

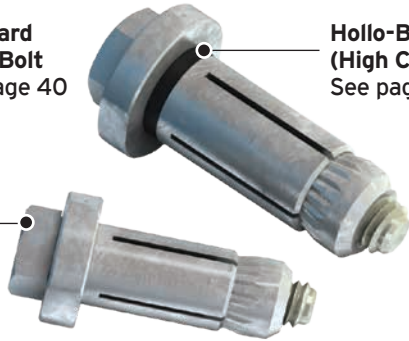
Hollo-Bolt® by Lindapter®

Installation is quickly carried out by inserting into pre-drilled steelwork and tightening with a torque wrench. Independent approvals include CE Mark, TÜV and ICC-ES seismic accreditation.

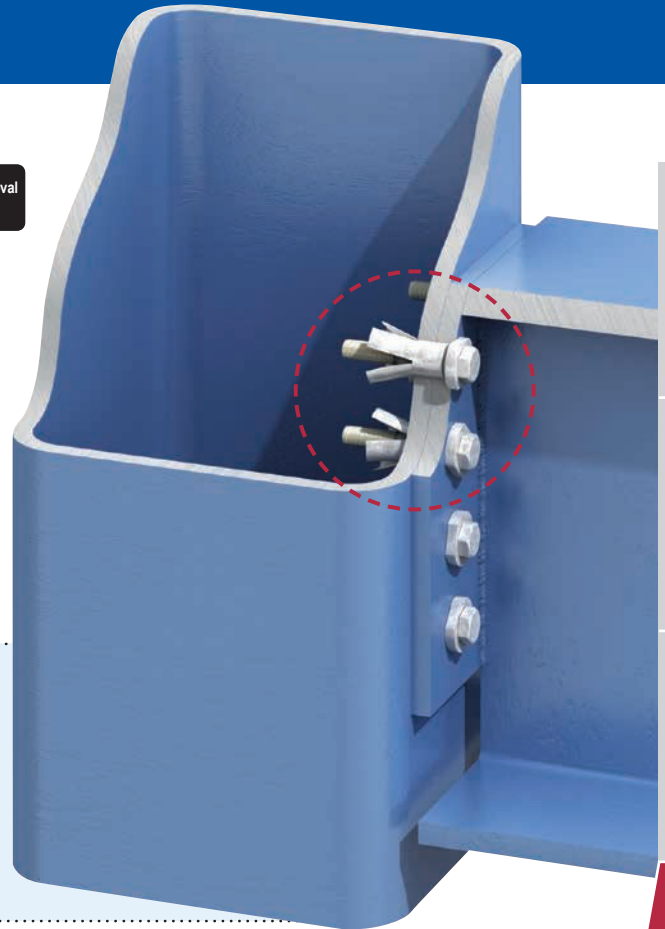


* Hexagonal head, HDG finish

Standard Hollo-Bolt
See page 40



Hollo-Bolt HCF (High Clamping Force)
See pages 40 and 41



GIRDER CLAMPS

RAIL FIXINGS

LIFTING POINTS

HOLLO-BOLT

FLOOR FIXINGS

SUPPORT FIXINGS

DECKING FIXINGS

- Fast, cost saving installation from one side.
- For square, rectangular and circular hollow sections.
- High resistance to shear and tension.
- Unique High Clamping Force design.
- A range of head types for architectural finishes.
- CE Mark, TÜV and ICC-ES Seismic approvals.
- Low temperature tested to -45°C (carbon steel variants).

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	M8	✓	✓	✓
	M10	✓	✓	✓
	M12	✓	✓	✓
	M16 High Clamping Force	✓	✓	-
	M20 High Clamping Force	✓	-	-
Corrosion Protection	Zinc Plated plus JS500	✓	✓	✓
	Hot Dip Galvanised	✓	-	-
	Sheraplex	✓	✓	✓
	Stainless Steel	✓	✓	✓



* Sizes M16 and M20, 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. Turn to **pages 40 and 41** to see the significance of clamping force and the superior performance of this unique product.

Holo-Bolt High Clamping Force

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

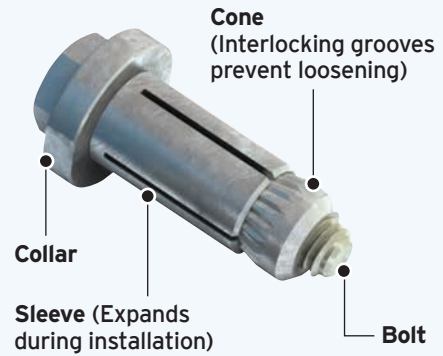
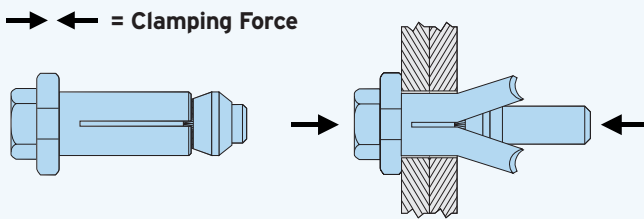
Sizes M8, M10 and M12

Standard Holo-Bolt

A typical connection is made by inserting the Holo-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 collar are visible.

→ ← = Clamping Force



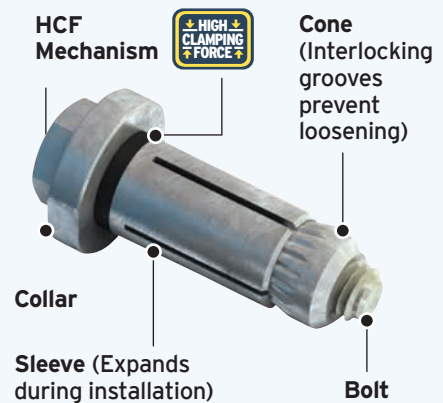
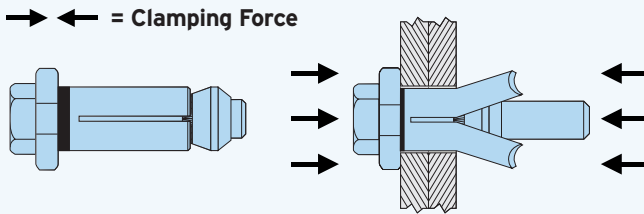
Sizes M16 and M20

Holo-Bolt HCF

By working closely with Structural Engineers and Steel Fabricators, Lindapter identified the need for the larger M16 and M20 Holo-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, optimised 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 steelwork, when compared to a product of the same size without the mechanism, thereby reducing displacement.

→ ← = Clamping Force



Watch the Holo-Bolt video at www.Lindapter.com to see how the HCF mechanism increases clamping force.

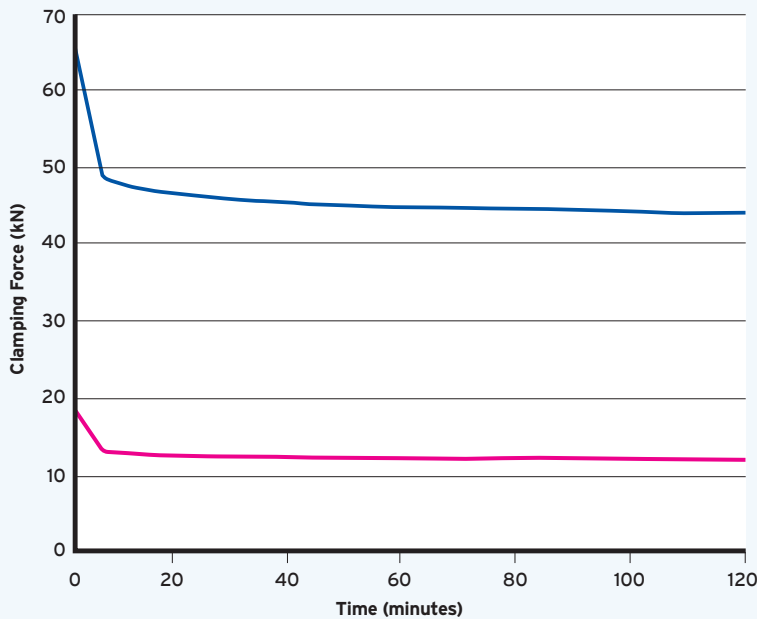


Hollo-Bolt Clamping Force

Hollo-Bolts are optimised for structural connections and the larger M16 and M20 sizes feature a High Clamping Force (HCF) mechanism. The graphs below compare the performance of a size M20 Hollo-Bolt HCF and an expansion bolt of the same size without the mechanism.

Clamping Force for Hollo-Bolt HCF (size M20)

Graph for illustration purposes only, see pages 42 and 43 for connection design.



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

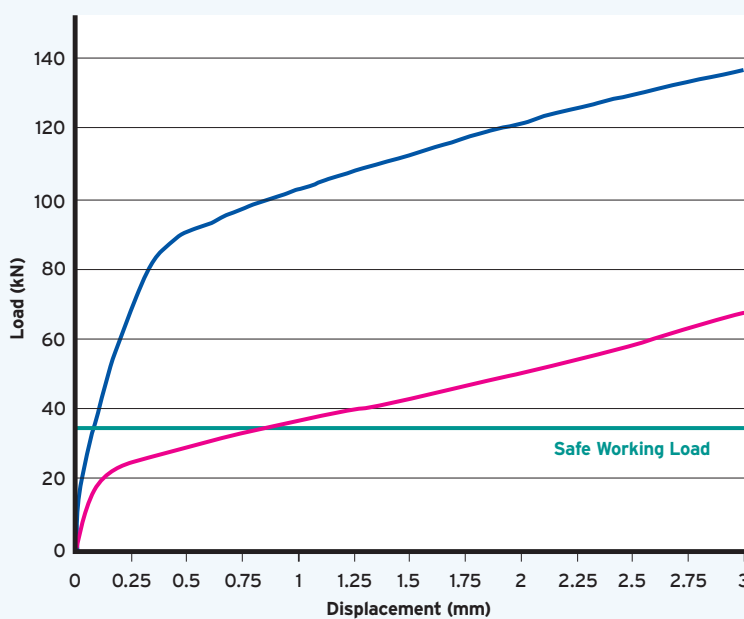
(Without Mechanism)
Hot Dip Galvanised, Size 2

Typical Performance Increase

As with any structural bolt, immediately after installation the bolt relaxes until a typical clamping force is reached. The 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.

Connection Load vs Ply Displacement for Hollo-Bolt HCF (size M20)

Graph for illustration purposes only, see pages 42 and 43 for connection design.



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

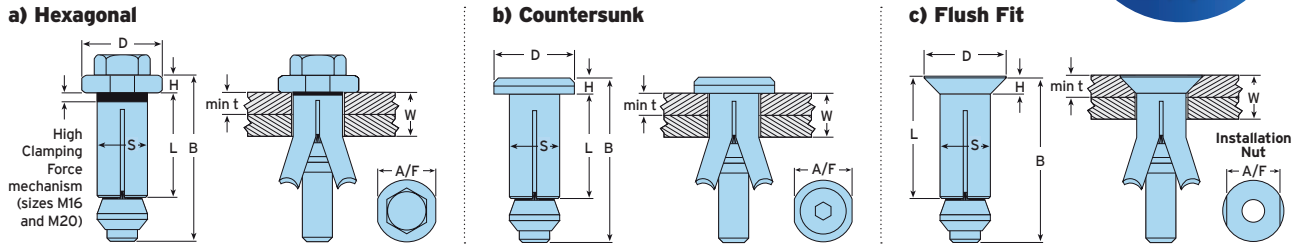
(Without Mechanism)
Hot Dip Galvanised, Size 2

Typical Performance Increase

This graph highlights the significance of increased clamping force. The blue curve demonstrates the superior performance of the Hollo-Bolt HCF in contrast to the same sized product without Lindapter's unique mechanism. At Safe Working Load, displacement (movement in the connection) is minimised when using the Hollo-Bolt HCF for a safer and more secure connection.

Hollo-Bolt Safe Working Loads

The Hollo-Bolt is featured in the BCSA and SCI design guide 'Joints in Steel Construction - Simple Connections', refer to this guide for designing primary structural connections. For connections to secondary steelwork, please refer to the tables below.



a) Hexagonal		b) Countersunk				Sleeve		Collar			Safe Working Loads (5:1 Factor of Safety)		
Product Code	Bolt Length B mm	Product Code	Bolt Length B mm	Clamping Thickness W mm	Outer Ply min t mm	Length L mm	Outer Ø S mm	Height H mm	Ø D mm	A/F mm	Tightening Torque Nm	Tensile kN	Single Shear kN
HB08-1	M8 x 50	HBCSK08-1	M8 x 50	3 - 22	-	30	13.75	5	22	19	23	4.0	5.0
HB08-2	M8 x 70	HBCSK08-2	M8 x 70	22 - 41	-	49	13.75	5	22	19	23	4.0	5.0
HB08-3	M8 x 90	HBCSK08-3	M8 x 90	41 - 60	-	68	13.75	5	22	19	23	4.0	5.0
HB10-1	M10 x 55	HBCSK10-1	M10 x 50	3 - 22	-	30	17.75	6	29	24	45	8.5	10.0
HB10-2	M10 x 70	HBCSK10-2	M10 x 70	22 - 41	-	48	17.75	6	29	24	45	8.5	10.0
HB10-3	M10 x 90	HBCSK10-3	M10 x 90	41 - 60	-	67	17.75	6	29	24	45	8.5	10.0
HB12-1	M12 x 60	HBCSK12-1	M12 x 55	3 - 25	-	35	19.75	7	32	30	80	10.5	15.0
HB12-2	M12 x 80	HBCSK12-2	M12 x 80	25 - 47	-	57	19.75	7	32	30	80	10.5	15.0
HB12-3	M12 x 100	HBCSK12-3	M12 x 100	47 - 69	-	79	19.75	7	32	30	80	10.5	15.0
HB16-1	M16 x 75	HBCSK16-1	M16 x 70	12 - 29	8	41.5	25.75	8	38	36	190	21.0	30.0
HB16-2	M16 x 100	HBCSK16-2	M16 x 100	29 - 50	8	63	25.75	8	38	36	190	21.0	30.0
HB16-3	M16 x 120	HBCSK16-3	M16 x 120	50 - 71	8	84	25.75	8	38	36	190	21.0	30.0
HB20-1	M20 x 90	-	-	12 - 34	8	50	32.75	10	51	46	300	35.0	40.0
HB20-2	M20 x 120	-	-	34 - 60	8	76	32.75	10	51	46	300	35.0	40.0
HB20-3	M20 x 150	-	-	60 - 86	8	102	32.75	10	51	46	300	35.0	40.0



Sizes M16 and M20, 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. Turn to pages 40 and 41 to see the significance of clamping force and the superior performance of this unique product.

c) Flush Fit				Sleeve		Collar			Safe Working Loads (5:1 Factor of Safety)		
Product Code	Countersunk Bolt B mm	Clamping Thickness W mm	Outer Ply min t mm	Length L mm	Outer Ø S mm	Height H mm	Ø D mm	Installation Nut A/F mm	Tightening Torque Nm	Tensile kN	Single Shear kN
HBFF08-1	M8 x 50	10 - 27	8	35	13.75	5	24	19	23	4.0	5.0
HBFF08-2	M8 x 70	27 - 45	8	54	13.75	5	24	19	23	4.0	5.0
HBFF08-3	M8 x 90	45 - 64	8	73	13.75	5	24	19	23	4.0	5.0
HBFF10-1	M10 x 50	12 - 27	10	36	17.75	6	30	24	45	8.5	10.0
HBFF10-2	M10 x 70	27 - 45	10	54	17.75	6	30	24	45	8.5	10.0
HBFF10-3	M10 x 90	45 - 64	10	73	17.75	6	30	24	45	8.5	10.0
HBFF12-1	M12 x 55	12 - 30	10	42	19.75	7	33	30	80	10.5	15.0
HBFF12-2	M12 x 80	30 - 52	10	64	19.75	7	33	30	80	10.5	15.0
HBFF12-3	M12 x 100	52 - 74	10	86	19.75	7	33	30	80	10.5	15.0

Hollo-Bolts can be used on a wide variety of steel hollow shape sections. Safe working loads shown are based on use in S275 structural hollow section 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.

Published by the SCI/BCSA Connections Group, 'Joints in Steel Construction - Simple Connections' provides design guidance for using Hollo-Bolt and structural steelwork connections in buildings designed using the 'Simple Method' i.e. braced frames where connections carry mainly shear and axial loads only. For more information please contact The Steel Construction Institute on +44 (0) 1344 636525 or visit www.steel-sci.com



Hollo-Bolt Characteristic Resistances

The values listed in the tables below are to be used when designing bolted connection to Eurocode 3 only, they are **not** standard safe working loads. The Declaration of Performance (DoP No.001) can be viewed on the website: www.Lindapter.com



Hollo-Bolt Hexagonal

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HB08	M8	23.1	32.9	430
HB10	M10	39.6	54.2	430
HB12	M12	45.8	71.0	430
HB16	M16	84.3	139.0	430
HB20	M20	124.0	211.0	390

Hollo-Bolt Hexagonal Stainless Steel

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HBST08	M8	26.8	30.7	500
HBST10	M10	46.0	51.0	500
HBST12	M12	53.3	65.0	500
HBST16	M16	98.0	128.0	500
HBST20	M20	154.0	205.0	500

Hollo-Bolt Countersunk

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HBCSK08	M8	23.1	32.9	430
HBCSK10	M10	39.6	54.2	430
HBCSK12	M12	45.8	71.0	430
HBCSK16	M16	84.3	139.0	430

Hollo-Bolt Countersunk Stainless Steel

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HBSTCSK08	M8	26.8	30.7	500
HBSTCSK10	M10	46.0	51.0	500
HBSTCSK12	M12	53.3	65.0	500
HBSTCSK16	M16	98.0	128.0	500



Sizes M16 and M20, 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. Turn to **pages 40 and 41** to see the significance of clamping force and the superior performance of this unique product.

Hollo-Bolt Flush Fit

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HBFF08	M8	23.1	32.9	430
HBFF10	M10	39.6	54.2	430
HBFF12	M12	45.8	71.0	430

Hollo-Bolt Flush Fit Stainless Steel

Product Code	Nominal Size	Tensile	Shear	Sleeve
		F _{t,Rk}	F _{v,Rk}	Material Strength
		kN	kN	N/mm ²
HBSTFF08	M8	26.8	30.7	500
HBSTFF10	M10	46.0	51.0	500
HBSTFF12	M12	53.3	65.0	500

- Hollo-Bolt lengths 1, 2 and 3 are covered by ETA 20/0917. The characteristic values are used to determine the design resistance of the Hollo-Bolt. The design resistance is calculated by dividing the characteristic value by a partial factor γ_{M2} . The partial factor is a nationally determined parameter (eg: $\gamma_{M2} = 1.25$ in UK).
- For Hollo-Bolt safe working loads with a Factor of Safety of 5:1 please refer to the tables on page 42 of this catalogue. The characteristic values are valid for the assembly itself, in any connection detail the design resistance of the connection may be limited to a lesser value. For example, when the thickness of the connected component is small, pull out failure may occur before failure of the Hollo-Bolt. Design checks should be carried out to determine the static design resistance.

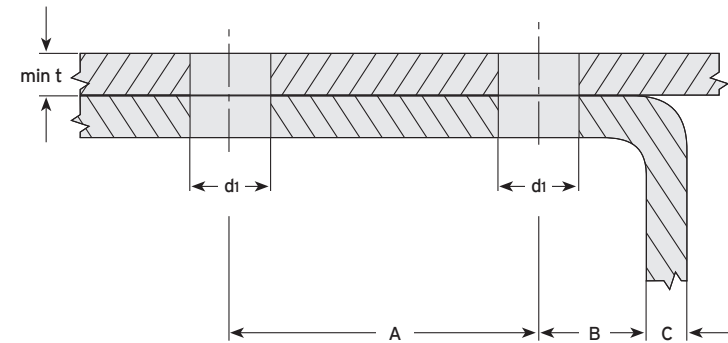
The SCI Greenbook publication 'Joints in Steel Construction: Simple Joints to Eurocode 3' contains a number of checks on the section. The characteristic values are only valid when the Hollo-Bolts are installed as per Lindapter's installation instructions. For more information please contact The Steel Construction Institute on +44 (0) 1344 636525 or visit www.steel-sci.com



Hollo-Bolt Hexagonal and Countersunk - Drilling 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.

Preparation for installing Hollo-Bolt Hexagonal and Countersunk



Type		Outer Ply min t mm	Clearance Hole \varnothing^* d1 mm	Hole Distances		Edge Distances B + C mm
Hexagonal	Countersunk			min A mm	min B mm	
HB08	HBCSK08	-	14 (+1.0/-0.2)	35	13	> 17.5
HB10	HBCSK10	-	18 (+1.0/-0.2)	40	15	> 22.5
HB12	HBCSK12	-	20 (+1.0/-0.2)	50	18	> 25.0
HB16	HBCSK16	8	26 (+2.0/-0.2)	55	20	> 32.5
HB20	-	8	33 (+2.0/-0.2)	70	25	> 33.0

* For Hollo-Bolts with Hot Dip Galvanised Finish, drilling the clearance hole to the top tolerance is recommended.

➔ Sizes M16 and M20 require outer ply thickness (min t) to be at least 8mm.

Tool sizes for installing Hollo-Bolt Hexagonal

Hollo-Bolt Hexagonal			
Product Code	Spanner	Socket	Tightening Torque Nm
	mm	mm	
HB08	19	13	23
HB10	24	17	45
HB12	30	19	80
HB16	36	24	190
HB20	46	30	300

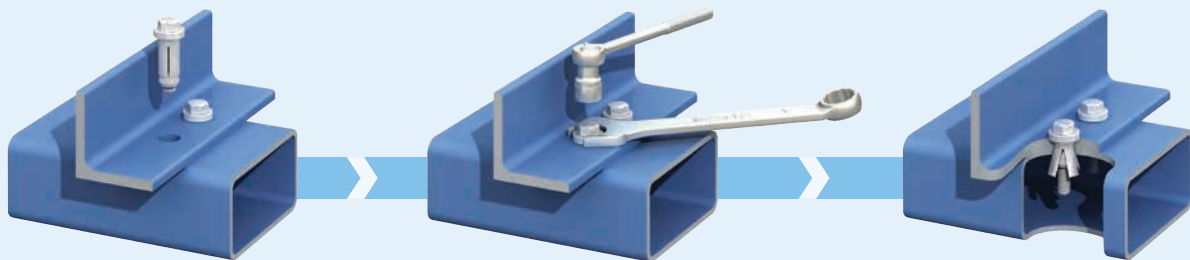
Tool sizes for installing Hollo-Bolt Countersunk

Hollo-Bolt Countersunk			
Product Code	Spanner	Hexagon Key	Tightening Torque Nm
	mm	mm	
HBCSK08	19	5	23
HBCSK10	24	6	45
HBCSK12	30	8	80
HBCSK16	36	10	190

How to install...

▶ Watch the Hollo-Bolt installation video at www.Lindapter.com

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



Notes:

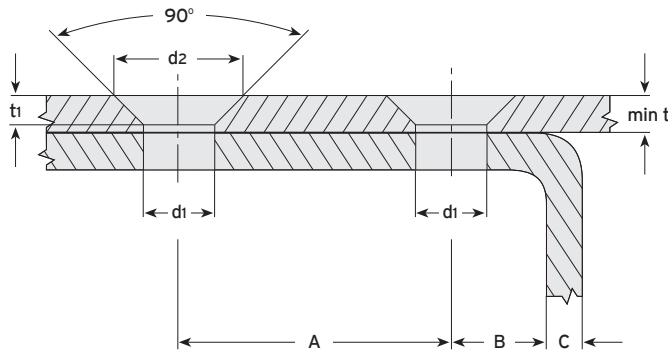
- a) Before tightening, ensure that the materials that are to be connected together are touching. See page 42 for tightening torque.
- b) Power tools, such as an impact wrench, may be used to speed up the tightening of the Hollo-Bolt. However, when using power tools, always complete the tightening process with a calibrated torque wrench to ensure the correct torque is applied to the Hollo-Bolt.

GIRDER CLAMPS
 RAIL FIXINGS
 LIFTING POINTS
 HOLLO-BOLT
 FLOOR FIXINGS
 SUPPORT FIXINGS
 DECKING FIXINGS

Hollo-Bolt Flush Fit - Drilling 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.

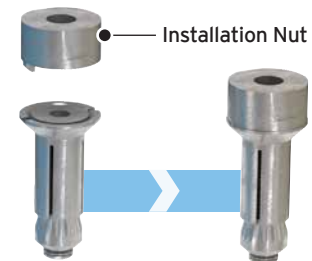
Preparation for installing Hollo-Bolt Flush Fit



Type	Outer Ply min t mm	Clearance Hole Ø d1 mm	Countersunk		Hole Distances		Edge Distances B + C mm
			d2 mm	t1 mm	min A mm	min B mm	
HBFF08	8	14 (+1.0/-0.2)	27	6.5	35	13	> 17.5
HBFF10	10	18 (+1.0/-0.2)	31	6.5	40	15	> 22.5
HBFF12	10	20 (+1.0/-0.2)	35	7.5	50	18	> 25.0

Tool sizes for installing Hollo-Bolt Flush Fit

Hollo-Bolt Flush Fit			
Product Code	Spanner mm	Hexagon Key mm	Tightening Torque Nm
HBFF08	19	5	23
HBFF10	24	6	45
HBFF12	30	8	80



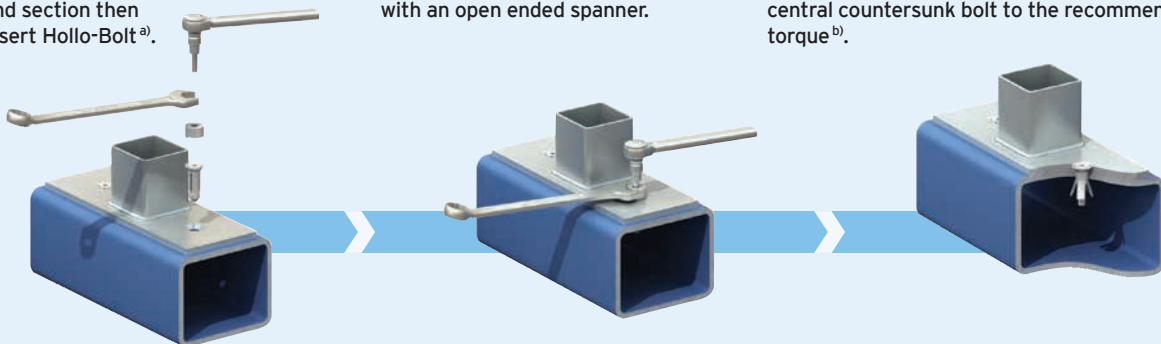
How to install...

▶ Watch the Hollo-Bolt installation video at www.Lindapter.com

1) Align pre-drilled fixture and section then insert Hollo-Bolt^{a)}.

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

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 42 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.