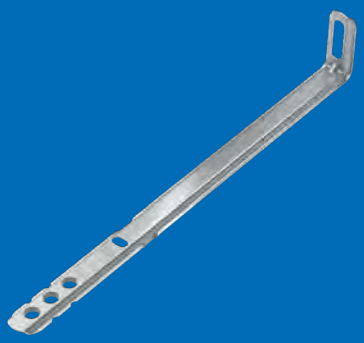
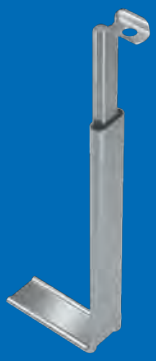
Keyfix®

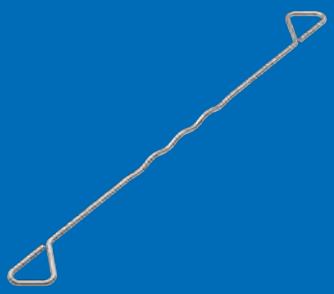
Wall Ties and Fixings

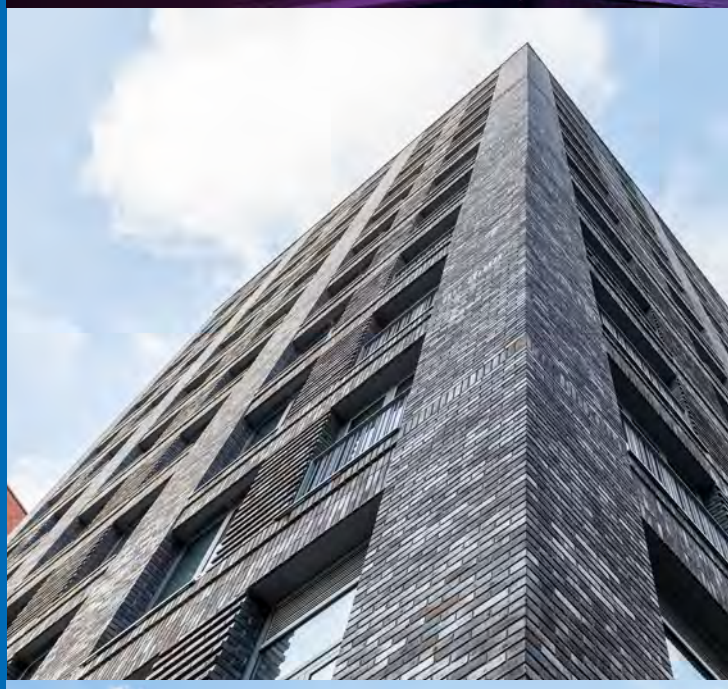
keyfix.com

Smart Solutions, Stronger Structures









Contents

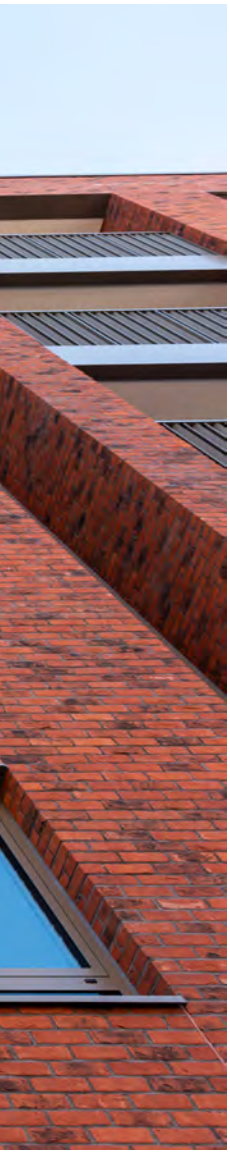
Innovating Safer, Stronger, and Smarter Masonry Construction

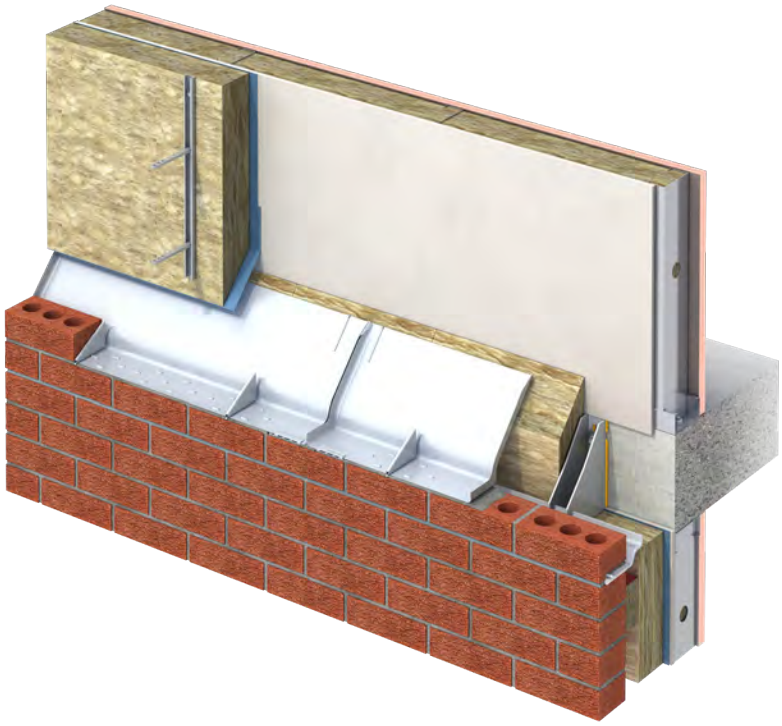
Part of the Keystone Group

Keyfix, part of the Keystone Group of companies, specialises in the development of non-combustible masonry accessories, providing the complete solution for external masonry facades in high rise buildings.

Keyfix has manufactured a range of stainless steel Wall Ties and Fixings which conform to a variety of Tie Types and comply with all relevant industry standards which help future-proof the stability of your project.

Keyfix is renowned for innovation, technically superior solutions and surpassing client expectations with our full customer service package. Our Technical team provide our clients with support from start to finish and are there to act as an extension of your team. From attending CPD's, design meetings to tool box talks on site, our Technical team cover it all.





Innovation


never sleeps

Standards and Definitions

Keyfix Wall Ties and Fixings range conform to the relevant standards:

PD 6697:2019 - Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2.

Classifies Masonry - Masonry Ties as Types 1-4 and includes recommendations for the relevant Tie length, embedment, density, positioning and material to meet the requirements of each Tie type.

BS EN 845-1:2013+A1:2016 – Specification for ancillary components for masonry.

Harmonised British and European standard specifying requirements for Wall Ties and the method of testing and determination of compressive and tensile loads (BS EN 846-5:2012 and BS EN 846-6:2012) and shear load (BS EN 846-7:2012). Applicable to UK and Ireland.

Eurocode 6 - Design of masonry structures (EN 1996-1-1:2005).

Refers to BS EN 845-1:2013+A1:2016 for Wall Ties and states a partial factor for a material property (γ_M) of 3 to be applied in Wall Tie calculations. i.e. Wall Tie Design Load Capacity is determined by applying a material factor of 3 to Ultimate or Manufacturers Declared Load Capacity.

- Ultimate Load Capacity
  Maximum load that each component can withstand before failure.

- Manufacturer's Declared Load Capacity
  Maximum load capacity specified by the manufacturer that a component can safely support during normal use. These loads are declared with the purpose of providing guidance for safe usage and preventing overloading components during design stage.

Design Load Capacity
Component load capacity that should be considered when designing structures. Design Load Capacity is determined by applying a partial factor for a material property (γ_M) of 3 to Ultimate or Manufacturer's Declared Load Capacity. This standard factor allows for discrepancies in the material, manufacturing process and workmanship in case of an exceptional event.

DD 140-2:1987 Part 2: Recommendation for design of Wall Ties.

Classifies Wall Ties as Types 1-6 and includes information regarding their design and application. Information for Types 1-4 and Types 5-6 carried forward to PD 6697:2019 and BS 5268-6.1:1996, respectively.

Approved Document B: Fire Safety.

Outlines the fire classification requirements of materials which become part of an external wall.

BS 5268-6.1:1996 - Structural use of timber.

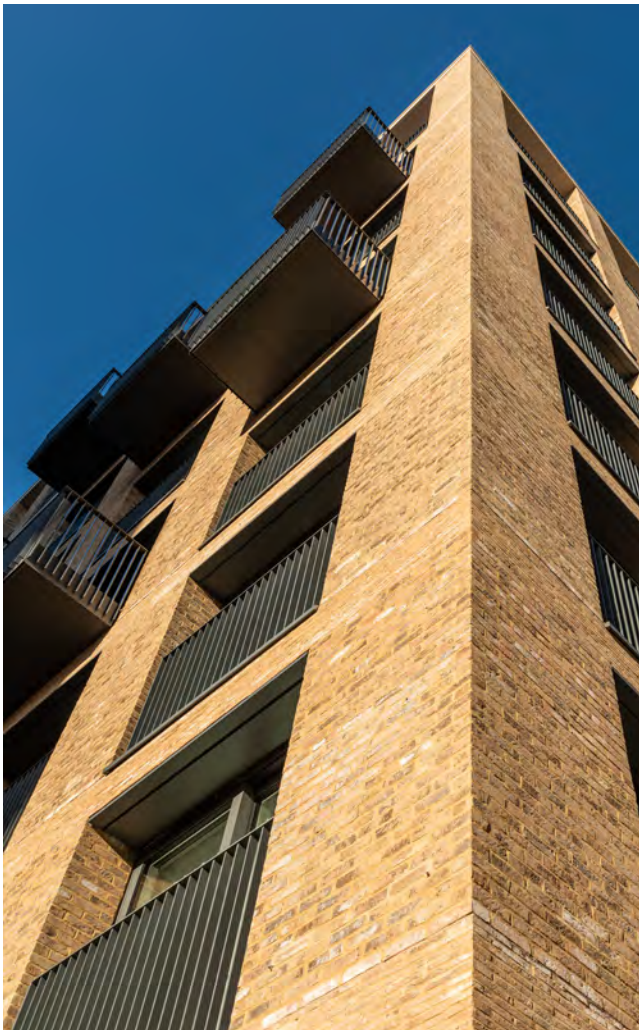
Classifies Timber Frame Ties as Types 5-7 and includes recommendations for the relevant Tie length, embedment, density, positioning and material to meet the requirements of each Tie type.

BS 5628-1:1992 - Code of practice for use of masonry.

Provides recommendations for the length, embedment, density and positioning of Wall Ties. However, the information in this standard has been reproduced in PD 6697:2019. Provides the same partial factor for a material property (γ_M) of 3 as stated in Eurocode 6.

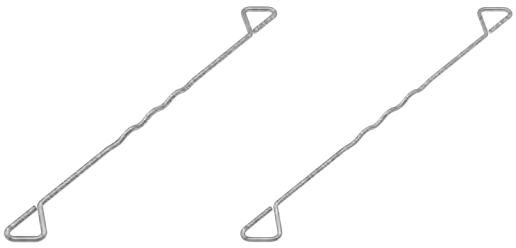
Wind Speed Information

Masonry Wall Ties should be selected from PD 6697:2019, based on wind speed information from BS EN 1991-1-4:2005 and Timber Frame Ties from BS 5268-6, based on BS 6399-2:1997.



Keyfix Wall Ties and Fixings Range

Masonry - Masonry Type 1 Wall Tie



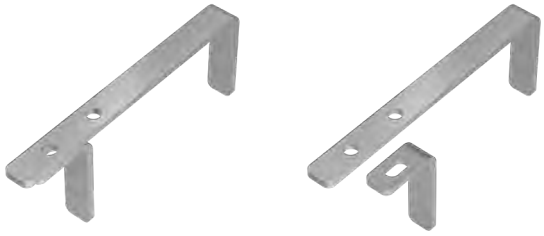
Masonry - Masonry Type 2 and Type 4 Wall Tie

25/14 Channel Restraint System

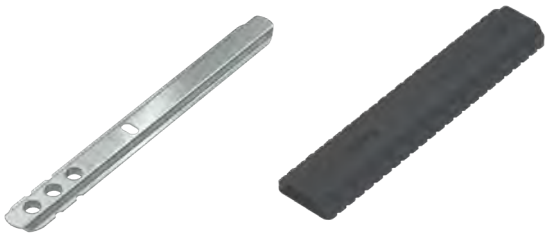
Frame Cramp

Timber Frame Wall Tie

Internal Head Restraint

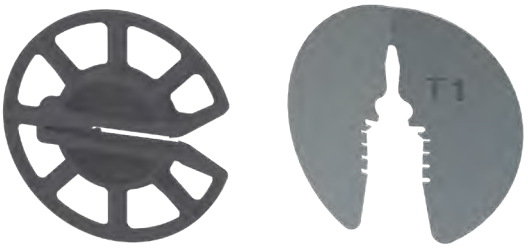


External Head Restraint



Movement Tie and Debonding Sleeve

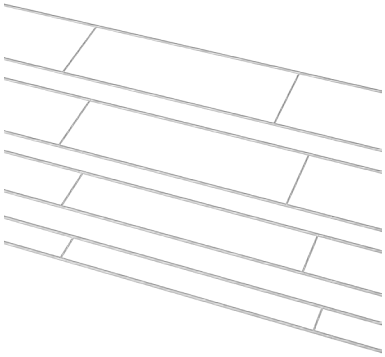
Frame Cramp Movement Tie



Insulation Retaining Discs

Reveal Support Plate

Wall Starter Kit



Bed Joint Reinforcement

Product Selector

Outer

E - Embedment

F - Embedment End with Free Dowel

W - Embedment End with Welded Dowel

P - Plain

U - Plain Upstand

A - Sliding Anchor Slot

Central

D - Drip

P - Plain

T - Half Twist

A - Sliding Anchor Slot

Inner

H - Upstand with 8mm Round Hole

L - Upstand with 30x8mm Slotted Hole

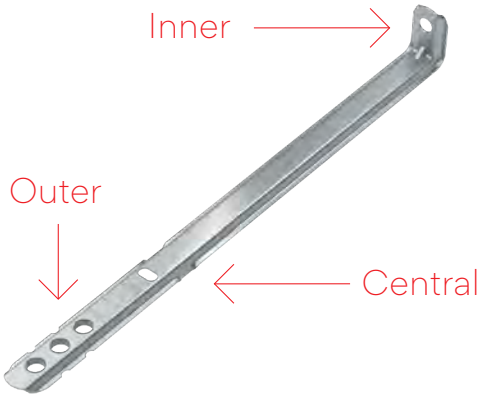
C25 - To suit 25/14 Channel

A - Sliding Anchor Slot

Specification Example

Product Code: EDH-250

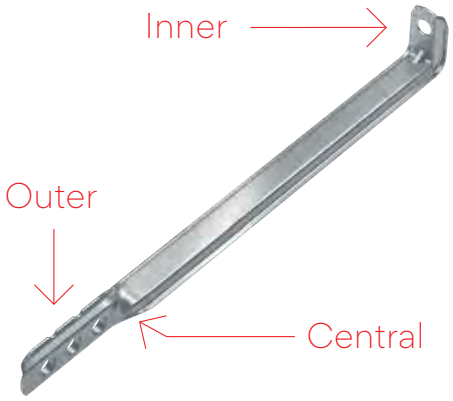
Outer "E" - Embedment
Central "D" - Drip
Inner "H" - Upstand with 8mm Round Hole
Length "250" - 250mm long tie to suit 176-200mm cavity



Bespoke Ties can be specified for use in unique applications using the Product Selector references for Outer, Central and Inner sections of the Tie. For other variations of these contact Keyfix Technical team.

Bespoke Product Code: ETH-250

Outer "E" - Embedment
Central "T" - Half Twist
Inner "H" - Upstand with 8mm Round Hole
Length "250" - 250mm long tie to suit 176-200mm cavity

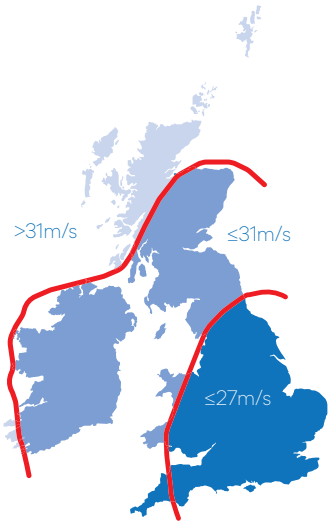


Classification of Wall Ties

Masonry - Masonry Wall Tie Types 1-4 to PD 6697:2019 (Tables 10 & 12)
Masonry - Timber Tie Types 5-6 to DD 140: Part 2:1987 (Tables 1 & 4) and BS 5268-6.1:1996

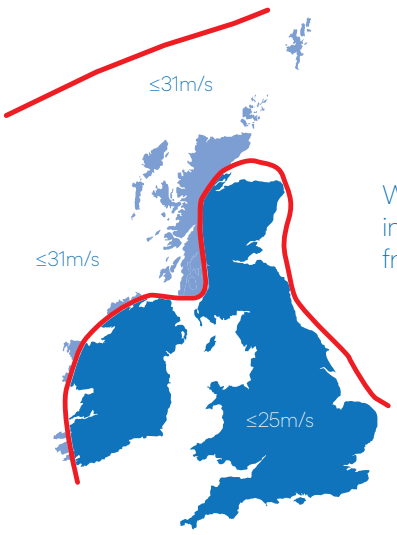
Tie Type	Minimum Mortar Class and Designation	Tensile Load Capacity (N)	Compressive Load Capacity (N)	Building Type	Tie density /m²	Max Building Height (m)	Geographical Location
Type 1 Masonry: Heavy duty	M12 (i)	5000	4000	Most masonry cavity and cladding walls and most building sizes and types. Not to be specified where large adjustments are likely to be needed during construction, where large differential movements are expected between leaves.	2.5	Any Height	Suitable for most site locations. However, for relatively tall buildings in the north western fringes of UK - particularly on coastal sites and buildings of unusual shapes - Tie provision should be calculated and increased Tie density recommended.
	M2 (iv)	2500	2000				
Type 2 Masonry: General purpose	M2 (iv)	1800	1050	Domestic dwellings and small commercial buildings up to three storeys (15m) above ground level, comprising two leaves 90 to 150mm thick each.	2.5	15	Suitable for buildings on flat open sites, basic wind velocity is up to 31 m/s, except where site altitude is 150m or more above sea level.
Type 3 Masonry: Basic	M2 (iv)	1100	650	As Type 2.	2.5	15	As Type 2, but basic wind velocity is limited to 27 m/s.
Type 4 Masonry: Light duty	M2 (iv)	650	350	Domestic dwellings up to 10m, comprising two leaves 90 to 150mm thick each.	2.5	10	Suitable for flat open sites within towns and cities in the UK except north western fringes of Scotland and Ireland (where wind speed exceeds 27 m/s) and any site altitude of 150m or more.
Type 5 Timber Frame	M4 (iii)	600	425	Tying masonry outer cladding to softwood structural framework of domestic dwellings and commercial buildings up to two storeys and not greater than 15m.	4.4	15	Suitable for buildings in towns or cities where basic wind velocity does not exceed 25 m/s, except where site altitude is 150m or more above sea level.
Type 6 Timber Frame: High movement	M4 (iii)	630	440	As Type 5, but suitable for three storey buildings designed to accommodate increased shrinkage levels of a building not greater than 15m in height.* *BS 5268-6.1:1996 specifies Type 6 to be used for up to four storey buildings.	4.4	15	As Type 5.

Wind Zones Masonry to Masonry



Wind speeds information taken from BS EN 1991-1-4:2005

Wind Zones Masonry to Timber



Wind speeds information taken from BS 6399-2:1997

Wall Tie Density and Positioning

In accordance with PD 6697:2019 and BS 5628-1:1992, Tie density should not be less than 2.5 ties/m² (where both leaves are 90mm or thicker) resulting in 900mm horizontal x 450mm vertical centres to be used. This spacing may be varied when required by the Building Regulations. Wall Ties should be evenly distributed and staggered across the area of the wall with the exception of openings.

For Channel Tie applications fixed to steelwork, due to typical steel framing section (SFS) horizontal centres being 600mm, this defines horizontal centres of Channel. Therefore, Ties need to be installed at 600mm horizontal centres also, increasing Tie density in such instances to 3.7 Ties / m². Wall Ties should be evenly distributed and staggered across the area of the wall with the exception of openings.

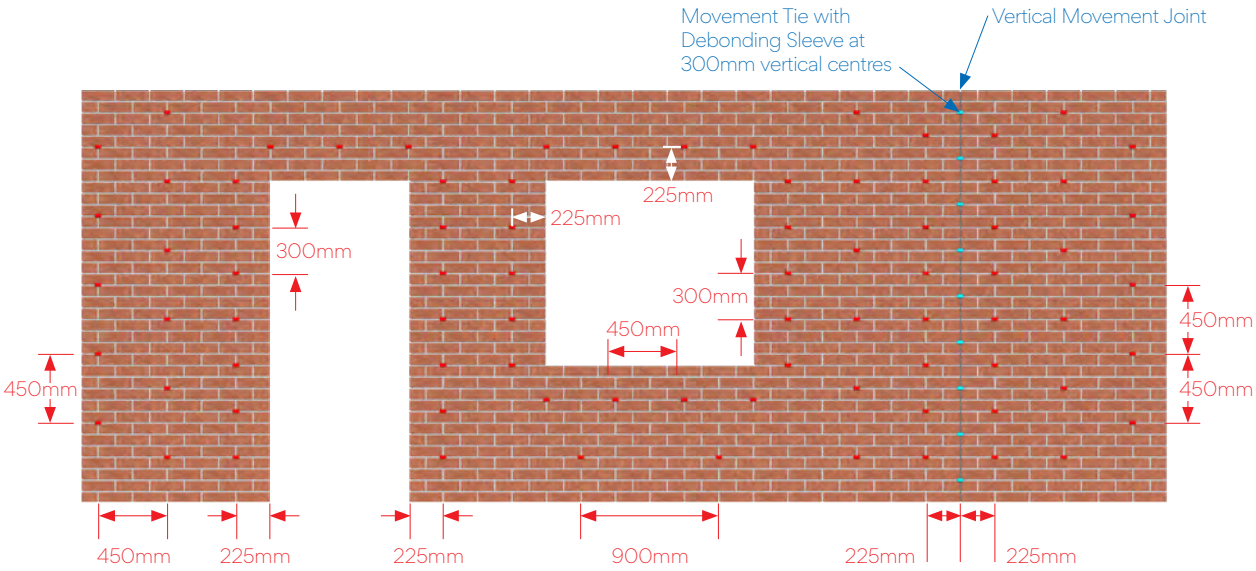
Areas of wall that are most susceptible to effects of wind load is masonry next to unbonded edges, such as vertical movement joints, and around openings. In these vulnerable areas, additional Ties should be used at 300mm vertical centres and no more than 225mm from the edge. In accordance with PD 6697:2019; across the top and bottom of openings, Ties should be positioned 225mm from an edge and at no more than 450mm horizontal centres.

Where vertical movement joints are used, good practice dictates Movement Ties should be spaced at maximum 300mm vertical centres, inline with warranty provider guidance. Additional cavity Ties should be spaced no more than 225mm from the edge of the movement joint and at no more than 300mm vertical centres.

Internal Head Restraints are installed at the top of the blockwork and spaced at 450 - 900mm horizontal centres, depending on the load requirements.

Wall Ties used in timber frame building types, should be installed at 4.4 Ties/m² (600mm horizontal centres and 375mm vertical centres).

Example of the Tie Positioning required in accordance with PD 6697:2019 and BS 5628-1:1992



Tie Density and Spacing Calculations

Symbols Explained

W_t = Load Requirements per Tie (N)
D_t = Tie density Requirement (per sq. m)
W = Design Load per square metre (N/m^2)
T_c = Tie Ultimate Load Capacity (N)
N_t = Number of Ties (per sq. m)
h = Horizontal Spacing of Ties (mm)
v = Vertical Spacing of Ties (mm)

Step 1

Calculating density of Wall Ties required to meet specified load requirement.

Example shown uses:

- Type 1 compressive load capacity of 2000N as stated within PD 6697:2019, and shown in Classification of Wall Ties table on page 14
- Minimum Tie density per sq. metre required in 25/14 Channel Restraint System (3.7 ties / m^2 as stated in page 15)
- Example shown omits Safety Factor in calculations

$W_t = 2000\ N \quad D_t = 3.7\ Ties / m^2$

$W = W_t \times D_t$

$W = 2000 \times 3.7 = 7400\ N / m^2$

$T_c = 1580\ N$

$$N_t \geq \frac{W}{T_c}$$

$$N_t \geq \frac{7400}{1580} = 4.7\ Ties / m^2$$

Step 2

Calculating the vertical spacing required using 600mm horizontal spacing of SFS

$D_t = 4.7\ Ties / m^2 \qquad h = 600mm$

$$N_t = \left(\frac{1000}{v}\right) \times \left(\frac{1000}{h}\right)$$

$$v = \left(\frac{1000}{N_t}\right) \times \left(\frac{1000}{h}\right)$$

$$v = \left(\frac{1000}{4.7}\right) \times \left(\frac{1000}{600}\right)$$

$v = 355mm$

$v = 300mm^*$

*Vertical Tie centres reduced to suit 75mm height of brickwork within Stretcher Bond pattern

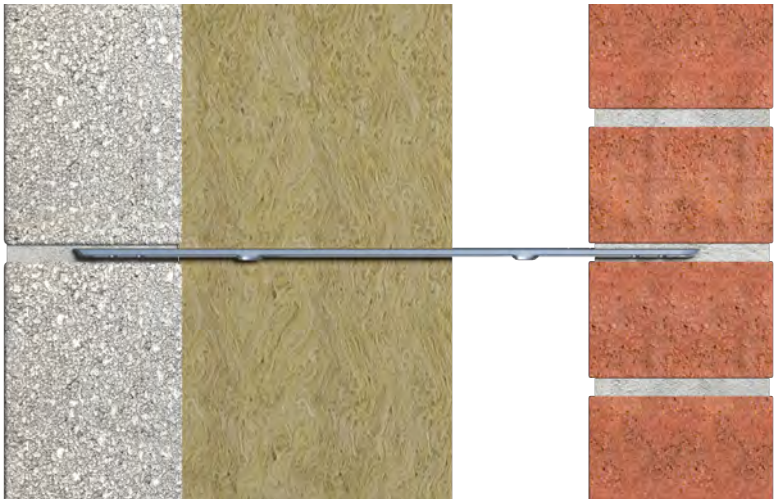
Installation Guidance

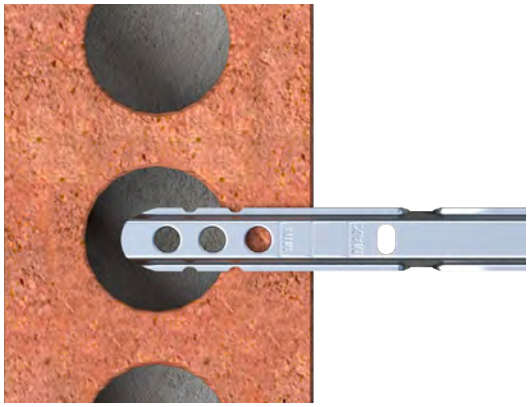
Tie Embedment

PD 6697:2019 states the minimum embedment of a Wall Tie in the mortar joint should not be less than 50mm in each leaf, also that the lengths of Wall Ties should be sufficient to give minimum embedment having regard to normal site tolerances for cavity width and centring of Tie.

To accommodate these site tolerances Keyfix recommend using the following embedment:

Tie Type	Recommended Design Embedment (mm)	Minimum Embedment (mm)	Maximum Embedment (mm)
Masonry - Masonry	62.5	50	75
Frame Cramp	65	50	75
Channel	65	50	75





Embedment Markings

Keyfix Wall Ties with Detail E Embedment End features embedment markings to assist with the installation of the Tie. This ensures that the recommended embedment is achieved.

To achieve the recommended embedment in mortar, Keyfix recommend using the Wall Tie lengths specified below. It is important to note that different Tie lengths are required depending on the type of Tie to be installed.

Recommended lengths of Masonry - Masonry Wall Ties	
Cavity Width (mm)	Wall Tie Length (mm)
≤25	150
26-50	175
51-75	200
76-100	225
101-125	250
126-150	275
151-175	300
176-200	325
201-225	350
226-250	375
251-275	400
276-300	425
301-325	450
326-350	475
351-375	500
376-400	525
401-425	550

Recommended lengths of Frame Cramp Ties	
Cavity Width (mm)	Wall Tie Length (mm)
≤25	75
26-50	100
51-75	125
76-100	150
101-125	175
126-150	200
151-175	225
176-200	250
201-225	275
226-250	300
251-275	325
276-300	350
301-325	375
326-350	400
351-375	425
376-400	450

Recommended lengths of 25/14 Channel Ties to be used with Keyfix 25/14 Channel Restraint System	
Clear Cavity Width (mm)	Keyfix 25/14 Channel Tie
35-59	EDC25-100
60-84	EDC25-125
85-109	EDC25-150
110-134	EDC25-175
135-159	EDC25-200
160-184	EDC25-225
185-209	EDC25-250
210-234	EDC25-275
235-259	EDC25-300

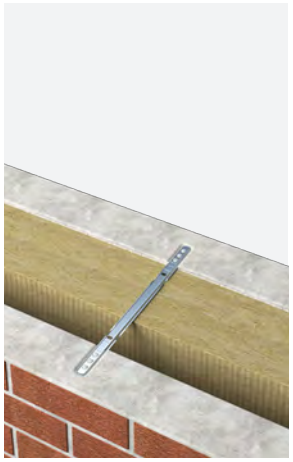
Tie Installation into Mortar

Wall Ties serve an important role in the construction industry, failure to install them correctly can negatively impact their performance and may lead to moisture ingress, cracking or collapsing of the wall itself.

Correct installation ensures that the Wall Ties can withstand the tensile and compressive loads required and allow the masonry to expand and contract without moisture passing across the cavity.

01

Apply the mortar to the masonry course where Wall Tie is to be installed. Wall Tie should be selected to ensure recommended embedment is achieved in masonry leaf.

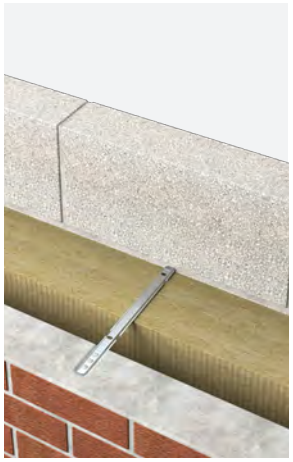


02

Firmly press the Wall Tie into the mortar, ensuring each Wall Tie is surrounded by fresh mortar and not just placed on the masonry, doing so would impede the Wall Ties pull-out performance. Wall Ties should be installed in correct orientation such that drip on each tie is pointing down.

03

Continue building the masonry above the installed Wall Tie. It is important to ensure that the Wall Tie is installed at the recommended embedment. Wall Ties within Keyfix range have embedment markings to assist the installer and help reduce the risk of invalidating Tie performance due to incorrect Tie embedment.



04

Cavity walls should be coursed so that the Wall Tie is installed level or sloped downwards toward the outer leaf. This encourages moisture to move away from the inner leaf and to help prevent moisture ingress.

Keyfix Recommendations:

- Wall Ties should be periodically cleaned during installation to help ensure Ties are clear of mortar droppings to prevent risk of moisture ingress.
- Wall Ties should not be bent or manipulated during installation. This is particular to light duty Wall Ties for domestic building types. Manipulating Wall Ties by bending can adversely affect function and performance.
- While each Wall Tie is manufactured with safety ends, there is still a potential risk of injury if Wall Ties are left protruding from internal leaf of masonry. To help eliminate risk, it is recommended that both leaves of cavity wall are built together.
- Wall Ties should be installed at the required horizontal and vertical spacing to suit the design load of the wall and Tie capacity.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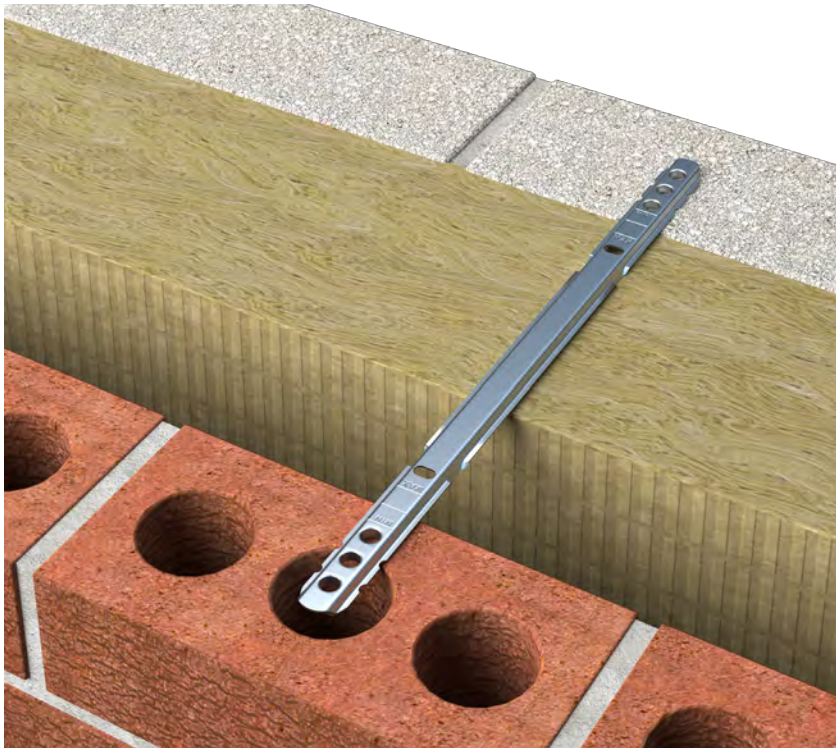
Masonry – Masonry

Keyfix KT1 Masonry - Masonry Wall Ties

Keyfix KT1 Masonry - Masonry Wall Tie range is designed to restrain two leaves of a cavity wall up to a maximum overall cavity width of 425mm and can be classified as a Type 1 Wall Tie in accordance with PD 6697:2019. KT1 is suitable for all building heights and can be used in most geographical locations within the UK and Ireland. However, in the north western fringes of the UK where higher wind speeds are to be expected (see page 14) - particularly on coastal sites and buildings of unusual shapes - Tie provision should be calculated.

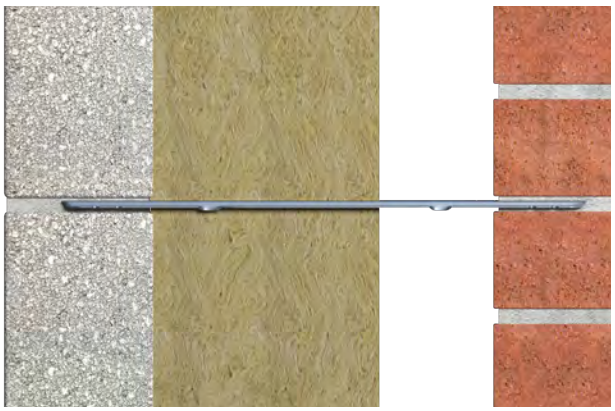


Key Features

- Type 1 Wall Tie in accordance with PD 6697:2019 in M2 mortar
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum cavity width of 425mm
- Embedment markings to aid installation
- Integral Drip feature

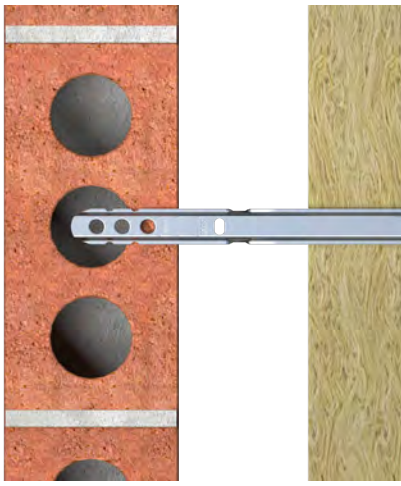
Drip Feature

The KT1 Wall Tie range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. The symmetrical design of this feature ensures that the Drip will function as intended regardless of which end of KT1 has been installed in the external leaf.



Embedment Markings

The KT1 Wall Tie range features embedment markings on both ends of the Tie to assist with the installation of the Tie and to ensure that the minimum embedment is achieved.



Test Results

The KT1 Wall Tie range exceeds the performance criteria for a Type 1 Wall Tie in accordance with PD 6697:2019 in M2 mortar. A Type 1 performance is achieved using a minimum Tie density of 2.5 Ties/m² (900mm horizontal c/c x 450mm vertical c/c).

KT1 Wall Tie range is independently tested within Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-5:2012. (Notified Body Number 1289).

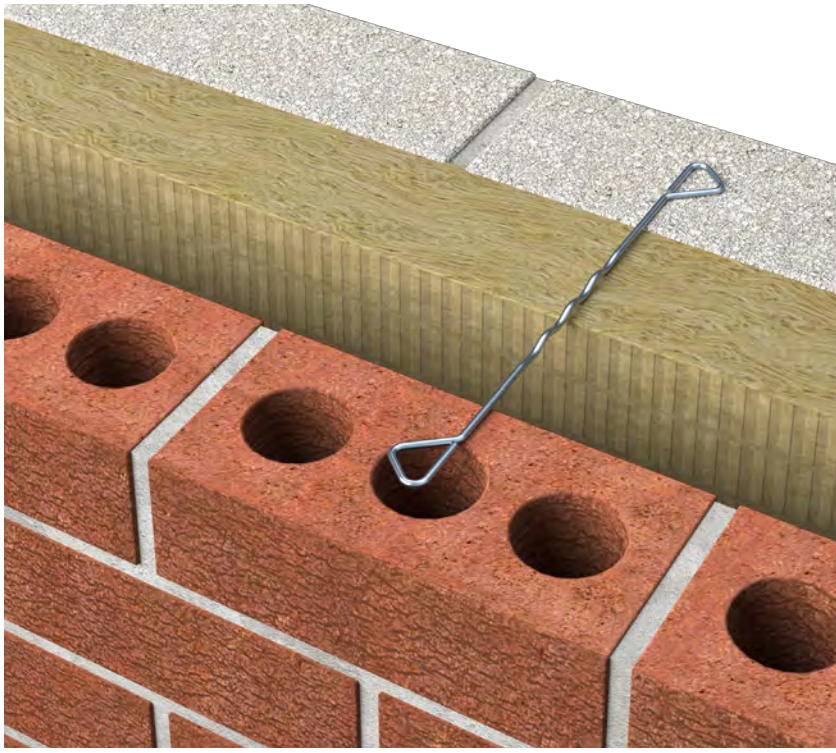
Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
KT1-150	≤25	150-275	Tension Compression	3090 3780	1030 1260
KT1-175	26-50				
KT1-200	51-75				
KT1-225	76-100				
KT1-250	101-125				
KT1-275	126-150				
KT1-300	151-175	300-350	Tension Compression	3090 3560	1030 1186
KT1-325	176-200				
KT1-350	201-225				
KT1-375	226-250	375-450	Tension Compression	3090 2610	1030 870
KT1-400	251-275				
KT1-425	276-300				
KT1-450	301-325				
KT1-475	326-350	475-550	Tension Compression	3090 2430	1030 810
KT1-500	351-375				
KT1-525	376-400				
KT1-550	401-425				

Keyfix Recommendations:

Ensure each Tie is fully embedded and surrounded with mortar. Insufficient Tie embedment and lack of mortar surrounding the Tie can affect performance.

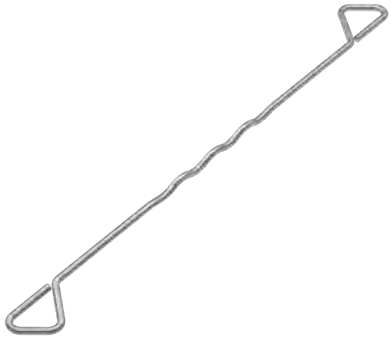
Keyfix KT2 Masonry - Masonry Wire Wall Ties

Keyfix KT2 Masonry - Masonry Wire Wall Tie range is designed to restrain two leaves of a cavity wall up to a maximum overall cavity width of 175mm and can be classified as a Type 2 general purpose Wall Tie in accordance with PD 6697:2019. KT2 Wire Wall Tie range is suitable for domestic houses and buildings up to a maximum height of 15m and where the basic wind velocity is less than 31m/s (see page 14).



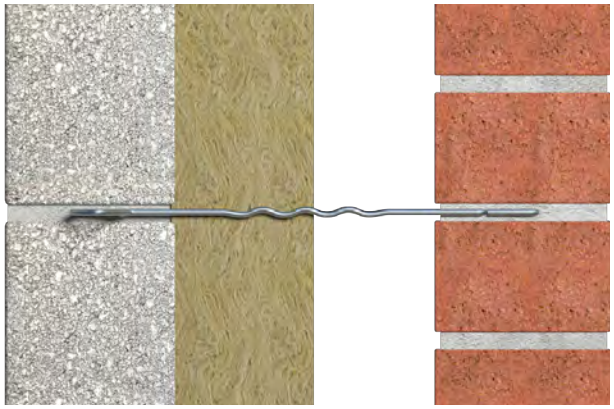
Key Features

- Type 2 Wall Tie in accordance with PD 6697:2019 in M2 mortar
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum cavity width of 175mm
- Tangle-free embedment design
- Integral Drip feature



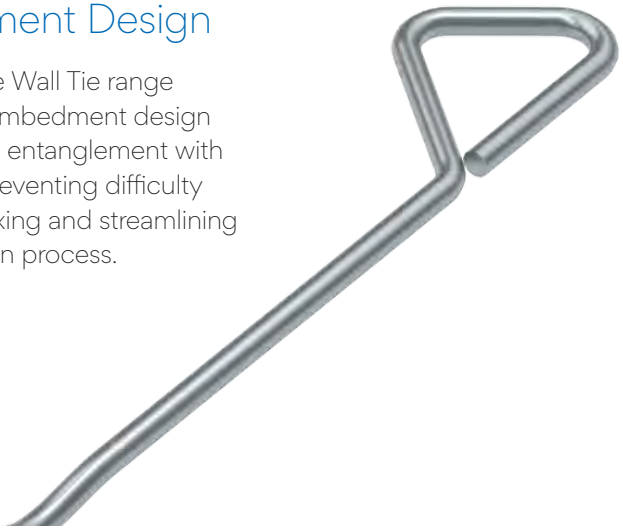
Drip Feature

The KT2 Wire Wall Tie range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. The symmetrical design of this features ensures that the Drip will function as intended regardless of which end of the KT2 has been installed in the external leaf.



Embedment Design

The KT2 Wire Wall Tie range features an embedment design that prevents entanglement with other Ties, preventing difficulty during unboxing and streamlining the installation process.



Test Results

The KT2 Wire Wall Tie range exceeds the performance criteria for a Type 2 Wall Tie in accordance with PD 6697:2019 in M2 mortar.

KT2 Wire Wall Tie range is independently tested within Lucideon to conform to BS EN 845-1:2013+A1:2016 and the test method BS EN 846-5:2012. (Notified Body Number 1289).

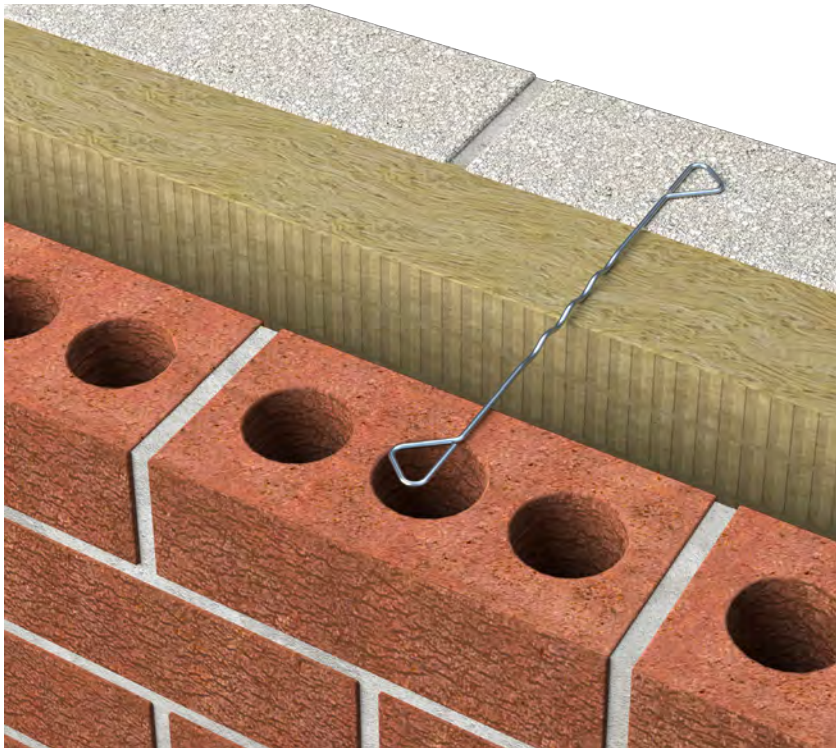
Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
KT2-200	50-75	200	Tension Compression	2070 1310	690 436
KT2-225	76-100	225	Tension Compression	2070 1460	690 486
KT2-250	101-125	250	Tension Compression	2070 1260	690 420
KT2-275	126-150	275	Tension Compression	2070 1260	690 420
KT2-300	151-175	300	Tension Compression	2070 1200	690 400

Keyfix Recommendations:

- Ensure each Tie is fully embedded and surrounded with mortar. Insufficient Tie embedment and lack of mortar surrounding the Tie can affect performance.
- Ties should not be bent or manipulated during installation. Manipulating Tie by bending can adversely affect function and performance of Tie.

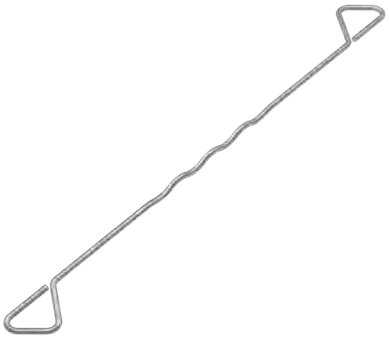
Keyfix KT4 Masonry - Masonry Wire Wall Ties

Keyfix KT4 Masonry - Masonry Wire Wall Tie range is designed to restrain two leaves of a cavity wall up to a maximum overall cavity width of 175mm and can be classified as a Type 4 Wall Tie in accordance with PD 6697:2019. KT4 Wire Wall Tie range is suitable for domestic houses up to a maximum height of 10m and where the wind speed is less then 27m/s.



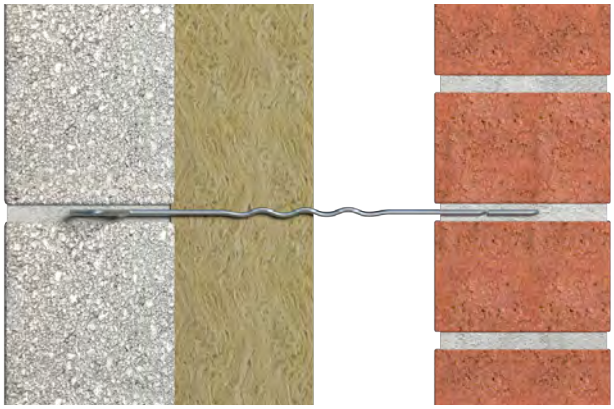
Key Features

- Type 4 Wall Tie in accordance with PD 6697:2019 in M2 mortar
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum cavity width of 175mm
- Tangle-free embedment design
- Integral Drip feature



Drip Feature

The KT4 Wire Wall Tie range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. The symmetrical design of this features ensures that the Drip will function as intended regardless of which end of the KT4 has been installed in the external leaf.



Embedment Design

The KT4 Wire Wall Tie range features an embedment design that prevents entanglement with other Ties, preventing difficulty during unboxing and streamlining the installation process.

Test Results

The KT4 Wire Wall Tie range exceeds the performance criteria for a Type 4 Wall Tie in accordance with PD 6697:2019 in M2 mortar.

KT4 Wire Wall Tie is independently tested within Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-5:2012. (Notified Body Number 1289).

Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
KT4-200	50-75	200	Tension Compression	1170 380	390 126
KT4-225	76-100	225	Tension Compression	1170 380	390 126
KT4-250	101-125	250	Tension Compression	1170 370	390 123
KT4-275	126-150	275	Tension Compression	1170 440	390 146
KT4-300	151-175	300	Tension Compression	1170 370	390 123

Keyfix Recommendations:

- Ensure each Tie is fully embedded and surrounded with mortar. Insufficient Tie embedment and lack of mortar surrounding the Tie can affect performance.
- Ties should not be bent or manipulated during installation. Manipulating Tie by bending can adversely affect function and performance of Tie.


keyfix.com

Masonry – In-situ Structures

Keyfix 25/14 Channel Restraint System

Keyfix 25/14 Channel Restraint System is designed to restrain an external masonry leaf to an internal Steel, Concrete or Timber Frame structure up to a maximum clear cavity width of 259mm and a maximum insulation thickness of 251mm. The 25/14 Channel Restraint System includes Keyfix EDC25 Channel Tie, 25/14 Channel, Fixing Screws to suit steel, concrete, or timber, and Compression Sleeves, when required, depending on the in-situ structure. The system is capable of conforming as Type 1 in accordance with PD 6697:2019 providing the system has been installed at the specified Fixing and Tie density.

Key Features

- Independently tested as a system
- Conforms as Type 1 in accordance with PD 6697:2019 in M2 mortar
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum clear cavity width of 259mm
- Fixings to suit up to a maximum insulation and backing board thickness of 251mm into Steel
- Fixings to suit up to a maximum insulation and backing board thickness of 263mm into Concrete
- Embedment markings to aid installation
- Integral Drip feature
- EDC25 design allows for easy vertical adjustment within Channel

Product Reference	Clear Cavity Width (mm)
EDC25-100	35-59
EDC25-125	60-84
EDC25-150	85-109
EDC25-175	110-134
EDC25-200	135-159
EDC25-225	160-184
EDC25-250	185-209
EDC25-275	210-234
EDC25-300	235-259

Drip Feature

The EDC25 Channel Tie range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. EDC25 range also features a notch at the Channel End to allow easy vertical adjustment within 25/14 Channel, allowing for flexibility during installation.

Embedment Markings

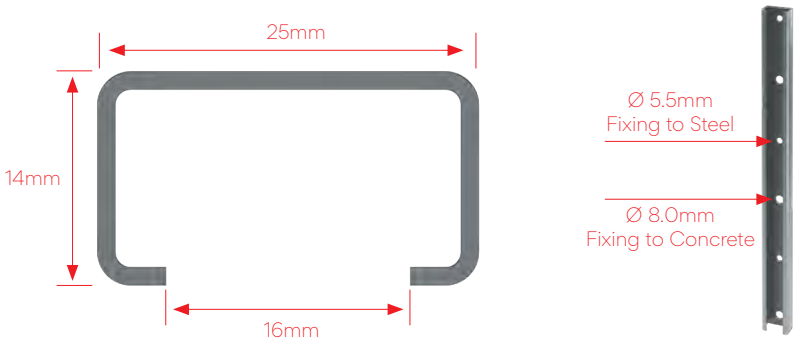
The EDC25 Channel Tie range features embedment markings at the Embedment End of the Tie to assist with the installation of the Tie and to ensure that the minimum embedment is achieved.

Compression Sleeves

Compression Sleeves are used to provide bearing onto the inner leaf structure which gives compressive strength and stability to the 25/14 Channel Restraint System. This limits the deflection of the Channel and helps prevent insulation crushing under load conditions. Compression Sleeves are manufactured from Grade 304 Austenitic Stainless Steel as standard and Grade 316 Austenitic Stainless Steel if required.

25/14 Channel

25/14 Channel features 5.5mm diameter holes for fixing to steel and 8.0mm diameter holes for fixing to concrete. These holes alternate along the Channel and are spaced to accommodate 225mm, 337.5mm and 450mm Fixing centres. 25/14 Channel is available in 2700mm lengths as standard and 3000mm lengths if required.



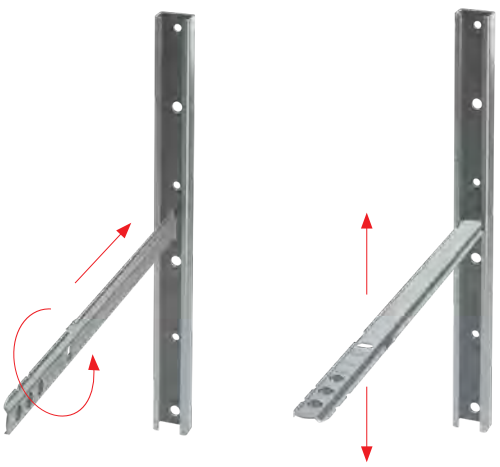
Channel Fixings

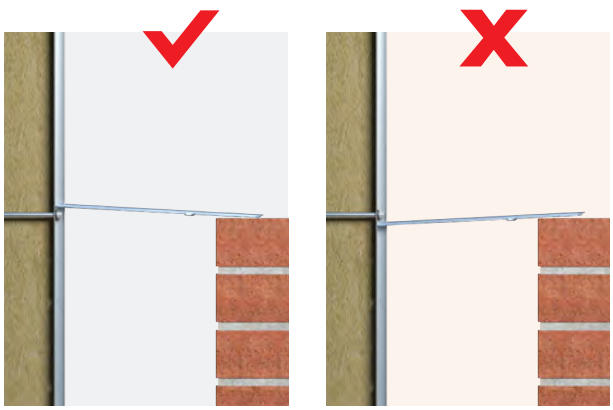
The 25/14 Channel Restraint System uses two variants of Fixings; Keyfix Steel Fixing Screws (KSFS) for securing Channel to a steel inner structure, and Keyfix Concrete Fixing Screws (KCFS) for securing back to concrete or timber. The vertical spacing of these Fixings is determined by the performance requirements of the system. Reduced Tie and Fixing centres can be specified to increase performance requirements of the system.

EDC25 Channel Tie Installation

The EDC25 Channel Tie is installed into 25/14 Channel by inserting Tie into the Channel profile, twisting Tie 90° and then adjusting vertically within the Channel to suit external leaf.

If EDC25 Channel Tie clashes with a Fixing, the Tie should be installed above the fixing, sloping downwards towards the external leaf to prevent moisture ingress.





Fixing to SFS Internal Structure

Compression Sleeves

- 25/14 Channel Restraint System has been tested without Compression Sleeves on ROCKWOOL Rainscreen Duo Slab® and Knauf Insulation Rocksilk® up to a thickness of 220mm. For other insulation types, up to 220mm thick, please contact Keyfix Technical team to discuss use with or without Compression Sleeves.
- Compression Sleeves should be used when fixing to steel if the insulation thickness is greater than 220mm or if semi-rigid or flexible insulation is used.

Keyfix Steel Fixing Screws (KSFS)

Keyfix Steel Fixing Screws (KSFS) are high thread, self-drilling screws to be used with the Keyfix 25/14 Channel Restraint System when fixing the Channel to light gauge steel framing systems. The KSFS drill point and lead-in threads are designed to require no pre-drilling of substrate before fixing. Keyfix recommend installing the Fixing using a Screwgun with a speed range of 1800 to 2500RPM. Impact Drivers are not recommended.

When installing KSFS range without Compression Sleeves, the installer should take care not to over-torque the Fixing. Recommended torque is 2Nm per Fixing. Over-torqueing of the Fixing creates a risk of the Channel deflecting, causing the insulation to compress. This negatively impacts the thermal resistance (U-Value) of the insulation and increases the risk of installing the EDC25 Channel Tie below the recommended embedment. In instances where the Fixing has been over-torqued, a Compression Sleeve that corresponds to the insulation thickness should be used.

The KSFS range comes pre-assembled with a Ø16mm EPDM sealing Washer. Over-torqueing of the Fixing and Washer combination can also cause water ingress due to damaging the washer.

Keyfix Product Code											
	Substrate Thickness	KSFS-A-65	KSFS-A-82	KSFS-A-100	KSFS-A-115	KSFS-A-135	KSFS-A-150	KSFS-A-180	KSFS-A-200	KSFS-A-240	KSFS-FF-275*
Material		Grade 304 Stainless Steel									
Low Thread Diameter (mm)		5.5									
High Thread Diameter (mm)		6.3									
Fixing Length (mm)		65	82	100	115	135	150	180	200	240	275
Substrate Thickness (mm)		1.2 - 3.2									
Design Pull-out Resistance Tension (kN)	1.2mm	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.30
	1.5mm	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	-
	2.0mm	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.34	2.62
	2.4mm	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	-
	3.0mm	5.27	5.27	5.27	5.27	5.27	5.27	5.27	5.27	5.27	4.76
Design Resistance Shear (kN)		3.75									0.98
Insulation & Backing Board Thickness (mm)		30-43	35-59	44-77	59-92	62-112	77-127	84-157	104-177	144-217	180-251
Compression Sleeve Required?		×	×	×	×	×	×	×	×	×	✓
Screw Drive Type		8mm Hex Socket									
Recommended Drill Speed (RPM)		1800 - 2500									

*Note below do not apply to these Fixings

Note:

- Pull-Out tests in accordance with EAD 330046-01-0602.
- Fasteners are classified as A1 according to EN 13501-1 in accordance with EC Decision 96/603/EC without need for further testing.
- Values shown are laboratory test results and should be taken as a guide for design purposes.
- Partial Safety Factor γ_M = 1.33 in accordance with EAD-330046-01-0602 where no value is given in national regulations of the Member State.

Test Results

When utilised with Compression Sleeves and Fixings at 225mm centres, 25/14 Channel Restraint System exceeds Type 1 performance criteria in accordance with PD 6697:2019 in M2 mortar.

Testing is performed with Tie positioned in the mid-span between specified Fixing and Tie spacings to achieve minimum recommended Tie density of 3.7 Ties/m² as per PD 6697:2019 (450mm vertical Tie spacing x 600mm horizontal Tie spacing). 25/14 Channel Restraint System is independently tested by Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-6:2012. (Notified Body Number 1289).

With Compression Sleeves					
Tie Length (mm)	**Insulation Thickness (mm)**	**Fixing c/c (mm)**	**Mode of Test**	**Ultimate Load Capacity (N)**	**Design Load Capacity (N)**
100-300	Up to 251	225	Tension	2520	840
			Compression	2480	826
		337.5	Tension	1850	616
			Compression	2000	666
		450	Tension	1020	340
			Compression	1140	380

Without Compression Sleeves					
Tie Length (mm)	**Insulation Thickness (mm)**	**Fixing c/c (mm)**	**Mode of Test**	**Ultimate Load Capacity (N)**	**Design Load Capacity (N)**
100-300	Up to 220	225	Tension	2520	840
			Compression	1580	526
		337.5	Tension	1850	616
			Compression	1470	490
		450	Tension	1020	340
			Compression	1040	346

Fixing to Light Gauge substrates with yield strength less than 450N/mm² will limit the capacity of the Fixing and therefore limit the capacity of the 25/14 Channel Restraint System, contact Keyfix Technical team to discuss.

Performance Characteristics

When installed at 600mm horizontal spacings, the 25/14 Channel Restraint System achieves the equivalent Type 1-4 performance in accordance with PD 6697:2019 when the specified combination of Fixing and Tie spacings are used.

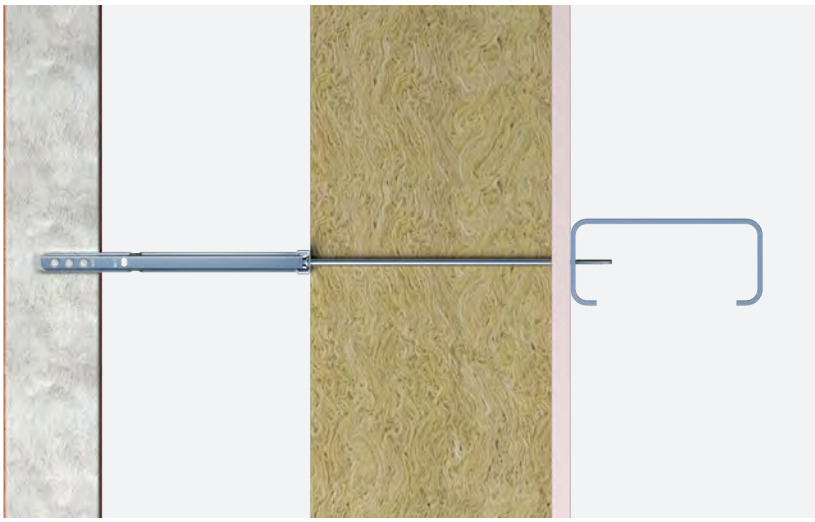
With Compression Sleeves		
Type Achieved	**Vertical Fixing c/c (mm)**	**Vertical Tie c/c (mm)**
Type 1	225	450
	337.5	300
Type 2	337.5	450
Type 3	337.5	450
Type 4	450	450

Without Compression Sleeves		
Type Achieved	**Vertical Fixing c/c (mm)**	**Vertical Tie c/c (mm)**
Type 1	225	300
Type 2	337.5	450
Type 3	337.5	450
Type 4	450	450

Using the incorrect combination of Fixings, Fixing centres or vertical Tie centres may invalidate the performance of the system. Please contact Keyfix Technical team for advice.

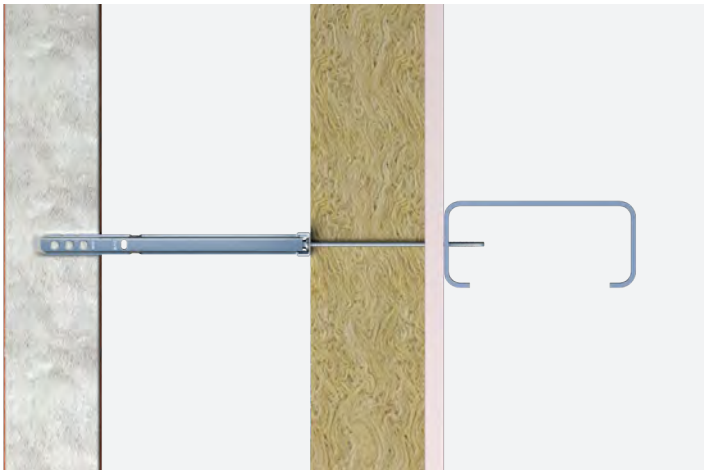
Installing to a Steel Substrate with Compression Sleeves

- Place the 25/14 Channel against the insulation at the desired position, in line with the inner steel structure.
- Puncture the insulation using the KSFS at the first fixing location and insert the Compression Sleeve into the punctured insulation.
- Fix the 25/14 Channel with the KSFS at the first fixing location using a Screwgun, an Impact driver should not be used. Recommended Drill Speed range is 1800 to 2500RPM.
- Once the first Fixing is installed, check that the 25/14 Channel is aligned vertically using a spirit level.
- Puncture the insulation at the remaining fixing locations with the 25/14 Channel in position. Fixing c/c specified to suit the load requirements of the system (see page 34).
- Move the 25/14 Channel aside to insert the Compression Sleeves into the punctured insulation.
- Realign 25/14 Channel and fix with KSFS using a Screwgun.
- Apply mortar to the masonry course where Tie is to be installed.
- Install the EDC25 Channel Tie within the 25/14 Channel and adjust vertically to suit the external leaf. Firmly press Tie into mortar, ensuring that EDC25 Tie is installed within the embedment lines in masonry and is level or sloping downwards towards the external leaf.
- Continue building masonry above installed Tie.



Installing to a Steel Substrate without Compression Sleeves

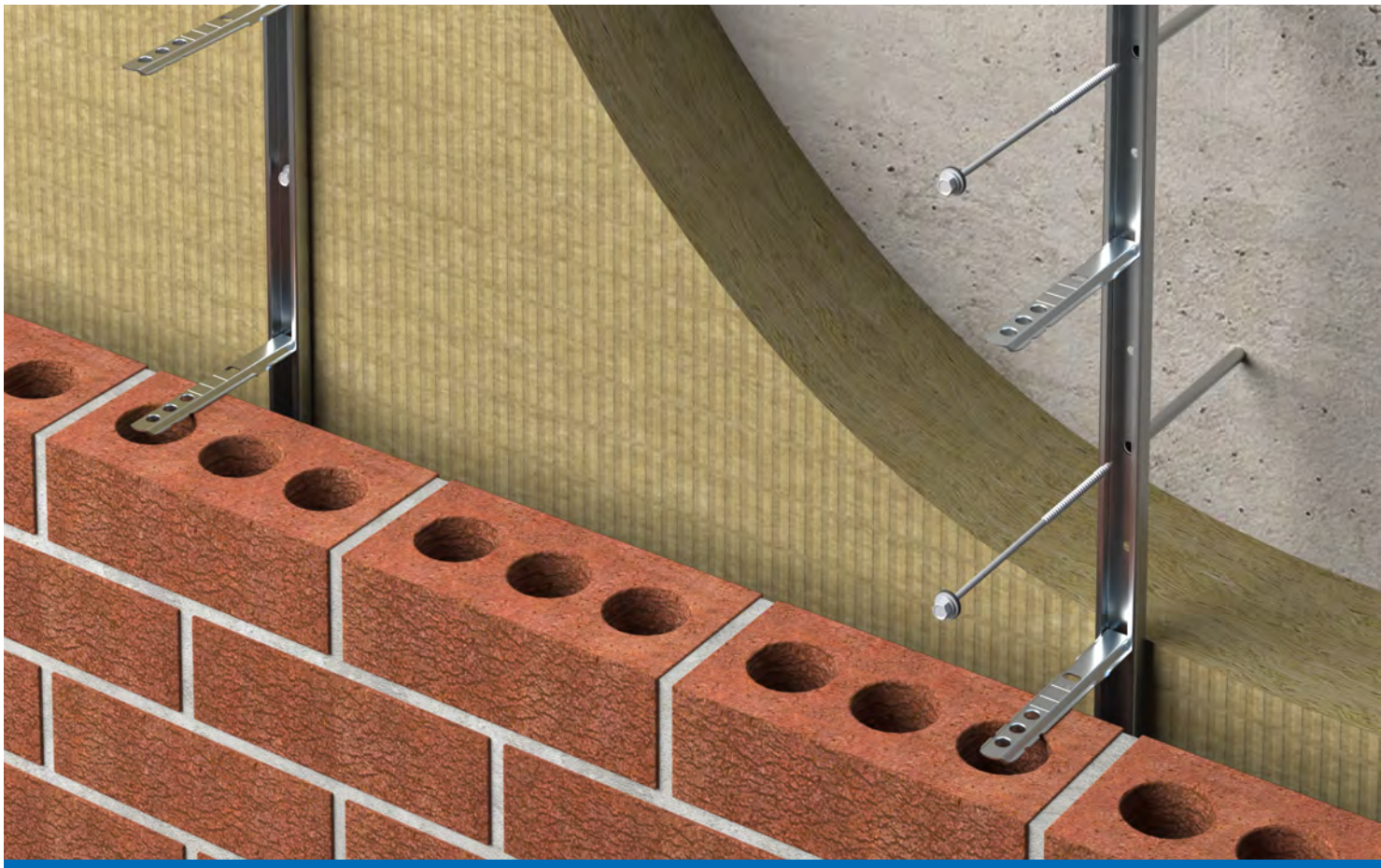
- Place the 25/14 Channel against the insulation at the desired position, in line with the inner steel structure.
- Fix the 25/14 Channel with the KSFS at the first fixing location using a Screwgun, an Impact driver should not be used. Recommended Drill Speed range is 1800 to 2500RPM.
- Once the first Fixing is installed, check that the 25/14 Channel is aligned vertically using a spirit level.
- Fix the 25/14 Channel at the remaining centres. Fixing c/c specified to suit the load requirements of the system (see page 34).
- Apply mortar to the masonry course where Tie is to be installed.
- Install the EDC25 Channel Tie within the 25/14 Channel and adjust vertically to suit the external leaf. Firmly press Tie into mortar, ensuring that EDC25 Tie is installed within the embedment lines in masonry and is level or sloping downwards towards the external leaf.
- Continue building masonry above installed Tie.
- When installing 25/14 Channel System without Compression Sleeves, installer should not over-torque KSFS when fixing to inner steel structure. Recommended Torque = 2Nm per Fixing.
- Over-torqueing Fixing creates risk of Channel deflecting, causing insulation to compress. This negatively impacts insulation thermal transmittance (U-Value) and increases risk of installing EDC25 Tie below recommended embedment.
- In instances where Fixing has been over torqued, a Compression Sleeve that corresponds to the insulation thickness should be used.



Keyfix Recommendations:

- Compression Sleeves and Fixings should be the appropriate length to suit the insulation and backing board thickness (see page 33).
- Ensure the EDC25 Channel Tie is installed with the recommended embedment in the masonry leaf and is fully embedded and surrounded with mortar. Insufficient Tie embedment and lack of mortar surrounding the Tie can affect performance.

Fixing to Concrete Internal Structure



Compression Sleeves

— Compression Sleeves should always be used when fixing the 25/14 Channel to concrete.

Keyfix Concrete Fixing Screws (KCFS)

Keyfix Concrete Fixing Screw (KCFS) range are to be used with the Keyfix 25/14 Channel Restraint System when fixing the Channel to a concrete application.

KCFS geometry and thread are designed to provide fast and easy installation whilst also preventing movement of the surface of the fixture. Before installing Fixing, a pilot hole is required and should be cleaned of debris.

The KCFS Fixing range comes pre-assembled with a Ø16mm EPDM sealing Washer. Over-tightening of Fixing and Washer combination can also cause water ingress due to damaging Washer.

Keyfix Product Code											
	KCFS-100	KCFS-120	KCFS-140	KCFS-160	KCFS-180	KCFS-200	KCFS-220	KCFS-240	KCFS-260	KCFS-280	KCFS-300
Material	Case Hardened Carbon Steel with Climadur Coating - 15 Kesternich cycles (DIN 50018, 1997)										
Thread Diameter (mm)	6.3										
Fixing Length (mm)	100	120	140	160	180	200	220	240	260	280	300
Pilot Hole Diameter (mm)	5										
Min. Pilot Hole Depth (mm)	40										
Min. Recommended Fixing Embedment (mm)	30										
Ultimate Pull-out Resistance Tension (kN)	3.70										
Design Pull-out Resistance Tension (kN)	1.23										
Min. Edge Distance (mm)	100										
Insulation Thickness (mm)	33-63	53-83	73-103	93-123	113-143	133-163	153-183	173-203	193-223	213-243	233-263
Compression Sleeve Required?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Screw Drive Type	TX30										
Maximum Drill Speed (RPM)	2500										

Note:

- Test performance declared is based upon Fixing tested in minimum recommended embedment in C12/15 and C20/25 non-cracked concrete in accordance with Regulation (EU) No 305/2011 (ETA-09/0346).

Test Results

When installed with Fixings at 225mm centres, 25/14 Channel Restraint System exceeds Type 1 performance criteria in accordance with PD 6697:2019 in M2 mortar.

Testing is performed with Tie positioned in the mid-span between specified Fixing and Tie spacing to achieve minimum recommended Tie density of 3.7 Ties/m² as per PD 6697:2019 (450mm Vertical Tie spacing x 600mm Horizontal Tie spacing). 25/14 Channel Restraint System is independently tested by Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-6:2012. (Notified Body Number 1289).

Tie Length (mm)	Insulation Thickness (mm)	Fixing c/c (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
100-300	Up to 263	225	Tension	2520	840
			Compression	2600	866
		337.5	Tension	1850	616
			Compression	2000	666
		450	Tension	1020	340
			Compression	1140	380

Performance Characteristics

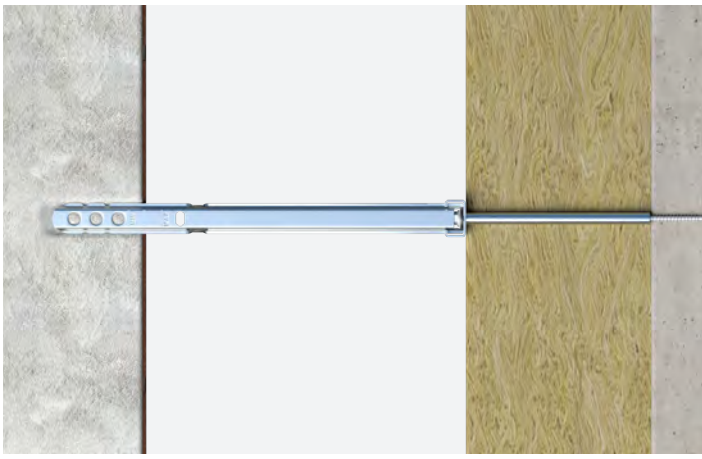
When installed at 600mm horizontal spacings, the 25/14 Channel Restraint System achieves the equivalent Type 1-4 performance in accordance with PD 6697:2019 when the specified combination of Fixing and Tie spacings are used.

Type Achieved	Vertical Fixing c/c (mm)	Vertical Tie c/c (mm)
Type 1	225	450
	337.5	300
Type 2	337.5	450
Type 3	337.5	450
Type 4	450	450

Using the incorrect combination of Fixings, Fixing centres or vertical Tie centres may invalidate the performance of the system. Please contact Keyfix Technical team for advice.

Installing to a Concrete Substrate

- Place the 25/14 Channel against the insulation at the desired position.
- Puncture the insulation using the KCFS at the first Fixing location.
- Insert the Compression Sleeve into the punctured insulation.
- Drill pilot hole into the concrete inner structure. Ensure pilot hole is clean and free of debris before installing KCFS.
- Fix the 25/14 Channel with the KCFS using a Screwgun, an Impact driver should not be used.
- Once the first Fixing is installed, check that the 25/14 Channel is aligned vertically using a spirit level.
- Puncture the insulation at the remaining Fixing locations with the 25/14 Channel in position. Fixing locations specified to suit load requirements. (See page 37)
- Move the 25/14 Channel aside, drill the pilot holes into the concrete and ensure the pilot holes are clean and free of debris before inserting the remaining Compression Sleeves into insulation.
- Realign the 25/14 Channel and insert KCFS at remaining locations using a Screwgun.
- Apply mortar to the masonry course where Tie is to be installed.
- Install the EDC25 Channel Tie within the 25/14 Channel and adjust vertically to suit the external leaf. Firmly press Tie into mortar, ensuring that EDC25 Tie is installed within the embedment lines in masonry and is level or sloping downwards towards the external leaf.
- Continue building masonry above installed Tie.



Keyfix Recommendations:

- Compression Sleeves and Fixings should be the appropriate length to suit the insulation and backing board thickness (see page 37).
- Pilot Hole should be drilled and cleaned before installing Fixing into concrete.
- Ensure the EDC25 Channel Tie is installed with the recommended embedment in the masonry leaf and is fully embedded and surrounded with mortar. Insufficient Tie embedment and lack of mortar surrounding the Tie can affect performance.
- KCFS should not be removed and reinstalled in the same hole as this compromises pull-out performance of KCFS. If Fixing is removed, it is recommended that a new Fixing and pilot hole be used.

Building the Future

of Masonry with Keyfix

Keyfix EDH Frame Cramp Wall Ties

Keyfix EDH Frame Cramp range is designed to connect a masonry outer leaf to a concrete or steel inner structure with a maximum overall cavity of 400mm and can be classified as a Type 1 Wall Tie in accordance with PD 6697:2019. EDH range is suitable for all building heights and can be used in most geographical locations within the UK and Ireland. However, in the north western fringes of the UK where higher wind speeds are to be expected (see page 14) - particularly on coastal sites and buildings of unusual shapes - Tie provision should be calculated.

Key Features

- Type 1 in accordance with PD 6697:2019 in M2 mortar
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum overall cavity width of 400mm
- Embedment markings to aid installation
- Ø8mm Hole in Upstand
- Integral Drip feature

Drip Feature

The EDH Frame Cramp range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. The location of this feature on the Tie is such that it will be located within the clear cavity.

Embedment Markings

The EDH Frame Cramp range features embedment markings at the Embedment End of the Tie to assist with the installation of the Tie and to ensure that the minimum embedment is achieved.

Isolation Pad

Where a stainless steel Frame Cramp is installed against a mild steel substrate, an Isolation Pad is recommended to help eliminate risk of bi-metallic corrosion between dissimilar material in a damp environment. Isolation Pad features a slot to allow the Fixing to be installed without the need to drill through the Pad.

Test Results

EDH Frame Cramp Wall Tie range exceeds the performance criteria for a Type 1 in accordance with PD 6697:2019 in M2 mortar. Type 1 performance is achieved using minimum Tie density of 2.5 Ties/m² (900mm Horizontal c/c x 450mm Vertical c/c). EDH Frame Cramp Wall Tie range is independently tested by Lucideon to conform to BS EN 845-1:2012+A1:2016 and test method BS EN 846-6:2012. (Notified Body Number 1289).

Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
EDH-75	≤25	75-300	Tension Compression	2600 3290	866 1096
EDH-100	26-50				
EDH-125	51-75				
EDH-150	76-100				
EDH-175	101-125				
EDH-200	126-150				
EDH-225	151-175				
EDH-250	176-200				
EDH-275	201-225				
EDH-300	226-250				
EDH-325	251-275	325-450	Tension Compression	3090 2310	1030 770
EDH-350	276-300				
EDH-375	301-325				
EDH-400	326-350				
EDH-425	351-375				
EDH-450	376-400				

Fixing to light gauge substrates with yield strength less than 450N/mm² will limit the capacity of the Fixing and therefore limit the capacity of the EDH Frame Cramp. Contact Keyfix Technical team to discuss.

Keyfix EDH - Fixing to SFS Internal Structure

- Build the external brickwork up to the EDH embedment course and position Tie, ensuring the Tie is installed at the recommended embedment within the mortar.
- Apply mortar to the masonry course where Tie is to be installed.
- Firmly press Tie into the mortar, ensuring Tie is surrounded by fresh mortar. Each Wall Tie within Keyfix range has embedment markings with the purpose of assisting installer to reduce the risk of compromising Tie performance due to incorrect Tie embedment.
- With the EDH in position (and Isolation Pad where required), fix Tie with KSFS using a Screwgun. An impact driver should not be used to install KSFS fixing range. Recommended Drill Speed range is 1800 to 2500RPM.
- Continue building masonry above installed Tie.

Keyfix Recommendations:

- Use Keyfix Steel Fixing Screw (KSFS) when fixing EDH Frame Cramp to steel inner structure, ensuring correct KSFS is selected to suit substrate thickness (see page 80)
- Use an Isolation Pad when installing to mild steel internal substrate to prevent bi-metallic corrosion

Keyfix EDH - Fixing to Concrete Internal Structure

- Build the external brickwork up to the EDH embedment course and position Tie, ensuring the Tie is installed at the recommended embedment within the mortar.
- With the EDH in position, mark the location of the pilot hole and drill to the Fixing requirements. Pilot hole should be cleaned before installing Fixing.
- Apply mortar to the masonry course where Tie is to be installed.
- Reposition the EDH and install Fixing using appropriate installation instructions.
- Firmly press Tie into the mortar, ensuring Tie is surrounded by fresh mortar. Each Wall Tie within Keyfix range has embedment markings with the purpose of assisting installer to reduce the risk of compromising Tie performance due to incorrect Tie embedment.
- Continue building masonry above installed Tie.

Keyfix Recommendations:

- Use Concrete Fixing when fixing EDH Frame Cramp to concrete inner structure (see page 81).
- A pilot hole to suit the Fixing requirements should be drilled and cleaned of debris before installing.
- Fixing should not be removed and reinstalled in the same hole as this compromises pull-out performance of Fixing. If Fixing is required to be removed, it is recommended that a new Fixing be used and repeat installation steps.

Keyfix EDL Frame Cramp Wall Ties

Keyfix EDL Frame Cramp range is designed to connect a masonry outer leaf to a concrete or steel inner structure over a maximum overall cavity of 400mm and features a Slotted Upstand to provide vertical adjustment during installation.

Key Features

- Wall Tie in accordance with PD 6697:2019
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum overall cavity width of 400mm
- Embedment markings to aid installation
- Slotted Upstand to provide 22mm vertical adjustment during installation
- Integral Drip feature

Drip Feature

The EDL Frame Cramp range has a formed geometrical feature, known as a Drip, that inhibits moisture ingress across the cavity. The location of this feature on the Tie is such that it will be located within the clear cavity.

Embedment Markings

The EDL Frame Cramp range features embedment markings at the Embedment End of the Frame Cramp to assist with the installation of the Wall Tie and to ensure that the minimum embedment is achieved.

Upstand Feature

The EDL Frame Cramp range features a Slotted Upstand that provides a 22mm vertical adjustment of the Tie during the installation process. When the Fixing is installed in the bottom position the EDL Frame Cramp will exceed performance requirements of a Type 1 Wall Tie as per PD 6697:2019. Installing the Fixing further up the slot however, will reduce the declared load capacity of the Tie (see Test Results table on page 45).

Isolation Pad

Where a stainless steel Frame Cramp is installed against a mild steel substrate, an Isolation Pad is recommended to help eliminate risk of bi-metallic corrosion between dissimilar material in a damp environment. Isolation Pad features a slot to allow the Fixing to be installed without the need to drill through the Pad.

Test Results

Load Capacity for EDL Frame Cramp Wall Tie range is independently tested by Lucideon at three different fixing positions within Slotted Upstand to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-6:2012 (Notified Body Number 1289).

Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Fixing Location	Ultimate Load Capacity (N)	Design Load Capacity (N)
EDL-75	≤25	75-300	Tension	Top	680	226
EDL-100	26-50					
EDL-125	51-75			Middle	1130	376
EDL-150	76-100					
EDL-175	101-125			Bottom	2820	940
EDL-200	126-150					
EDL-225	151-175		Compression		3290	1096
EDL-250	176-200					
EDL-275	201-225					
EDL-300	226-250					
EDL-325	251-275	325-450	Tension	Top	910	303
EDL-350	276-300			Middle	1550	516
EDL-375	301-325			Bottom	3090	1030
EDL-400	326-350		Compression		2310	770
EDL-425	351-375					
EDL-450	376-400					

Fixing to light gauge substrates with yield strength less than 450N/mm² will limit the capacity of the Fixing and therefore limit the capacity of the EDL Frame Cramp. Contact Keyfix Technical team to discuss.

Keyfix EDL - Fixing to SFS Internal Structure

- Build the external brickwork up to the EDL embedment course and position Tie, ensuring the Tie is installed at the recommended embedment within the mortar.
- Apply mortar to the masonry course where Tie is to be installed.
- Firmly press Tie into the mortar, ensuring Tie is surrounded by fresh mortar. Each Wall Tie within Keyfix range has embedment markings with the purpose of assisting installer to reduce the risk of compromising Tie performance due to incorrect Tie embedment.
- With the EDL in position (and Isolation Pad where required), fix the Tie with KSFS using a Screwgun. An impact driver should not be used to install KSFS Fixing range. Recommended Drill Speed range is 1800 to 2500RPM.
- Continue building masonry above installed Tie.

Keyfix Recommendations:

- Use Keyfix Steel Fixing Screw (KSFS) when fixing EDL Frame Cramp to steel inner structure, ensuring correct KSFS is selected to suit substrate thickness (see page 80).
- Use an Isolation Pad when installing to mild steel internal substrate to prevent bi-metallic corrosion.

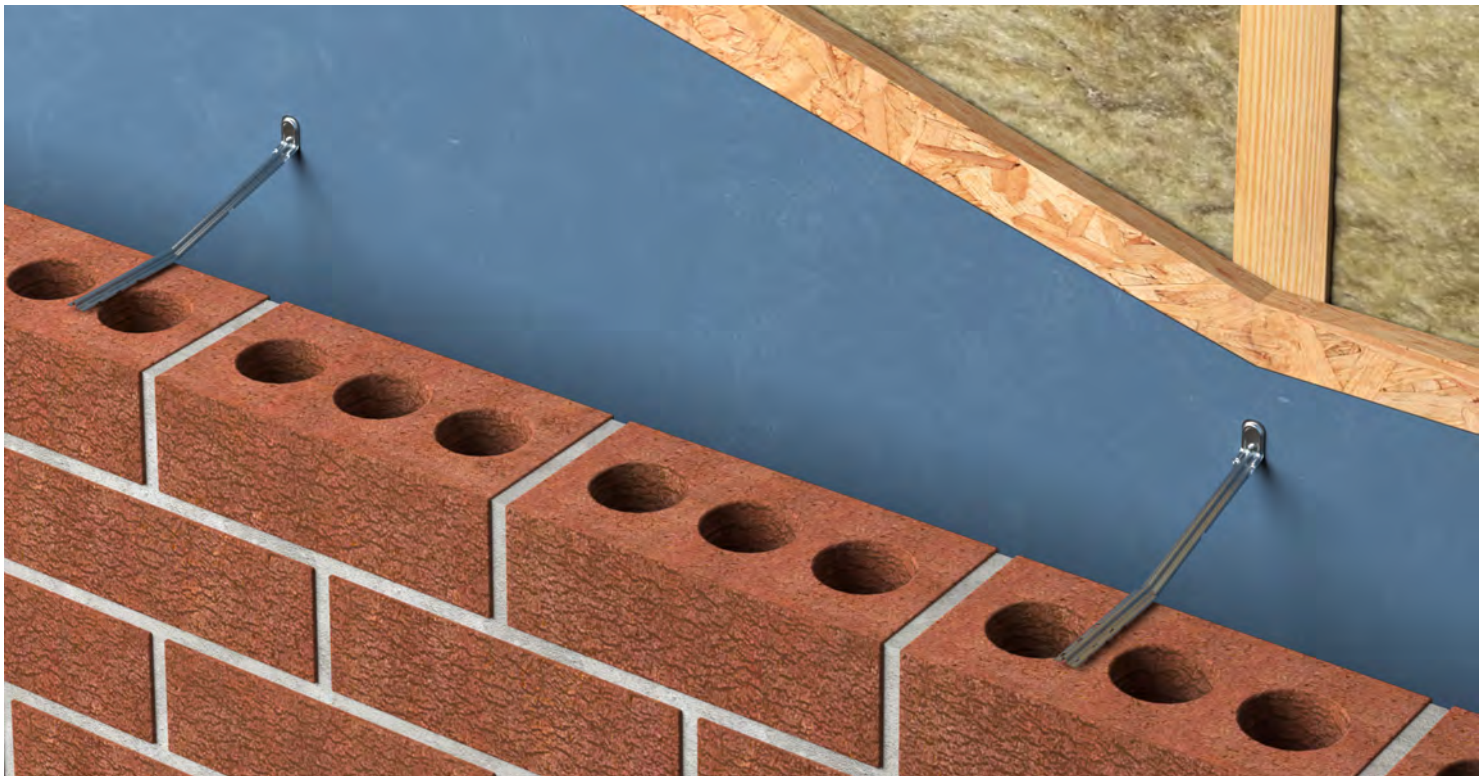
Keyfix EDL - Fixing to Concrete Internal Structure

- Build the external brickwork up to the EDL embedment course and position Tie, ensuring the Tie is installed at the recommended embedment within the mortar.
- With the EDL in position, mark the location of the pilot hole and drill to the Fixing requirements. Pilot hole should be cleaned before installing Fixing.
- Apply mortar to the masonry course where Tie is to be installed.
- Reposition the EDL and install Fixing using appropriate installation instructions.
- Firmly press Tie into the mortar, ensuring Tie is surrounded by fresh mortar. Each Wall Tie within Keyfix range has embedment markings with the purpose of assisting installer to reduce the risk of compromising Tie performance due to incorrect Tie embedment.
- Continue building masonry above installed Tie.

Keyfix Recommendations:

- Use Concrete Fixing when fixing EDL Frame Cramp to concrete inner structure (see page 81).
- A pilot hole to suit the Fixing requirements should be drilled and cleaned of debris before installing.
- Fixing should not be removed and reinstalled in the same hole as this compromises pull-out performance of Fixing. If Fixing is required to be removed, it is recommended that a new Fixing be used and repeat installation steps.

Keyfix KTFT Timber Frame Wall Ties



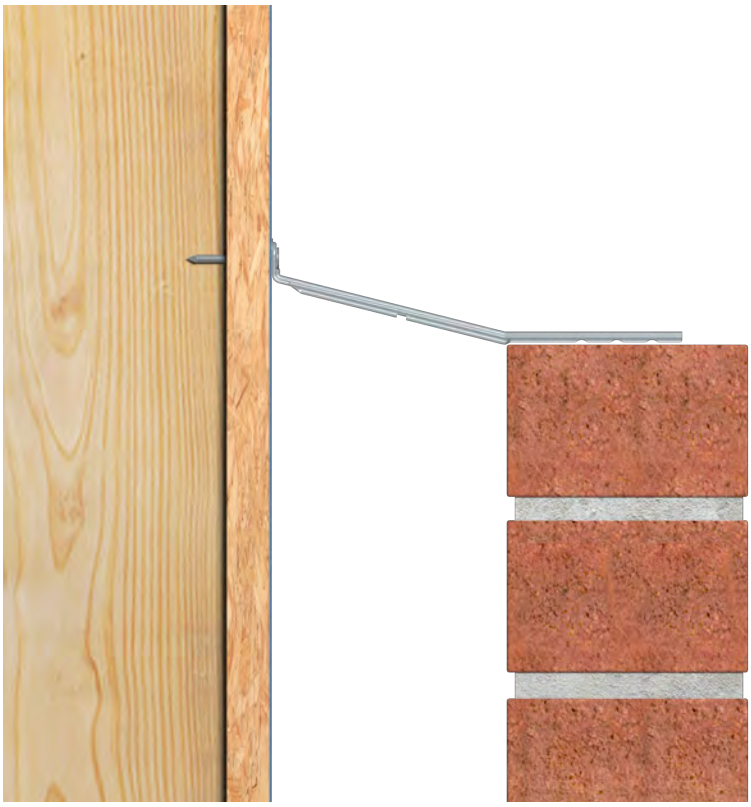
Keyfix KTFT Timber Frame Wall Tie range is designed to restrain an inner timber frame structure to an exterior masonry leaf up to a maximum cavity of 150mm, allowing for up to 24mm of differential movement to accommodate settlement. Due to Timber Frame Ties being omitted from PD 6697:2019, Keyfix KTFT range can be classified as a Type 6 Wall Tie in accordance with BS 5268-6.1:1996. KTFT range is suitable for buildings up to four storeys in locations where basic wind velocity does not exceed 25m/s, however, it is not suitable where the site altitude is 150m or above sea level.

Key Features

- Type 6 Wall Tie in accordance with BS 5268-6.1:1996 in M2 mortar
- UKCA Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Suits up to a maximum cavity width of 150mm
- Accommodates up to 24mm of differential movement
- 50mm Annular Ring Shank Nail supplied with each KTFT

Drip Feature

Due to the design of KTFT Wall Tie, the Tie is sloped downwards toward the outer leaf, preventing moisture from crossing the cavity. However, when the Tie has flattened due to building settlement, the Tie's integral Drip feature will continue to inhibit moisture ingress across the cavity.



Test Results

KTFT Wall Tie range exceeds the performance criteria for a Type 6 Wall Tie using a minimum Tie Density of 4.4 Ties/m² (600mm horizontal c/c x 375mm vertical c/c) in accordance with BS 5268-6.1:1996 in M2 mortar. Tie Density can be increased to suit more severe site conditions.

KTFT Wall Tie range is independently tested within Lucideon to conform to BS EN 845-1:2013+A1:2016 and test methods BS EN 846-5:2012 and BS EN 846-6:2012. (Notified Body Number 1289)

Product Reference	Cavity Width (mm)	Tie Length (mm)	Mode of Test	Ultimate Load Capacity (N)	Design Load Capacity (N)
KTFT-50	50	125	Tension	920	306
			Compression	500	166
KTFT-75	75	150	Tension	920	306
			Compression	500	166
KTFT-100	100	175	Tension	920	306
			Compression	490	163
KTFT-125	125	200	Tension	910	303
			Compression	500	166
KTFT-150	150	225	Tension	880	293
			Compression	500	166

KTFT is tested with 50mm Annular Ring Shank Nail provided and when fully embedded within timber frame stud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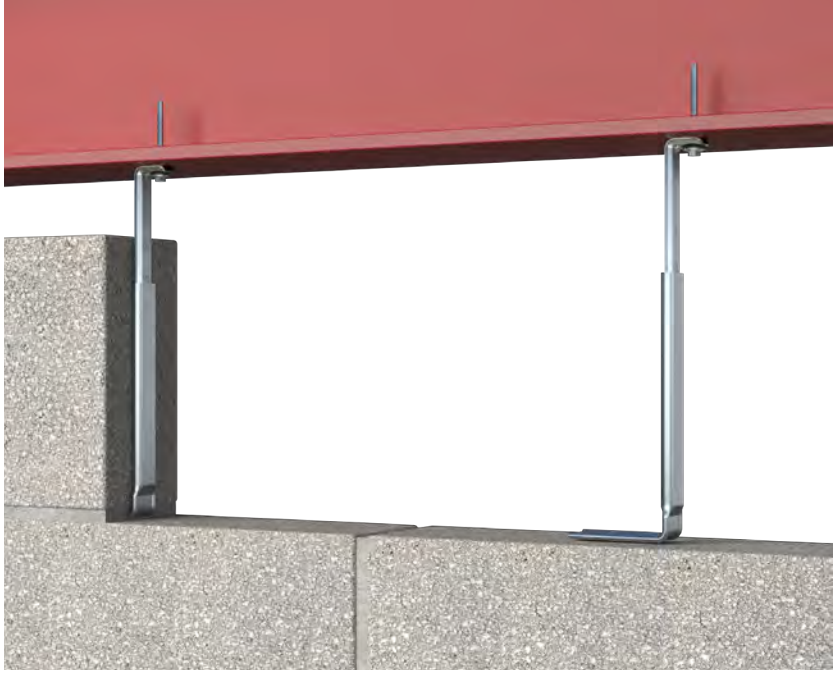
Head Restraint

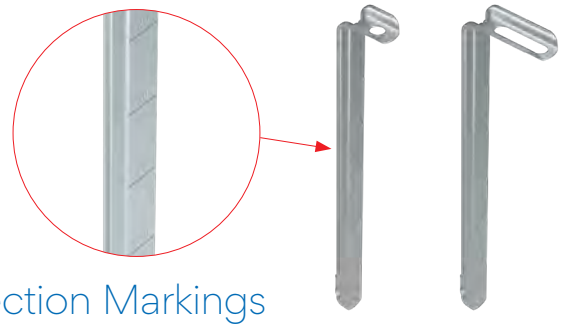
Keyfix IHR Internal Head Restraint

Keyfix Internal Head Restraint (IHR) comprises of two components, IHR-H or IHR-L Tie and IHR-STEM. When combined together, these components restrain the top of non-load bearing walls to the underside of a concrete or steel structure. The Tie section can move vertically within the Stem section, allowing for vertical deflection of the concrete or steel structure, which helps prevent cracking.



Key Features

- Designed in accordance with PD 6697:2019
- UKCA Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Allows for structure to deflect up to 75mm
- Designed to suit standard 215mm blockwork
- Projection Markings on Tie Section to aid installation
- Available to suit 140mm cut blocks if required



Projection Markings

The IHR-H and IHR-L Tie Sections feature Projection Markings at 25, 50, 75 and 100mm intervals to assist with the installation of the Tie and to ensure that the correct projection is achieved.

Keyfix have developed and tested the Internal Head Restraint range to be suitable for up to 100mm projection. This will help accommodate where greater deflections of internal structures is expected or where fire stops are located at the top of non-load bearing walls.

Isolation Pad

Where a stainless steel IHR Tie is installed against a mild steel substrate, an Isolation Pad is recommended to help eliminate risk of bi-metallic corrosion between dissimilar material in a damp environment. Isolation Pad features a slot to allow the Fixing to be installed without the need to drill through the Pad.

Test Results

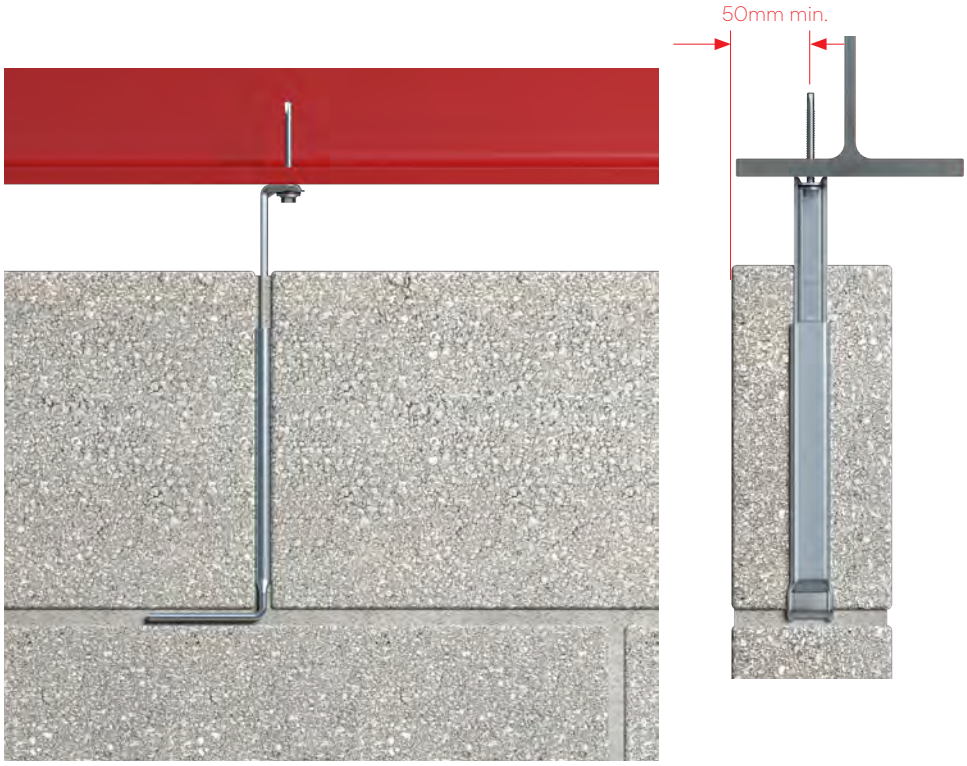
Internal Head Restraint range is independently tested by Lucideon to conform to BS EN 845-1 :2013+A1:2016 and test method BS EN 846-7:2012 for shear load capacity. (Notified Body Number 1289).

Projection (mm)	Mode of Test	Spacing c/c (mm)	Manufacturers Declared Load Capacity (N/m)	Design Load Capacity (N/m)
25	Shear	450	4130	1376
		900	2060	686
50		450	3900	1300
		900	1950	650
75		450	3750	1250
		900	1870	623
100		450	3240	1080
		900	1620	540

Mortar mix proportions 1:1:6 cement : lime : sand. In accordance with BS EN 998-2:2010

Keyfix IHR - Fixing to SFS Internal Structure

- IHR installed at 450mm or 900mm centres depending on expected load.
- Build the wall up to the Stem Section embedment course, this is the penultimate course of the wall.
- Insert Tie section inside Stem section.
- Internal Head Restraint should be installed centrally or at a minimum of 50mm from the edge of blockwork.
- With the Internal Head Restraint Tie in position against steel structure, (and Isolation Pad where required) fix with appropriate KSFS using a Screwgun. An impact driver should not be used. Recommended Drill Speed range is 1800 to 2500RPM.
- Ensuring the Internal Head Restraint Stem section is fully embedded in mortar in the horizontal and vertical joint, complete the construction of the wall.

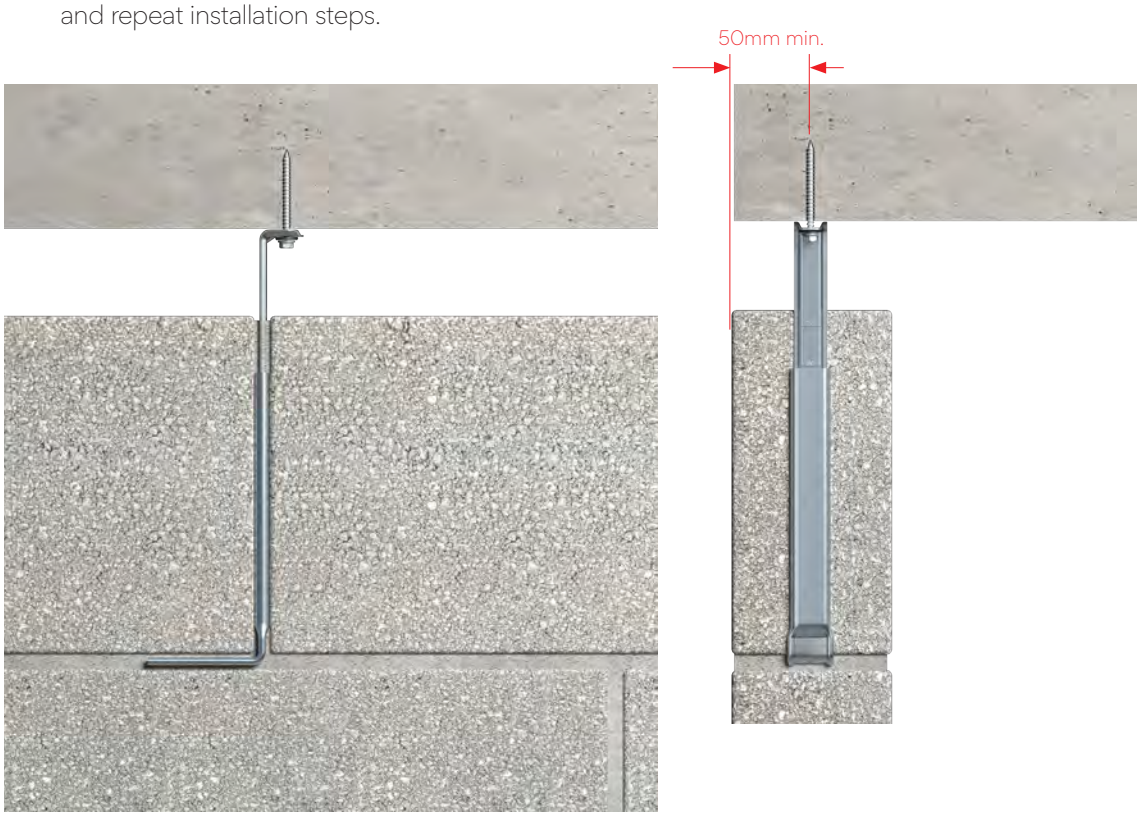


Keyfix Recommendations:

- Use Keyfix Steel Fixing Screw (KSFS) when fixing IHR to steel inner structure, ensuring correct KSFS is selected to suit substrate thickness (see page 80).
- Use an Isolation Pad when installing to mild steel internal substrate to prevent bi-metallic corrosion.

Keyfix IHR - Fixing to Concrete Internal Structure

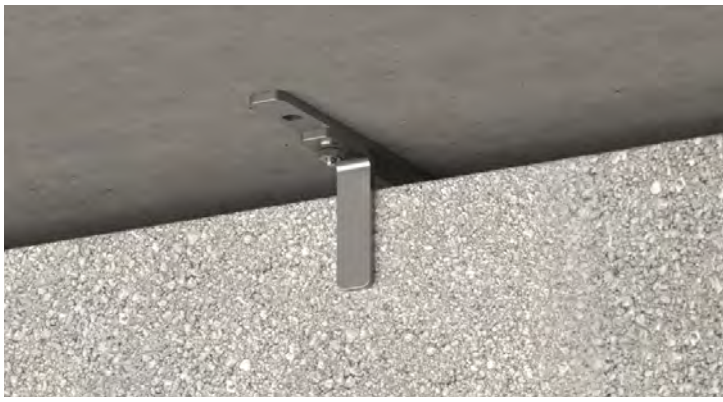
- IHR installed at 450mm or 900mm centres depending on expected load.
- Build the wall up to the Stem Section embedment course, this is the penultimate course of the wall.
- Insert Tie into Stem section.
- Position the Internal Head Restraint centrally or at a minimum of 50mm from the edge of the blockwork.
- With the IHR in position, mark the location of the pilot hole. Remove IHR and drill pilot hole as per the Fixing requirements. Pilot hole should be cleaned before installing Fixing.
- Reposition the Internal Head Restraint and install Fixing using appropriate installation instructions.
- Ensuring the Internal Head Restraint Stem section is fully embedded in mortar in the horizontal and vertical joint, complete the construction of the wall.
- Fixing should not be removed and reinstalled in the same hole as this compromises pull-out performance of Fixing. If Fixing is required to be removed, it is recommended that a new Fixing be used and repeat installation steps.



Keyfix Recommendations:

- Use Concrete Fixing when fixing IHR to concrete inner structure (see page 81).

Keyfix EHR External Head Restraint



Keyfix EHR External Head Restraint is designed to restrain the top of an internal masonry wall. Keyfix EHR comprises two components that clamp the block at the top of the masonry wall, the longer of these components features two holes that allow the EHR to suit 100 or 140mm wide blockwork.

Key Features

- UKCA Accredited
- Manufactured from A1 Non-combustible Grade 304 Stainless Steel
- Suits 100 and 140mm wide blockwork
- Slot to allow for adjustment during installation
- EHR-25 suits up to 25mm projection
- EHR-50 suits up to 50mm projection

Installation Guidance

EHR should typically be positioned at 450mm or 900mm centres depending on the expected load requirements.

The maximum projection of EHR-25 should not exceed 25mm.

The maximum projection of EHR-50 should not exceed 50mm.

Test Results

Keyfix EHR Range is independently tested within Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-7:2012 for shear load capacity. (Notified Body Number 1289)

Product Reference	Projection (mm)	Mode of Test	Spacing c/c (mm)	Ultimate Load Capacity (N/m)	Design Load Capacity (N/m)
EHR-25	0-25	Shear	450	4560	1520
			900	2280	760
EHR-50	0-50	Shear	450	3000	1000
			900	1500	500

Mortar mix proportions 1:1:6 cement : lime : sand. In accordance with BS EN 998-2:2010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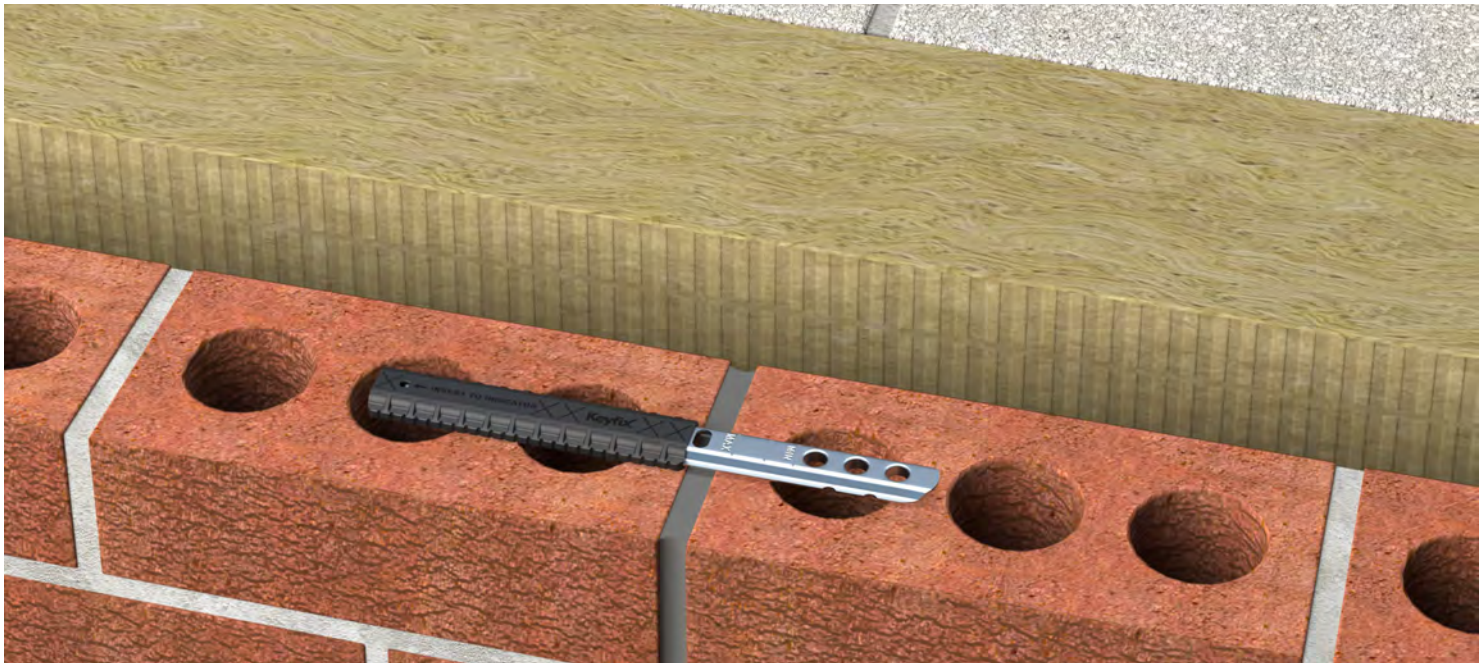
Movement Tie

Keyfix PPE Movement Tie

Keyfix PPE Movement Tie range is used with Keyfix Debonding Sleeve in vertical movement joints at 300mm vertical centres to resist lateral wind loads and allow for expansion and contraction in masonry.



Key Features

- Designed in accordance with PD 6697:2019
- UKCA and CE Accredited
- Tie manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Debonding Sleeve manufactured from Recycled Polypropylene (rPP)
- Allows for expansion and contraction of the masonry whilst restraining lateral loads

Embedment Markings

Keyfix Movement Tie range features embedment markings on the Embedment End to aid with the installation process and to ensure that the minimum embedment is achieved. Recommended embedment of PPE Movement Tie in mortar is 65mm.

Debonding Sleeve

Keyfix Debonding Sleeve is designed to fit Keyfix PPE Movement Tie range in a 10mm vertical movement joint.

When installing PPE Movement Tie, the Plain End should be inserted into Debonding Sleeve and the Embedment End is installed into the mortar.

To ensure the Tie is installed into the Debonding Sleeve correctly, an installation hole is located at the top of the sleeve to ensure the recommended embedment inside the Debonding Sleeve is achieved.

Installation of the Movement Tie beyond this hole will restrict horizontal movement of the Tie when masonry expands and contracts.

Product Reference	Product Length (mm)
DB-120	120

Please contact Keyfix Technical team to discuss manufacturing special sizes on request.

Test Results

Movement Tie and Debonding Sleeve range is independently tested by Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-7:2012 for shear load capacity. (Notified Body Number 1289).

Product Reference	Tie Length (mm)	Mode of Test	Vertical c/c (mm)	Design Load Capacity (N/m)
PPE-175*	175 -250	Shear	300	1811
PPE-200				
PPE-225				
PPE-250				

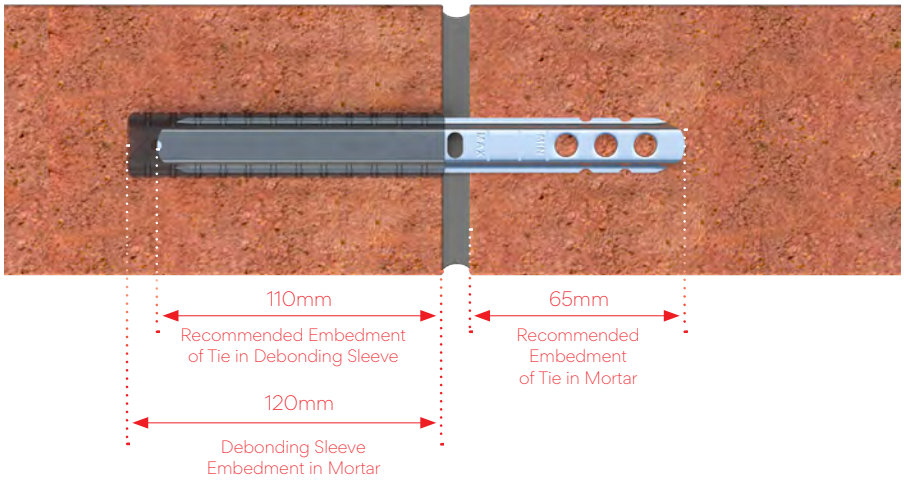
Mortar mix proportions 1:8 + plasticiser (cement: sand + plasticiser by volume) in accordance with BS EN 998-2:2016. Compressive Strength of mortar was 4.23 N/mm² (M4 Mortar) in accordance with BS EN 1015-11:2019.

Design Load Capacity use a partial factor for a material property (γ_M) of 3, as stated in UK National Annex to BS EN 1996-1-1:2006 (Eurocode 6).

The Design Load Capacity shown should be used with factored wind loads.

PPE Install

The Plain End of the PPE Tie should be installed within the Debonding Sleeve.



*To achieve 65mm embedment in mortar when using 175mm PPE Tie, ensure Plain End is inserted 100mm within Debonding Sleeve.

Keyfix PPH Frame Cramp Movement Tie

Keyfix PPH Frame Cramp Movement Tie range is to be installed with a Keyfix Debonding Sleeve at a vertical movement joint between a masonry panel and a concrete or steel structure, allowing for expansion and contraction of the masonry.

Key Features

- Designed in accordance with PD 6697:2019
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Debonding Sleeve manufactured from Recycled Polypropylene (rPP)
- Allows for expansion and contraction of the masonry whilst restraining lateral loads

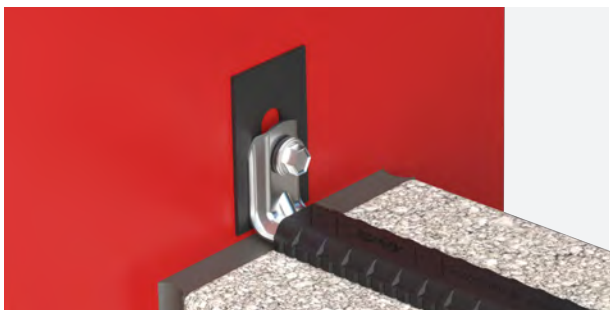
Debonding Sleeve

Keyfix Debonding Sleeve is designed to fit Keyfix PPH Movement Tie range in a 10mm vertical movement joint between masonry and a steel or concrete structure.

To ensure the Tie is installed into the Debonding Sleeve correctly, an installation hole is located at the top of the sleeve to ensure the recommended embedment is achieved. Installation of the Movement Tie beyond this hole will restrict horizontal movement of the Tie when masonry leaf expands and contracts.

Product Reference	**Product Length** (mm)
DB-120	120

Please contact Keyfix Technical team to discuss manufacturing special sizes on request.



Isolation Pad

Where a stainless steel Frame Cramp is installed against a mild steel substrate, an Isolation Pad is recommended to help eliminate risk of bi-metallic corrosion between dissimilar material in a damp environment. Isolation Pad features a slot to allow the Fixing to be installed without the need to drill through the Pad.

Test Results

Movement Tie and Debonding Sleeve range is independently tested by Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-7:2012 for shear load capacity. (Notified Body Number 1289).

Product Reference	Tie Length (mm)	Mode of Test	Vertical c/c (mm)	Design Load Capacity (N/m)
PPH-125	125 -225	Shear	300	2077
PPH-150				
PPH-175				
PPH-200				
PPH-225				

Mortar mix proportions 1:8 + plasticiser (cement: sand + plasticiser by volume) in accordance with BS EN 998-2:2016. Compressive Strength of mortar was 4.23 N/mm² (M4 Mortar) in accordance with BS EN 1015-11:2019.

Design Load Capacity use a partial factor for a material property (γ_M) of 3, as stated in UK National Annex to BS EN 1996-1-1:2006 (Eurocode 6).

The Design Load Capacity shown should be used with factored wind loads.

Keyfix PPH - Fixing to SFS Internal Structure

Keyfix Recommendations:

- Use Keyfix Steel Fixing Screw (KSFS) when fixing PPH Frame Cramp Movement Tie to steel inner structure, ensuring correct KSFS is selected to suit substrate thickness (see page 80).
- Use an Isolation Pad when installing to mild steel internal substrate to prevent bi-metallic corrosion.

Keyfix PPH - Fixing to Concrete Internal Structure

Keyfix Recommendations:

- Use Concrete Fixing when fixing PPH Frame Cramp Movement Tie to concrete inner structure (see page 81).
- A pilot hole to suit the Fixing requirements should be drilled and cleaned of debris before installing.
- Fixing should not be removed and reinstalled in the same hole as this compromises pull-out performance of Fixing. If Fixing is required to be removed, it is recommended that a new Fixing be used and repeat installation steps.

Keyfix PPL Frame Cramp Movement Tie

The Keyfix PPL Frame Cramp Movement Tie range is to be installed with a Keyfix Debonding Sleeve at a vertical movement joint between a masonry panel and a concrete or steel structure, allowing for expansion and contraction of the masonry. The PPL Movement Tie range features a Slotted Upstand to facilitate a 20mm vertical adjustment to the installation position of the Tie.

Key Features

- Designed in accordance with PD 6697:2019
- UKCA and CE Accredited
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)
- Slotted Upstand to provide 22mm vertical adjustment during installation
- Debonding Sleeve manufactured from Recycled Polypropylene (rPP)
- Allows for expansion and contraction of the masonry whilst restraining lateral loads

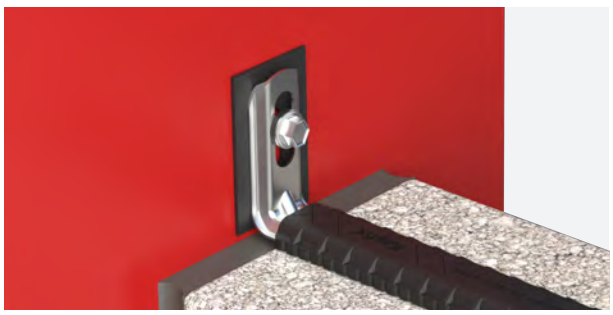
Debonding Sleeve

Keyfix Debonding Sleeve is designed to fit Keyfix PPL Movement Tie range in a 10mm vertical movement joint between masonry and a steel or concrete structure.

To ensure the Tie is installed into the Debonding Sleeve correctly, an installation hole is located at the top of the sleeve to ensure the recommended embedment is achieved. Installation of the Movement Tie beyond this hole will restrict horizontal movement of the Tie when masonry leaf expands and contracts.

Product Reference	**Product Length** (mm)
DB-120	120

Please contact Keyfix Technical team to discuss manufacturing special sizes on request.



Isolation Pad

Where a stainless steel Frame Cramp is installed against a mild steel substrate, an Isolation Pad is recommended to help eliminate risk of bi-metallic corrosion between dissimilar material in a damp environment. Isolation Pad features a slot to allow the Fixing to be installed without the need to drill through the Pad.

Test Results

Movement Tie and Debonding Sleeve range is independently tested by Lucideon to conform to BS EN 845-1:2013+A1:2016 and test method BS EN 846-7:2012 for shear load capacity. (Notified Body Number 1289).

Product Reference	Tie Length (mm)	Mode of Test	Vertical c/c (mm)	Design Load Capacity (N/m)
PPL-125	125 -225	Shear	300	700
PPL-150				
PPL-175				
PPL-200				
PPL-225				

Mortar mix proportions 1:8 + plasticiser (cement: sand + plasticiser by volume) in accordance with BS EN 998-2:2016. Compressive Strength of mortar was 4.23 N/mm² (M4 Mortar) in accordance with BS EN 1015-11:2019.

Design Load Capacity use a partial factor for a material property (γ_M) of 3, as stated in UK National Annex to BS EN 1996-1-1:2006 (Eurocode 6).

The Design Load Capacity shown should be used with factored wind loads.

Keyfix PPL - Fixing to SFS Internal Structure

Keyfix Recommendations:

- Use Keyfix Steel Fixing Screw (KSFS) when fixing PPL Frame Cramp Movement Tie to steel inner structure, ensuring correct KSFS is selected to suit substrate thickness (see page 80).
- Use an Isolation Pad when installing to mild steel internal substrate to prevent bi-metallic corrosion.

Keyfix PPL - Fixing to Concrete Internal Structure

Keyfix Recommendations:

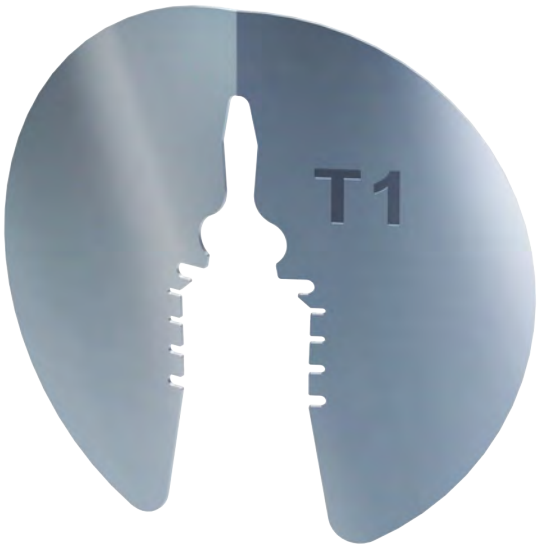
- Use Concrete Fixing when fixing PPL Frame Cramp Movement Tie to concrete inner structure (see page 81).
- A pilot hole to suit the Fixing requirements should be drilled and cleaned of debris before installing.
- Fixing should not be removed and reinstalled in the same hole as this compromises pull-out performance of Fixing. If Fixing is required to be removed, it is recommended that a new Fixing be used and repeat installation steps.


keyfix.com

Ancillary Components

Keyfix Non-combustible Retaining Disc

Keyfix Non-combustible Retaining Disc (NCRD) is compatible with Keyfix Wall Tie Range and the majority of other Type 1 Ties and Frame Cramps available. The NCRD has a unique patented spring loaded design which clamps onto the main body of the Tie, allowing the Disc to slide along the Tie to retain the insulation in its required position.

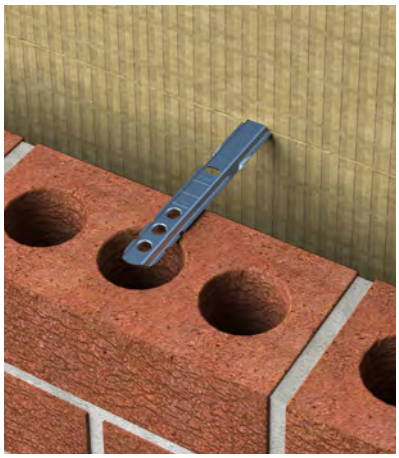


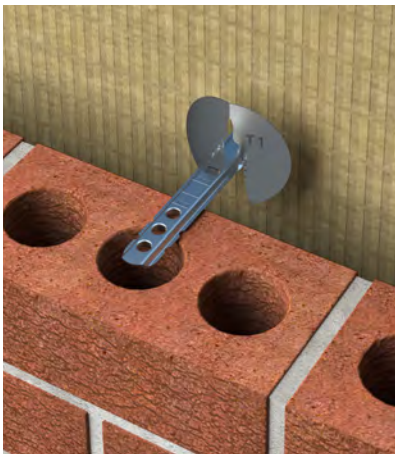
Key Features

- Accommodates all insulation thicknesses
- Provides restraint to the insulation
- Requires no additional Fixings
- Manufactured from Grade 304 Austenitic Stainless Steel (Grade 316 available on request)

Installation Guidance

- Fold Keyfix NCRD as shown in image 2, rotate Disc to engage with Tie between the drip feature and the insulation face.
- Slide the Disc towards the insulation.





Compatibility

Keyfix Non-combustible Retaining Disc is compatible with the following Wall Tie types:

- KT1 Wall Tie
- EDH Frame Cramp
- EDL Frame Cramp
- Majority of other Type 1 Ties and Frame Cramps e.g. WT1, ST1 and Basalt Fibre Composite Wall Ties, WTS2U and SDB/V

Keyfix Insulation Retaining Disc

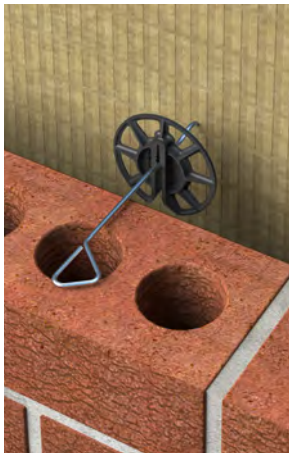
Keyfix Insulation Retaining Disc (KIRD) is designed to work with the Keyfix Wall Tie range to retain the insulation in its required position. The KIRD uses a clamping mechanism to install onto the Tie, enabling the Disc to slide along the Tie to retain the insulation in its required position.

Key Features

- Accommodates all insulation thicknesses
- Provides restraint to the insulation
- Requires no additional Fixings
- Manufactured from Recycled Polypropylene (rPP)

Installation Guidance

- Install the KIRD on the Tie between the Drip feature and the insulation face.
- Slide the Disc towards the insulation.



Compatibility

The Keyfix Insulation Retaining Disc is compatible with the following Keyfix ranges:

Blue

KT1 Wall Tie

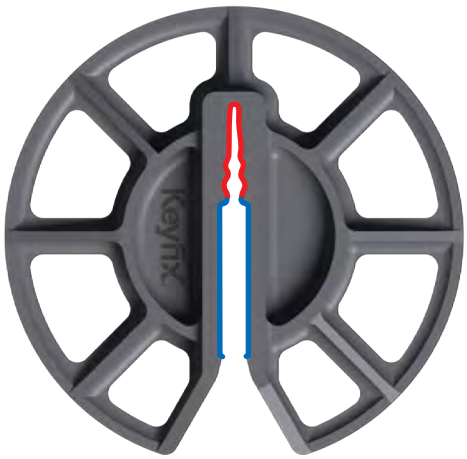
EDH Frame Cramp

EDL Frame Cramp

Red

KT2 Wall Tie

KT4 Wall Tie



Keyfix Insofast Products

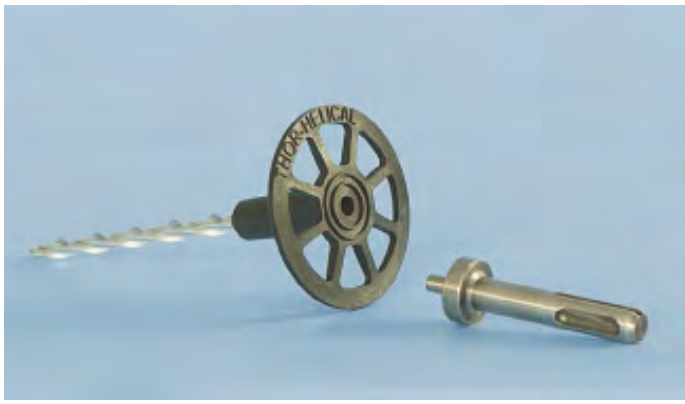
Plasterboard Insulation Fixing

- Fire-proof mechanical fixing for plasterboard insulation
- Quick & easy to use
- Dependable performance
- Countersinks without tearing
- Dished head retains filler
- Highly versatile in a wide range of construction materials
- Fixes plasterboard to light-weight block without pre-drill
- Fixes to concrete block & brick with tiny pilot hole

Flat Roof Fixing

- Quick and easy to use
- Reduced cold bridging
- Fewer fixings - reduced labour
- Alleviates splitting of joists or rafters
- High degree of fire resistance
- Shallow dome head leaves no sharp edges
- Fix with hammer or rapid SDS drill adapter
- Dependable performance

External Wall Insulation Fixing



- Integral thermal break collar
- Quick and easy to use
- Fewer fixings - reduced labour
- Reduced cold bridging
- Dependable performance
- Highly versatile in a wide range of construction materials
- Fix with hammer or SDS drill adapter
- Fixes into concrete and masonry with tiny pilot hole
- Fixes directly into lightweight block without pre-drilling

Soffit / Mesh Anchor

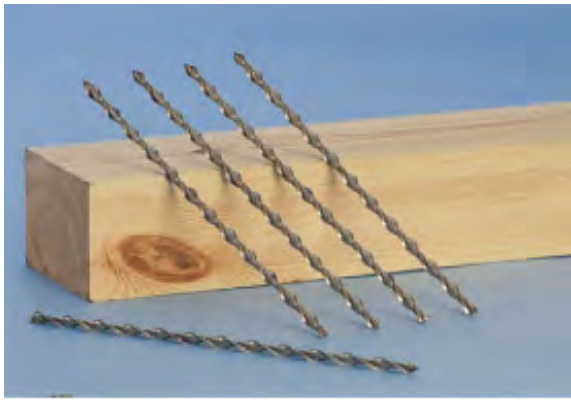
- High degree of fire resistance
- Quick and easy to use
- Fewer fixings - reduced labour
- Reduced cold bridging
- Dependable performance
- Highly versatile in a wide range of construction materials
- Fix with hammer or SDS drill adapter
- Fixes into concrete and masonry with tiny pilot hole
- Fixes directly into lightweight block without pre-drilling

Thin Joint Wall Tie

- Rapid hammer driven installation
- Suitable for use in all makes of Aircrete
- Patented helix consistency
- Precise helical interlock anchorage
- Combines strength & flexibility
- Robust & corrosion free
- Independently tested & verified
- Complies with Part E as Type B Tie
- Meets the requirements of NHBC

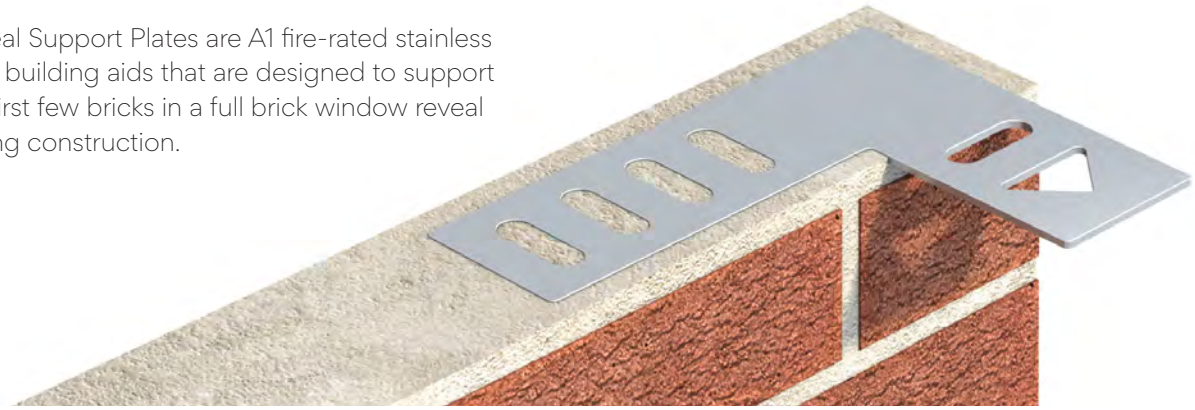
Warm Roof Insulation Fixing

- Stronger stiffer fixings – prevents buckling
- Withstands all structural loads
- Suitable for 150mm deep insulation
- Improved build quality & reliability
- Reduced density & cold bridging
- Cost effective - up to 66% less nailing
- Independently tested & verified
- BRE approved design method
- Meets the requirements of NHBC
- Part L compliant



Keyfix Reveal Support Plate

Reveal Support Plates are A1 fire-rated stainless steel building aids that are designed to support the first few bricks in a full brick window reveal during construction.



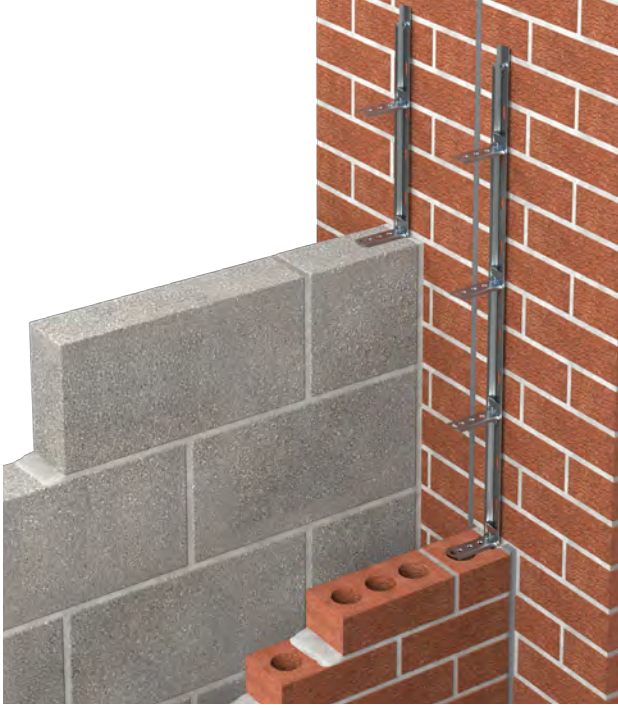
Key Features

- UKCA and CE Accredited
- Manufactured from A1 Non-combustible Grade 304 Stainless Steel
- Suits 215 and 327.5mm reveals
- Suitable for bonded brick patterns i.e. stretcher and flemish
- Quick and easy installation

Installation Guidance

- Reveal Support Plates are a building aid and applied loads should never exceed 0.15kN.
- Higher capacity plates for different reveal depths and stacked bond patterns are also available and are designed to order.

Wall Starter Systems



Keyfix KWSK Wall Starter Kit

Keyfix Wall Starter Kit (KWSK) is designed to secure a 2.4m high brickwork or blockwork masonry leaf to an existing masonry structure, suitable for both internal and external walls from 60 to 250mm thick. Overlapping Wall Starter Rails allows for installing new masonry leaves up to a maximum of three storeys (8m) high.

Key Features

- Third party performance tested by UKAS Accredited Laboratory, Lucideon Ltd.
- Manufactured from A1 Non-combustible Grade 430 Stainless Steel
- Suitable for installation within 60 - 250mm wide brickwork/blockwork
- Tie designed to allow for easy vertical adjustment within Rail

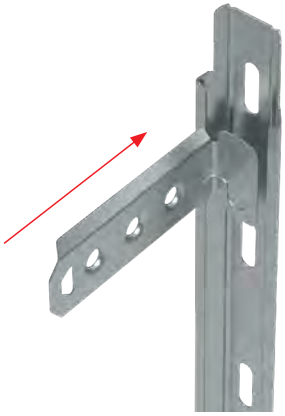
KWSK Contents

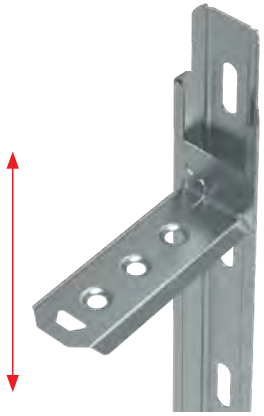
Each kit contains the following to suit a single leaf of masonry up to 2.4m high:

- 2 x Wall Starter Rails
- 10 x Wall Starter Ties
- 5 x Fixing Sets including Plugs, Coach Screw and washers

KWSK Tie Installation

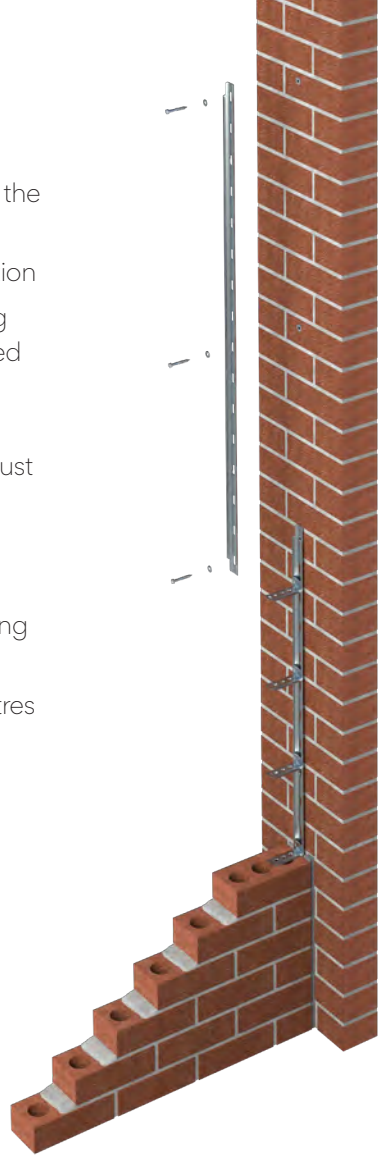
Wall Starter Ties included with each kit are inserted into the Wall Starter Rail and rotated 90° to lock securely in place. Once installed, the Ties can be adjusted vertically within the Rail to accommodate brickwork and blockwork coursing.





Installation Guidance

- Remove any render, pebble dash and debris from the existing wall
- Mark centreline using Spirit Level at new wall position
- Mark Fixing locations that are evenly spaced along the length of Rails, ensuring there is a Fixing located at the overlap
- Using SDS Drill and 12mm masonry drill bit, drill 50mm deep pilot holes, ensure holes are free of dust and debris before inserting Plugs
- Position bottom Rail and loosely fix using Fixings provided, then repeat for top Rail
- With both Rails in position, fully tighten Fixings using Screwgun
- Build new masonry and install Ties at 225mm centres by twisting Tie into Rail



Additional Guidance for heights over 2.4m

For new masonry leafs exceeding 2.4m, additional KWSK are required. Additional Rails can be overlapped and installed following the same installation procedure, up to a maximum height of 8m.

External Wall

- Follow installation procedure while ensuring the bottom edge of the Wall Starter Rail is positioned above the DPC level.
- A 10mm weather seal should be applied between the connector and the existing wall using a pre-compressed sealing strip or a flexible mastic sealer.
- Following best practice, ensure the vertical joint between the existing and new wall is appropriately weather sealed to avoid risk of moisture ingress between new external and internal masonry leaf.

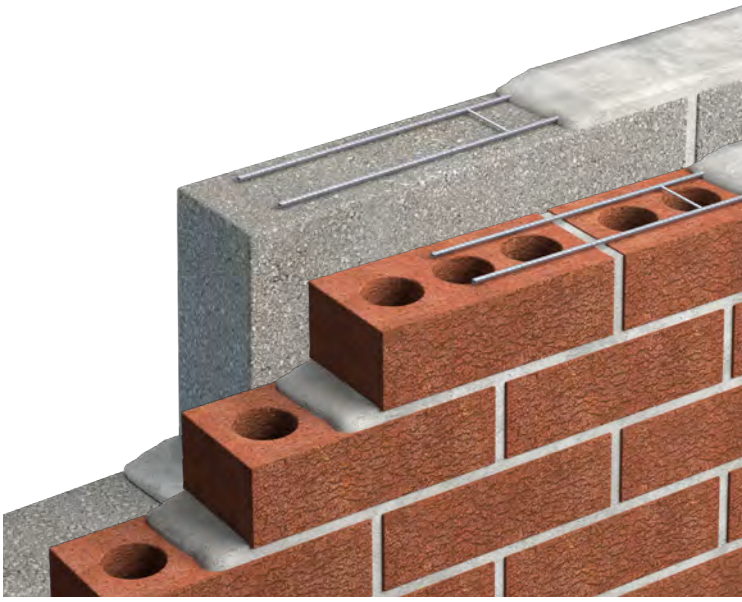
Test Results

Keyfix KWSK Wall Starter Kit is independently tested within Lucideon. (Notified Body Number 1289)

Product Reference	Kit Length (m)	Mode of Test	Ultimate Load Capacity (N/m)	Design Load Capacity (N/m)
KWSK	2.4	Shear	6858	2286

Masonry Reinforcement

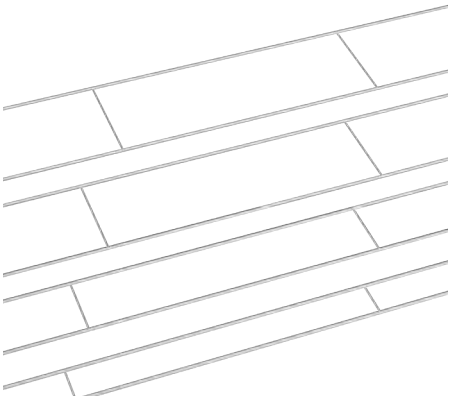
Keyfix KBJR
Bed Joint Reinforcement



Keyfix KBJR Bed Joint Reinforcement range is a ladder style masonry reinforcement designed to help control the movement in masonry caused by shrinkage, stress and thermal movement. KBJR helps reduce the risk of cracking occurring in masonry walls and facades constructed from standard brickwork or blockwork up to 215mm wide.

Key Features

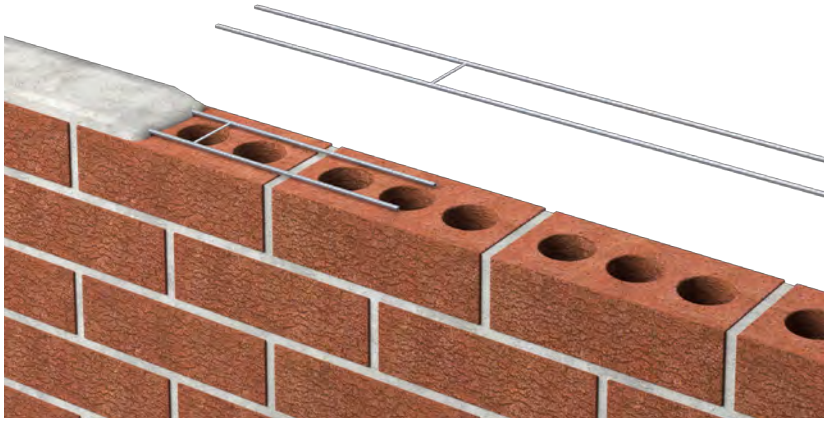
- UKCA & CE Accredited
- Manufactured from A1 Non-combustible Grade 304 Stainless Steel
- Supplied in 2.7m lengths, 20 lengths per pack to give 54m per pack
- Four standard KBJR widths to suit up to 215mm wide blockwork
- Flattened profile wire provides improved anchorage



Flattened Wire Profile

KBJR range is manufactured with a unique flattened wire profile, providing maximum anchorage within the bed joint. This increases the bond strength, as well as the flexural and tensile strength, ensuring maximum mortar coverage within the joint.

KBJR 2.75mm cross wires are sized to help ensure the maximum mortar coverage and to create a robust and durable reinforcement strip. Cross wires are welded in-line to avoid steel build up problems within the mortar joint.



Installation Guidance

To ensure there is no weakness in performance along the masonry wall, an overlap of at least 225mm and at least one crosswire should be achieved during installation.

Test Results

Keyfix KBJR range is independently tested within Lucideon to conform to BS EN 845-3:2013+A1:2016 - Specification for ancillary components for masonry - Bed joint reinforcement of steel meshwork.

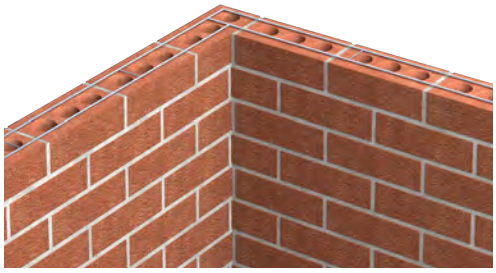
CE Mark in accordance with clause 4:2:2 of the standard. (Notified Body Number 1289)

Product Reference	Ladder Width (mm)	Wall Thickness (mm)	Main Wire Diameter (mm)	Bond Strength (N)	Shear Load Capacity of Welds (N)
KBJR-30W60	60	102 brick or 100 block	3	8370	3500
KBJR-40W60			4	14450	
KBJR-30W100	100	140 block	3	7917	
KBJR-40W100			4	8540	
KBJR-30W150	150	190 or 200 block	3	7917	
KBJR-40W150			4	8540	
KBJR-30W175	175	215 block	3	7917	
KBJR-40W175			4	8540	

Custom Made Keyfix KBJR

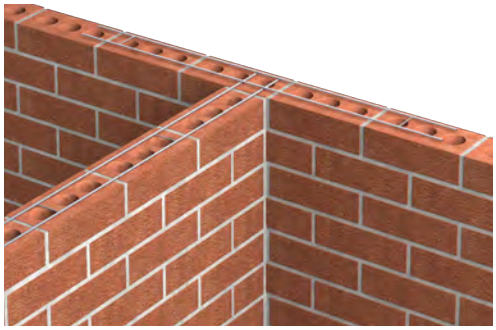
Keyfix KBJR can be custom made in a variety of widths and shapes to accommodate bespoke details. Due to the use of engineered units allowing for continuity of the Keyfix KBJR range, the structural integrity of the masonry can be maintained to prevent cracking across the detail.

Please contact Keyfix Technical Team to discuss.



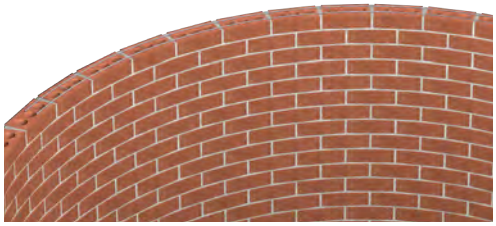
KBJR Corner

Product Reference	Ladder Width (mm)	Wall Thickness (mm)	Corner Dimensions (axb) (mm)	Main Wire Diameter (mm)
KBJRC-30W60	60	100	900 x 900	3
KBJRC-40W60				4
KBJRC-30W100	100	140		3
KBJRC-40W100				4



KBJR Tee

Product Reference	Ladder Width (mm)	Wall Thickness (mm)	Corner Dimensions (axb) (mm)	Main Wire Diameter (mm)
KBJRT-30W60	60	100	900 x 900	3
KBJRT-40W60				4
KBJRT-30W100	100	140		3
KBJRT-40W100				4



Custom Made Brick Track

Contact Keyfix Technical Team to discuss custom made Brick Track to provide continuity around radiused masonry structures.


keyfix.com

Fixings

Keyfix Steel Fixings

Keyfix offers a range of steel Fixings to be used when installing to different steel gauges.

Keyfix Steel Fixing Screws (KSFS)

KSFS Fixing range are self-drilling screws to be used when installing into steel framing systems. The KSFS drill point and lead-in threads are designed to require no pre-drilling of substrate before fixing into substrate. KSFS Fixing range is offered with two types of drill points to suit different substrate thicknesses:

2PT Drill Point
to suit 1.2 – 3.2mm
light duty substrate

5PT Drill Point
to suit 4.0 – 12.0mm
heavy duty substrate

During installation, Keyfix recommend installing Fixing using a Screwgun with a drill speed range of 1800 to 2500RPM and a recommended torque of 5Nm per Fixing. Impact Drivers are not recommended.

KSFS Fixing range are pre-assembled with a Ø16mm EPDM sealing washer. Over tightening of Fixing and washer combination can cause water ingress due to damaging washer.

		Keyfix Product Code		
	Substrate Thickness	KSFS-2PT-35	KSFS-2PT-55	KSFS-5PT-55
Material		Grade 304 Stainless Steel		
Thread Diameter (mm)		5.5		
Fixing Length (mm)		37	57	55
Effective Thread Length (mm)		16	36	27
Substrate Thickness (mm)		1.2 - 3.2		4.0 - 12.0
Design Pull-out Resistance Tension (kN)	1.2mm	1.40	1.40	-
	1.5mm	2.40	2.40	-
	2.0mm	3.34	3.34	-
	2.4mm	3.80	3.80	-
	3.0mm	5.27	5.27	-
	4.0mm	-	-	4.97
	6.0mm	-	-	7.49
	8.0mm	-	-	7.93
	10.0mm	-	-	7.93
	12.0mm	-	-	7.93
Design Resistance Shear (kN)		3.23		3.75
Screw Drive Type		8mm Hex Socket		
Recommended Drill Speed (RPM)		1800 - 2500		
Installation Torque (Nm)		5		

Note:

- Pull-Out tests in accordance with EAD 330046-01-0602.
- Fasteners are classified as A1 according to EN 13501-1 in accordance with EC Decision 96/603/EC without need for further testing.
- Values shown are laboratory test results and should be taken as a guide for design purposes.
- Partial Safety Factor (γ_M) = 1.33 in accordance with EAD-330046-01-0602 where no value is given in national regulations of the Member State.
- Fixings should be specified to suit design load requirements of Wall Tie.

Keyfix Concrete Fixings

Keyfix offers a range of concrete Fixings to be used when installing into concrete for a variety of applications.

Keyfix Plug & Screw (KCPS)

KCPS are Plug & Screw Fixings that allow for simple and effective installation into concrete and non-cracked substrates. Plug uses a two component material that ensures high material displacement and thereby facilitating higher loads.

Fixing requires a pilot hole to be drilled into the substrate and cleaned before installation.

Keyfix Product Code		
	KCPS08-40	KCPS08-65
Material	Nylon Plug with Stainless Steel Screw	
Plug Diameter (mm)	8	
Plug Length (mm)	40	65
Screw Diameter (mm)	6	
Screw Length (mm)	50	80
Max. Fixing Thickness (mm)	5	
Pilot Hole Diameter (mm)	8	
Min. Pilot Hole Depth (mm)	55	85
Ultimate Pull-out Resistance Tension (kN)	3.46	-
Design Pull-out Resistance Tension (kN)	1.15	2.30
Min. Edge Distance (mm)	50	
Screw Drive Type	8mm Hex Socket	

Note:

- Test performance declared is based upon Fixing tested in C20/25 cracked concrete.
- Fixings should be specified to suit design load requirements of Wall Tie.

Keyfix Throughbolt (KCTB)

KCTB are high performance stainless steel anchors to be installed in cracked and non-cracked concrete.

Fixing requires a pilot hole to be drilled into the substrate and cleaned before installation.

Keyfix Product Code			
	KCTB06-1-FI-65*	KCTB06-7-FI-55*	KCTB08-1-FI-75*
Anchor Classification	Option 1	Option 7	Option 1
Material	Stainless Steel		
Fixing Diameter (mm)	6		8
Fixing Length (mm)	65	55	75
Max. Fixture Thickness (mm)	10		
Pilot Hole Diameter (mm)	6		8
Min. Pilot Hole Depth (mm)	49.5	40	47.5
Min. Recommended Fixing Embedment (mm)	46.5	30	44.5
Char. Pull-out Resistance Tension (kN)	1.5	6	5.5
Char. Resistnace Shear (kN)	8.8	5.3	17.6
Min. Edge Distance (mm)	40		
Min. Spacing	35	40	35
Screw Drive Type	10mm Hex Socket		13mm Hex Socket
Installation Torque (Nm)	8	4	20

Note:

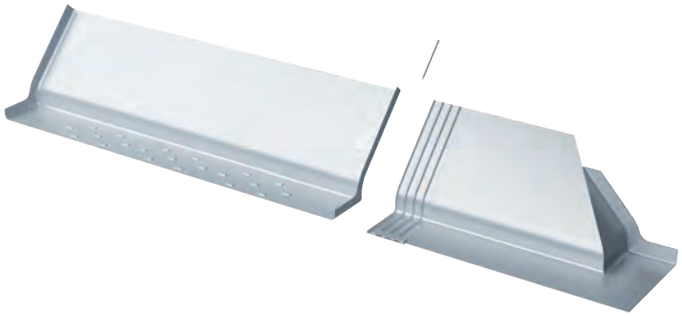
- *Test performance declared is based upon Fixing tested in C20/25 cracked concrete
- Fixings should be specified to suit design load requirements of Wall Tie.

Keyfix Range

Keyfix specialises in the development of non-combustible masonry accessories, providing the complete non-combustible cavity solution for external masonry facades in high rise building projects.

Keyfix Non-combustible Cavity Tray System

Keyfix is setting new standards in the delivery of Non-combustible Cavity Tray Systems for projects requiring Document B compliance in buildings utilising steel frame systems in the external cavity.



Keyfix Non-combustible Cavity Tray Lintel

The NCCTL is for use in an exterior masonry skin in conjunction with a non-masonry inner leaf such as a steel frame system, the NCCTL is a highly efficient and practical solution to the challenge of non-combustible cavity detailing.

Keyfix Non-combustible Stainless Steel Weep

The Keyfix Non-combustible Stainless Steel Weep (NCW) range is a Document B compliant component. Manufactured entirely from Class A1 Non-combustible Grade 304 Stainless Steel.


THE VANTAGE

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Keyfix Limited GB
Ryder Close
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V1 01 / 25

This Brochure will undergo various updates as we continually develop our innovative range of products.
Please contact a member of our Technical team for the latest information about Keyfix products.