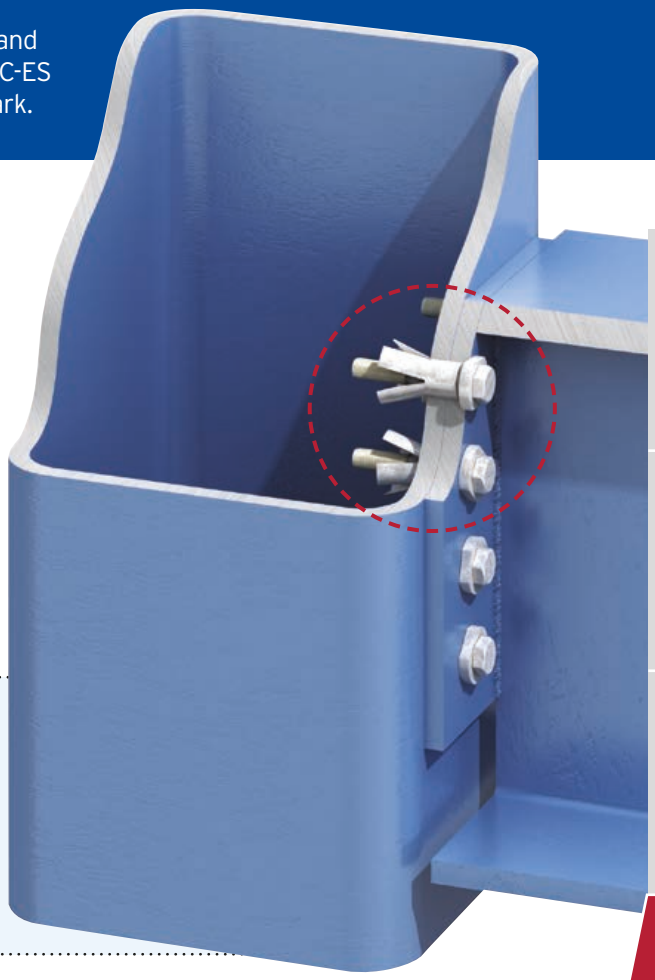
Hollo-Bolt® by Lindapter®

Installation is quickly carried out by inserting into pre-drilled steel and tightening with a torque wrench. Independent approvals include ICC-ES seismic accreditation, the Los Angeles Research Report and CE Mark.



Hollo-Bolt®

ICC ES ESR-3330 Seismic Approved *

LA DBS *

CE

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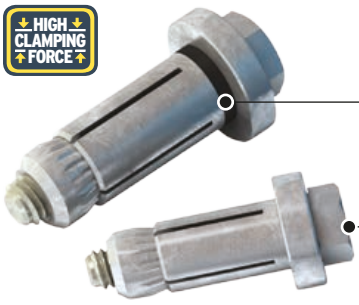
TÜV NORD

* See page 40 for details.

HIGH CLAMPING FORCE



Hollo-Bolt HCF (High Clamping Force)

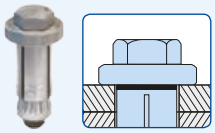
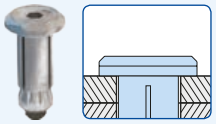
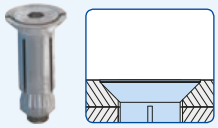
Standard Hollo-Bolt

Hollo-Bolt is the **only** HSS expansion bolt ICC-ES and LARR approved for all Seismic Design Categories (SDC) 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").

Hollo-Bolt Options

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

		Head Variants		
		HEXAGONAL Normal visible protrusion	**COUNTERSUNK (HEAD)** Minimal visible protrusion	**FLUSH FIT** Zero visible protrusion
				
Sizes Available	5/16"	✔	✔	✔
	3/8"	✔	✔	✔
	1/2"	✔	✔	✔
	5/8" High Clamping Force	✔	✔	-
	3/4" High Clamping Force	✔	-	-
Corrosion Protection	Zinc Plated plus JS500	✔	✔	✔
	Hot Dip Galvanized	✔	-	-
	Sheraplex	✔	✔	✔
	Stainless Steel	✔	✔	✔

HIGH CLAMPING FORCE

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. Go to **pages 38 and 39** to see the significance of clamping force and the superior performance of this unique product.

Hollo-Bolt Clamping Force

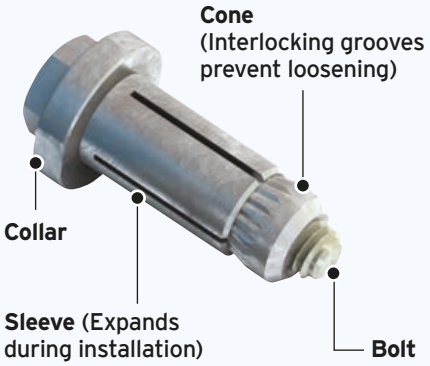
Lindapter Hollo-Bolts are available in two versions; the original standard design for general hollow section connections and the larger sized High Clamping Force (HCF) for higher strength structural connections.

Sizes 5/16", 3/8" and 1/2"

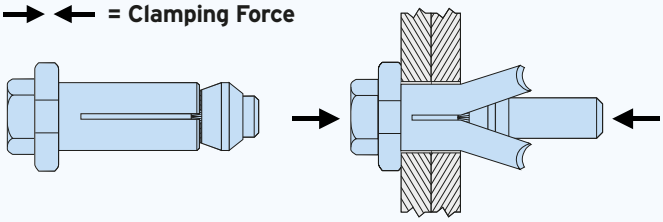
Standard Hollo-Bolt

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.

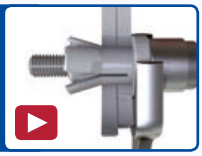
At full tightening torque, a clamping force is established between the fixture and the steel section to form a secure connection. Once installed, only the head and the collar are visible.



→ ← = Clamping Force



See how to install Hollo-Bolt on **page 42** or watch the video on Lindapter's website.

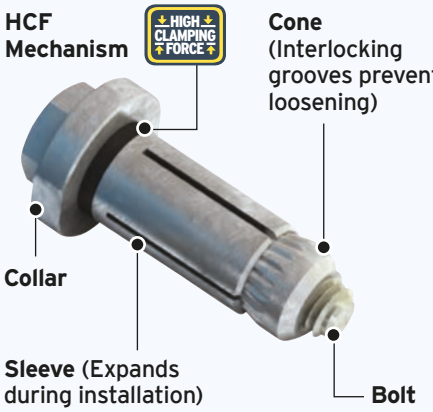


Sizes 5/8" and 3/4"

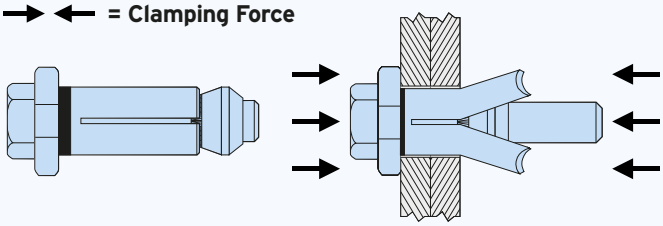
Hollo-Bolt HCF

By working closely with Structural Engineers and Steel Fabricators, Lindapter identified the need for the larger 5/8" and 3/4" Hollo-Bolts to have an increased clamping force suitable for higher strength structural connections. This led to Lindapter's invention of the High Clamping Force (HCF) design, optimized for superior performance.

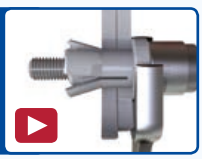
The HCF mechanism consists of a special rubber washer that compresses during installation to significantly increase the clamping force between the connecting steel, thereby reducing displacement to achieve a higher strength connection. See page 39 for more information.



→ ← = Clamping Force



See how to install Hollo-Bolt on **page 42** or watch the video on Lindapter's website.



Hollo-Bolt Clamping Force

The Hollo-Bolt HCF is optimized for high strength structural connections and features a High Clamping Force (HCF) mechanism. The graphs below compare the performance of a Hollo-Bolt HCF and an expansion bolt of the same size without the mechanism.

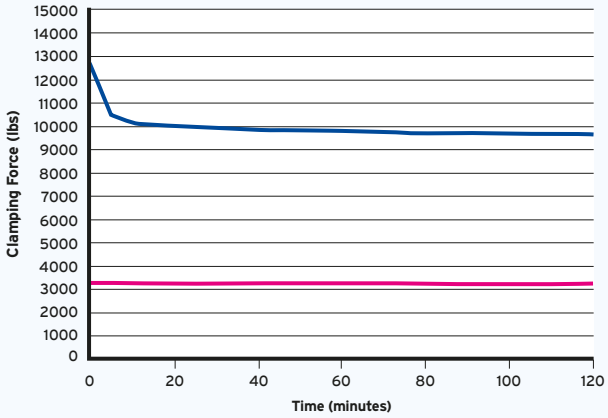
Clamping Force

Typical performance increase

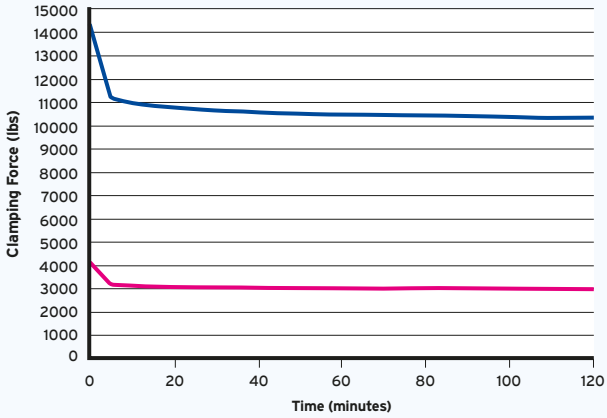
Hollo-Bolt HCF (With Mechanism) Hot Dip Galvanized, Size 2

(Without Mechanism) Hot Dip Galvanized, Size 2

Size 5/8": Up to 3 times more clamping force



Size 3/4": Up to 3.5 times more clamping force



As with any structural bolt, immediately after installation the bolt relaxes until a typical clamping force is reached. Typical clamping force of the Hollo-Bolt HCF is over **three times higher** than the same sized product without the HCF mechanism. This results in a more secure connection and a greater force that has to be overcome before displacement begins.

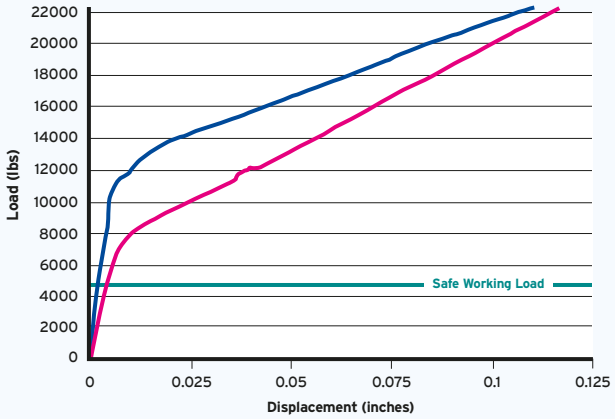
Displacement

Typical performance increase

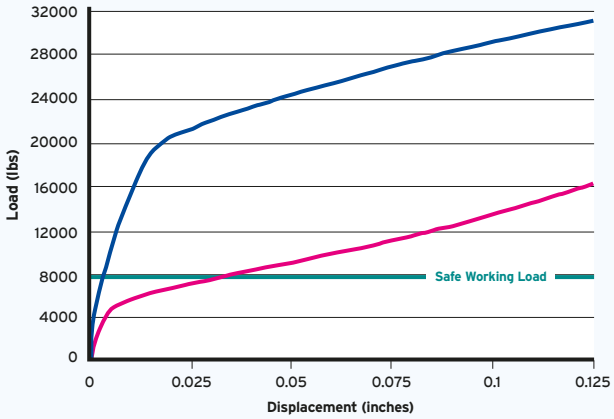
Hollo-Bolt HCF (With Mechanism) Hot Dip Galvanized, Size 2

(Without Mechanism) Hot Dip Galvanized, Size 2

Size 5/8": Connection Load vs Ply Displacement



Size 3/4": Connection Load vs Ply Displacement



The graphs above show the significance of increased clamping force. The blue curve demonstrates the superior performance of the Hollo-Bolt HCF in contrast to 5/8" and 3/4" sized products without Lindapter's unique mechanism. At Safe Working Load, displacement (movement in the connection) is minimized when using the Hollo-Bolt HCF for a safer and more secure connection.

Graphs for illustration purposes only, see pages 40 and 41 for connection design.

Hollo-Bolt Allowable Loading

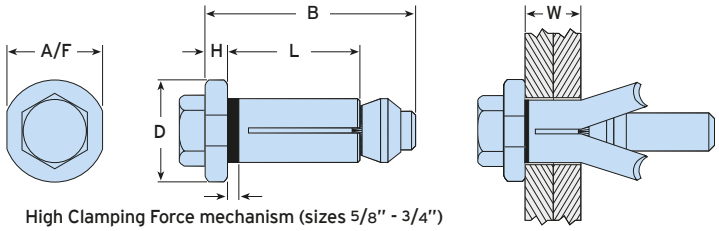
The Hollo-Bolt is the only HSS expansion bolt ICC-ES and LARR approved for all Seismic Design Categories (SDC) A through F, in compliance with the International Building Code (IBC).

LRFD and ASD Methods

The Hollo-Bolt LRFD and ASD Design Strengths (taken from ESR 3330) are to be used only when designing a bolted connection to AISC 360, AISC 341 and AISI S-100 as referenced in Section 2205 of the IBC.

ICC ES ESR-3330 Seismic Approved

LA DBS Research Report: RR 26037 (based on ESR-3330)



High Clamping Force mechanism (sizes 5/8" - 3/4")

Download the full Evaluation Report ESR-3330 from **www.LindapterUSA.com**

								Allowable Loading							
								Static and Seismic Design Categories A, B, C				Seismic Design Categories D, E, F			
				Collar				LRFD Method		ASD Method		LRFD Method		ASD Method	
	Product Code	Bolt B	Max. Clamping Range W	Sleeve Length L	Height H	Ø D	A/F	Tightening Torque	Tensile	Shear	Tensile	Shear	Tensile	Shear	Tensile	Shear
								ft lb	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs
	LHBM08#1	5/16" x 2"	1/4" - 7/8"	13/16"	3/16"	7/8"	3/4"	17	3775	3215	2340	2000	3305	2675	2045	1665
	LHBM08#2	5/16" x 2 3/4"	7/8" - 1 5/8"	1 15/16"	3/16"	7/8"	3/4"	17	3775	3215	2340	2000	3305	2675	2045	1665
	LHBM08#3	5/16" x 3 9/16"	1 5/8" - 2 3/8"	2 11/16"	3/16"	7/8"	3/4"	17	3775	3215	2340	2000	3305	2675	2045	1665
	LHBM10#1	3/8" x 2 3/16"	5/16" - 7/8"	13/16"	1/4"	1 1/8"	15/16"	33	6160	5485	3820	3415	5485	4565	3395	2830
	LHBM10#2	3/8" x 2 3/4"	7/8" - 1 5/8"	1 7/8"	1/4"	1 1/8"	15/16"	33	6160	5485	3820	3415	5485	4565	3395	2830
	LHBM10#3	3/8" x 3 9/16"	1 5/8" - 2 3/8"	2 5/8"	1/4"	1 1/8"	15/16"	33	6160	5485	3820	3415	5485	4565	3395	2830
	LHBM12#1	1/2" x 2 3/8"	5/16" - 1"	1 3/8"	1/4"	1 1/4"	1 3/16"	59	8545	7485	5305	4675	7465	6250	4630	3890
	LHBM12#2	1/2" x 3 5/32"	1" - 1 13/16"	2 1/4"	1/4"	1 1/4"	1 3/16"	59	8545	7485	5305	4675	7465	6250	4630	3890
	LHBM12#3	1/2" x 4"	1 13/16" - 2 3/4"	3 1/8"	1/4"	1 1/4"	1 3/16"	59	8545	7485	5305	4675	7465	6250	4630	3890
Hollo-Bolt HCF	LHBM16#1	5/8" x 3"	1/2" - 1 1/8"	1 5/8"	5/16"	1 1/2"	1 7/16"	140	13915	11645	8635	7285	13330	9780	8270	6090
Hollo-Bolt HCF	LHBM16#2	5/8" x 4"	1 1/8" - 2"	2 1/2"	5/16"	1 1/2"	1 7/16"	140	13915	11645	8635	7285	13330	9780	8270	6090
Hollo-Bolt HCF	LHBM16#3	5/8" x 4 3/4"	2" - 2 13/16"	3 5/16"	5/16"	1 1/2"	1 7/16"	140	13915	11645	8635	7285	13330	9780	8270	6090
Hollo-Bolt HCF	LHBM20#1	3/4" x 3 9/16"	1/2" - 1 5/16"	1 15/16"	3/8"	2"	1 13/16"	221	19985	18390	12410	11490	19355	15330	12005	9555
Hollo-Bolt HCF	LHBM20#2	3/4" x 4 3/4"	1 5/16" - 2 3/8"	3"	3/8"	2"	1 13/16"	221	19985	18390	12410	11490	19355	15330	12005	9555
Hollo-Bolt HCF	LHBM20#3	3/4" x 5 7/8"	2 3/8" - 3 3/8"	4"	3/8"	2"	1 13/16"	221	19985	18390	12410	11490	19355	15330	12005	9555

ICC-ES approved use

ICC-ES is North America's leading evaluation service for innovative building products, providing evidence that products meet the requirements of building codes and technical standards. Evaluation report ESR-3330 states:

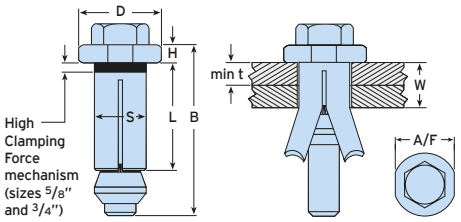
"Hollo-Bolt fasteners are designed for connecting structural steel to hollow structural section (HSS) steel members and other structural steel elements where access is difficult or restricted to one side only."

"Hollo-Bolt fasteners may be used to resist wind loads, and seismic loads in Seismic Design categories A through F."

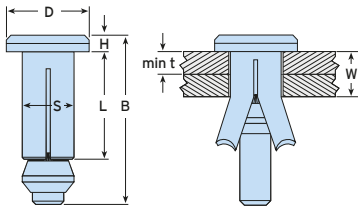
Hollo-Bolt Safe Working Loads

For connections to secondary steel, please refer to the safe working loads in the tables below:

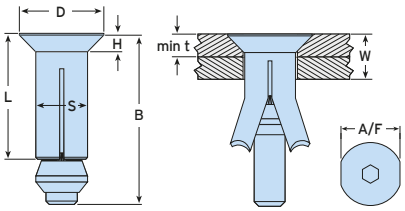
a) Hexagonal



b) Countersunk



c) Flush Fit



	a) Hexagonal		b) Countersunk				Sleeve		Collar				Safe Working Loads (FOS 5:1)	
	Product Code	Bolt B	Product Code	Bolt B	Clamping Thickness W	Outer Ply min t	Length L	Outer Ø S	Height H	Ø D	A/F	Tightening Torque ft lb	Tensile lbs	Single Shear lbs
	LHBM08#1	5/16" x 2"	LHBCSKM08#1	5/16" x 2"	1/8" - 7/8"	-	13/16"	0.541"	3/16"	7/8"	3/4"	17	899	1124
	LHBM08#2	5/16" x 2 3/4"	LHBCSKM08#2	5/16" x 2 3/4"	7/8" - 1 5/8"	-	1 15/16"	0.541"	3/16"	7/8"	3/4"	17	899	1124
	LHBM08#3	5/16" x 3 9/16"	LHBCSKM08#3	5/16" x 3 9/16"	1 5/8" - 2 3/8"	-	2 11/16"	0.541"	3/16"	7/8"	3/4"	17	899	1124
	LHBM10#1	3/8" x 2 3/16"	LHBCSKM10#1	3/8" x 2"	1/8" - 7/8"	-	13/16"	0.699"	1/4"	1 1/8"	15/16"	33	1910	2248
	LHBM10#2	3/8" x 2 3/4"	LHBCSKM10#2	3/8" x 2 3/4"	7/8" - 1 5/8"	-	17/8"	0.699"	1/4"	1 1/8"	15/16"	33	1910	2248
	LHBM10#3	3/8" x 3 9/16"	LHBCSKM10#3	3/8" x 3 9/16"	1 5/8" - 2 3/8"	-	2 5/8"	0.699"	1/4"	1 1/8"	15/16"	33	1910	2248
	LHBM12#1	1/2" x 2 3/8"	LHBCSKM12#1	1/2" x 2 3/16"	1/8" - 1"	-	13/8"	0.778"	1/4"	1 1/4"	13/16"	59	2360	3372
	LHBM12#2	1/2" x 3 5/32"	LHBCSKM12#2	1/2" x 3 1/8"	1" - 1 13/16"	-	2 1/4"	0.778"	1/4"	1 1/4"	13/16"	59	2360	3372
	LHBM12#3	1/2" x 4"	LHBCSKM12#3	1/2" x 4"	1 13/16" - 2 3/4"	-	3 1/8"	0.778"	1/4"	1 1/4"	13/16"	59	2360	3372
Hollo-Bolt HCF	LHBM16#1	5/8" x 3"	LHBCSKM16#1	5/8" x 2 3/4"	1/2" - 1 1/8"	5/16"	15/8"	1.014"	5/16"	1 1/2"	17/16"	140	4720	6744
Hollo-Bolt HCF	LHBM16#2	5/8" x 4"	LHBCSKM16#2	5/8" x 4"	1 1/8" - 2"	5/16"	2 1/2"	1.014"	5/16"	1 1/2"	17/16"	140	4720	6744
Hollo-Bolt HCF	LHBM16#3	5/8" x 4 3/4"	LHBCSKM16#3	5/8" x 4 3/4"	2" - 2 13/16"	5/16"	3 5/16"	1.014"	5/16"	1 1/2"	17/16"	140	4720	6744
Hollo-Bolt HCF	LHBM20#1	3/4" x 3 9/16"	-	-	1/2" - 1 5/16"	5/16"	1 15/16"	1.289"	3/8"	2"	1 13/16"	221	7868	8992
Hollo-Bolt HCF	LHBM20#2	3/4" x 4 3/4"	-	-	1 5/16" - 2 3/8"	5/16"	3"	1.289"	3/8"	2"	1 13/16"	221	7868	8992
Hollo-Bolt HCF	LHBM20#3	3/4" x 5 7/8"	-	-	2 3/8" - 3 3/8"	5/16"	4"	1.289"	3/8"	2"	1 13/16"	221	7868	8992

HIGH CLAMPING FORCE

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 the significance of clamping force and the superior performance of this unique product on **pages 38 and 39**.

	c) Flush Fit				Sleeve		Collar				Safe Working Loads (FOS 5:1)	
	Product Code	Countersunk Bolt B	Clamping Thickness W	Outer Ply min t	Length L	Outer Ø S	Height H	Ø D	Installation Nut A/F	Tightening Torque ft lb	Tensile lbs	Single Shear lbs
	LHBFF08#1	5/16" x 2"	3/8" - 1 1/16"	5/16"	1 3/8"	0.541"	3/16"	15/16"	3/4"	17	899	1124
	LHBFF08#2	5/16" x 2 3/4"	1 1/16" - 1 3/4"	5/16"	2 1/8"	0.541"	3/16"	15/16"	3/4"	17	899	1124
	LHBFF08#3	5/16" x 3 9/16"	1 3/4" - 2 1/2"	5/16"	2 7/8"	0.541"	3/16"	15/16"	3/4"	17	899	1124
	LHBFF10#1	3/8" x 2"	1/2" - 1 1/16"	3/8"	1 7/16"	0.699"	1/4"	1 3/16"	15/16"	33	1910	2248
	LHBFF10#2	3/8" x 2 3/4"	1 1/16" - 1 3/4"	3/8"	2 1/8"	0.699"	1/4"	1 3/16"	15/16"	33	1910	2248
	LHBFF10#3	3/8" x 3 9/16"	1 3/4" - 2 1/2"	3/8"	2 7/8"	0.699"	1/4"	1 3/16"	15/16"	33	1910	2248
	LHBFF12#1	1/2" x 2 3/16"	1/2" - 1 3/16"	3/8"	1 5/8"	0.778"	1/4"	1 5/16"	1 3/16"	59	2360	3372
	LHBFF12#2	1/2" x 3 1/8"	1 3/16" - 2 1/32"	3/8"	2 1/2"	0.778"	1/4"	1 5/16"	1 3/16"	59	2360	3372
	LHBFF12#3	1/2" x 4"	2 1/32" - 2 7/8"	3/8"	3 3/8"	0.778"	1/4"	1 5/16"	1 3/16"	59	2360	3372

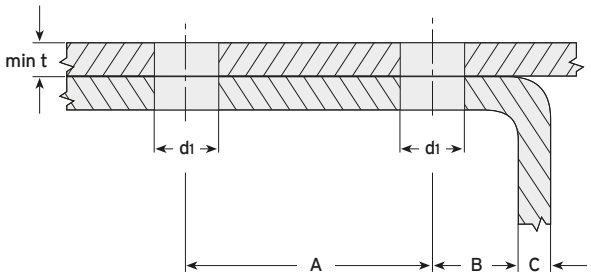
Hollo-Bolts can be used on a variety of steel hollow sections and shapes. Safe working loads shown are based on use in A36 structural tube and are applicable to the Hollo-Bolt only in both tension and shear. Failure of the section, particularly on those with thin walls and a wide chord face, could occur at a lower figure and its strength should be checked by a qualified Structural Engineer.

Hollo-Bolt Preparation and Installation

Please ensure that the holes are drilled into both the fixture and the section according to the drilling guidance below. Please note that the holes are slightly larger than standard bolt clearance holes to accommodate the sleeve and cone.

Hexagonal and Countersunk

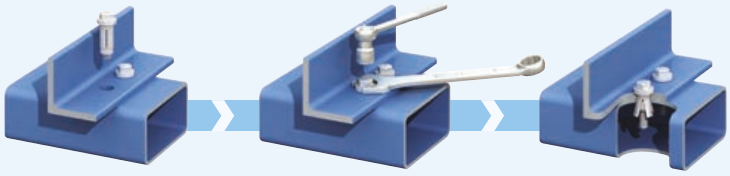
Type		Outer Ply	Clearance Hole Ø	Hole Distances		Edge Distances
Hexagonal	Countersunk	min t	d1	min A	min B	B + C
LHBM08	LHBCSKM08	-	9/16"	1 3/8"	1/2"	>11/16"
LHBM10	LHBCSKM10	-	3/4"	1 9/16"	9/16"	>7/8"
LHBM12	LHBCSKM12	-	13/16"	2"	11/16"	>1"
LHBM16	LHBCSKM16	5/16"	1 1/16"	2 3/16"	13/16"	>1 5/16"
LHBM20	-	5/16"	1 5/16"	2 3/4"	1"	>1 5/16"



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

How to install...

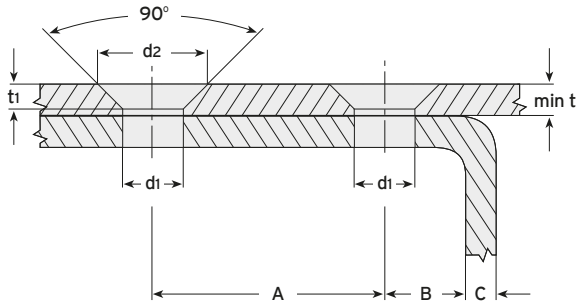
1) Align pre-drilled fixture and section then insert the Hollo-Bolt[a].
2) Grip Hollo-Bolt collar with an open ended wrench.
3) Using a calibrated torque wrench, tighten the central bolt to the recommended torque[b].



Watch the Hollo-Bolt installation video at www.LindapterUSA.com

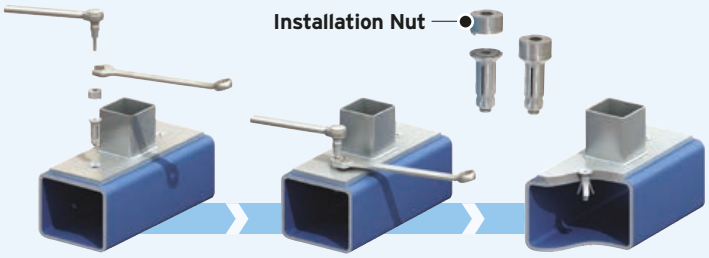
Flush Fit

Type	Outer Ply	Clearance Hole Ø	Countersunk		Hole Distances		Edge Distances
	min t	d1	d2	t1	min A	min B	B + C
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"	1 9/16"	9/16"	>7/8"
LHBM12FF	3/8"	13/16"	1 3/8"	5/16"	2"	11/16"	>1"



How to install...

1) Align pre-drilled fixture and section then insert the Hollo-Bolt[a].
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[b].



Notes:

a) Before tightening, ensure that the materials that are to be connected together are touching. See **page 41** for tightening torque.

b) 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.

For further installation and equipment information please visit www.LindapterUSA.com or contact Lindapter.