | W36X282             | 282            | 37.1                       | 37 1/8 | 16.6                     | 16 5/8                      | 0.885     | 7/8   | 1.57  | 19/16   |
| W40X372             | 372            | 40.6           | 40 5/8 | 16.1                       | 16 1/8 | 1.16                     | 13/16                       | 2.05           | 2 1/16  | W36X262             | 262            | 36.9                       | 36 7/8 | 16.6                     | 16 1/2                      | 0.840     | 13/16 | 1.44  | 17/16   |
| W40X362             | 362            | 40.6           | 40 1/2 | 16.0                       | 16     | 1.12                     | 1 1/8                       | 2.01           | 2       | W36X247             | 247            | 36.7                       | 36 5/8 | 16.5                     | 16 1/2                      | 0.800     | 13/16 | 1.35  | 13/8    |
| W40X324             | 324            | 40.2           | 40 1/8 | 15.9                       | 15 7/8 | 1.00                     | 1                           | 1.81           | 1 13/16 | W36X231             | 231            | 36.5                       | 36 1/2 | 16.5                     | 16 1/2                      | 0.760     | 3/4   | 1.26  | 11/4    |
| W40X297             | 297            | 39.8           | 39 7/8 | 15.8                       | 15 7/8 | 0.930                    | 15/16                       | 1.65           | 15/8    | W36X256             | 256            | 37.4                       | 37 3/8 | 12.2                     | 12 1/4                      | 0.960     | 15/16 | 1.73  | 13/4    |
| W40X277             | 277            | 39.7           | 39 3/4 | 15.8                       | 15 7/8 | 0.830                    | 13/16                       | 1.58           | 19/16   | W36X232             | 232            | 37.1                       | 37 1/8 | 12.1                     | 12 1/8                      | 0.870     | 7/8   | 1.57  | 19/16   |
| W40X249             | 249            | 39.4           | 39 3/8 | 15.8                       | 15 3/4 | 0.750                    | 3/4                         | 1.42           | 17/16   | W36X210             | 210            | 36.7                       | 36 3/4 | 12.2                     | 12 1/8                      | 0.830     | 13/16 | 1.36  | 13/8    |
| W40X215             | 215            | 39.0           | 39     | 15.8                       | 15 3/4 | 0.650                    | 5/8                         | 1.22           | 11/4    | W36X194             | 194            | 36.5                       | 36 1/2 | 12.1                     | 12 1/8                      | 0.765     | 3/4   | 1.26  | 11/4    |
| W40X199             | 199            | 38.7           | 38 5/8 | 15.8                       | 15 3/4 | 0.650                    | 5/8                         | 1.07           | 11/16   | W36X182             | 182            | 36.3                       | 36 3/8 | 12.1                     | 12 1/8                      | 0.725     | 3/4   | 1.18  | 13/16   |
| W40X392             | 392            | 41.6           | 41 5/8 | 12.4                       | 12 3/8 | 1.42                     | 17/16                       | 2.52           | 2 1/2   | W36X170             | 170            | 36.2                       | 36 1/8 | 12.0                     | 12                          | 0.680     | 11/16 | 1.10  | 11/8    |
| W40X331             | 331            | 40.8           | 40 3/4 | 12.2                       | 12 1/8 | 1.22                     | 1 1/4                       | 2.13           | 2 1/8   | W36X160             | 160            | 36.0                       | 36     | 12.0                     | 12                          | 0.650     | 5/8   | 1.02  | 1       |
| W40X327             | 327            | 40.8           | 40 3/4 | 12.1                       | 12 1/8 | 1.18                     | 13/16                       | 2.13           | 2 1/8   | W36X150             | 150            | 35.9                       | 35 7/8 | 12.0                     | 12                          | 0.625     | 5/8   | 0.940 | 15/16   |
| W40X294             | 294            | 40.4           | 40 3/8 | 12.0                       | 12     | 1.06                     | 11/16                       | 1.93           | 1 15/16 | W36X135             | 135            | 35.6                       | 35 1/2 | 12.0                     | 12                          | 0.600     | 5/8   | 0.790 | 13/16   |
| W40X278             | 278            | 40.2           | 40 1/8 | 12.0                       | 12     | 1.03                     | 1                           | 1.81           | 1 13/16 | W33X387             | 387            | 36.0                       | 36     | 16.2                     | 16 1/4                      | 1.26      | 11/4  | 2.28  | 2 1/4   |
| W40X264             | 264            | 40.0           | 40     | 11.9                       | 11 7/8 | 0.960                    | 15/16                       | 1.73           | 13/4    | W33X354             | 354            | 35.6                       | 35 1/2 | 16.1                     | 16 1/8                      | 1.16      | 13/16 | 2.09  | 2 1/16  |
| W40X235             | 235            | 39.7           | 39 3/4 | 11.9                       | 11 7/8 | 0.830                    | 13/16                       | 1.58           | 19/16   | W33X318             | 318            | 35.2                       | 35 1/8 | 16.0                     | 16                          | 1.04      | 11/16 | 1.89  | 17/8    |
| W40X211             | 211            | 39.4           | 39 3/8 | 11.8                       | 11 3/4 | 0.750                    | 3/4                         | 1.42           | 17/16   | W33X291             | 291            | 34.8                       | 34 7/8 | 15.9                     | 15 7/8                      | 0.960     | 15/16 | 1.73  | 13/4    |
| W40X183             | 183            | 39.0           | 39     | 11.8                       | 11 3/4 | 0.650                    | 5/8                         | 1.20           | 1 3/16  | W33X263             | 263            | 34.5                       | 34 1/2 | 15.8                     | 15 3/4                      | 0.870     | 7/8   | 1.57  | 19/16   |
| W40X167             | 167            | 38.6           | 38 5/8 | 11.8                       | 11 3/4 | 0.650                    | 5/8                         | 1.03           | 1       | W33X241             | 241            | 34.2                       | 34 1/8 | 15.9                     | 15 7/8                      | 0.830     | 13/16 | 1.40  | 13/8    |
| W40X149             | 149            | 38.2           | 38 1/4 | 11.8                       | 11 3/4 | 0.630                    | 5/8                         | 0.830          | 13/16   | W33X221             | 221            | 33.9                       | 33 7/8 | 15.8                     | 15 3/4                      | 0.775     | 3/4   | 1.28  | 11/4    |
| W36X925             | 925            | 43.1           | 43 1/8 | 18.6                       | 18 5/8 | 3.02                     | 3                           | 4.53           | 4 1/2   | W33X201             | 201            | 33.7                       | 33 5/8 | 15.7                     | 15 3/4                      | 0.715     | 11/16 | 1.15  | 11/8    |
| W36X853             | 853            | 43.1           | 43 1/8 | 18.2                       | 18 1/4 | 2.52                     | 2 1/2                       | 4.53           | 4 1/2   | W33X169             | 169            | 33.8                       | 33 7/8 | 11.5                     | 11 1/2                      | 0.670     | 11/16 | 1.22  | 11/4    |
| W36X802             | 802            | 42.6           | 42 5/8 | 18.0                       | 18     | 2.38                     | 2 3/8                       | 4.29           | 4 5/16  | W33X152             | 152            | 33.5                       | 33 1/2 | 11.6                     | 11 5/8                      | 0.635     | 5/8   | 1.06  | 11/16   |
| W36X723             | 723            | 41.8           | 41 3/4 | 17.8                       | 17 3/4 | 2.17                     | 2 3/16                      | 3.90           | 3 7/8   | W33X141             | 141            | 33.3                       | 33 1/4 | 11.5                     | 11 1/2                      | 0.605     | 5/8   | 0.960 | 15/16   |

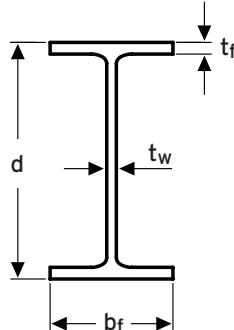
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# Structural Sections

(Continued).

## Wide Flange Beams (continued)



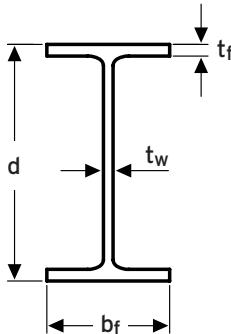
| Section Designation | Nominal Weight | Section        |        |                            |        | Thickness                |                             |                |         | Section Designation | Nominal Weight | Section                    |        |                          |                             | Thickness |       |       |        |
|---------------------|----------------|----------------|--------|----------------------------|--------|--------------------------|-----------------------------|----------------|---------|---------------------|----------------|----------------------------|--------|--------------------------|-----------------------------|-----------|-------|-------|--------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Depth <i>d</i> |         |                     |                | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> |           |       |       |        |
| lb/ft               | in.            | in.            | in.    | in.                        | in.    | in.                      | in.                         | lb/ft          | in.     | in.                 | in.            | in.                        | in.    | in.                      | in.                         | lb/ft     | in.   | in.   |        |
| W33X130             | 130            | 33.1           | 33 1/8 | 11.5                       | 11 1/2 | 0.580                    | 9/16                        | 0.855          | 7/8     | W27X94              | 94.0           | 26.9                       | 26 7/8 | 10.0                     | 10                          | 0.490     | 1/2   | 0.745 | 3/4    |
| W33X118             | 118            | 32.9           | 32 7/8 | 11.5                       | 11 1/2 | 0.550                    | 9/16                        | 0.740          | 3/4     | W27X84              | 84.0           | 26.7                       | 26 3/4 | 10.0                     | 10                          | 0.460     | 7/16  | 0.640 | 5/8    |
| W30X391             | 391            | 33.2           | 33 1/4 | 15.6                       | 15 5/8 | 1.36                     | 13/8                        | 2.44           | 2 7/16  | W24X370             | 370            | 28.0                       | 28     | 13.7                     | 13 5/8                      | 1.52      | 1 1/2 | 2.72  | 2 3/4  |
| W30X357             | 357            | 32.8           | 32 3/4 | 15.5                       | 15 1/2 | 1.24                     | 11/4                        | 2.24           | 2 1/4   | W24X335             | 335            | 27.5                       | 27 1/2 | 13.5                     | 13 1/2                      | 1.38      | 13/8  | 2.48  | 2 1/2  |
| W30X326             | 326            | 32.4           | 32 3/8 | 15.4                       | 15 3/8 | 1.14                     | 11/8                        | 2.05           | 2 1/16  | W24X306             | 306            | 27.1                       | 27 1/8 | 13.4                     | 13 3/8                      | 1.26      | 1 1/4 | 2.28  | 2 1/4  |
| W30X292             | 292            | 32.0           | 32     | 15.3                       | 15 1/4 | 1.02                     | 1                           | 1.85           | 1 7/8   | W24X279             | 279            | 26.7                       | 26 3/4 | 13.3                     | 13 1/4                      | 1.16      | 13/16 | 2.09  | 2 1/16 |
| W30X261             | 261            | 31.6           | 31 5/8 | 15.2                       | 15 1/8 | 0.930                    | 15/16                       | 1.65           | 1 5/8   | W24X250             | 250            | 26.3                       | 26 3/8 | 13.2                     | 13 1/8                      | 1.04      | 11/16 | 1.89  | 17/8   |
| W30X235             | 235            | 31.3           | 31 1/4 | 15.1                       | 15     | 0.830                    | 13/16                       | 1.50           | 1 1/2   | W24X229             | 229            | 26.0                       | 26     | 13.1                     | 13 1/8                      | 0.960     | 15/16 | 1.73  | 13/4   |
| W30X211             | 211            | 30.9           | 31     | 15.1                       | 15 1/8 | 0.775                    | 3/4                         | 1.32           | 1 5/16  | W24X207             | 207            | 25.7                       | 25 3/4 | 13.0                     | 13                          | 0.870     | 7/8   | 1.57  | 19/16  |
| W30X191             | 191            | 30.7           | 30 5/8 | 15.0                       | 15     | 0.710                    | 11/16                       | 1.19           | 1 3/16  | W24X192             | 192            | 25.5                       | 25 1/2 | 13.0                     | 13                          | 0.810     | 13/16 | 1.46  | 17/16  |
| W30X173             | 173            | 30.4           | 30 1/2 | 15.0                       | 15     | 0.655                    | 5/8                         | 1.07           | 1 1/16  | W24X176             | 176            | 25.2                       | 25 1/4 | 12.9                     | 12 7/8                      | 0.750     | 3/4   | 1.34  | 15/16  |
| W30X132             | 132            | 30.3           | 30 1/4 | 10.5                       | 10 1/2 | 0.615                    | 5/8                         | 1.00           | 1       | W24X162             | 162            | 25.0                       | 25     | 13.0                     | 13                          | 0.705     | 11/16 | 1.22  | 11/4   |
| W30X124             | 124            | 30.2           | 30 1/8 | 10.5                       | 10 1/2 | 0.585                    | 9/16                        | 0.930          | 15/16   | W24X146             | 146            | 24.7                       | 24 3/4 | 12.9                     | 12 7/8                      | 0.650     | 5/8   | 1.09  | 11/16  |
| W30X116             | 116            | 30.0           | 30     | 10.5                       | 10 1/2 | 0.565                    | 9/16                        | 0.850          | 7/8     | W24X131             | 131            | 24.5                       | 24 1/2 | 12.9                     | 12 7/8                      | 0.605     | 5/8   | 0.960 | 15/16  |
| W30X108             | 108            | 29.8           | 29 7/8 | 10.5                       | 10 1/2 | 0.545                    | 9/16                        | 0.760          | 3/4     | W24X117             | 117            | 24.3                       | 24 1/4 | 12.8                     | 12 3/4                      | 0.550     | 9/16  | 0.850 | 7/8    |
| W30X99              | 99.0           | 29.7           | 29 5/8 | 10.5                       | 10 1/2 | 0.520                    | 1/2                         | 0.670          | 11/16   | W24X104             | 104            | 24.1                       | 24     | 12.8                     | 12 3/4                      | 0.500     | 1/2   | 0.750 | 3/4    |
| W30X90              | 90.0           | 29.5           | 29 1/2 | 10.4                       | 10 3/8 | 0.470                    | 1/2                         | 0.610          | 5/8     | W24X103             | 103            | 24.5                       | 24 1/2 | 9.00                     | 9                           | 0.550     | 9/16  | 0.980 | 1      |
| W27X539             | 539            | 32.5           | 32 1/2 | 15.3                       | 15 1/4 | 1.97                     | 2                           | 3.54           | 3 9/16  | W24X94              | 94.0           | 24.3                       | 24 1/4 | 9.07                     | 9 1/8                       | 0.515     | 1/2   | 0.875 | 7/8    |
| W27X368             | 368            | 30.4           | 30 3/8 | 14.7                       | 14 5/8 | 1.38                     | 13/8                        | 2.48           | 2 1/2   | W24X84              | 84.0           | 24.1                       | 24 1/8 | 9.02                     | 9                           | 0.470     | 1/2   | 0.770 | 3/4    |
| W27X336             | 336            | 30.0           | 30     | 14.6                       | 14 1/2 | 1.26                     | 11/4                        | 2.28           | 2 1/4   | W24X76              | 76.0           | 23.9                       | 23 7/8 | 8.99                     | 9                           | 0.440     | 7/16  | 0.680 | 11/16  |
| W27X307             | 307            | 29.6           | 29 5/8 | 14.4                       | 14 1/2 | 1.16                     | 13/16                       | 2.09           | 2 1/16  | W24X68              | 68.0           | 23.7                       | 23 3/4 | 8.97                     | 9                           | 0.415     | 7/16  | 0.585 | 9/16   |
| W27X281             | 281            | 29.3           | 29 1/4 | 14.4                       | 14 3/8 | 1.06                     | 11/16                       | 1.93           | 1 15/16 | W24X62              | 62.0           | 23.7                       | 23 3/4 | 7.04                     | 7                           | 0.430     | 7/16  | 0.590 | 9/16   |
| W27X258             | 258            | 29.0           | 29     | 14.3                       | 14 1/4 | 0.980                    | 1                           | 1.77           | 1 3/4   | W24X55              | 55.0           | 23.6                       | 23 5/8 | 7.01                     | 7                           | 0.395     | 3/8   | 0.505 | 1/2    |
| W27X235             | 235            | 28.7           | 28 5/8 | 14.2                       | 14 1/4 | 0.910                    | 15/16                       | 1.61           | 1 5/8   | W21X275             | 275            | 24.1                       | 24 1/8 | 12.9                     | 12 7/8                      | 1.22      | 1 1/4 | 2.19  | 2 3/16 |
| W27X217             | 217            | 28.4           | 28 3/8 | 14.1                       | 14 1/8 | 0.830                    | 13/16                       | 1.50           | 1 1/2   | W21X248             | 248            | 23.7                       | 23 3/4 | 12.8                     | 12 3/4                      | 1.10      | 11/8  | 1.99  | 2      |
| W27X194             | 194            | 28.1           | 28 1/8 | 14.0                       | 14     | 0.750                    | 3/4                         | 1.34           | 1 5/16  | W21X223             | 223            | 23.4                       | 23 3/8 | 12.7                     | 12 5/8                      | 1.00      | 1     | 1.79  | 113/16 |
| W27X178             | 178            | 27.8           | 27 3/4 | 14.1                       | 14 1/8 | 0.725                    | 3/4                         | 1.19           | 1 3/16  | W21X201             | 201            | 23.0                       | 23     | 12.6                     | 12 5/8                      | 0.910     | 15/16 | 1.63  | 15/8   |
| W27X161             | 161            | 27.6           | 27 5/8 | 14.0                       | 14     | 0.660                    | 11/16                       | 1.08           | 1 1/16  | W21X182             | 182            | 22.7                       | 22 3/4 | 12.5                     | 12 1/2                      | 0.830     | 13/16 | 1.48  | 11/2   |
| W27X146             | 146            | 27.4           | 27 3/8 | 14.0                       | 14     | 0.605                    | 5/8                         | 0.975          | 1       | W21X166             | 166            | 22.5                       | 22 1/2 | 12.4                     | 12 3/8                      | 0.750     | 3/4   | 1.36  | 13/8   |
| W27X129             | 129            | 27.6           | 27 5/8 | 10.0                       | 10     | 0.610                    | 5/8                         | 1.10           | 1 1/8   | W21X147             | 147            | 22.1                       | 22     | 12.5                     | 12 1/2                      | 0.720     | 3/4   | 1.15  | 11/8   |
| W27X114             | 114            | 27.3           | 27 1/4 | 10.1                       | 10 1/8 | 0.570                    | 9/16                        | 0.930          | 15/16   | W21X132             | 132            | 21.8                       | 21 7/8 | 12.4                     | 12 1/2                      | 0.650     | 5/8   | 1.04  | 11/16  |
| W27X102             | 102            | 27.1           | 27 1/8 | 10.0                       | 10     | 0.515                    | 1/2                         | 0.830          | 13/16   | W21X122             | 122            | 21.7                       | 21 5/8 | 12.4                     | 12 3/8                      | 0.600     | 5/8   | 0.960 | 15/16  |

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# Structural Sections

(Continued).

## Wide Flange Beams (continued)



| Section Designation | Nominal Weight | Section        |        |                            |        | Thickness                |                             |                |        | Section Designation | Nominal Weight | Section                    |        |                          |                             | Thickness |         |           |         |
|---------------------|----------------|----------------|--------|----------------------------|--------|--------------------------|-----------------------------|----------------|--------|---------------------|----------------|----------------------------|--------|--------------------------|-----------------------------|-----------|---------|-----------|---------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Depth <i>d</i> |        |                     |                | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Thickness |         | Thickness |         |
|                     | lb/ft          | in.            |        | in.                        |        | in.                      | in.                         |                | lb/ft  | in.                 |                | in.                        |        | in.                      | in.                         | in.       |         | in.       |         |
| W21X111             | 111            | 21.5           | 21 1/2 | 12.3                       | 12 3/8 | 0.550                    | 9/16                        | 0.875          | 7/8    | W18X46              | 46.0           | 18.1                       | 18     | 6.06                     | 6                           | 0.360     | 3/8     | 0.605     | 5/8     |
| W21X101             | 101            | 21.4           | 21 3/8 | 12.3                       | 12 1/4 | 0.500                    | 1/2                         | 0.800          | 13/16  | W18X40              | 40.0           | 17.9                       | 17 7/8 | 6.02                     | 6                           | 0.315     | 5/16    | 0.525     | 1/2     |
| W21X93              | 93.0           | 21.6           | 21 5/8 | 8.42                       | 8 3/8  | 0.580                    | 9/16                        | 0.930          | 15/16  | W18X35              | 35.0           | 17.7                       | 17 3/4 | 6.00                     | 6                           | 0.300     | 5/16    | 0.425     | 7/16    |
| W21X83              | 83.0           | 21.4           | 21 3/8 | 8.36                       | 8 3/8  | 0.515                    | 1/2                         | 0.835          | 13/16  | W16X100             | 100            | 17.0                       | 17     | 10.4                     | 10 3/8                      | 0.585     | 9/16    | 0.985     | 1       |
| W21X73              | 73.0           | 21.2           | 21 1/4 | 8.30                       | 8 1/4  | 0.455                    | 7/16                        | 0.740          | 3/4    | W16X89              | 89.0           | 16.8                       | 16 3/4 | 10.4                     | 10 3/8                      | 0.525     | 1/2     | 0.875     | 7/8     |
| W21X68              | 68.0           | 21.1           | 21 1/8 | 8.27                       | 8 1/4  | 0.430                    | 7/16                        | 0.685          | 11/16  | W16X77              | 77.0           | 16.5                       | 16 1/2 | 10.3                     | 10 1/4                      | 0.455     | 7/16    | 0.760     | 3/4     |
| W21X62              | 62.0           | 21.0           | 21     | 8.24                       | 8 1/4  | 0.400                    | 3/8                         | 0.615          | 5/8    | W16X67              | 67.0           | 16.3                       | 16 3/8 | 10.2                     | 10 1/4                      | 0.395     | 3/8     | 0.665     | 11/16   |
| W21X55              | 55.0           | 20.8           | 20 3/4 | 8.22                       | 8 1/4  | 0.375                    | 3/8                         | 0.522          | 1/2    | W16X57              | 57.0           | 16.4                       | 16 3/8 | 7.12                     | 7 1/8                       | 0.430     | 7/16    | 0.715     | 11/16   |
| W21X48              | 48.0           | 20.6           | 20 5/8 | 8.14                       | 8 1/8  | 0.350                    | 3/8                         | 0.430          | 7/16   | W16X50              | 50.0           | 16.3                       | 16 1/4 | 7.07                     | 7 1/8                       | 0.380     | 3/8     | 0.630     | 5/8     |
| W21X57              | 57.0           | 21.1           | 21     | 6.56                       | 6 1/2  | 0.405                    | 3/8                         | 0.650          | 5/8    | W16X45              | 45.0           | 16.1                       | 16 1/8 | 7.04                     | 7                           | 0.345     | 3/8     | 0.565     | 9/16    |
| W21X50              | 50.0           | 20.8           | 20 7/8 | 6.53                       | 6 1/2  | 0.380                    | 3/8                         | 0.535          | 9/16   | W16X40              | 40.0           | 16.0                       | 16     | 7.00                     | 7                           | 0.305     | 5/16    | 0.505     | 1/2     |
| W21X44              | 44.0           | 20.7           | 20 5/8 | 6.50                       | 6 1/2  | 0.350                    | 3/8                         | 0.450          | 7/16   | W16X36              | 36.0           | 15.9                       | 15 7/8 | 6.99                     | 7                           | 0.295     | 5/16    | 0.430     | 7/16    |
| W18X311             | 311            | 22.3           | 22 3/8 | 12.0                       | 12     | 1.52                     | 1 1/2                       | 2.74           | 2 3/4  | W16X31              | 31.0           | 15.9                       | 15 7/8 | 5.53                     | 5 1/2                       | 0.275     | 1/4     | 0.440     | 7/16    |
| W18X283             | 283            | 21.9           | 21 7/8 | 11.9                       | 11 7/8 | 1.40                     | 13/8                        | 2.50           | 2 1/2  | W16X26              | 26.0           | 15.7                       | 15 3/4 | 5.50                     | 5 1/2                       | 0.250     | 1/4     | 0.345     | 3/8     |
| W18X258             | 258            | 21.5           | 21 1/2 | 11.8                       | 11 3/4 | 1.28                     | 11/4                        | 2.30           | 2 5/16 | W14X873             | 873            | 23.6                       | 23 5/8 | 18.8                     | 18 3/4                      | 3.94      | 3 15/16 | 5.51      | 5 1/12  |
| W18X234             | 234            | 21.1           | 21     | 11.7                       | 11 5/8 | 1.16                     | 13/16                       | 2.11           | 2 1/8  | W14X808             | 808            | 22.8                       | 22 3/4 | 18.6                     | 18 5/8                      | 3.74      | 3 3/4   | 5.12      | 5 1/8   |
| W18X211             | 211            | 20.7           | 20 5/8 | 11.6                       | 11 1/2 | 1.06                     | 11/16                       | 1.91           | 115/16 | W14X730             | 730            | 22.4                       | 22 3/8 | 17.9                     | 17 7/8                      | 3.07      | 3 1/16  | 4.91      | 4 15/16 |
| W18X192             | 192            | 20.4           | 20 3/8 | 11.5                       | 11 1/2 | 0.960                    | 15/16                       | 1.75           | 13/4   | W14X665             | 665            | 21.6                       | 21 5/8 | 17.7                     | 17 5/8                      | 2.83      | 2 13/16 | 4.52      | 4 1/2   |
| W18X175             | 175            | 20.0           | 20     | 11.4                       | 11 3/8 | 0.890                    | 7/8                         | 1.59           | 19/16  | W14X605             | 605            | 20.9                       | 20 7/8 | 17.4                     | 17 3/8                      | 2.60      | 2 5/8   | 4.16      | 4 3/16  |
| W18X158             | 158            | 19.7           | 19 3/4 | 11.3                       | 11 1/4 | 0.810                    | 13/16                       | 1.44           | 17/16  | W14X550             | 550            | 20.2                       | 20 1/4 | 17.2                     | 17 1/4                      | 2.38      | 2 3/8   | 3.82      | 3 13/16 |
| W18X143             | 143            | 19.5           | 19 1/2 | 11.2                       | 11 1/4 | 0.730                    | 3/4                         | 1.32           | 15/16  | W14X500             | 500            | 19.6                       | 19 5/8 | 17.0                     | 17                          | 2.19      | 2 3/16  | 3.50      | 3 1/2   |
| W18X130             | 130            | 19.3           | 19 1/4 | 11.2                       | 11 1/8 | 0.670                    | 11/16                       | 1.20           | 13/16  | W14X455             | 455            | 19.0                       | 19     | 16.8                     | 16 7/8                      | 2.02      | 2       | 3.21      | 3 3/16  |
| W18X119             | 119            | 19.0           | 19     | 11.3                       | 11 1/4 | 0.655                    | 5/8                         | 1.06           | 11/16  | W14X426             | 426            | 18.7                       | 18 5/8 | 16.7                     | 16 3/4                      | 1.88      | 17/8    | 3.04      | 3 1/16  |
| W18X106             | 106            | 18.7           | 18 3/4 | 11.2                       | 11 1/4 | 0.590                    | 9/16                        | 0.940          | 15/16  | W14X398             | 398            | 18.3                       | 18 1/4 | 16.6                     | 16 5/8                      | 1.77      | 13/4    | 2.85      | 2 7/8   |
| W18X97              | 97.0           | 18.6           | 18 5/8 | 11.1                       | 11 1/8 | 0.535                    | 9/16                        | 0.870          | 7/8    | W14X370             | 370            | 17.9                       | 17 7/8 | 16.5                     | 16 1/2                      | 1.66      | 11/16   | 2.66      | 2 11/16 |
| W18X86              | 86.0           | 18.4           | 18 3/8 | 11.1                       | 11 1/8 | 0.480                    | 1/2                         | 0.770          | 3/4    | W14X342             | 342            | 17.5                       | 17 1/2 | 16.4                     | 16 3/8                      | 1.54      | 19/16   | 2.47      | 2 1/2   |
| W18X76              | 76.0           | 18.2           | 18 1/4 | 11.0                       | 11     | 0.425                    | 7/16                        | 0.680          | 11/16  | W14X311             | 311            | 17.1                       | 17 1/8 | 16.2                     | 16 1/4                      | 1.41      | 17/16   | 2.26      | 2 1/4   |
| W18X71              | 71.0           | 18.5           | 18 1/2 | 7.64                       | 7 5/8  | 0.495                    | 1/2                         | 0.810          | 13/16  | W14X283             | 283            | 16.7                       | 16 3/4 | 16.1                     | 16 1/8                      | 1.29      | 15/16   | 2.07      | 2 1/16  |
| W18X65              | 65.0           | 18.4           | 18 3/8 | 7.59                       | 7 5/8  | 0.450                    | 7/16                        | 0.750          | 3/4    | W14X257             | 257            | 16.4                       | 16 3/8 | 16.0                     | 16                          | 1.18      | 13/16   | 1.89      | 17/8    |
| W18X60              | 60.0           | 18.2           | 18 1/4 | 7.56                       | 7 1/2  | 0.415                    | 7/16                        | 0.695          | 11/16  | W14X233             | 233            | 16.0                       | 16     | 15.9                     | 15 7/8                      | 1.07      | 11/16   | 1.72      | 13/4    |
| W18X55              | 55.0           | 18.1           | 18 1/8 | 7.53                       | 7 1/2  | 0.390                    | 3/8                         | 0.630          | 5/8    | W14X211             | 211            | 15.7                       | 15 3/4 | 15.8                     | 15 3/4                      | 0.980     | 1       | 1.56      | 19/16   |
| W18X50              | 50.0           | 18.0           | 18     | 7.50                       | 7 1/2  | 0.355                    | 3/8                         | 0.570          | 9/16   | W14X193             | 193            | 15.5                       | 15 1/2 | 15.7                     | 15 3/4                      | 0.890     | 7/8     | 1.44      | 17/16   |

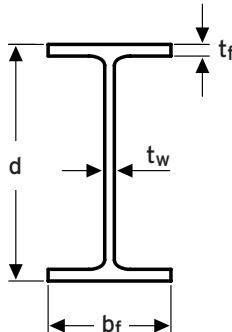
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# Structural Sections

(Continued).

## Wide Flange Beams (continued)



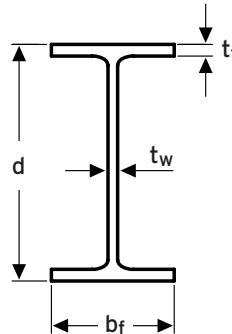
| Section Designation | Nominal Weight | Section        |        |                            |        | Thickness                |                             |                |         | Section Designation | Nominal Weight | Section                    |        |                          |                             | Thickness |       |       |       |
|---------------------|----------------|----------------|--------|----------------------------|--------|--------------------------|-----------------------------|----------------|---------|---------------------|----------------|----------------------------|--------|--------------------------|-----------------------------|-----------|-------|-------|-------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Depth <i>d</i> |         |                     |                | Width <i>b<sub>f</sub></i> |        | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> |           |       |       |       |
| lb/ft               | in.            | in.            | in.    | in.                        | in.    | in.                      | in.                         | lb/ft          | in.     | in.                 | in.            | in.                        | in.    | in.                      | in.                         | lb/ft     | in.   | in.   |       |
| W14X176             | 176            | 15.2           | 15 1/4 | 15.7                       | 15 5/8 | 0.830                    | 13/16                       | 1.31           | 15/16   | W12X96              | 96.0           | 12.7                       | 12 3/4 | 12.2                     | 12 1/8                      | 0.550     | 9/16  | 0.900 | 7/8   |
| W14X159             | 159            | 15.0           | 15     | 15.6                       | 15 5/8 | 0.745                    | 3/4                         | 1.19           | 13/16   | W12X87              | 87.0           | 12.5                       | 12 1/2 | 12.1                     | 12 1/8                      | 0.515     | 1/2   | 0.810 | 13/16 |
| W14X145             | 145            | 14.8           | 14 3/4 | 15.5                       | 15 1/2 | 0.680                    | 11/16                       | 1.09           | 11/16   | W12X79              | 79.0           | 12.4                       | 12 3/8 | 12.1                     | 12 1/8                      | 0.470     | 1/2   | 0.735 | 3/4   |
| W14X132             | 132            | 14.7           | 14 5/8 | 14.7                       | 14 3/4 | 0.645                    | 5/8                         | 1.03           | 1       | W12X72              | 72.0           | 12.3                       | 12 1/4 | 12.0                     | 12                          | 0.430     | 7/16  | 0.670 | 11/16 |
| W14X120             | 120            | 14.5           | 14 1/2 | 14.7                       | 14 5/8 | 0.590                    | 9/16                        | 0.940          | 15/16   | W12X65              | 65.0           | 12.1                       | 12 1/8 | 12.0                     | 12                          | 0.390     | 3/8   | 0.605 | 5/8   |
| W14X109             | 109            | 14.3           | 14 3/8 | 14.6                       | 14 5/8 | 0.525                    | 1/2                         | 0.860          | 7/8     | W12X58              | 58.0           | 12.2                       | 12 1/4 | 10.0                     | 10                          | 0.360     | 3/8   | 0.640 | 5/8   |
| W14X99              | 99.0           | 14.2           | 14 1/8 | 14.6                       | 14 5/8 | 0.485                    | 1/2                         | 0.780          | 3/4     | W12X53              | 53.0           | 12.1                       | 12     | 10.0                     | 10                          | 0.345     | 3/8   | 0.575 | 9/16  |
| W14X90              | 90.0           | 14.0           | 14     | 14.5                       | 14 1/2 | 0.440                    | 7/16                        | 0.710          | 11/16   | W12X50              | 50.0           | 12.2                       | 12 1/4 | 8.08                     | 8 1/8                       | 0.370     | 3/8   | 0.640 | 5/8   |
| W14X82              | 82.0           | 14.3           | 14 1/4 | 10.1                       | 10 1/8 | 0.510                    | 1/2                         | 0.855          | 7/8     | W12X45              | 45.0           | 12.1                       | 12     | 8.05                     | 8                           | 0.335     | 5/16  | 0.575 | 9/16  |
| W14X74              | 74.0           | 14.2           | 14 1/8 | 10.1                       | 10 1/8 | 0.450                    | 7/16                        | 0.785          | 13/16   | W12X40              | 40.0           | 11.9                       | 12     | 8.01                     | 8                           | 0.295     | 5/16  | 0.515 | 1/2   |
| W14X68              | 68.0           | 14.0           | 14     | 10.0                       | 10     | 0.415                    | 7/16                        | 0.720          | 3/4     | W12X35              | 35.0           | 12.5                       | 12 1/2 | 6.56                     | 6 1/2                       | 0.300     | 5/16  | 0.520 | 1/2   |
| W14X61              | 61.0           | 13.9           | 13 7/8 | 10.0                       | 10     | 0.375                    | 3/8                         | 0.645          | 5/8     | W12X30              | 30.0           | 12.3                       | 12 3/8 | 6.52                     | 6 1/2                       | 0.260     | 1/4   | 0.440 | 7/16  |
| W14X53              | 53.0           | 13.9           | 13 7/8 | 8.06                       | 8      | 0.370                    | 3/8                         | 0.660          | 11/16   | W12X26              | 26.0           | 12.2                       | 12 1/4 | 6.49                     | 6 1/2                       | 0.230     | 1/4   | 0.380 | 3/8   |
| W14X48              | 48.0           | 13.8           | 13 3/4 | 8.03                       | 8      | 0.340                    | 5/16                        | 0.595          | 5/8     | W12X22              | 22.0           | 12.3                       | 12 1/4 | 4.03                     | 4                           | 0.260     | 1/4   | 0.425 | 7/16  |
| W14X43              | 43.0           | 13.7           | 13 5/8 | 8.00                       | 8      | 0.305                    | 5/16                        | 0.530          | 1/2     | W12X19              | 19.0           | 12.2                       | 12 1/8 | 4.01                     | 4                           | 0.235     | 1/4   | 0.350 | 3/8   |
| W14X38              | 38.0           | 14.1           | 14 1/8 | 6.77                       | 6 3/4  | 0.310                    | 5/16                        | 0.515          | 1/2     | W12X16              | 16.0           | 12.0                       | 12     | 3.99                     | 4                           | 0.220     | 1/4   | 0.265 | 1/4   |
| W14X34              | 34.0           | 14.0           | 14     | 6.75                       | 6 3/4  | 0.285                    | 5/16                        | 0.455          | 7/16    | W12X14              | 14.0           | 11.9                       | 11 7/8 | 3.97                     | 4                           | 0.200     | 3/16  | 0.225 | 1/4   |
| W14X30              | 30.0           | 13.8           | 13 7/8 | 6.73                       | 6 3/4  | 0.270                    | 1/4                         | 0.385          | 3/8     | W10X112             | 112            | 11.4                       | 11 3/8 | 10.4                     | 10 3/8                      | 0.755     | 3/4   | 1.25  | 11/16 |
| W14X26              | 26.0           | 13.9           | 13 7/8 | 5.03                       | 5      | 0.255                    | 1/4                         | 0.420          | 7/16    | W10X100             | 100            | 11.1                       | 11 1/8 | 10.3                     | 10 3/8                      | 0.680     | 11/16 | 1.12  | 11/8  |
| W14X22              | 22.0           | 13.7           | 13 3/4 | 5.00                       | 5      | 0.230                    | 1/4                         | 0.335          | 5/16    | W10X88              | 88.0           | 10.8                       | 10 7/8 | 10.3                     | 10 1/4                      | 0.605     | 5/8   | 0.990 | 1     |
| W12X336             | 336            | 16.8           | 16 7/8 | 13.4                       | 13 3/8 | 1.78                     | 13/4                        | 2.96           | 2 15/16 | W10X77              | 77.0           | 10.6                       | 10 5/8 | 10.2                     | 10 1/4                      | 0.530     | 1/2   | 0.870 | 7/8   |
| W12X305             | 305            | 16.3           | 16 3/8 | 13.2                       | 13 1/4 | 1.63                     | 15/8                        | 2.71           | 2 11/16 | W10X68              | 68.0           | 10.4                       | 10 3/8 | 10.1                     | 10 1/8                      | 0.470     | 1/2   | 0.770 | 3/4   |
| W12X279             | 279            | 15.9           | 15 7/8 | 13.1                       | 13 1/8 | 1.53                     | 11/2                        | 2.47           | 2 1/2   | W10X60              | 60.0           | 10.2                       | 10 1/4 | 10.1                     | 10 1/8                      | 0.420     | 7/16  | 0.680 | 11/16 |
| W12X252             | 252            | 15.4           | 15 3/8 | 13.0                       | 13     | 1.40                     | 13/8                        | 2.25           | 2 1/4   | W10X54              | 54.0           | 10.1                       | 10 1/8 | 10.0                     | 10                          | 0.370     | 3/8   | 0.615 | 5/8   |
| W12X230             | 230            | 15.1           | 15     | 12.9                       | 12 7/8 | 1.29                     | 15/16                       | 2.07           | 2 1/16  | W10X49              | 49.0           | 10.0                       | 10     | 10.0                     | 10                          | 0.340     | 5/16  | 0.560 | 9/16  |
| W12X210             | 210            | 14.7           | 14 3/4 | 12.8                       | 12 3/4 | 1.18                     | 13/16                       | 1.90           | 17/8    | W10X45              | 45.0           | 10.1                       | 10 1/8 | 8.02                     | 8                           | 0.350     | 3/8   | 0.620 | 5/8   |
| W12X190             | 190            | 14.4           | 14 3/8 | 12.7                       | 12 5/8 | 1.06                     | 11/16                       | 1.74           | 13/4    | W10X39              | 39.0           | 9.92                       | 9 7/8  | 7.99                     | 8                           | 0.315     | 5/16  | 0.530 | 1/2   |
| W12X170             | 170            | 14.0           | 14     | 12.6                       | 12 5/8 | 0.960                    | 15/16                       | 1.56           | 19/16   | W10X33              | 33.0           | 9.73                       | 9 3/4  | 7.96                     | 8                           | 0.290     | 5/16  | 0.435 | 7/16  |
| W12X152             | 152            | 13.7           | 13 3/4 | 12.5                       | 12 1/2 | 0.870                    | 7/8                         | 1.40           | 13/8    | W10X30              | 30.0           | 10.5                       | 10 1/2 | 5.81                     | 5 3/4                       | 0.300     | 5/16  | 0.510 | 1/2   |
| W12X136             | 136            | 13.4           | 13 3/8 | 12.4                       | 12 3/8 | 0.790                    | 13/16                       | 1.25           | 11/4    | W10X26              | 26.0           | 10.3                       | 10 3/8 | 5.77                     | 5 3/4                       | 0.260     | 1/4   | 0.440 | 7/16  |
| W12X120             | 120            | 13.1           | 13 1/8 | 12.3                       | 12 3/8 | 0.710                    | 11/16                       | 1.11           | 11/8    | W10X22              | 22.0           | 10.2                       | 10 1/8 | 5.75                     | 5 3/4                       | 0.240     | 1/4   | 0.360 | 3/8   |
| W12X106             | 106            | 12.9           | 12 7/8 | 12.2                       | 12 1/4 | 0.610                    | 5/8                         | 0.990          | 1       | W10X19              | 19.0           | 10.2                       | 10 1/4 | 4.02                     | 4                           | 0.250     | 1/4   | 0.395 | 3/8   |

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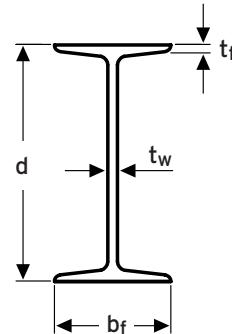
# Structural Sections

(Continued).

## Wide Flange Beams (continued)



## Standard Beams



| Section Designation | Nominal Weight | Section        |        |                            |       | Thickness                |                             |                          |                             |
|---------------------|----------------|----------------|--------|----------------------------|-------|--------------------------|-----------------------------|--------------------------|-----------------------------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |       | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> |
|                     | lb/ft          | in.            |        | in.                        |       | in.                      | in.                         | in.                      | in.                         |
| W10X17              | 17.0           | 10.1           | 10 1/8 | 4.01                       | 4     | 0.240                    | 1/4                         | 0.330                    | 5/16                        |
| W10X15              | 15.0           | 9.99           | 10     | 4.00                       | 4     | 0.230                    | 1/4                         | 0.270                    | 1/4                         |
| W10X12              | 12.0           | 9.87           | 9 7/8  | 3.96                       | 4     | 0.190                    | 3/16                        | 0.210                    | 3/16                        |
| W8X67               | 67.0           | 9.00           | 9      | 8.28                       | 8 1/4 | 0.570                    | 9/16                        | 0.935                    | 15/16                       |
| W8X58               | 58.0           | 8.75           | 8 3/4  | 8.22                       | 8 1/4 | 0.510                    | 1/2                         | 0.810                    | 13/16                       |
| W8X48               | 48.0           | 8.50           | 8 1/2  | 8.11                       | 8 1/8 | 0.400                    | 3/8                         | 0.685                    | 11/16                       |
| W8X40               | 40.0           | 8.25           | 8 1/4  | 8.07                       | 8 1/8 | 0.360                    | 3/8                         | 0.560                    | 9/16                        |
| W8X35               | 35.0           | 8.12           | 8 1/8  | 8.02                       | 8     | 0.310                    | 5/16                        | 0.495                    | 1/2                         |
| W8X31               | 31.0           | 8.00           | 8      | 8.00                       | 8     | 0.285                    | 5/16                        | 0.435                    | 7/16                        |
| W8X28               | 28.0           | 8.06           | 8      | 6.54                       | 6 1/2 | 0.285                    | 5/16                        | 0.465                    | 7/16                        |
| W8X24               | 24.0           | 7.93           | 7 7/8  | 6.50                       | 6 1/2 | 0.245                    | 1/4                         | 0.400                    | 3/8                         |
| W8X21               | 21.0           | 8.28           | 8 1/4  | 5.27                       | 5 1/4 | 0.250                    | 1/4                         | 0.400                    | 3/8                         |
| W8X18               | 18.0           | 8.14           | 8 1/8  | 5.25                       | 5 1/4 | 0.230                    | 1/4                         | 0.330                    | 5/16                        |
| W8X15               | 15.0           | 8.11           | 8 1/8  | 4.02                       | 4     | 0.245                    | 1/4                         | 0.315                    | 5/16                        |
| W8X13               | 13.0           | 7.99           | 8      | 4.00                       | 4     | 0.230                    | 1/4                         | 0.255                    | 1/4                         |
| W8X10               | 10.0           | 7.89           | 7 7/8  | 3.94                       | 4     | 0.170                    | 3/16                        | 0.205                    | 3/16                        |
| W6X25               | 25.0           | 6.38           | 6 3/8  | 6.08                       | 6 1/8 | 0.320                    | 5/16                        | 0.455                    | 7/16                        |
| W6X20               | 20.0           | 6.20           | 6 1/4  | 6.02                       | 6     | 0.260                    | 1/4                         | 0.365                    | 3/8                         |
| W6X15               | 15.0           | 5.99           | 6      | 5.99                       | 6     | 0.230                    | 1/4                         | 0.260                    | 1/4                         |
| W6X16               | 16.0           | 6.28           | 6 1/4  | 4.03                       | 4     | 0.260                    | 1/4                         | 0.405                    | 3/8                         |
| W6X12               | 12.0           | 6.03           | 6      | 4.00                       | 4     | 0.230                    | 1/4                         | 0.280                    | 1/4                         |
| W6X9                | 9.00           | 5.90           | 5 7/8  | 3.94                       | 4     | 0.170                    | 3/16                        | 0.215                    | 3/16                        |
| W6X8.5              | 8.50           | 5.83           | 5 7/8  | 3.94                       | 4     | 0.170                    | 3/16                        | 0.195                    | 3/16                        |
| W5X19               | 19.0           | 5.15           | 5 1/8  | 5.03                       | 5     | 0.270                    | 1/4                         | 0.430                    | 7/16                        |
| W5X16               | 16.0           | 5.01           | 5      | 5.00                       | 5     | 0.240                    | 1/4                         | 0.360                    | 3/8                         |
| W4X13               | 13.0           | 4.16           | 4 1/8  | 4.06                       | 4     | 0.280                    | 1/4                         | 0.345                    | 3/8                         |

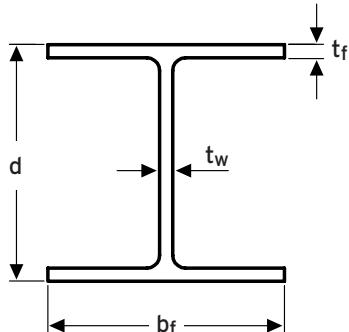
| Section Designation | Nominal Weight | Section        |        |                            |       | Thickness                |                             |                          |                             |
|---------------------|----------------|----------------|--------|----------------------------|-------|--------------------------|-----------------------------|--------------------------|-----------------------------|
|                     |                | Depth <i>d</i> |        | Width <i>b<sub>f</sub></i> |       | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> | Web <i>t<sub>w</sub></i> | Flange <i>t<sub>f</sub></i> |
|                     | lb/ft          | in.            |        | in.                        |       | in.                      | in.                         | in.                      | in.                         |
| S24X121             | 121            | 24.5           | 24 1/2 | 8.05                       | 8     | 0.800                    | 13/16                       | 1.09                     | 11/16                       |
| S24X106             | 106            | 24.5           | 24 1/2 | 7.87                       | 7 7/8 | 0.620                    | 5/8                         | 1.09                     | 11/16                       |
| S24X100             | 100            | 24.0           | 24     | 7.25                       | 7 1/4 | 0.745                    | 3/4                         | 0.870                    | 7/8                         |
| S24X90              | 90.0           | 24.0           | 24     | 7.13                       | 7 1/8 | 0.625                    | 5/8                         | 0.870                    | 7/8                         |
| S24X80              | 80.0           | 24.0           | 24     | 7.00                       | 7     | 0.500                    | 1/2                         | 0.870                    | 7/8                         |
| S20X96              | 96.0           | 20.3           | 20 1/4 | 7.20                       | 7 1/4 | 0.800                    | 13/16                       | 0.920                    | 15/16                       |
| S20X86              | 86.0           | 20.3           | 20 1/4 | 7.06                       | 7     | 0.660                    | 11/16                       | 0.920                    | 15/16                       |
| S20X75              | 75.0           | 20.0           | 20     | 6.39                       | 6 3/8 | 0.635                    | 5/8                         | 0.795                    | 13/16                       |
| S20X66              | 66.0           | 20.0           | 20     | 6.26                       | 6 1/4 | 0.505                    | 1/2                         | 0.795                    | 13/16                       |
| S18X70              | 70.0           | 18.0           | 18     | 6.25                       | 6 1/4 | 0.711                    | 11/16                       | 0.691                    | 11/16                       |
| S18X54.7            | 54.7           | 18.0           | 18     | 6.00                       | 6     | 0.461                    | 7/16                        | 0.691                    | 11/16                       |
| S15X50              | 50.0           | 15.0           | 15     | 5.64                       | 5 5/8 | 0.550                    | 9/16                        | 0.622                    | 5/8                         |
| S15X42.9            | 42.9           | 15.0           | 15     | 5.50                       | 5 1/2 | 0.411                    | 7/16                        | 0.622                    | 5/8                         |
| S12X50              | 50.0           | 12.0           | 12     | 5.48                       | 5 1/2 | 0.687                    | 11/16                       | 0.659                    | 11/16                       |
| S12X40.8            | 40.8           | 12.0           | 12     | 5.25                       | 5 1/4 | 0.462                    | 7/16                        | 0.659                    | 11/16                       |
| S12X35              | 35.0           | 12.0           | 12     | 5.08                       | 5 1/8 | 0.428                    | 7/16                        | 0.544                    | 9/16                        |
| S12X31.8            | 31.8           | 12.0           | 12     | 5.00                       | 5     | 0.350                    | 3/8                         | 0.544                    | 9/16                        |
| S10X35              | 35.0           | 10.0           | 10     | 4.94                       | 5     | 0.594                    | 5/8                         | 0.491                    | 1/2                         |
| S10X25.4            | 25.4           | 10.0           | 10     | 4.66                       | 4 5/8 | 0.311                    | 5/16                        | 0.491                    | 1/2                         |
| S8X23               | 23.0           | 8.00           | 8      | 4.17                       | 4 1/8 | 0.441                    | 7/16                        | 0.425                    | 7/16                        |
| S8X18.4             | 18.4           | 8.00           | 8      | 4.00                       | 4     | 0.271                    | 1/4                         | 0.425                    | 7/16                        |
| S6X17.25            | 17.25          | 6.00           | 6      | 3.57                       | 3 5/8 | 0.465                    | 7/16                        | 0.359                    | 3/8                         |
| S6X12.5             | 12.5           | 6.00           | 6      | 3.33                       | 3 3/8 | 0.232                    | 1/4                         | 0.359                    | 3/8                         |
| S5X10               | 10.0           | 5.00           | 5      | 3.00                       | 3     | 0.214                    | 3/16                        | 0.326                    | 5/16                        |
| S4X9.5              | 9.50           | 4.00           | 4      | 2.80                       | 2 3/4 | 0.326                    | 5/16                        | 0.293                    | 5/16                        |
| S4X7.7              | 7.70           | 4.00           | 4      | 2.66                       | 2 5/8 | 0.193                    | 3/16                        | 0.293                    | 5/16                        |
| S3X7.5              | 7.50           | 3.00           | 3      | 2.51                       | 2 1/2 | 0.349                    | 3/8                         | 0.260                    | 1/4                         |
| S3X5.7              | 5.70           | 3.00           | 3      | 2.33                       | 2 3/8 | 0.170                    | 3/16                        | 0.260                    | 1/4                         |

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# Structural Sections

(Continued).

## Bearing Piles



| Section Designation | Nominal Weight | Section |        |           |          | Thickness |       |            |       |
|---------------------|----------------|---------|--------|-----------|----------|-----------|-------|------------|-------|
|                     |                | Depth d |        | Width b_f |          | Web t_w   |       | Flange t_f |       |
|                     | lb/ft          | in.     | in.    | in.       | in.      | in.       | in.   | in.        | in.   |
| HP18X204            | 204            | 18.3    | 18 1/4 | 18.1      | 18 1/8   | 1.13      | 1 1/8 | 1.13       | 1 1/8 |
| HP18X181            | 181            | 18.0    | 18     | 18.0      | 18       | 1.00      | 1     | 1.00       | 1     |
| HP18X157            | 157            | 17.7    | 17 3/4 | 17.9      | 17 7/8   | 0.870     | 7/8   | 0.870      | 7/8   |
| HP18X135            | 135            | 17.5    | 17 1/2 | 17.8      | 17 3/4   | 0.750     | 3/4   | 0.750      | 3/4   |
| HP16X183            | 183            | 16.5    | 16 1/2 | 16.3      | 16 1/2   | 1.13      | 1 1/8 | 1.13       | 1 1/8 |
| HP16X162            | 162            | 16.3    | 16 1/4 | 16.1      | 16 1/8   | 1.00      | 1     | 1.00       | 1     |
| HP16X141            | 141            | 16.0    | 16     | 16.0      | 16       | 0.875     | 7/8   | 0.875      | 7/8   |
| HP16X121            | 121            | 15.8    | 15 3/4 | 15.9      | 15 7/8   | 0.750     | 3/4   | 0.750      | 3/4   |
| HP16X101            | 101            | 15.5    | 15 1/2 | 15.8      | 15 3/4   | 0.625     | 5/8   | 0.625      | 5/8   |
| HP16X88             | 88.0           | 15.3    | 15 3/8 | 15.7      | 15 11/16 | 0.540     | 9/16  | 0.540      | 9/16  |
| HP14X117            | 117            | 14.2    | 14 1/4 | 14.9      | 14 7/8   | 0.805     | 13/16 | 0.805      | 13/16 |
| HP14X102            | 102            | 14.0    | 14     | 14.8      | 14 3/4   | 0.705     | 11/16 | 0.705      | 11/16 |
| HP14X89             | 89.0           | 13.8    | 13 7/8 | 14.7      | 14 3/4   | 0.615     | 5/8   | 0.615      | 5/8   |
| HP14X73             | 73.0           | 13.6    | 13 5/8 | 14.6      | 14 5/8   | 0.505     | 1/2   | 0.505      | 1/2   |
| HP12X89             | 89.0           | 12.4    | 12 3/8 | 12.3      | 12 3/8   | 0.720     | 3/4   | 0.720      | 3/4   |
| HP12X84             | 84.0           | 12.3    | 12 1/4 | 12.3      | 12 1/4   | 0.685     | 11/16 | 0.685      | 11/16 |
| HP12X74             | 74.0           | 12.1    | 12 1/8 | 12.2      | 12 1/4   | 0.605     | 5/8   | 0.610      | 5/8   |
| HP12X63             | 63.0           | 11.9    | 12     | 12.1      | 12 1/8   | 0.515     | 1/2   | 0.515      | 1/2   |
| HP12X53             | 53.0           | 11.8    | 11 3/4 | 12.0      | 12       | 0.435     | 7/16  | 0.435      | 7/16  |
| HP10X57             | 57.0           | 9.99    | 10     | 10.2      | 10 1/4   | 0.565     | 9/16  | 0.565      | 9/16  |
| HP10X42             | 42.0           | 9.70    | 9 3/4  | 10.1      | 10 1/8   | 0.415     | 7/16  | 0.420      | 7/16  |
| HP8X36              | 36.0           | 8.02    | 8      | 8.16      | 8 1/8    | 0.445     | 7/16  | 0.445      | 7/16  |

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## Proven connection solutions

Lindapter products are used in multiple industries around the world in an extensive range of applications. The case studies below highlight the wide use of Lindapter connections. To view more project examples please visit [www.Lindapter.com](http://www.Lindapter.com)

GIRDER CLAMPS

LIFTING POINTS

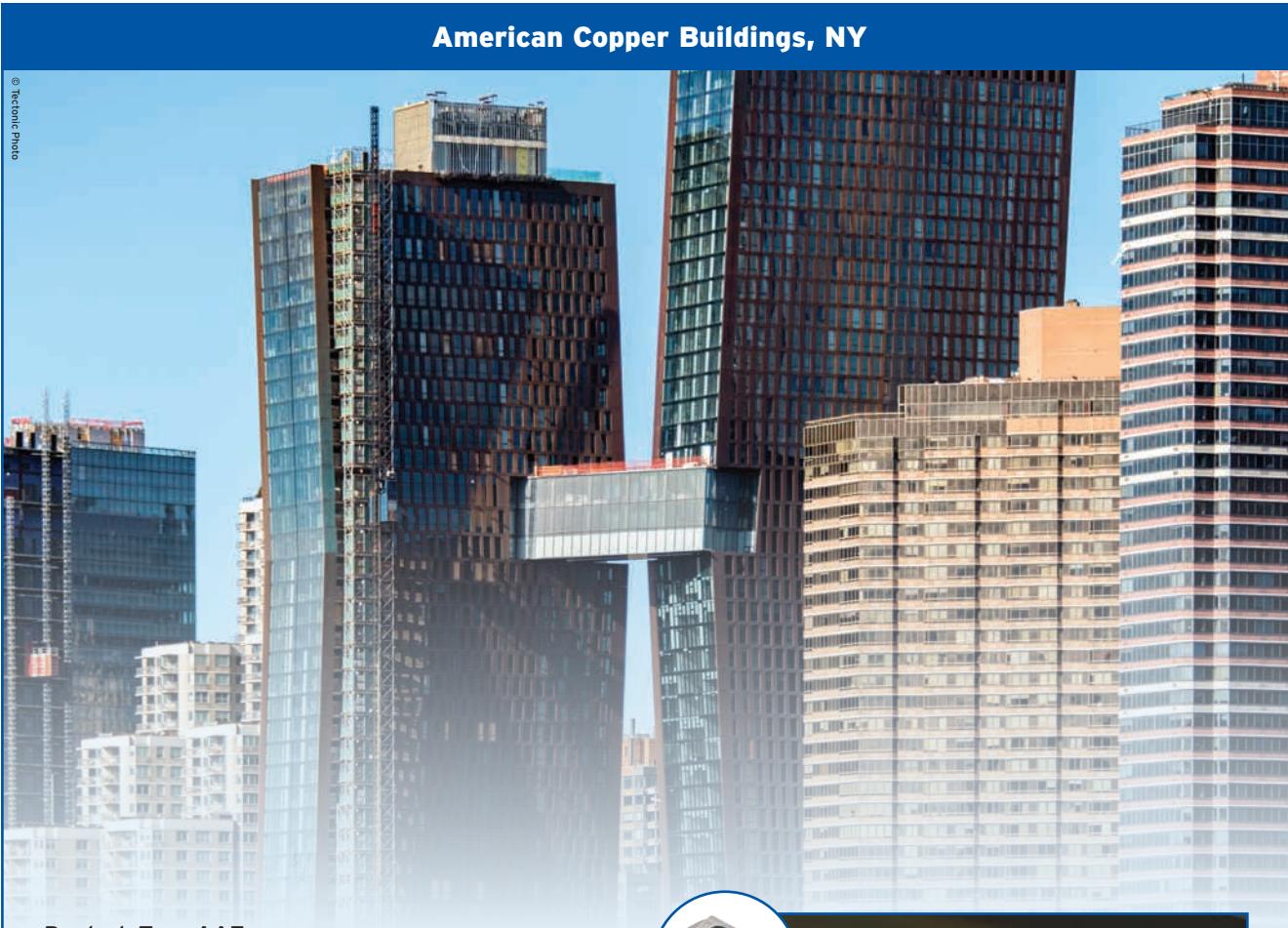
HOLLOW-BOLT

FLOOR CONNECTIONS

PIPE SUPPORTS

FAQS &amp; CASE STUDIES

### American Copper Buildings, NY



#### Product: Type AAF

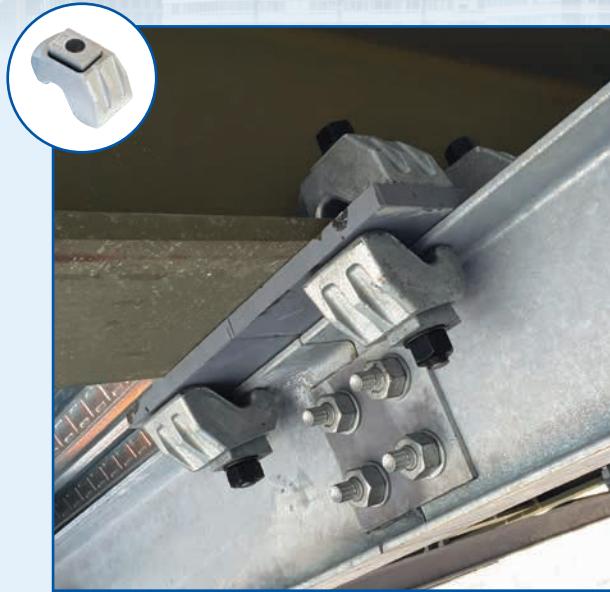
Application: Connecting a steel grid to the structural beams on the sky-bridge structure.

The sky-pool is on the bottom floor of the three-story fitness and leisure complex, which bridges the gap between the two towers, high above New York City.

Engineers specified Lindapter's Type AAF clamps for connecting a steel grid to the trusses to create a frame for the façade panels to be installed onto the sky-bridge. Type AAF was chosen due to its high strength capacity and longevity.

The adjustability of the product allowed the contractors to quickly, align and secure the frame into position without drilling or welding, saving the contractors time and money on this prestigious project.

► See page 10 for Type AAF.



## One Manhattan Square, NY



Product: **Hollo-Bolt™**

Application: Connecting the grid-shaped Hollow Structural Section (HSS) steel frame.



Lindapter Hollo-Bolts allowed this residential structure to be erected faster than conventional construction techniques.

The spliced HSS connection detail was designed to minimize assembly work in the field. Long sections were fabricated with pre-drilled connection plates welded to one end of each section on all four sides of the square HSS.

When positioned vertically to create a column, the four plates protruded above the height of each HSS, essentially forming a 'socket' for the section above to be located into. Contractors simply inserted Hollo-Bolts into the pre-drilled holes and tightened with a standard torque wrench.

► See pages 41 - 55 for Hollo-Bolt.



## Benjamin Franklin Bridge, PA



Product: **Grate-Fast™ Stainless Steel**

Application: Securing open grate flooring for maintenance access.



This suspension bridge connects Philadelphia, PA and Camden, NJ across the Delaware River. Lindapter's Grate-Fast was used to secure open bar grating to maintenance platforms along the length of the bridge.

The Grate-Fast has a cast malleable iron body that provides superior clamping force over the life of the connection and is Lloyds Register approved for resistance to shock and vibration.

Contractors used standard hand tools to secure the grating and this simple installation process resulted in the project being delivered on time and on budget.

► See page 62 for Grate-Fast.



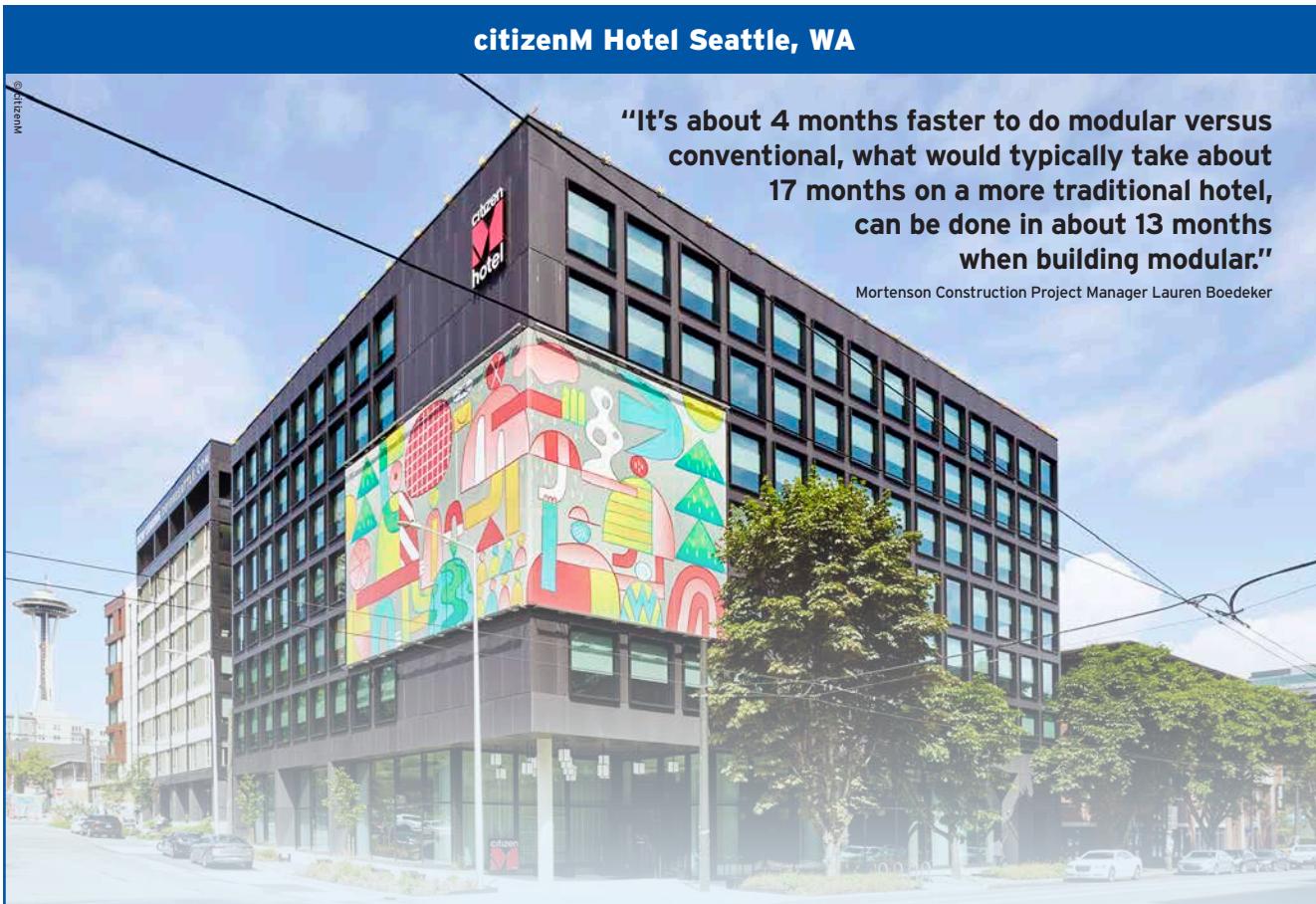
## Proven connection solutions

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### citizenM Hotel Seattle, WA

**"It's about 4 months faster to do modular versus conventional, what would typically take about 17 months on a more traditional hotel, can be done in about 13 months when building modular."**

Mortenson Construction Project Manager Lauren Boedeker



**Product: Hollo-Bolt™**

**Application: Connecting modular units during the construction of this hotel in Seattle.**

Polcom was appointed to build 228 modular units for this new hotel in Seattle. The traditional method of connecting the units together by drilling and bolting was not appropriate and hot welding risked damaging the waterproof membrane.

Special steel structural shear plates were designed and added to the modules. Hollo-Bolts were then used to connect through the shear plates to the Hollow Structural Sections (HSS) of each module.

High strength capacity Hollo-Bolts provided a drilling and weld free connection that was quick and easy to install without damaging the waterproof membranes.

► See pages 41 - 55 for Hollo-Bolt.



### Alexander Hamilton Bridge, NY



**Product: Type AF**

**Application: Structural support connections on a bridge refurbishment.**



Widening the bridge deck to introduce two additional traffic lanes required adding cantilever brackets to the main arch span to support the new deck. Structural Engineers specified Lindapter Girder Clamps (approved by NYSDOT) to connect the necessary temporary supports.

Type AF clamps were configured in a customized assembly to suit the flange thickness and angle of each tapered cantilevered bracket. The connection provided the required load capacities and did not require welding or drilling in the field, resulting in a quick and convenient way to temporarily support the cantilevered brackets.

► See page 11 for Type AF.



### American Helicopter Museum, PA



**Product: Lifting Point LP4**

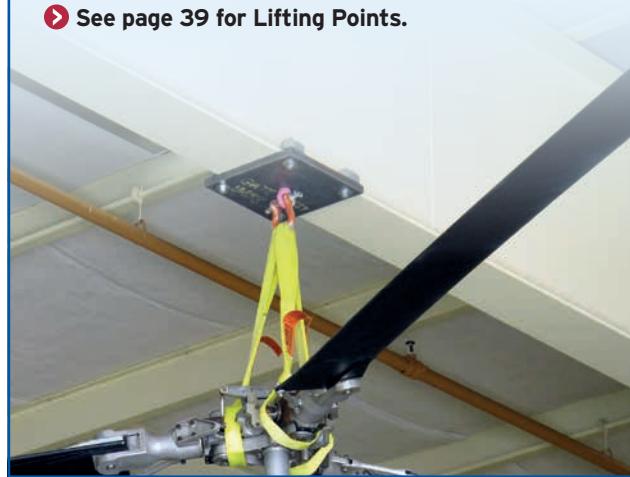
**Application: Suspending helicopters from the museum ceiling.**



Lindapter steel connections were supplied to The American Helicopter Museum for the suspension of an Enstrom F28A Helicopter. Weighing in at over 1500lbs, it is well within the capability of the lifting point, which was fitted with an eye bolt without drilling or welding. Connections have also been specified for arenas and theaters in lighting and sound rigging equipment, as well as in sports facilities to suspend heavy equipment.

Lindapter can design and manufacture customized lifting points for your specific load requirements free of charge. The Type ALP is also available as an off-the-shelf adjustable lifting point that adjusts to suit the beam width, flange thickness and the orientation of the lift.

► See page 39 for Lifting Points.



## Proven connection solutions

Lindapter products are used in multiple industries around the world in an extensive range of applications. The case studies below highlight the wide use of Lindapter connections. To view more project examples please visit [www.Lindapter.com](http://www.Lindapter.com)

GIRDER CLAMPS

LIFTING POINTS

HOLLO-BOLT

FLOOR CONNECTIONS

PIPE SUPPORTS

FAQS &amp; CASE STUDIES

### Wilshire Grand Center, CA



**Product: Hollo-Bolt™**

**Application: Securing primary steel tubes (HSS) which form the canopy of this skyscraper in Los Angeles.**

3,000 Hollo-Bolts were used to connect steel tubes which form the curved canopy structure. They were installed from just one side, rapidly achieving discreet splice connections without drilling or welding in the field.

The cost-effective installation did not require specialist equipment or labor and reduced the amount of work at height in comparison to welding or through-bolting.

The design eradicated the possibility of tube deformation that can be associated with through-bolting if the bolts are over-tightened. The result was aesthetically pleasing, clean and discreet connections which complement the architecturally exposed structural steel design.

► See pages 41 - 55 for Hollo-Bolt.



## Allegiant Stadium, NV

© Jason O'Rear



**Product: Type AAF**

**Application: Connecting a 275 foot electronic media mesh screen to the stadium's exterior.**



To secure the huge video screen to the front of this \$1.8 billion structure, contractors used 4,200 of Lindapter's high slip resistance Type AAF Girder Clamps to connect the brackets and plates to the structural columns.

Type AAF Girder Clamps provided a drilling and weld free connection that was quick and easy to install whilst working at height. Type AAF self-adjusts to suit the flange thickness which allows assemblies to be positioned close to where they are needed before final adjustments are made. The clamps can then be fully tightened using a calibrated torque wrench. Before the screen was installed the clamps were painted black to match the stadium's color scheme.

► See page 10 for Type AAF.



## Tobin Memorial Bridge, MA

© massmatt via Flickr (CC BY-SA 2.0)



**Product: Hollo-Bolt™**

**Application: Connecting checker plate walkway covers on the safety curbs.**



Due to limited access to the 11,800 ft long bridge structure, a bolted connection with one-sided access was required for the repair of the safety curbs on the walkway. Over 50,000 Hollo-Bolts were specified due to their high strength capacity and ability to be installed from one side of the bridge steel.

The checker plate covers were formed off-field into "S" shapes and then installed onto the safety curbs using 1/2" stainless steel Hollo-Bolts with hexagonal head on the vertical sections. 5/16" stainless steel Hollo-Bolts with countersunk head were then used on the horizontal sections to reduce trip hazards for bridge maintenance personnel and contribute to a safer walkway.

► See pages 41 - 55 for Hollo-Bolt.



## Passionate about safety

For over 90 years, Lindapter has manufactured to the highest standards, earning a multitude of independent approvals and a reputation synonymous with safety and reliability. Current accreditations are detailed below.

### Quality, Environment and Traceability

Accredited to ISO 9001 since 1986, Lindapter strictly enforces a quality management system that includes rigorous product testing to ensure consistently high manufacturing standards. As part of Lindapter's ISO 9001 quality management system and in compliance with the Construction Products Regulation, Lindapter operates a comprehensive Factory Production Control system that ensures traceability of all Lindapter products throughout the manufacturing process.

The company also operates an ISO 14001 certified environmental management system, constantly monitoring and improving aspects of the business that may impact on the environment, such as the use of natural resources as well as handling and treatment of waste and energy consumption.



### Independent Product Approvals & Associations

These approvals reinforce Lindapter's extensive in-house testing procedures. Products are tested so that Engineers and Contractors can be confident Lindapter products will perform as detailed in this catalog.



#### ICC-ES

North America's leading evaluation service has approved multiple Lindapter products to be compliant with the International Building Code. Girder Clamps (Types AF and AAF) and Hollo-Bolts are ICC-ES approved to resist wind and seismic loads.



#### CE Mark

CE Marking provides additional assurance that a product complies with the Construction Product Regulation and will perform as stated in the corresponding Declaration of Performance (DoP).



#### UKCA Mark

This demonstrates compliance with the Construction Products Regulation in Great Britain. Independently verified product specification data, including Characteristic Resistances for designing connections to Eurocode 3 are published in Declaration of Conformity (DoC) documents.



#### VdS Schadenverhütung GmbH

VdS is a leading independent testing institution in Germany for products used in fire protection applications.



#### Factory Mutual

This American insurance organization offers an approval that is recognized by the fire protection industry worldwide.



#### Lloyd's Register Type Approval

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



#### TÜV Nord

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

#### Associations

Lindapter is a member of the American Institute of Steel Construction (AISC), Canadian Institute of Steel Construction (CISC), British Constructional Steelwork Association (BCSA), The Steel Construction Institute (SCI), Southern African Institute of Steel Construction (SAISC) and the Australian Steel Institute (ASI).



## Live Webinars

We are pleased to offer live webinars **free of charge** to Structural Engineers, Consulting Engineers, Graduate Engineers and Specifiers. More information is below, to view our webinar schedule and to register visit [www.Lindapter.com](http://www.Lindapter.com)

## Designing Steel Connections Without Drilling or Welding

Gain an update on the latest ICC-ES approved steel-to-steel connections and an insight to the technical and practical advantages of specifying innovative clamping systems. Our experienced presenter will introduce a range of faster, cost-effective alternatives to conventional bolted and welded connections at a date and time to suit you.



### Introduction to Lindapter

- Our history which began in 1934.
- Market sectors and industries we supply.
- Global brands we have worked with.

### Conventional Connection Methods vs Lindapter Method

Overview of welding and drilling and bolting versus Lindapter clamping systems.

### Innovative Solutions

- Girder Clamps for connecting steel sections.
- Floor connections for steel plate and open bar grating.
- Hollo-Bolt expansion bolts for connecting to HSS.

### Typical Applications, Installation and Case Studies

See a wide selection of typical assemblies that are possible with Lindapter products and find out how other customers have used them to solve problems in real case study examples. Video animations are also used to demonstrate the simplicity of installation.

### Technical Support (Free Connection Detailing)

Learn about our industry leading Technical Support services, including FREE connection detailing, site visits and contractor product installation training.

### Research & Development (Engineered Solutions)

Do you have a unique connection problem? Our R&D facility can work with you to develop custom products and solutions.

### Q&A Session

Submit your questions during the webinar and our experienced presenter will answer as many as possible at the end during a live 10 minute Q&A session.



To view our webinar schedule and to register free of charge visit [www.Lindapter.com](http://www.Lindapter.com)

#### Disclaimer

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