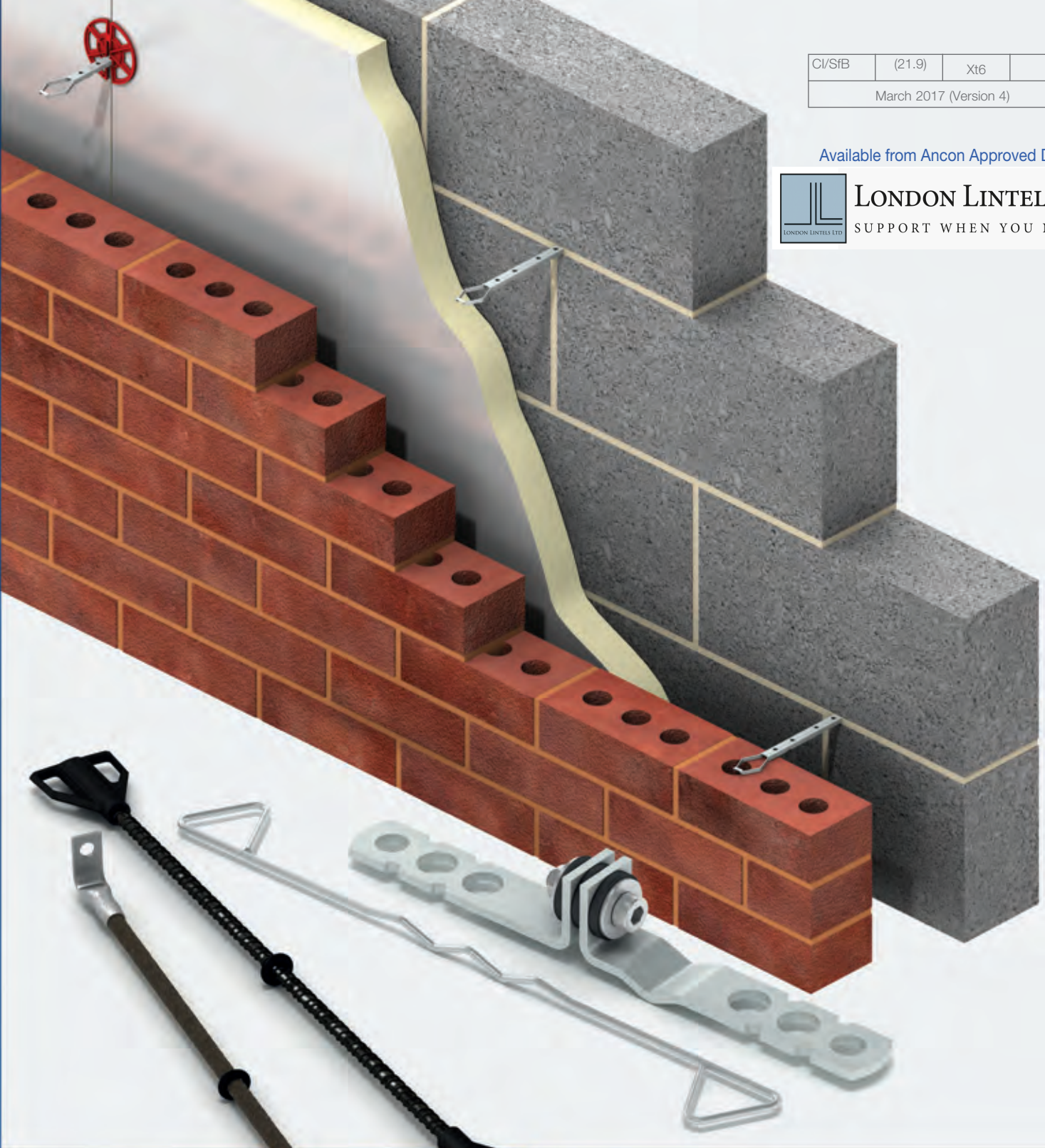


CI/SfB	(21.9)	Xt6	
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# Ancon<sup>®</sup>

## Wall Ties & Restraint Fixings

for the Construction Industry

**CE**  
BS EN 845-1

# Wall Ties and Restraint Fixings

For building with brick, block and stone

Wall ties and restraint fixings are an essential element in the stability of masonry panels.

Ancon manufactures fixings in a variety of lengths and types for restraining brickwork, blockwork and stonework. Restraints can be fixed to concrete and structural steelwork as well as any type of masonry.

Products are manufactured from stainless steel unless stated otherwise.

The range of standard ties provides a solution for all types of wall construction and many products can be delivered in 24 hours. These items are shown in *red italics*.



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Cavity Wall Tie  
Product Selector  
App



CPD Seminars  
available



CE marking to  
BS EN 845-1



Product information  
in NBS format



ISO 9001, ISO 14001  
& OHSAS 18001



BIM Objects  
available

## CE Marking

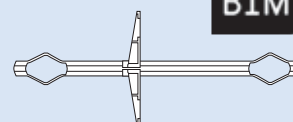
Construction products which fall within the scope of a harmonised European Standard should carry CE Marking under the EU Construction Products Regulation. For wall ties, the harmonised standard is BS EN 845-1. Ancon complies with all requirements of this legislation, including independent testing by a notified body, and our literature identifies the products affected with a CE logo.

For more information or to download a Declaration of Performance, please visit [www.ancon.co.uk/CE](http://www.ancon.co.uk/CE).



## Building Information Modelling

A number of Ancon wall ties are available as BIM Objects for use in a 3D building model and its associated component database. Visit [www.ancon.co.uk/BIM](http://www.ancon.co.uk/BIM) or the NBS National BIM Library to download our objects in Revit, IFC, ArchiCAD, Vectorworks and Bentley file formats.



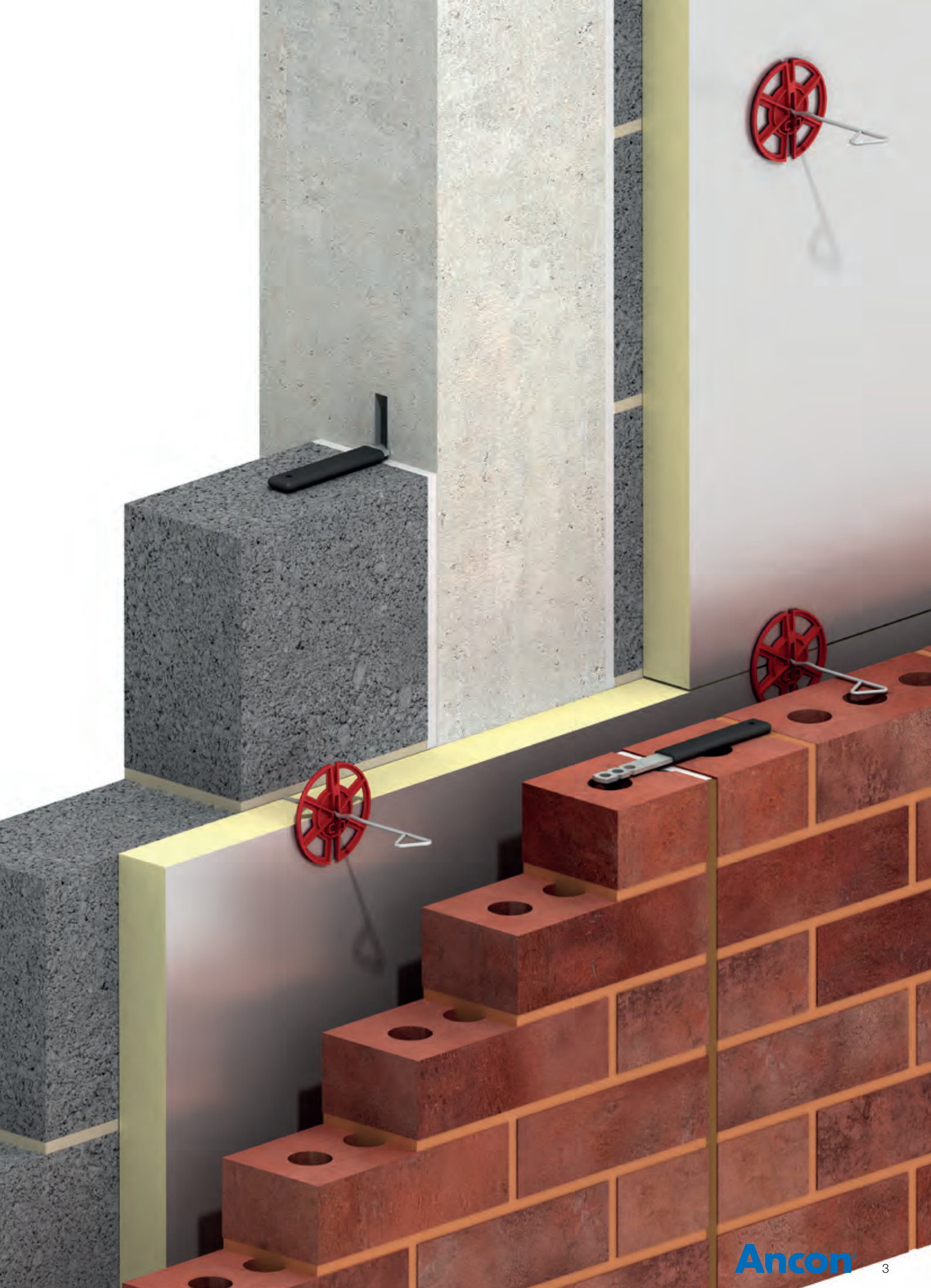
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# Wall Ties and Restraint Fixings



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## Cavity Wall Tie Selection

The selection and spacing of wall ties depend on many factors. These include type of masonry to be tied, cavity width, type and height of building and geographical location. There are several documents which need to be consulted and are summarised here.

### Eurocode 6 – Design of Masonry Structures (BS EN 1996-1-1: 2005)

In 2010, Eurocode 6 became the main code for the design of reinforced and unreinforced masonry. Eurocode 6 refers to EN 845-1 for wall ties and sets the density of ties per square metre based on the declared value of the tie. The material factor of 3.0 for detailed calculations is specified in the UK National Annex.

### BS EN 845-1: 2013 Specification for Ancillary Components for Masonry – Part 1: Wall Ties, Tension Straps, Hangers and Brackets

This European Standard specifies the requirements for wall ties used for interconnecting masonry and for connecting masonry to beams, columns or other parts of the building. Materials, tolerances, tie variations and the requirements for declared values, are all covered in this standard. For tie Types and qualifying criteria refer to PD 6697.

### CE Marking

Construction products which fall within the scope of a harmonised European Standard must carry CE marking before they can legally be sold in the European Economic Area. For wall ties, the harmonised standard is BS EN 845-1 detailed above. Ancon complies with all requirements of this legislation and our literature identifies the products affected with a CE logo. For more information or to download a Declaration of Performance, please visit [www.ancon.co.uk/CE](http://www.ancon.co.uk/CE).



### PD 6697: 2010 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2

Published Document 6697 contains non-contradictory, complementary information from the withdrawn British Standard BS 5628, which was not included in the BS EN 1996 series.

It includes recommendations on tie lengths, embedment, density, material and positioning. Masonry-to-masonry ties are classified as Types 1 to 4; the relevant classification is determined by strength, function and use. Minimum declared values for tension and compression are listed on page 5 for each tie Type.

### Approved Document E: Resistance to the Passage of Sound

This document specifies the acoustic performance requirements of ties suitable for use in separating walls (Type A) and external walls (Type B) of new build dwellings.



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Type A ties must have a measured dynamic stiffness of  $<4.8\text{MN/m}^2$  for the specified minimum cavity, at a standard density. Type A ties in this literature are indicated by this logo e.g. Staifix HRT4, page 8.



All Ancon ties which cross a cavity meet the requirements of Type B.

### BS 5628, Code of Practice for the Use of Masonry

BS 5628 was withdrawn when the Eurocode became the accepted National code in March 2010. The majority of information in this British Standard has been reproduced in PD 6697.

### BS 5268-6.1: 1996 (Incorporating Amendments No. 1 and 2): Structural use of timber – Dwellings not exceeding seven storeys

BS 5268 provides recommendations for wall ties for timber framed buildings. Information is provided for the type of structure, location, embedment, density and positioning. These ties are classified as Types 5 to 7; minimum declared values in tension and compression are listed for Types 5 and 6.

Although BS 5268 was officially withdrawn on the full implementation of Eurocodes in March 2010, timber frame wall ties should continue to be selected from Types 5 to 7 as given in Annex B of BS 5268 Part 6.1: 1996, until further guidance is made available.

### Wind Code Variations

Masonry wall ties should be selected from the Types in PD 6697 and timber frame wall ties should be selected from the Types in BS 5268. These two documents use different Wind Codes.

The maximum wind speeds referred to in PD 6697 are based on ten minute return periods according to the current Wind Code BS EN 1991-1-4: 2005.

The geographical locations in BS 5268-6.1 are based on hourly return period wind speeds according to BS 6399-2: 1997.

Wall tie Types and the appropriate wind speed maps are shown on page 5.

### Wall Tie Product Selector

Available on the Ancon website or as an App, this easy to use product selector enables selection of the most appropriate wall ties for your application. Simply answer a series of multiple choice questions about wall type, inner leaf construction, building type and height, insulation and cavity width, to arrive at the required solution.



App available for iPhone and Android devices

## Minimum Requirements for Wall Ties to PD 6697: 2010 (Table 12) and BS 5268-6.1: 1996 (Annex B)

Type of Tie	Minimum Mortar Class and Designation	Tensile Load Capacity (N)	Compressive Load Capacity (N)
1	M2 (iv)	2500	2500 (2000)
2	M2 (iv)	1800	1300 (1050)
3	M2 (iv)	1100	800 (650)
4	M2 (iv)	650	450 (350)
5	M4 (iii)	600	425
6	M4 (iii)	630	440
7	M4 (iii)	To be declared by the Wall Tie Manufacturer	

Bracketed compression values are those confirmed for inclusion in the next issue of PD6697 following a change to test procedures in BS EN 846-5:2012 which affects wall tie tests from August 2015 and are applied by Ancon as appropriate.

## Masonry-to-Masonry Wall Tie Types to PD 6697: 2010

Type	Application	Density	Maximum Building Height	Geographical Location
<b>Type 1</b>	Heavy duty tie suitable for most building sizes and types. Not very flexible and not recommended for applications where there is expected to be excessive differential movement between leaves	2.5 ties/m <sup>2</sup> 3-4 ties/m <sup>2</sup> at unbonded edges	Any Height	Suitable for most sites. However, for relatively tall or unusually shaped buildings in vulnerable areas such as coastal sites, the tie provision should be calculated
<b>Type 2</b>	General purpose tie for domestic and small commercial buildings	As Type 1	15m	Suitable for flat sites where the basic wind speed is up to 31m/s and altitude is not more than 150m above sea level
<b>Type 2 ties are suitable for use outside the parameters stated e.g. sites over 150m above sea level, buildings exceeding 15 metres etc, if shown to be adequate by calculation. Contact Ancon for more information.</b>				
<b>Type 3</b>	Basic wall tie generally as Type 2 above	As Type 1	15m	Suitable for flat sites where the basic wind speed is up to 27m/s and altitude is not more than 150m above sea level
<b>Type 4</b>	Light duty wall tie suitable for box-form domestic dwellings with leaves of similar thickness	As Type 1	10m	Suitable for flat sites in towns and cities where the basic wind speed does not exceed 27m/s and altitude is not more than 150m above sea level

Note: Refer to PD 6697: 2010 and BS EN 1991-1-4: 2005 for complete information.



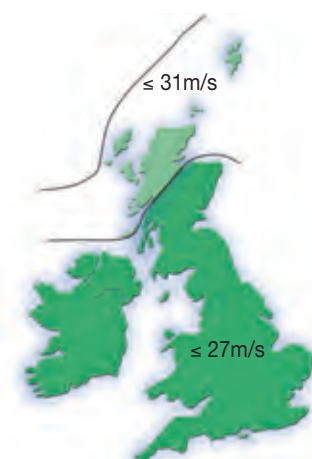
## Masonry-to-Timber Tie Types to BS 5268-6.1: 1996

Type	Application	Density	Maximum Building Height	Geographical Location
<b>Type 5</b>	Timber frame tie suitable for domestic houses and industrial/commercial developments of up to three storeys	4.4 ties/m <sup>2</sup> 3-4 ties/m <sup>2</sup> at unbonded edges	15m	Suitable for flat sites in towns and cities where the basic wind speed does not exceed 25m/s and altitude is not more than 150m above sea level
<b>Type 6</b>	As Type 5 but suitable for developments of up to four storeys	As Type 5	15m	Suitable for flat sites in towns and cities where the basic wind speed does not exceed 25m/s and altitude is not more than 150m above sea level
<b>Type 7</b>	As Type 5 but suitable for developments of between five and seven storeys, being designed to accommodate the increased vertical differential movement	Calculated for actual performance required for each site location	18m	Calculated for actual performance required for each site location

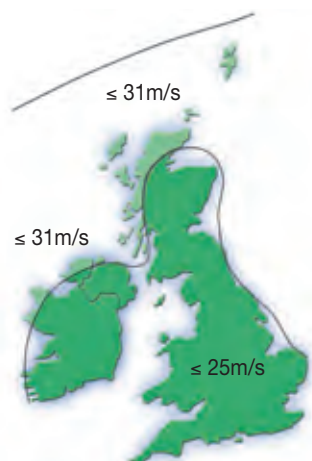
Note: Refer to BS 5268-6.1: 1996 and BS 6399-2: 1997 for complete information.

## Lime Mortars

Ancon stainless steel wall ties and Teplo-BF wall ties are suitable for use with lime mortars (minimum strength HLM2); tie selection should be based on the general guidance given here.



Wind speed information taken from BS EN 1991-1-4: 2005 for use with PD 6697: 2010.



Wind speed information taken from BS 6399-2: 1997 Code of Practice for Wind Loads for use with BS 5268-6.1: 1996.



# Wall Ties and Restraint Fixings

## Density & Positioning of Ties

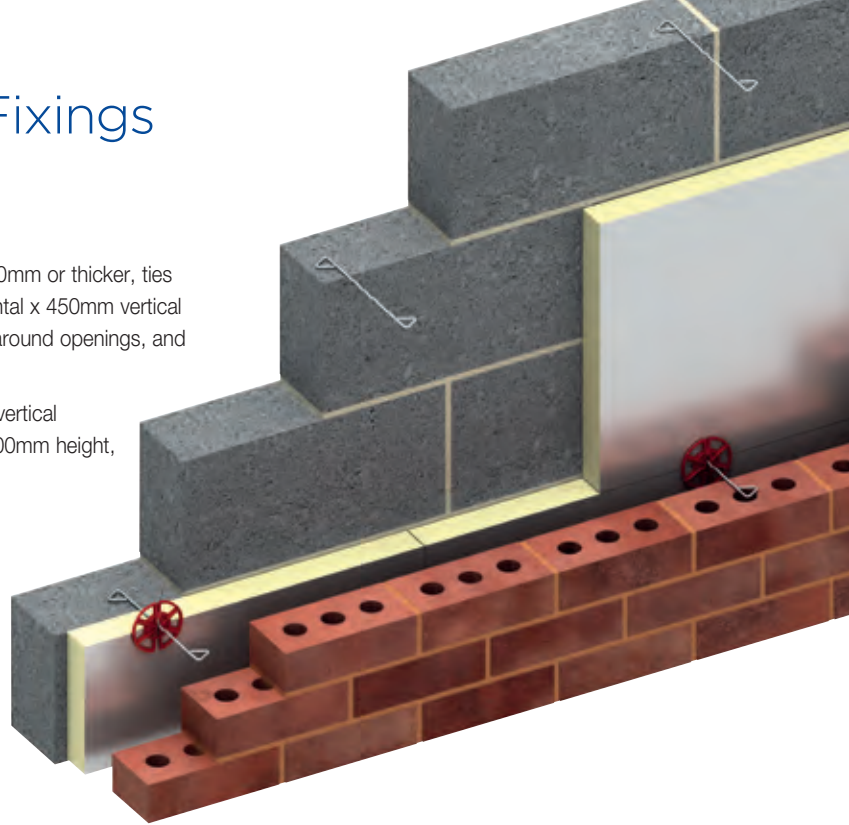
PD 6697: 2010 recommends that for walls in which both leaves are 90mm or thicker, ties should be used at not less than 2.5 per square metre (900mm horizontal x 450mm vertical centres). Ties should be evenly distributed over the wall area, except around openings, and should preferably be staggered.

At vertical edges of an opening, unreturned or unbonded edges, and vertical expansion joints, additional ties should be used at a rate of one per 300mm height, located not more than 225mm from the edge.

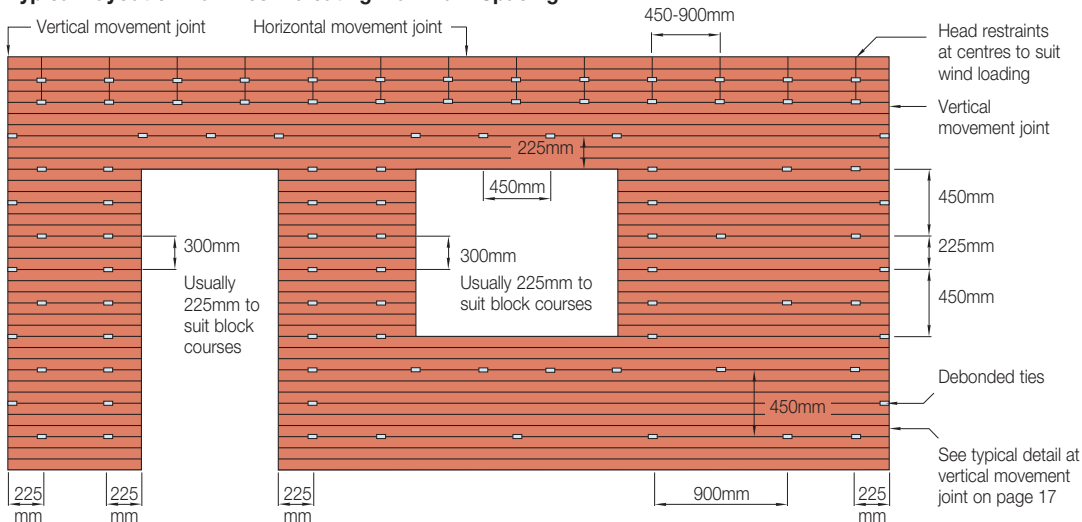
A typical layout is shown below. Various details incorporating debonding ties at vertical movement joints are shown on page 17.

### Lime Mortars

Ancon stainless steel wall ties and Teplo-BF wall ties are suitable for use with lime mortars (minimum strength HLM2). Tie length, spacing and density should be the same as for cement mortars where the performance is based on M2 (iv).



## Typical Layout of Wall Ties Indicating Maximum Spacing



Standard spacing for cavity brickwork 900mm x 450mm centres in a staggered pattern (2.5 ties per square metre)

## Length of Tie & Embedment

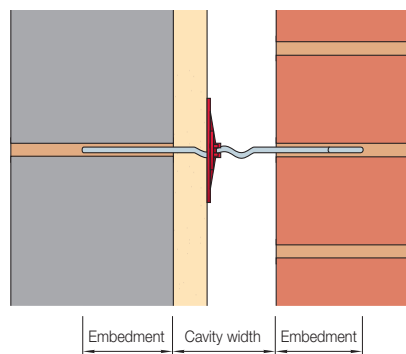
Wall ties should be of the correct length to ensure they are properly embedded in the masonry.

Masonry-to-masonry wall ties are typically symmetrical and should be centred from the middle of the cavity to ensure equal embedment in each leaf.

The minimum embedment of symmetrical Ancon wall ties, i.e. ST1, RT2, HRT4 and Teplo-BF, is 50mm in each leaf and the PD6697 Tie Types declared by Ancon are backed by independent testing at this minimum embedment.

However, Ancon recommends tie lengths which achieve a design embedment of between 62.5mm and 75mm in each leaf (see table), to allow for site tolerance in both cavity width and centring of the ties.

Longer wall ties will be required where cavities are outside the tolerance offered by Ancon and a minimum 50mm embedment cannot be achieved in each leaf.



Embedment of Wall Ties

## Recommended Lengths of Masonry / Masonry Wall Ties

Cavity Width (mm)	Length of Wall Tie (mm)
50-75	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
426-450	575

## Installation Guidance

Wall ties are important to the stability of masonry and failure to install them correctly may lead to damp penetration, cracking or even the collapse of walls.

Wall ties should be pressed down in fresh mortar. They should be surrounded by mortar and not simply positioned directly onto masonry with mortar placed around them.

Ideally, ties should be installed level or with a slight fall to the outer leaf, not towards the inner leaf as this could provide a path for moisture to cross the cavity.

The drip part of the tie should point downward and be positioned near the centre of the open cavity. Ties with multiple drips, like the Staifix RT2 and Ancon ST1, should be positioned centrally as a drip will normally be near the centre of the open section of a partial fill cavity. 'O rings' as used on the Teplo range should be moved along the shank to the open cavity.

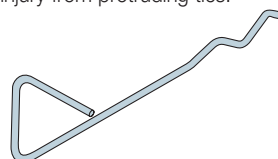
Installed ties should be clear of mortar droppings to allow the drip to function and prevent water from crossing to the inner leaf of masonry.

The practice of bending up installed wire ties should be discouraged. This can adversely affect the performance of the tie and weaken the embedment in the inner leaf. Rigid ties like the Ancon SD1 and ST1 should never be bent on site.

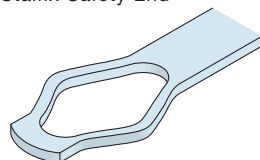
To ensure cavity wall ties are effective at tying the leaves together they should be installed as the inner leaf is constructed and not simply pushed into a joint. There is a risk of injury if wall ties are left protruding from a single wall leaf before the second leaf is constructed. Site managers should make all workers and visitors aware of this risk.

Installation guides can be downloaded from [www.ancon.co.uk](http://www.ancon.co.uk)

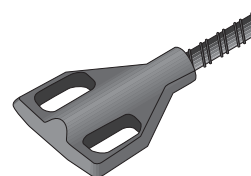
To reduce the risk of injury, Ancon's wall ties feature rounded safety ends, however, Ancon recommends both leaves of a cavity wall are built simultaneously to eliminate any risk of injury from protruding ties.



Staifix Safety End

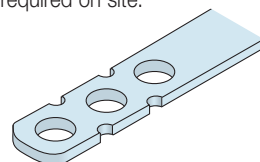


Ancon Spread Safety End

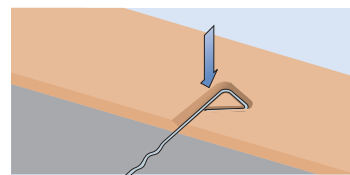


Teplo-BF Moulded Safety End

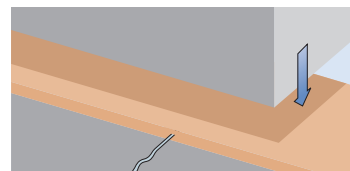
Ancon frame ties and channel ties are manufactured with a non-spread safety end and allowing the use of a debonding sleeve. This type of safety end reduces the variety of ties required on site.



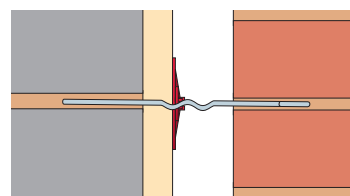
Ancon Non-Spread Safety End



Wall ties should be pressed down in, and then surrounded by, fresh mortar.



To ensure cavity wall ties are effective at tying the leaves together they should be installed as the inner leaf is constructed and not simply pushed into a joint.



Ties should be installed with a slight fall to the outer leaf, never towards the inner leaf as this could provide a path for moisture to cross the cavity.

Wall Ties with Insulation Retaining Clips



# Wall Ties and Restraint Fixings

## Low Thermal Conductivity Wall Ties to PD 6697 for Brick-to-Block Construction

### Ancon ST1 Type 1 Tie (Masonry Heavy Duty)

The Ancon ST1 is suitable for cavities from 50mm to 225mm and can be used for all types of buildings of any height, anywhere in the British Isles. The section that spans the cavity has a series of holes to provide water drips. The ST1 has a measured dynamic stiffness of  $<113\text{MN/m}^3$  that meets the performance requirement of Approved Document E for use in external masonry walls. For internal separating walls of new-build attached dwellings see HRT4. Type 1 performance is declared in M2 mortar.

### Staifix RT2 Type 2 Tie (Masonry General Purpose)

The Staifix RT2 is a general purpose tie. It is suitable for cavities from 50mm to 150mm and can be used for domestic houses and small commercial buildings up to 15 metres in height (see page 5 for geographical restrictions). In many cases, Staifix RT2 wall ties can be used in buildings greater than 15 metres if shown to be adequate by calculation. For further information please contact Ancon's Technical Services Team. The RT2 has a measured dynamic stiffness of  $<113\text{MN/m}^3$  that meets the performance requirement of Approved Document E for use in external masonry walls. For internal separating walls of new-build attached dwellings see HRT4.

### Staifix HRT4 Type 4 / Type A Tie (Masonry Light Duty)

The Staifix HRT4 is available for cavities from 50mm to 150mm. As a Type 4 tie it is suitable for use in external walls of domestic houses up to 10 metres in height (see page 5 for geographical restrictions).

The HRT4 is a Type A tie for separating walls of any height. Independent tests have proven the Staifix HRT4 has a measured dynamic stiffness of  $<4.8\text{MN/m}^3$  at a cavity of 50-100mm and 125-150mm and is therefore suitable for internal separating (party) walls of new-build attached dwellings with these cavities. The HRT4 can be used with all approved robust details for cavity masonry separating walls, whether traditional or thin-joint blockwork. Use of these details eliminates the need for pre-completion sound testing. For wall ties with greater acoustic resilience, see page 24.



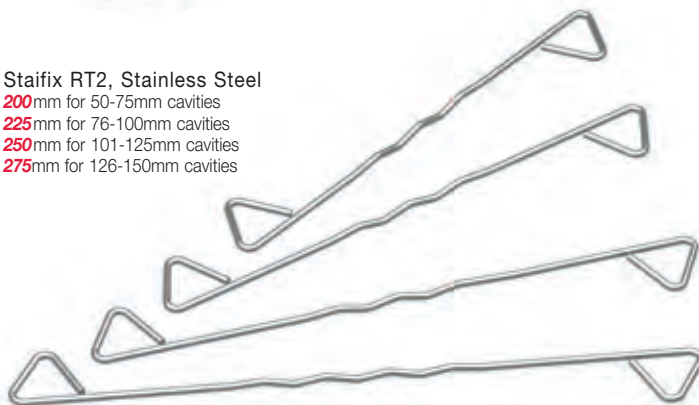
#### Ancon ST1, Stainless Steel

200mm for 50-75mm cavities  
225mm for 76-100mm cavities  
250mm for 101-125mm cavities  
275mm for 126-150mm cavities  
300mm for 151-175mm cavities  
325mm for 176-200mm cavities  
350mm for 201-225mm cavities



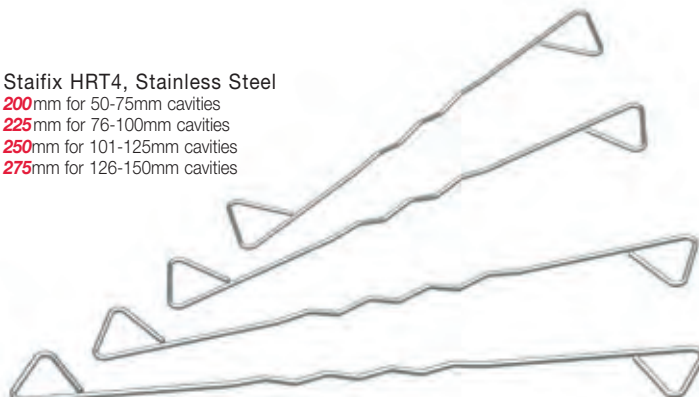
#### Staifix RT2, Stainless Steel

200mm for 50-75mm cavities  
225mm for 76-100mm cavities  
250mm for 101-125mm cavities  
275mm for 126-150mm cavities



#### Staifix HRT4, Stainless Steel

200mm for 50-75mm cavities  
225mm for 76-100mm cavities  
250mm for 101-125mm cavities  
275mm for 126-150mm cavities





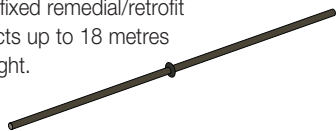
### Ancon Teplo-BF

The Ancon Teplo-BF is suitable for cavities from 50mm to 450mm and is manufactured from pultruded basalt fibres. This material has a thermal conductivity of only 0.7W/mK which can be shown in U-value calculations to reduce insulation thickness and wall footprint.

The Ancon Teplo-BF range comprises Teplo-BF1 (Type 1), Teplo-BF2 (Type 2), Teplo-BF3 (Type 3) and Teplo-BF4 (Type 4). Please refer to page 5 for further details on the suitability of each wall tie at the standard spacings. Decreasing wall tie centres can increase performance level e.g Type 3 to Type 2. Contact Ancon for more information.

The Ancon Teplo range has BBA approval and can be used in line with NHBC standards. It also meets the performance requirement of Approved Document E for use in external masonry walls. For internal separating walls of new-build attached dwellings use HRT4.

Plain-ended TeploTies, the original basalt-fibre wall tie, are available. They are ideal for resin-fixed remedial/retrofit projects up to 18 metres in height.



Also available is the Teplo-BFR featuring a plain end for anchoring with resin and a 'BF' moulded safety end for building into a bed joint. This product is ideal for use when mortar joints do not align or when a new leaf of masonry is being added to an existing masonry or concrete structure.

Visit [www.ancon.co.uk](http://www.ancon.co.uk) to download a product datasheet.



### Low Thermal Conductivity Wall Ties

Wall ties are an essential element in the strength and stability of cavity walls, but by crossing the cavity they act as a thermal bridge between the internal and external leaves. The ties featured here on pages 8-9 form Ancon's Low Thermal Conductivity range; cavity ties which minimise heat loss and improve the energy-efficiency of a masonry wall. With a thermal conductivity of only 0.7W/mK, Ancon Teplo wall ties are the most thermally-efficient products in the range and are excluded from U-value calculations to BS EN ISO 6946.

For the accurate calculation of a wall's U-value it is important to use the correct information for the wall ties. Using the actual cross-sectional area and thermal conductivity value of a wall tie, rather than allowing a program to apply default values, can make a considerable difference to the calculated U-value. Default values will over-estimate the effect of an Ancon Wall Tie. The effect Ancon's high tensile wire wall ties have on heat transfer is negligible.

### Ancon Teplo-BF1/2/4, Basalt-Fibre

**200mm** for 50-75mm cavities  
**225mm** for 76-100mm cavities  
**250mm** for 101-125mm cavities

### Ancon Teplo-BF1/2, Basalt-Fibre

**275mm** for 126-150mm cavities

### Ancon Teplo-BF2, Basalt-Fibre

**300mm** for 151-175mm cavities  
**325mm** for 176-200mm cavities  
**350mm** for 201-225mm cavities  
**375mm** for 226-250mm cavities  
**400mm** for 251-275mm cavities  
**425mm** for 276-300mm cavities

### Ancon Teplo-BF3, Basalt-Fibre

**450mm** for 301-325mm cavities  
**475mm** for 326-350mm cavities  
**500mm** for 351-375mm cavities  
**525mm** for 376-400mm cavities

### Ancon Teplo-BF4, Basalt-Fibre

**550mm** for 401-425mm cavities  
**575mm** for 426-450mm cavities

Teplo-BF is available in a range of diameters and lengths to suit cavities from 50mm to 450mm



### Cross-Sectional Areas and Thermal Conductivity of Ancon Wall Ties

Tie Reference	Tie Length (mm)	Cavity Width (mm)	Tie Type to PD 6697	Area (mm <sup>2</sup> )	Thermal Conductivity* (W/mK)
ST1	200	50-75	1	19.5	17
	225	76-100	1	19.5	17
	250	101-125	1	19.5	17
	275	126-150	1	23.4	17
	300	151-175	1	23.4	17
	325	176-200	1	23.4	17
RT2	350	201-225	1	23.4	17
	200	50-75	2	8.6	17
	225	76-100	2	8.6	17
	250	101-125	2	8.6	17
HRT4	275	126-150	2	10.2	17
	200	50-75	4	3.5	17
	225	76-100	4	4.2	17
	250	101-125	4	6.2	17
Teplo-BF1	275	126-150	4	6.2	17
	200	50-75	1	38.5	0.7
	225	76-100	1	38.5	0.7
	250	101-125	1	38.5	0.7
Teplo-BF2	275	126-150	1	38.5	0.7
	200	50-75	2	19.6	0.7
	225	76-100	2	19.6	0.7
	250	101-125	2	19.6	0.7
	275	126-150	2	28.3	0.7
	300	151-175	2	28.3	0.7
	325	176-200	2	28.3	0.7
	350	201-225	2	38.5	0.7
	375	226-250	2	38.5	0.7
	400	251-275	2	38.5	0.7
Teplo-BF3	425	276-300	2	38.5	0.7
	450	301-325	3	38.5	0.7
	475	326-350	3	38.5	0.7
	500	351-375	3	38.5	0.7
	525	376-400	3	38.5	0.7
Teplo-BF4	200	50-75	4	12.6	0.7
	225	76-100	4	12.6	0.7
	250	101-125	4	12.6	0.7
	550	401-425	4	38.5	0.7
	575	426-450	4	38.5	0.7

**Note:** BS EN ISO 6946 permits the corrections due to wall ties, air gaps etc to be omitted, if the corrections amount to less than 3% of the uncorrected U-value of the element. \*Wall Ties with a thermal conductivity of less than 1.0W/mK e.g. Teplo, are excluded from U-value calculations to BS EN ISO 6946, irrespective of cross-sectional area.

# Wall Ties and Restraint Fixings

## Ancon Two-Part Tie

Long ties for cavities of 150mm and above can often be difficult to balance and keep horizontal when built into the inner leaf. As an alternative, the Ancon Two-Part Tie has one section built into the blockwork and a second section is then fixed as the outer leaf is built. An embedment of 75mm is required at each end. The inner tie is usually manufactured in lengths of 170mm with variation in the cavity width being accommodated by the length of the outer section. Where insulation thickness is in excess of 60mm, the inner section should be longer than the standard 170mm to ensure the connection between the two parts is made in the open cavity.

To specify or order this tie simply quote 'Ancon Two-Part Tie to suit \_ \_ mm cavity with an insulation thickness of \_ \_ mm'. The black TJ Insulation Retaining Clip is recommended for use with the inner section.

Using the standard inner section, Ancon Two-Part Ties sustain loads which exceed the requirements for a Type 2 tie to PD 6697 for cavities up to 400mm.

### Recommended Fixing Centres for Two-Part Ties

Inner Section (mm)	Cavity (mm)	Type 1	Type 2	Type 3
170	150-400	600x450	900x450	900x450
171-230	150-400	375x450	750x450	900x450

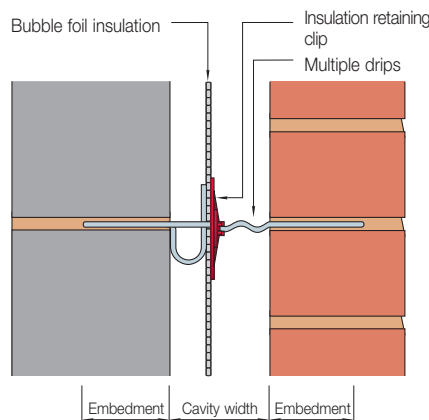
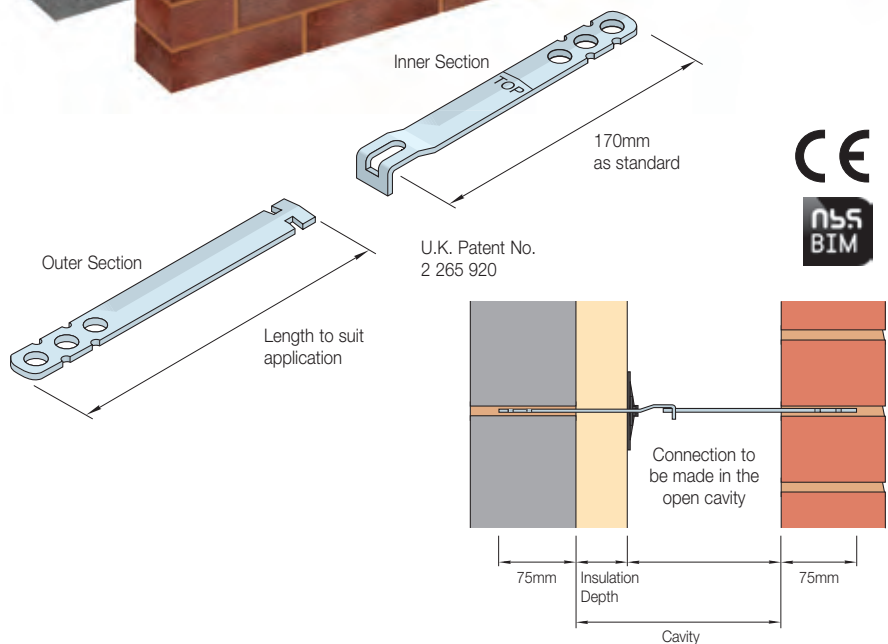
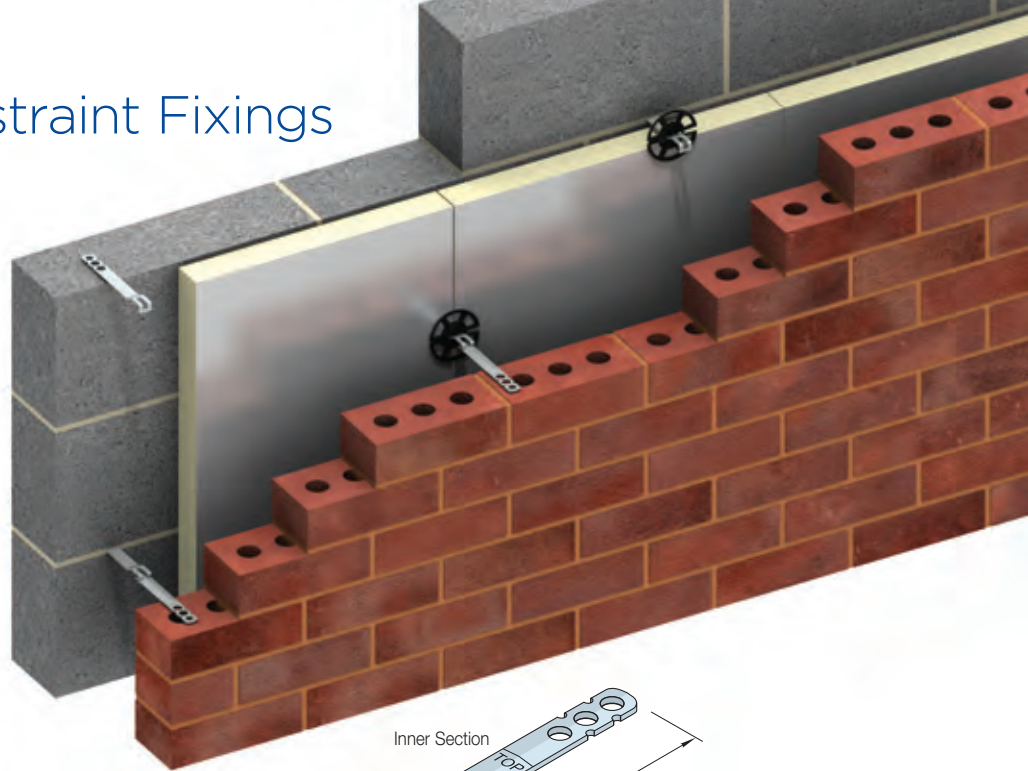
**Notes:** Centres shown achieve equivalent tie type performances to PD 6697: 2010 6.2.2.5 Table 12. See page 5 for details.

## Ties for Bubble Foil Insulation

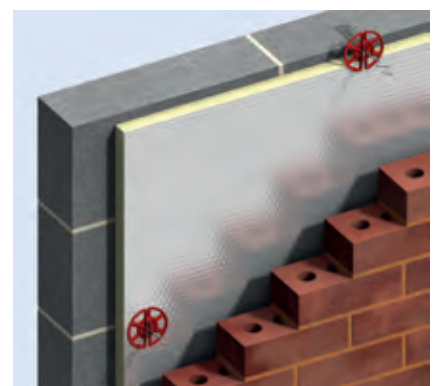
A range of ties are manufactured under license from Thermal Economics Ltd for use with Bubble Foil Insulation. These ties are available as Type 2 and Type 4 ties to PD 6697. ITB referenced ties enable the insulation material to be installed flush to the blockwork. ITC referenced ties position the insulation 25mm away from the block. These ties can be used in line with NHBC standards.

Wall Tie Reference	PD 6697 Type	Length (mm)	Cavity Range (mm)
TE-ITB4-185	4	185	50-60
TE-ITB4-200	4	200	60-75
TE-ITB4-225	4	225	85-100
TE-ITB4-250	4	250	110-125
TE-ITC4-200	4	200	60-75
TE-ITC4-225	4	225	85-100
TE-ITB2-185	2	185	50-60
TE-ITB2-200	2	200	60-75
TE-ITB2-225	2	225	85-100
TE-ITC2-200	2	200	60-75
TE-ITC2-225	2	225	85-100
TE-ITC2-250	2**	250	110-125

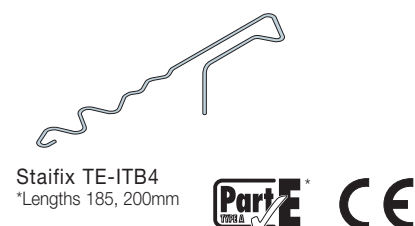
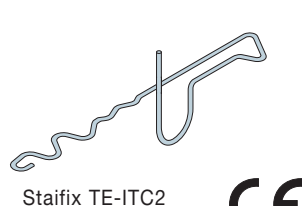
**Notes:** Refer to page 5 for more information on Type 4 and Type 2 ties. \*\* Type 2 tie at 450mm vertical x 700mm horizontal centres.



Installation of Staifix TE-ITC2 Wall Ties



Staifix TE-ITB2 Wall Ties shown with Alreflex Ultratherm





## Ancon 25/14 Restraint System

The Ancon 25/14 system is designed to tie masonry cladding to an in-situ structural frame, through a layer of insulation. It is suitable for use with steel, timber or concrete frames and any type of insulation.

The system comprises 25/14 Channel, SD25 Wall Ties, HT high thread (for fixing to steel/timber) or CFS (for fixing to concrete) Fixing Screws, and Compression Sleeves when required.

Ancon 25/14 channel features alternate 5.3mm and 9.5mm diameter holes to accept the two fixing types. Vertical centres vary for both fixing screws and wall ties, depending on the Tie Type performance required (see page 5 and table below).

Ancon recommends SD25 wall ties are designed to achieve an embedment of 55mm in the masonry and are available in lengths from 100mm to 300mm to suit open cavities up to 259mm.

The 25/14 system has been independently tested at Lucideon and is CE marked to EN 845-1.

### Fixing to Steel/Timber

Ancon self-drilling high-thread screws fix through the channel and the insulation and into the steel or timber framing system. This system is suitable for use with rigid insulation up to a depth of 220mm and ROCKWOOL Rainscreen Duo Slab up to 180mm. When using more flexible insulation materials up to 220mm thick, an Ancon Compression Sleeve is required around the fixing screws.

### Fixing to Concrete

Ancon CFS screws fix through the channel and a stainless steel Ancon Compression Sleeve, located in the insulation, and into a pilot hole in the concrete. This system is suitable for all insulation types up to a thickness of 267mm.

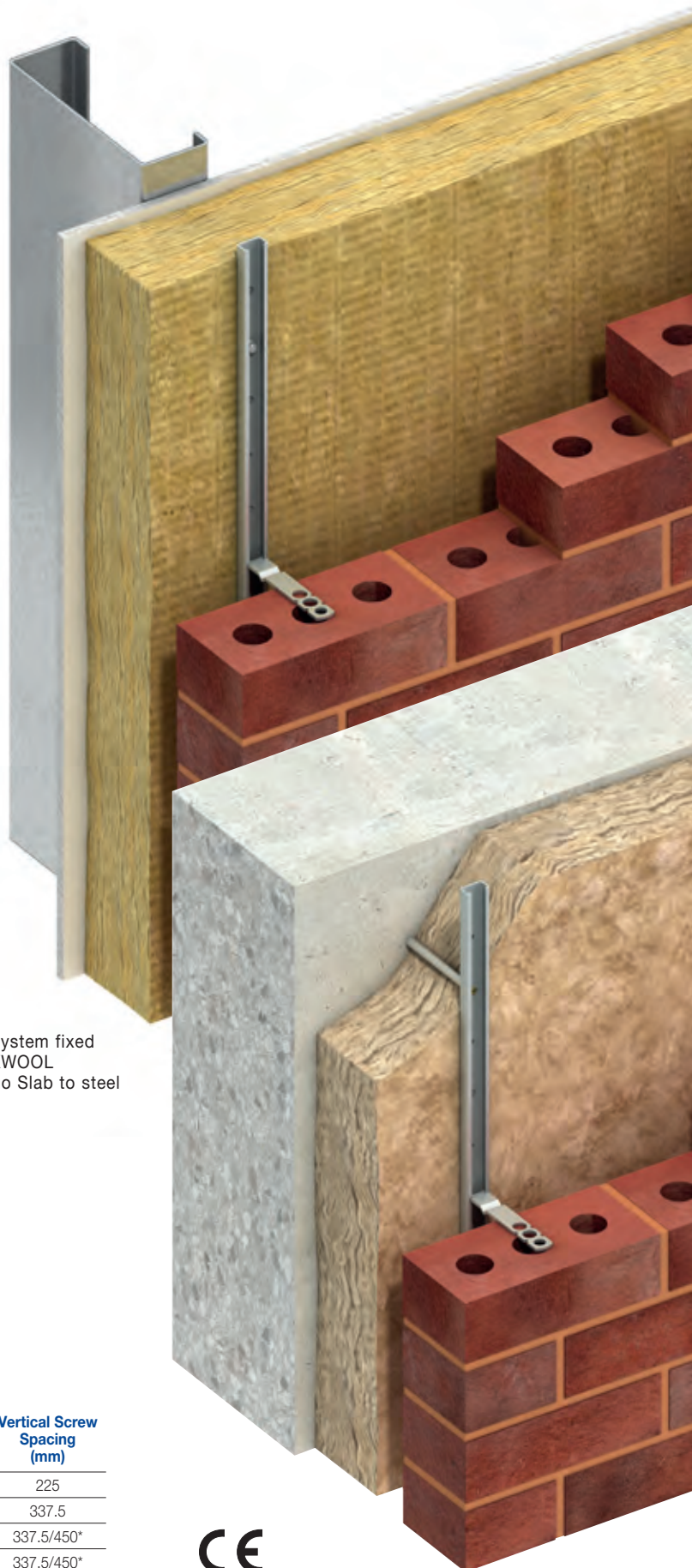
### Recommended Vertical Centres for Wall Ties & Fixing Screws

Tie Type	Maximum Backing Board & Insulation Thickness (mm)			Vertical Tie Spacing (mm)	Vertical Screw Spacing (mm)
	Steel	Timber	Concrete		
1	220	186	267	300	225
2				450	337.5
3				450	337.5/450*
4				450	337.5/450*

**Notes:** Based on 25/14 Channel at 600mm horizontal centres. Centres shown achieve equivalent tie type performances to PD6697, Table 12 (M2 mortar). See page 5 for more details on Tie Types. \*337.5mm centres for insulation thickness >114mm.

Datasheets featuring wall tie and fixing screw references are available to help with specification.

Visit [www.ancon.co.uk](http://www.ancon.co.uk) or contact Ancon.



Ancon 25/14 system fixed through ROCKWOOL Rainscreen Duo Slab to steel



Ancon Compression Sleeve used when fixing all insulation types to concrete.

# Wall Ties and Restraint Fixings

## Ties for Thin-Joint Blockwork

### Staifix-Thor Helical TJ2 Wall Tie

The TJ2 wall tie hammers directly into aerated concrete blocks, through insulation material, and is built into the bed joints of the outer leaf of brickwork. It is ideal for thin-joint blockwork and other applications where the joints in the inner and outer leaves are not aligned.

This tie can be used in line with NHBC standards and meets the requirements of PD 6697 as a type 2 or 3 wall tie depending on the block used and the cavity width. The TJ2 has a cross-sectional area of 8.8mm<sup>2</sup>.

The helix of the Staifix-Thor Helical range differs from other helical fixings; each rotation interlocks perfectly down its length guaranteeing maximum performance. Tools are available to simplify installation.

The black Teplo Clip is designed for use with TJ2 wall ties.

### Staifix HRT4 Wall Tie

For thin-joint to thin-joint separating walls use the Staifix HRT4 (see page 8).

### Ties for Cellular Clay Blocks

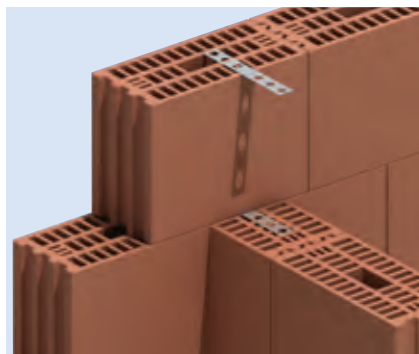
Ancon has developed an innovative range of wall ties for use with cellular clay blockwork, where the horizontal bed joints are just 1mm.

The range includes cavity wall ties for use with external brickwork, cavity wall ties for internal separating walls to Approved Document E and ties for connecting perimeter walls to internal walls.

Installation of the component parts of cavity wall ties in this range are phased which eliminates any danger of injury from wall ties projecting from a part-built cavity wall.



Ancon CCB3 Wall Tie



Ancon CCB-IWJ Ties for Internal Wall Junctions

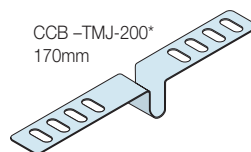
### TJ2 to PD 6697

Block Strength (N/mm <sup>2</sup> )	Cavity Width (Tie Length)				
	50mm (205mm)	75mm (230mm)	100mm (255mm)	125mm (280mm)	150mm (305mm)
2.8	Type 3	Type 3	Type 3	Type 3	Type 3
3.5	Type 3	Type 3	Type 3	Type 3	Type 3
7.0	Type 2	Type 2	Type 2	Type 2	Type 2
10.0	Type 2	Type 2	Type 2	Type 2	Type 2

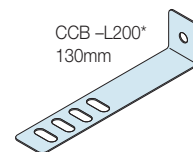
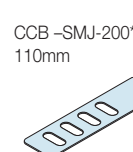
**Note:** For maximum building height and restrictions based on geographical location please refer to page 5.



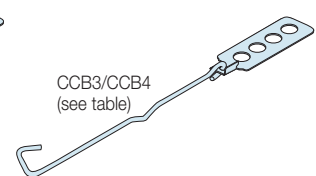
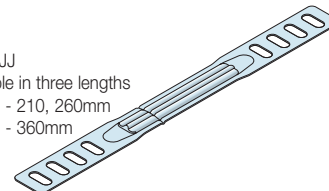
Staifix-Thor Helical TJ2 Thin-Joint Tie  
European Patent No. 1307303



\*Declared Shear Value 159N



CCB -JJ  
Available in three lengths  
Type 3 - 210, 260mm  
Type 4 - 360mm



### Cellular Clay Block to Traditional Masonry

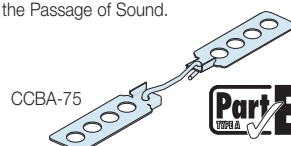
Product Reference	Cavity Width (mm)	Type 4 Performance	Type 3 Performance	Type 2 Performance
			Horizontal x Vertical Spacings (mm)	
CCB3-100	100	900 x 450	900 x 450	600 x 450
CCB3-125	125	900 x 450	900 x 450	600 x 450
CCB4-150	150	900 x 450	450 x 450	-

**Notes:** At vertical edges of an opening, unreturned or unbonded edges, additional ties should be used at a rate of one per 300mm height, located not more than 225mm from the edge. For complete information on tie types refer to PD6697: 2010.

### Cellular Clay Block to Cellular Clay Block for Internal Separating (Party) Walls

Cavity Width (mm)	Product Reference	Horizontal x Vertical Spacings (mm)
75	CCBA-75	900 x 450
100	CCBA-100	900 x 450

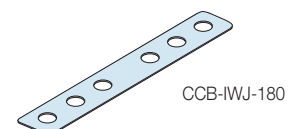
**Note:** Type A tie suitable for use in internal separating walls of any height to Approved Document E: Resistance to the Passage of Sound.



### Flat Tie for connecting perimeter walls to internal walls

Product Reference	Length (mm)
CCB-IWJ-180	180

**Note:** For block widths greater than 140mm, two ties should be used per course.





## Ties for Timber Frames

Ancon provides a choice of three Type 6 Timber Frame Ties designed to fix brickwork or blockwork to timber-framed structures up to 4 storeys in height and accommodate maximum differential movement of 24mm; the Type 7 Ancon TFMT wall tie is available for other timber frame applications.

### Staifix Timber Frame Tie, STF6 (Type 6)

The Staifix STF6 tie is available in three lengths to suit 50mm, 75mm and 100mm cavities.

It is supplied complete with an annular ring shank nail. The tie is cranked to simplify correct installation and to prevent moisture from crossing the cavity. The STF6 has a cross-sectional area of 12mm<sup>2</sup> and stainless steel has a thermal conductivity of 17W/mK; this information is provided to aid U-value calculations.

The Staifix STF6 tie has been independently tested for use with 15mm OSB (Oriented Strand Board) SIPS Panel. The standard annular ring shank nail should be replaced with a 4 x 30mm stainless steel Spax® screw.

### Staifix-Thor Helical Timber Tie, TIM6 (Type 6)

The Staifix-Thor Helical TIM6 is available in four standard lengths. It is suitable for cavities from 50mm to 150mm and can be used with the red Staifix Universal Clip where insulation is to be retained in the cavity. An installation tool is required to hammer the tie into the timber frame. The TIM6 has a cross-sectional area of 6.6mm<sup>2</sup> and stainless steel has a thermal conductivity 17W/mK; this information is provided to aid U-value calculations.

Ancon recommends a minimum embedment depth of 35mm in the timber frame and 65mm in the masonry leaf.

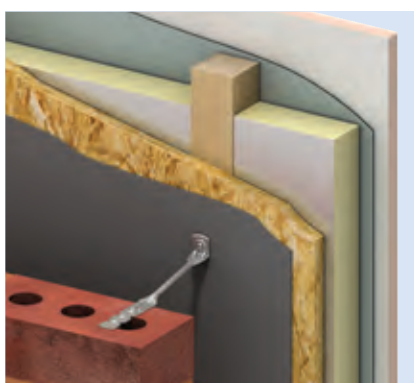
### TIM6 (Type 6) Recommended Lengths

Tie Length (mm)	Cavity Width (mm)
175	50-75
200	76-100
225	101-125
250	126-150

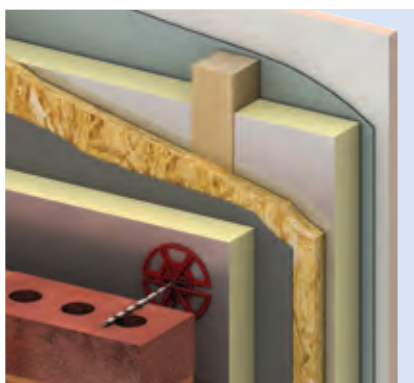
### Ancon Timber Frame Movement Tie, TFMT7 (Type 7)

Where standard Type 6 Timber Frame Ties are unsuitable, Ancon recommends the use of the Timber Frame Movement Tie. Manufactured to suit any cavity from 50mm to 150mm, the Ancon Timber Frame Movement Tie comprises a channel, a strip tie and a screw. This system accommodates maximum differential movement of 65mm; the tie should be positioned 10-12mm from the bottom of the channel. The tie is suitable for use with the Universal Insulation Clip.

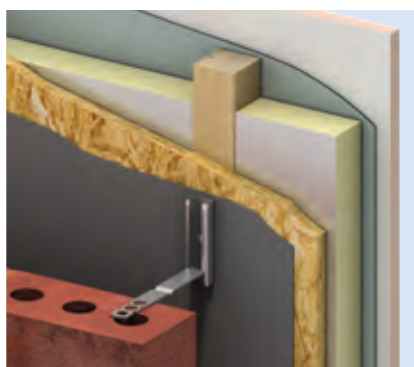
The TFMT complies with BS 5268-6.1 as a Type 7 tie. The product has a declared value of 960N. See page 5 for more information on Type 7 ties.



**Staifix STF6 Timber Frame Tie**  
Available to suit **50mm**, **75mm** and **100mm** cavities.



**Staifix-Thor Helical TIM6 Tie**



**Ancon TFMT7 Timber Frame Movement Tie**



### Teplo-L-Tie Type 6 Range and Chi Values

Product Code	Length mm	Cavity mm	BS5268 Type	Chi-value W/K	ΔU <sub>t</sub> (if 4.4 ties/m <sup>2</sup> ) W/m <sup>2</sup> K
TEPLO-L-5-165	165	100	6	0.000335	0.00147
TEPLO-L-5-190	190	125	6	0.000260	0.00114
TEPLO-L-5-215	215	150	6	0.000215	0.00095
TEPLO-L-5-240	240	175	6	0.000175	0.00077
TEPLO-L-5-265	265	200	6	0.000150	0.00066
TEPLO-L-7-290	290	225	6	0.000210	0.00092
TEPLO-L-7-315	315	250	6	0.000190	0.00084
TEPLO-L-7-340	340	275	6	0.000165	0.00073
TEPLO-L-7-365	365	300	6	0.000150	0.00066

### Ancon Teplo-L-Tie (Type 6)

The Teplo-L-Tie is ideal where a low thermal conductivity restraint fixing is required between a masonry outer leaf and an in-situ timber frame.

The body is manufactured from basalt fibres set in a resin matrix and features a stainless steel upstand at one end with a 7mm diameter fixing hole. When fixing to timber, Ancon recommends a 5mm x 30mm countersunk wood screw.

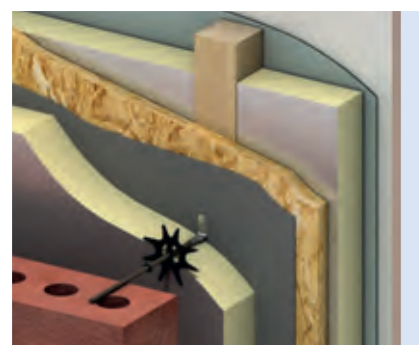
This tie is suitable for cavities from 100mm to 300mm, features a moveable o-ring drip to prevent water crossing the cavity and can be used with the black Teplo-Clip where insulation is to be retained.

The Teplo-L-Tie has been independently tested, is approved by the BBA and can be used in line with NHBC standards.



A Lambda value (W/mK) is normally given for Ancon wall ties which expresses the thermal conductivity of the material i.e. 17W/mK for stainless steel ties and 0.7W/mK for basalt fibre Teplo ties, however, as the Teplo-L-Tie comprises both materials a Lambda value is not applicable. Instead, to aid with U-value calculations, the table below provides the Chi value of an individual Teplo-L-Tie and the U-value correction (ΔU<sub>t</sub>) if Teplo-L-Ties were installed at the standard 4.4 ties per square metre. BS EN ISO 6946 permits the corrections due to wall ties and air gaps between insulation boards etc, to be omitted from U-value calculations if the corrections amount to less than 3% of the uncorrected U-value of the element.

The Teplo-L-Tie is suitable for fixing to a range of substrates. For more information, see page 15.



**Ancon Teplo-L-Tie (Type 6)**

# Wall Ties and Restraint Fixings

## Frame Cramps

Frame cramps are an ideal solution where a restraint is required between masonry and in-situ structures. They can be fixed to a range of materials including concrete, steelwork and masonry. Frame cramps referenced \_P\_ have a plain shank, while those referenced \_D\_ feature an integral drip for use across a cavity.

### SDB

Ancon SDB Frame Cramps used as cavity wall ties exceed the requirements of a Type 2 tie to PD 6697 for lengths up to 300mm. They have a 7mm diameter hole to suit a range of fixings. Ancon M6 single expansion bolts are recommended for fixing to concrete and M6 set screws or SDTSS-38-5PT self-drilling screws for fixing to steelwork. Frame cramps can be fixed to masonry with suitable plugs and screws or resin anchors. Poor substrates will limit the capacity of fixings and site testing is advisable in such applications. All fixings should be used in conjunction with a DIN washer.

### SDV

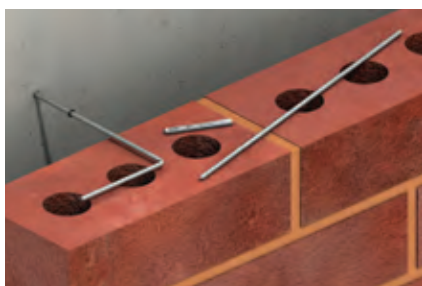
Ancon SDV Frame Cramps have an 8mm x 30mm vertical slot that allows vertical fixing position adjustment where required. Their load capacity is limited when fixed in the top of the slot therefore they are not recommended for applications where tension is a consideration.

### Ancon HiT - Hammer-in Tie

The Ancon HiT fixes masonry to concrete, dense blocks ( $\geq 7\text{N/mm}^2$ ), non-perforated brick or hard stone. It can reduce the variety of tie lengths required on site and speed the rate of construction.

The HiT is available in a standard length of 310mm that is bent on site with a special installation tool to suit all cavities up to 150mm. Unlike conventional frame cramps it does not require a mechanical fixing, but is hammered into a plug.

The Ancon HiT meets the requirements of PD 6697 as a Type 2 tie. A neoprene 'O' ring must be installed on the tie to prevent moisture crossing the cavity.



Ancon Hammer-in Tie (310mm)

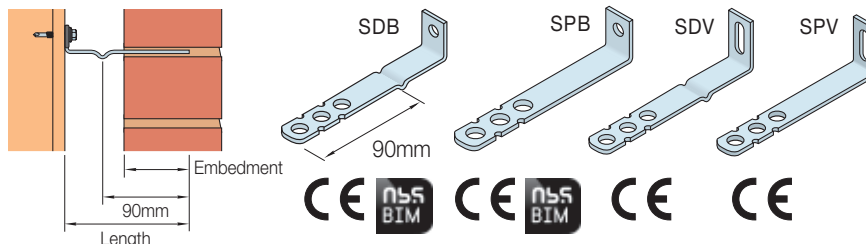


## Recommended Tie Lengths and Fixing Centres for SDB Frame Cramps

Cavity Width (mm)	Length of Wall Tie (mm)	Recommended Spacing (mm)	
		Type 1	Type 2
20-44*	100	600 x 450	900 x 450
45-69	125	600 x 450	900 x 450
70-94	150	600 x 450	900 x 450
95-119	175	900 x 450	900 x 450
120-144	200	900 x 450	900 x 450
145-168	225	900 x 450	900 x 450
170-194	250	900 x 450	900 x 450
195-219	275	900 x 450	900 x 450
220-244	300	900 x 450	900 x 450

**Note:** \*Due to limited length of tie a water drip would not be provided.

Centres shown achieve equivalent tie type performances to PD 6697. See page 5 for details.



### SDB Frame Cramp Fixed to Steel with Self-Drilling Screw

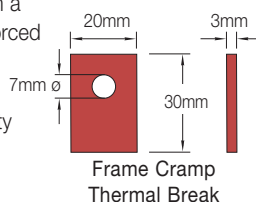
#### Isolation

Ancon isolation sleeves and pads are supplied blank for use with self-drilling screws to isolate stainless steel frame cramps from mild steel. Self-adhesive isolation pads are also available for \_B\_ (20 x 30mm) and \_V\_ (25 x 50mm) referenced frame cramps.



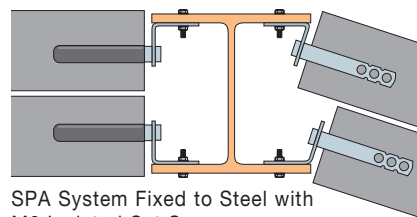
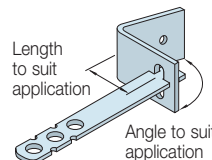
#### Thermal Breaks

Ancon Frame Cramps can now be supplied with Thermal Breaks to be located between the upstand and the structural frame. They are manufactured from a durable fibre-reinforced thermoset plastic which has a thermal conductivity of just 0.3 W/mK.



### SPA

Where masonry is in line with a column flange, a notched wall tie is used in conjunction with a bespoke angle section to allow the mechanical fixing to be suitably located. This system is referenced SPA. The angle section features a 7mm fixing hole as standard and a slot to accept the wall tie. The slot provides vertical tolerance in the position of the tie allowing the angles to be fixed in advance of the masonry if required. Ties can be used with debonding sleeves when used at vertical movement joints. The thickness, size and shape of the angle are designed to suit each application. Contact Ancon's Technical Department or download the online design sheet.



SPA System Fixed to Steel with M6 Isolated Set Screws

## Pre-Fixing Aids

The practice of pre-fixing frame cramps in advance of masonry can accelerate the speed of construction and provides an opportunity to check that wall restraints have been located correctly and are securely fixed.

### Ancon Gauge Tape

(Pre-fix Patent 2 256 223)

Gauge Tape illustrates the standard 225mm brick/block gauge and the fixing position of frame cramps. It is applied directly to the structural frame (steel, concrete, timber or masonry) to facilitate the pre-fixing of frame cramps and to maintain accurate masonry coursing.

### Ancon ISO-TW Washer

The ISO-TW washer enables Ancon slot-ended frame cramps to be vertically adjusted within the 30mm range of the slot to suit the exact location of mortar joints without affecting the integrity of the fixing. In addition, this washer prevents bi-metallic corrosion by separating the frame cramp from the structural frame and fixing screw.



Ancon ISO-TW Washer and Gauge Tape



## Teplo-L-Tie

The Teplo-L-Tie is ideal where a low thermal conductivity restraint fixing is required between a masonry outer leaf and an in-situ structure. It offers the same thermal benefit as Teplo basalt fibre cavity wall ties (page 9), with an additional stainless steel upstand which is mechanically and chemically bonded to one end of the tie to allow for a secondary fixing.

The 7mm diameter hole in the upstand suits a variety of fixings, typically an M6 single expansion bolt for concrete, a plug and screw for either masonry or concrete, and either an M6 set screw or SDTSS-38-5PT self-drilling screw for steelwork. The load performance will depend on the substrate and on-site pull out tests are recommended to confirm the strength of uncertain or old substrates. For fixing to timber frames, see page 13.

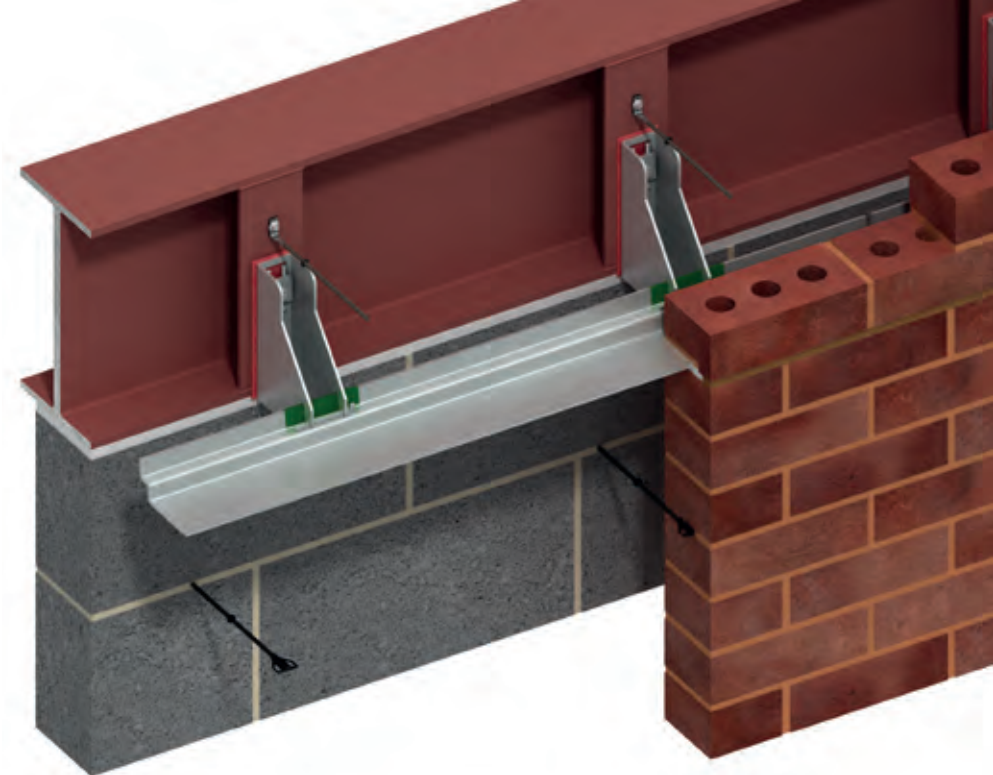
Teplo-L-Ties are suitable for cavities from 100mm to 300mm. The range comprises 14 standard products which meet the performance of Tie Types 2, 3 or 4 when installed at a standard spacing of 2.5 ties per square metre; decreasing wall tie centres can increase the performance level as shown in the table.



Teplo-L-Tie can be fixed to concrete, masonry, steel and timber

An o-ring drip prevents water crossing the cavity and the Teplo-L-Tie can be used with the black Teplo-Clip where insulation is to be retained.

A Lambda value (W/mK) is normally given for Ancon wall ties which expresses the thermal conductivity of the material i.e. 17W/mK for stainless steel ties and 0.7W/mK for basalt fibre Teplo ties, however, as the Teplo-L-Tie comprises both materials a Lambda value is not applicable. Instead, to aid with U-value calculations, the table provides the Chi value of an individual Teplo-L-Tie and the U-value correction ( $\Delta U_f$ ) if Teplo-L-Ties were installed at the standard spacing of 2.5 ties per square metre (900mm x 450mm centres). BS EN ISO 6946 permits the corrections due to wall ties and air gaps between insulation boards etc, to be omitted from U-value calculations if the corrections amount to less than 3% of the uncorrected U-value of the element.



Teplo-BF cavity wall ties and Teplo-L-Tie frame cramps used with an Ancon stainless steel brick support system featuring a thermal break



The BBA-approved Teplo-L-Tie is available to suit cavities from 100mm to 300mm



## Teplo-L-Tie Product Codes and Recommended Fixing Centres

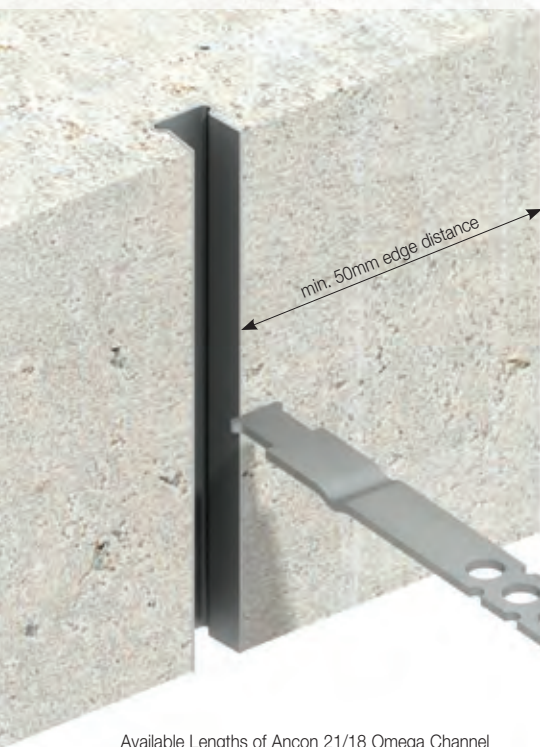
Product Code	PD6697 Tie Type	Cavity mm	Tie Length mm	Recommended Spacing (mm)			
				Type 1*	Type 2	Type 3	Type 4
TEPLO-L-7-165	2	100	165	500 X 450	900 X 450	-	-
TEPLO-L-7-190	2	125	190	500 X 450	900 X 450	-	-
TEPLO-L-7-215	2	150	215	500 X 450	900 X 450	-	-
TEPLO-L-7-240	2	175	240	500 X 450	900 X 450	-	-
TEPLO-L-7-265	2	200	265	500 X 450	900 X 450	-	-
TEPLO-L-7-290	2	225	290	500 X 450	900 X 450	-	-
TEPLO-L-7-315	2	250	315	500 X 450	900 X 450	-	-
TEPLO-L-7-340	2	275	340	500 X 450	900 X 450	-	-
TEPLO-L-7-365	2	300	365	500 X 450	900 X 450	-	-
TEPLO-L-5-165	3	100	165	380 X 450	710 X 450	900 X 450	-
TEPLO-L-5-190	3	125	190	380 X 450	710 X 450	900 X 450	-
TEPLO-L-5-215	3	150	215	380 X 450	710 X 450	900 X 450	-
TEPLO-L-5-240	4	175	240	230 X 450	450 X 450	740 X 450	900 X 450
TEPLO-L-5-265	4	200	265	230 X 450	450 X 450	740 X 450	900 X 450

**Note:** Centres shown achieve equivalent tie type performances to PD6697: 2010 Table 12. See page 5 for details.  
\*Type 1 based on M2 mortar and a strength requirement of 2500N (PD6697) in Tension and Compression.

## Teplo-L-Tie Chi Values

Product Code	Tie Length mm	PD6697 Tie Type	Chi value W/K	$\Delta U_f$ (if 2.5 ties/m <sup>2</sup> ) W/m <sup>2</sup> K
TEPLO-L-7-165	165	2	0.000515	0.00129
TEPLO-L-7-190	190	2	0.000405	0.00101
TEPLO-L-7-215	215	2	0.000340	0.00085
TEPLO-L-7-240	240	2	0.000280	0.00070
TEPLO-L-7-265	265	2	0.000245	0.00061
TEPLO-L-7-290	290	2	0.000210	0.00053
TEPLO-L-7-315	315	2	0.000190	0.00048
TEPLO-L-7-340	340	2	0.000165	0.00041
TEPLO-L-7-365	365	2	0.000150	0.00038
TEPLO-L-5-165	165	3	0.000335	0.00084
TEPLO-L-5-190	190	3	0.000260	0.00065
TEPLO-L-5-215	215	3	0.000215	0.00054
TEPLO-L-5-240	240	4	0.000175	0.00044
TEPLO-L-5-265	265	4	0.000150	0.00038

# Wall Ties and Restraint Fixings



## Channel Ties

### Ancon 21/18 Omega Channel

Ancon 21/18 Omega Channel is a high performance, self-anchoring, cast-in channel slot suitable for use with Ancon wall ties to provide the necessary restraint to the outer leaf of masonry. The section is only 18mm deep and can be used where there is reduced cover to reinforcement and concrete as thin as 75mm. Available in 100mm and 3000mm lengths, Ancon 21/18 Omega Channel is filled with polystyrene to help prevent the ingress of concrete. Nail holes aid the fixing of the slot to timber formwork.

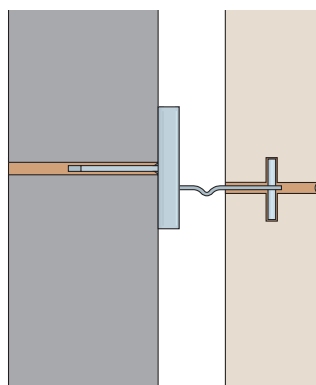
### Ancon 25/14, 28/15, 30/20, 38/17, 36/8 and 40/25 Channels

Ancon wall ties can also be used with our 25/14, 28/15, 30/20, 38/17, 36/8 and 40/25 channels.

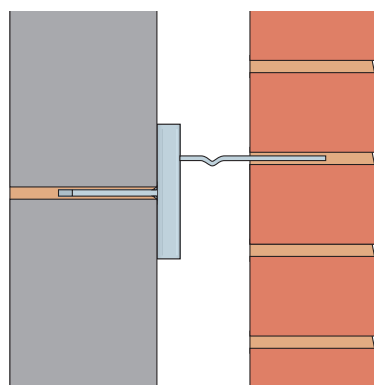
30/20 Channel is supplied with anchors for casting into concrete. 25/14 and 36/8 Channels are supplied plain-backed for surface fixing. 28/15, 38/17 and 40/25 Channels are available with or without anchors for casting in or surface fixing. Data shown below applies to cavity wall ties into 21/18, 28/15, 30/20, 38/17 and 40/25 cast-in channels. 36/8 channels are only suitable for shear applications, see page 17. For 25/14 channels see pages 11. Maximum safe working loads of surface-fixed channels will be subject to suitable fixings, and appropriate fixing centres. Consult Ancon's Technical Department for advice.

Available Lengths of Ancon 21/18 Omega Channel  
**100, 3000mm**  
U.K Patent No. 2 249 110

Ancon 21/18 Omega Channel with Ancon SD21 Tie



Fastrack used with DD28 Tie for Stonework



Fastrack used with SD28 Tie for Brickwork



## Recommended Fixing Centres for Cast-in Channel Ties for Masonry Cavity Applications

Tie Length (mm)	Cavity Width (mm)	Type 1	Type 2
125	45-69	450x450	900x450
150	70-94	450x450	900x450
175	95-119	750x450	900x450
200	120-144	750x450	900x450
225	145-169	750x450	900x450
250	170-194	750x450	900x450
275	195-219	750x450	900x450
300	220-244	300x450	600x450

**Note:** Centres shown achieve equivalent tie type performances to PD 6697. See page 5 for details.

## Fixing of Channel

Fixing Method	Omega 21/18	25/14	28/15	30/20	38/17	36/8	40/25
Cast-in	✓	✗	✓	✓	✓	✗	✓
Surface Fixed	✗	✓	✓	✗	✓	✓	✓

## Ancon Fastrack

Building one leaf of the cavity wall in advance of the other is often beneficial but can create problems with coursing. Buildings which incorporate imperial or continental bricks and standard metric blocks present even greater difficulties.

Ancon Fastrack Channel is built into the inner leaf of blockwork ready to take an Ancon SD28 or similar tie for the outer leaf. This method of construction avoids the dangers of projecting ties.

Ancon Fastrack Channels and Ties suit cavities from 50mm to 150mm and can also be used for tying stonework to blockwork if DD28 or similar Ancon Ties are used.

The recommended tie length for use with a fastrack channel is 'cavity width plus 50mm'.



Ancon Fastrack Channels 100mm long with SD28 Tie

Ancon 28/15 Fastrack Channels and Ties sustain loads which exceed the requirements for a Type 2 tie to PD 6697. This system can also be manufactured in a 36/8 channel which also offers Type 2 performance and accepts wall ties referenced \_ \_ 36.

Tie Reference	Type 1	Type 2	Type 3	Type 4
28/15 Fastrack	450x450	900x450	900x450	900x450
36/8 Fastrack	450x450	900x450	900x450	900x450

**Note:** Centres shown achieve equivalent tie type performances to PD 6697. See page 5 for details.



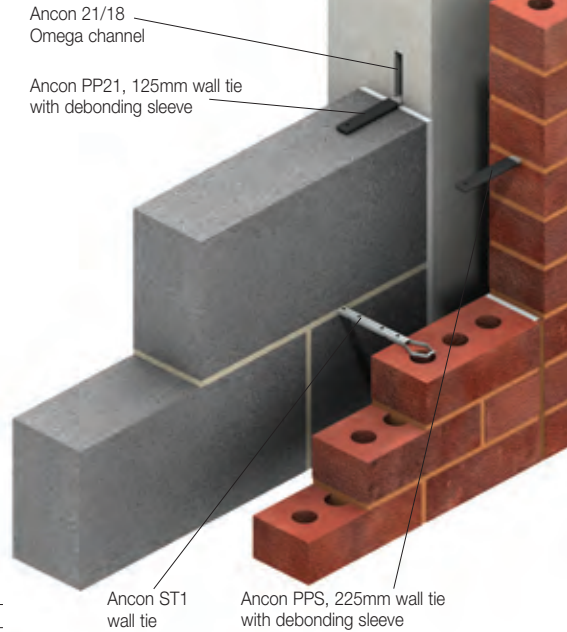
## Vertical Movement Joints

Debonding sleeves are used on plain-ended wall ties, such as the Ancon PP21 or PPB, at vertical movement joints that abut columns. The tie will restrain the masonry against lateral wind loads whilst the sleeve allows the masonry to expand and contract.

These shear ties are available either to suit cast-in channels or as frame cramps to be post-fixed on site. Channel ties are available to suit Ancon 21/18, 28/15, 30/20, 36/8, 38/17 and 40/25 channels. Frame cramps are available as a PPB with a single hole or as a PPV with a vertical slot. PPS ties are used across movement joints in masonry walls. PPB-HD is a heavy duty version of the PPB.

These ties are subject to shear rather than tensile / compressive forces and can be selected from the following table. The design resistances shown should be used with factored wind loads.

Ancon shear ties are suitable for a standard 10mm joint and require a minimum embedment of 100mm. Debonding sleeves should be installed with a 10mm gap at the end to allow for expansion of the masonry. The ties are also available with a bonded safety end for applications where a debonding sleeve is not required.

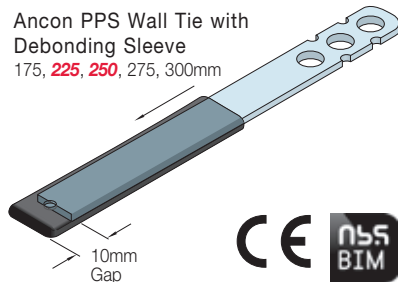


Intermediate Column with Vertical Movement Joint in Brickwork and Blockwork

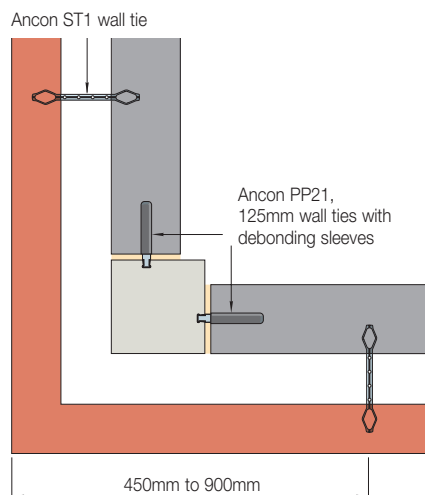
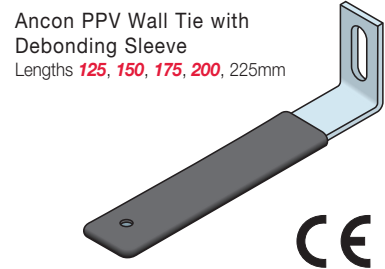
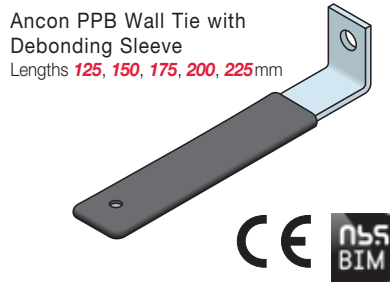
## Design Resistances for Shear Ties

Tie	Design Resistance (N)	Design Resistance per metre (N/m)	
		450mm centres	225mm centres
Channel Ties	900	2000	4000
PPV	463	1028	2056
PPB	663	1474	2948
PPB-HD	896	1991	3982
PPS	896	1991	3982

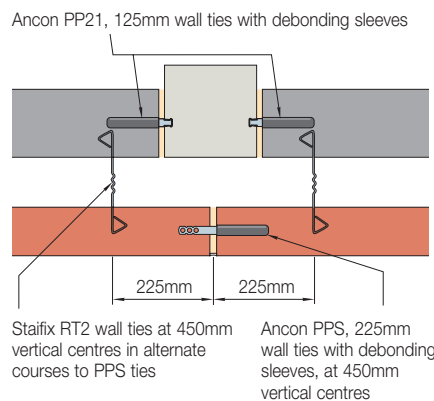
**Note:** Design resistances shown use a material factor,  $\gamma_m$  of 3.0 as given in the UK National Annex to BS EN 1996-1-1:2005



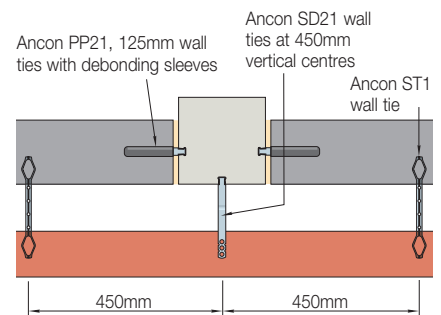
Debonding sleeves should be pulled back 10mm to allow expansion as well as contraction of brickwork



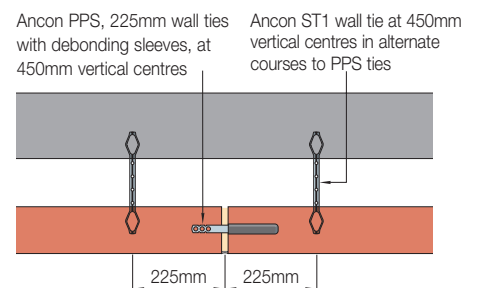
External Corner with Fully Bonded Brickwork



Intermediate Column with Vertical Movement Joints in both Brickwork and Blockwork



Intermediate Column with Vertical Movement Joints in Blockwork



Cavity Wall with Vertical Movement Joint in Brickwork

**Note:** All spacings are maximums. The type of cavity wall tie and spacing will be determined by the cavity width, height of brickwork, wind loading and type of building. See page 5 for further information.

# Wall Ties and Restraint Fixings

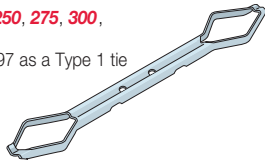
## Standard Wall Ties

Lengths shown in **red italics** refer to items normally available at all times.

Ancon's Technical Services Team will be pleased to advise on the correct selection and use of our wall ties.

### ST1

Lengths **200, 225, 250, 275, 300, 325, 350**mm  
Conforms to PD 6697 as a Type 1 tie in M2 mortar



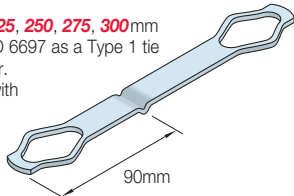
### Teplo-BF1

Lengths **200, 225, 250, 275**mm  
Conforms to PD 6697 as a Type 1 tie.



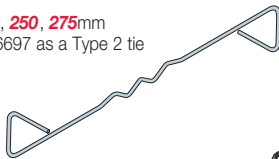
### SD1

Lengths **200, 225, 250, 275, 300**mm  
Conforms to PD 6697 as a Type 1 tie in M2 (iv) mortar.  
Also available with a central drip



### RT2

Lengths **200, 225, 250, 275**mm  
Conforms to PD 6697 as a Type 2 tie



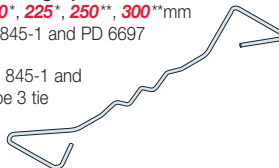
### Teplo-BF2

Lengths **200, 225, 250, 275, 300, 325, 350, 375, 400, 425**mm  
Conforms to PD 6697 as a Type 2 tie



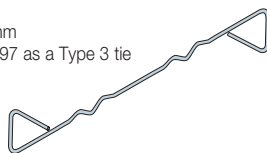
### DT (Double Triangle)

Lengths **150\*, 200\*, 225\*, 250\*\*, 300\*\***mm  
\*Conforms to EN 845-1 and PD 6697 as a Type 2 tie  
\*\*Conforms to EN 845-1 and PD 6697 as a Type 3 tie



### RD3

Lengths **250, 275**mm  
Conforms to PD 6697 as a Type 3 tie

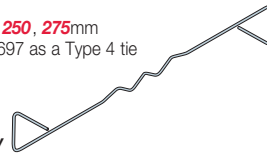


## Recommended Lengths for Masonry/ Masonry Wall Ties

Cavity Width (mm)	Tie Length (mm)
50-75	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

### HRT4

Lengths **200, 225, 250, 275**mm  
Conforms to PD 6697 as a Type 4 tie



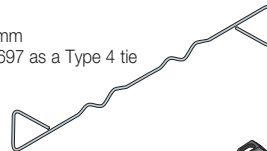
### Suitable for party

walls with 50-100mm and 125-150mm cavities



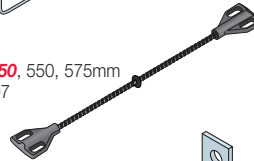
### HRD4

Lengths **250, 275**mm  
Conforms to PD 6697 as a Type 4 tie



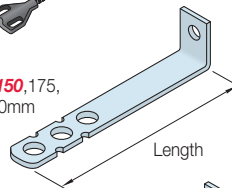
### Teplo-BF4

Lengths **200, 225, 250, 550, 575**mm  
Conforms to PD 6697 as a Type 4 tie



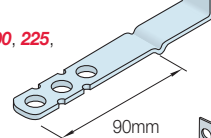
### SPB

Lengths 75, **100, 125, 150, 175, 200, 225, 250, 275, 300**mm  
(Heavy duty version also available)



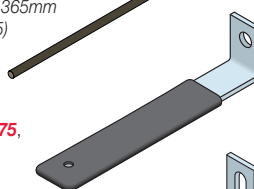
### SDB

Lengths **125, 150, 175, 200, 225, 250, 275, 300**mm



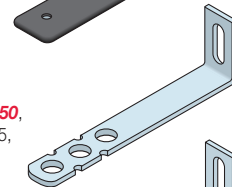
### Teplo-L-Tie

Lengths 165, 190, 215, 240, 265, 290, 315, 340, 365mm  
(See page 13 and 15)



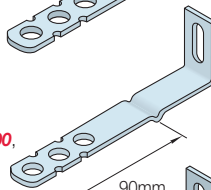
### PPB

Lengths **125, 150, 175, 200, 225**mm



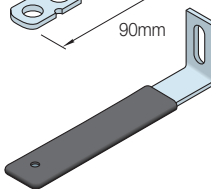
### SPV

Lengths 75, **100, 125, 150, 175, 200, 225, 250, 275, 300**mm



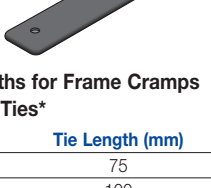
### SDV

Lengths **125, 150, 175, 200, 225, 250, 275, 300**mm



### PPV

Lengths **125, 150, 175, 200, 225**mm



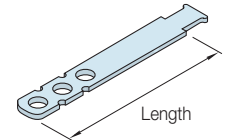
## Recommended Lengths for Frame Cramps and Cast-in Channel Ties\*

Cavity Width (mm)	Tie Length (mm)
<20	75
20-44	100
45-69	125
70-94	150
95-119	175
120-144	200
145-169	225

\*Excluding surface-fixed channels, Ancon Fastrack and Ancon Teplo-L-Tie

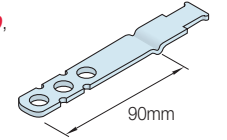
### SP21

Lengths **75, 100, 125, 150, 175, 200**mm  
For use with 21/18 Omega Channel



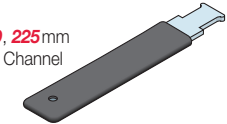
### SD21

Lengths **125, 150, 175, 200, 225, 250, 275, 300**mm  
For use with 21/18 Omega Channel



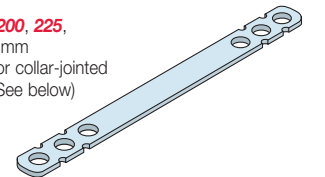
### PP21

Lengths **125, 150, 175, 200, 225**mm  
For use with 21/18 Omega Channel



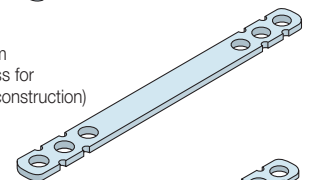
### SPS

Lengths **150, 200, 225, 250, 275, 300**mm  
(Not suitable for collar-jointed construction. See below)



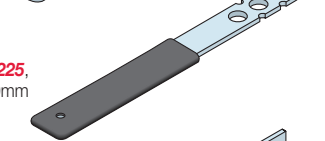
### SPS CJ

Length **150**mm  
(3mm thickness for collar-jointed construction)



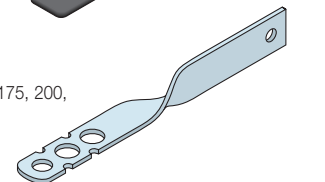
### PPS

Lengths 175, **225, 250, 275, 300**mm



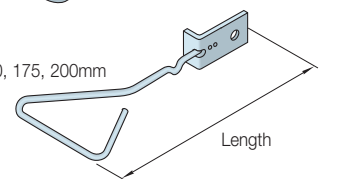
### SHX

Lengths 150, 175, 200, 225mm



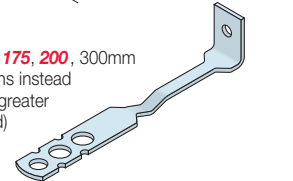
### WHX

Lengths 150, 175, 200mm



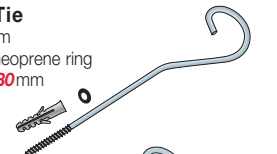
### SRB

Lengths **125, 150, 175, 200, 300**mm  
(Used in applications instead of the SDB where greater flexibility is required)



### Cavity Starter Tie

Supplied with an 8mm nylon wall plug and neoprene ring  
Lengths **180, 200, 230**mm



### Starter Tie

Supplied with an 8mm nylon wall plug  
Length **135**mm



### Frame Tie

Length **115**mm





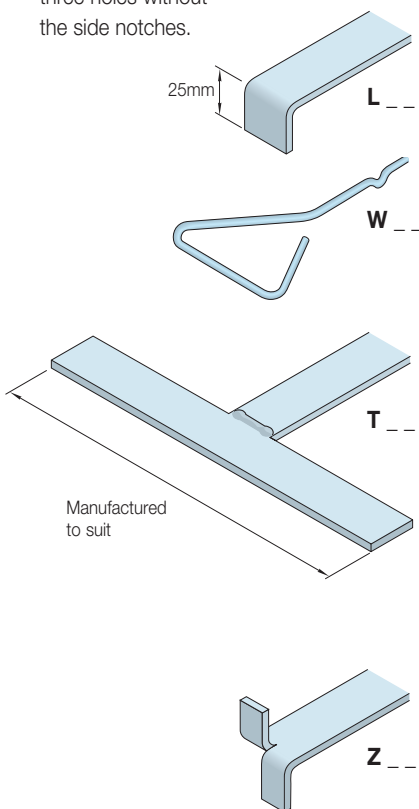
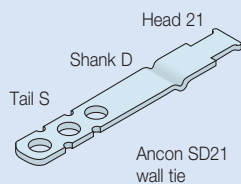
## References for Wall Ties

Many variations are available in addition to the standard ties. Wall ties for special applications may be specified and ordered with ease by using a reference letter for the tail, shank and head of the tie.

These bespoke ties are manufactured to order, typically for use on a single unique project and therefore are not tested to EN 845 and do not carry CE marking.

Ancon ties are produced in lengths from 150mm for masonry-to-masonry ties, and 75mm for masonry-to-concrete ties, in increments of 25mm. Drips will usually be positioned 90mm from the outer end of the tie (first reference letter). Masonry-to-masonry ties can also be supplied with a central drip. Special wall ties with a section wider than 20mm referenced S \_\_, will have an end with three holes without the side notches.

### Example using Reference System



### TAIL

Most can be used at either end of tie

### SHANK

### HEAD

8x30mm slot

V  
U without slot

7mm diameter hole

B

21

To fit 21/18  
Omega Channel

25 To fit 25/14

28 To fit 28/15

30 To fit 30/20

36 To fit 36/8

38\* To fit 38/17

40\* To fit 40/25

\*Tie will be 25mm wide

X

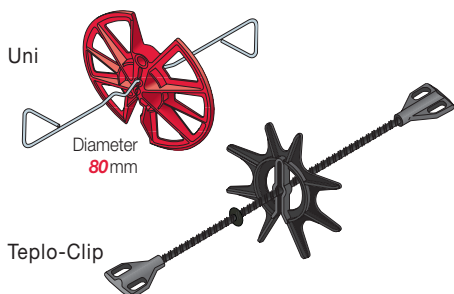
7mm diameter hole

G

110mm  
Tie will be 25mm wide

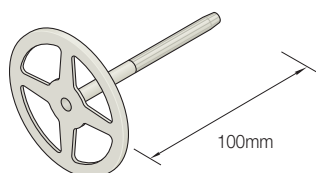
## Insulation Retaining Clips

The red Staifix Universal Insulation Retaining Clip (Uni) will fit all the standard stainless steel ties shown on page 18. The black Teplo-Clip should be used with the Teplo range and the TJ2 wall tie (see page 12).



## Insulation Retainer

The H75/2 Insulation Retainer is for securing material to concrete, blockwork and brickwork. The 90mm diameter head can hold back up to 75mm of insulation (for thicker insulation please contact Ancon). A 10mm diameter hole is required in the base material. The projecting end of the retainer is pushed through the insulation material into the hole and tapped into position to secure the insulation.



## Debonding Sleeves

Debonded Ties require 100mm embedment.

A 120mm long sleeve will provide an allowance for movement and tolerance, and will be suitable for most applications. Other lengths and sizes available to special order.



# Wall Ties and Restraint Fixings

## Non-Drill Fixings for Steelwork

Ancon's range of 'NON-DRILL' masonry-to-steel fixing solutions was developed to address the safety concerns of the Industry.

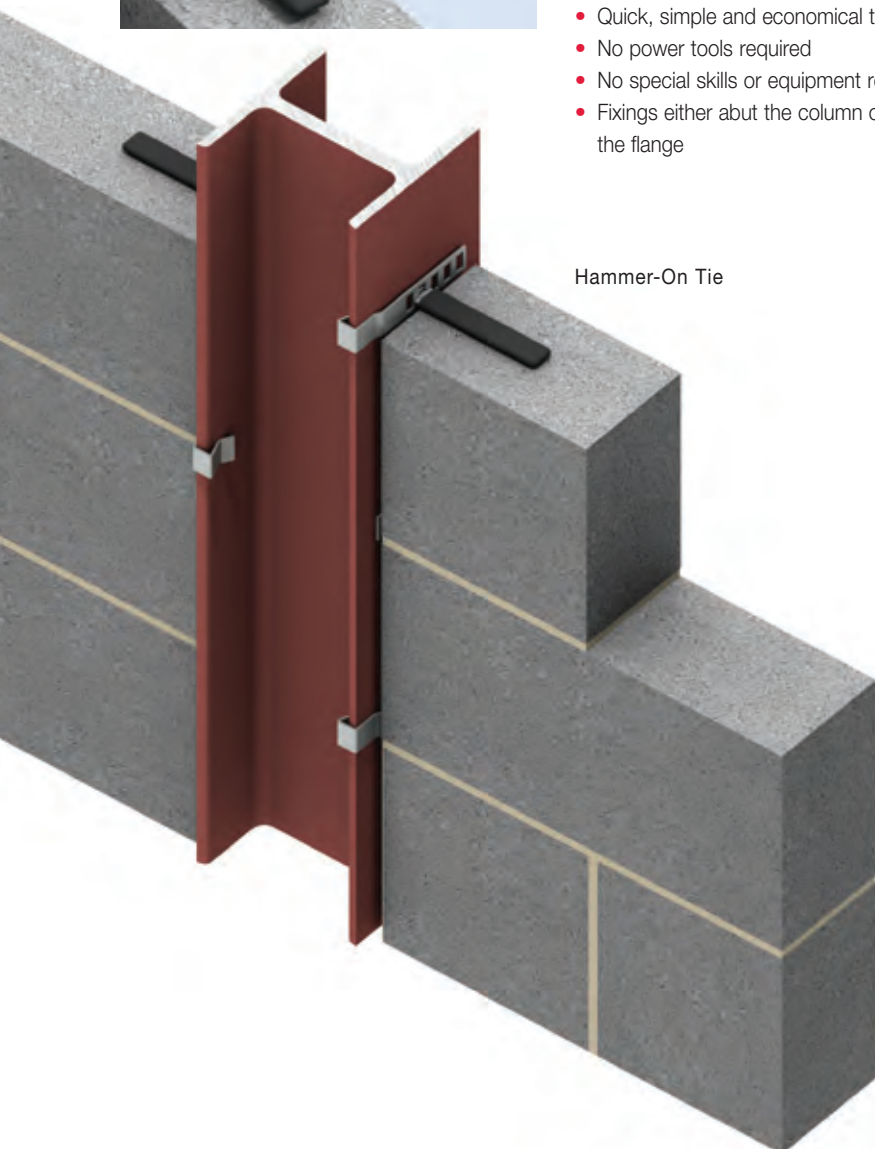
Driven by customer demand for masonry restraint fixings with an alternate installation method from either shot-firing or drilling, Ancon engineered the innovative solutions detailed here. These fixings do not require the use of power tools and can reduce installation times and costs. In all instances they simply abut the column or attach to the flange to restrain the wall against lateral wind loads.

### Design Sheets

Contact Ancon on +44 (0) 114 275 5224 or visit [www.ancon.co.uk](http://www.ancon.co.uk) for a Non-Drill Fixings Design Sheet. This sheet summarises all the information required by Ancon to specify/quote for the most appropriate non-drill fixing to suit your application.

### Ancon NON-DRILL fixings:

- Eliminate the dangers associated with shot-firing and drilling
- Quick, simple and economical to install
- No power tools required
- No special skills or equipment required
- Fixings either abut the column or attach to the flange



Hammer-On Tie

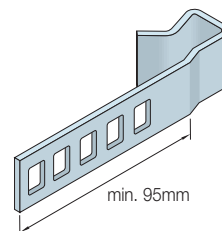
## Hammer-On Section

Available in five sizes to accommodate a steel thickness from 7mm to 25mm, this fixing is simply hammered onto the flange. It can be utilised either on a column with a tie (HOS-TIE) or on a beam with an internal head restraint (IHR-H).

Hammer-On Section Size	Flange Thickness Accommodated
XS	6.8-10mm
S	10-13mm
M	14-17mm
L	18-21mm
XL	22-25mm

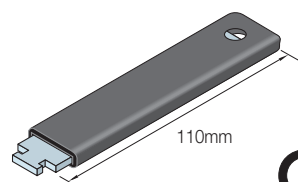
The wall tie (HOS-TIE) or head restraint (IHR-H) should be positioned central to the masonry leaf when located in one of the five fixing slots. The Hammer-On section is available in three lengths. Hammer-On Ties should be installed at 225mm vertical centres and Hammer-On Head Restraints at 450mm horizontal centres. For more information on the IHR-H Head Restraint see page 22.

**The Hammer-On Section resists load in one direction only and should be installed on alternate sides of the flange.**



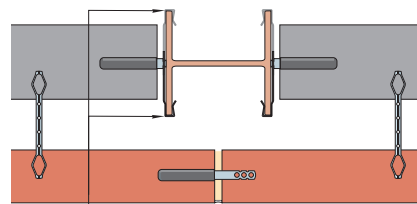
Hammer-On Section

Lengths 95mm, 155mm, 215mm



Hammer-On Tie (Debonded HOS-TIE, pictured above, supplied complete with Hammer-On Section)

Hammer-On Ties used at 225mm centres provide a design resistance of 1993N per metre.



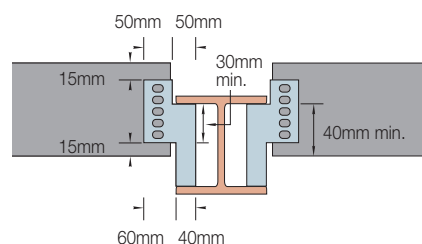
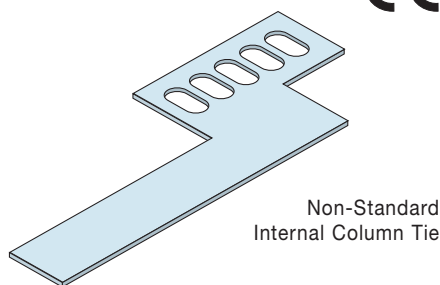
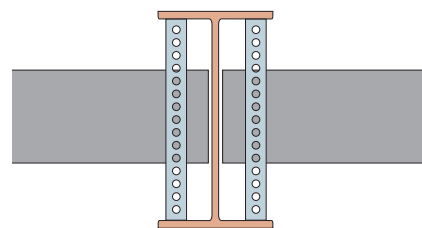
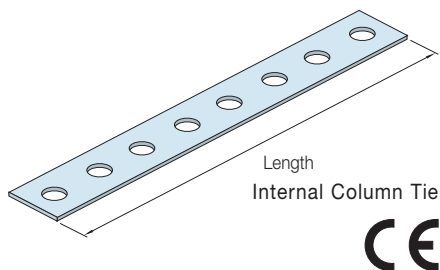
Hammer-On Ties installed to alternate sides of the column at 225mm vertical centres



### Internal Column Tie

Available in seven lengths, this tie fits between the flanges of a column. It should be installed at 225mm vertical centres, providing a design resistance of 6355N per metre.

Length (mm)	Beam/Column Accommodated
179	203 x 203 UC
186	203 x 133 UB
224	254 x 254 UC
232	254 x 146 UB
275	305 x 305 UC
281	305 x 127 & 165 UB
330	356 x 127 & 171 UB



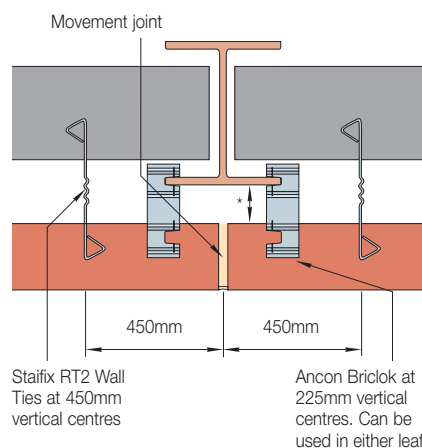
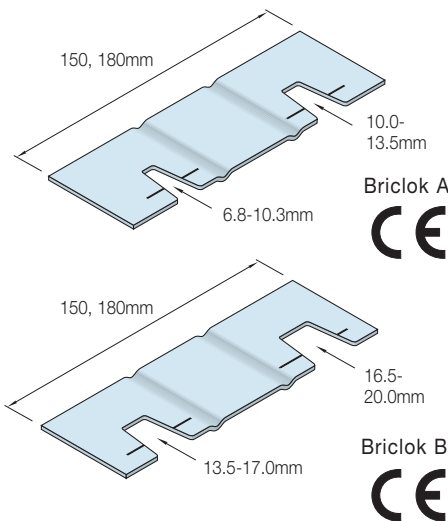
### Non-Standard Internal Column Tie

Special internal column ties can be designed to suit applications where the masonry does not sit inside the flanges of a column. The drawing provides some guidance on dimensions; contact Ancon for more information.

### New Briclok

The Briclok fits to a column flange and can be used either across a cavity or back into the inner leaf. It should be positioned with the appropriate notch around the flange and installed at 225mm vertical centres. The tie must not be forced onto the column and should have no less than 10mm engagement. Two types (A and B) accommodate a steel thickness from 6.8mm to 20mm and are available in two lengths to suit an open cavity from 20mm to 80mm.

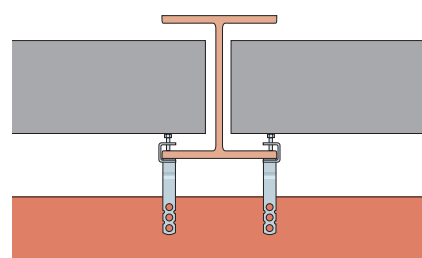
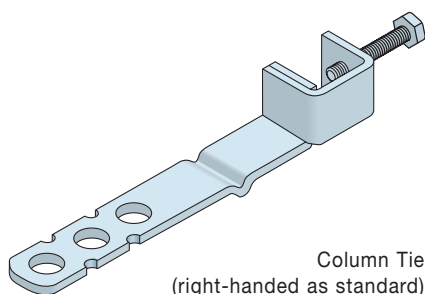
Briclok ties exceed the requirements for a Type 1 tie to PD 6697 in type M2 (iv) mortar.



### Column Tie

The Column Tie clamps to the flange of a column. It accommodates a steel thickness from 6mm to 25mm and should be installed at 225mm vertical centres. Manufactured in lengths to suit the application, it can feature a drip for use across the cavity or a plain shank for installation back into the inner leaf.

The clamp-on Column Tie is supplied right-handed as standard and can be manufactured left-handed on request.



### Avoiding Bi-Metallic Corrosion

Bi-metallic corrosion may occur in a damp environment where stainless steel fixings are in contact with a structural steel frame. This will not affect the stainless steel but may cause slight surface corrosion to the mild steel. Best practice is to isolate the two dissimilar metals. Bitumen paint or some other form of isolation e.g. adhesive tape, applied at the point of contact will prevent this corrosion.

Product Code	Length	Open Cavity*	Flange Thickness
Briclok150A	150mm	20-50mm	6.8-13.5mm
Briclok180A	180mm	50-80mm	6.8-13.5mm
Briclok150B	150mm	20-50mm	13.5-20.0mm
Briclok180B	180mm	50-80mm	13.5-20.0mm

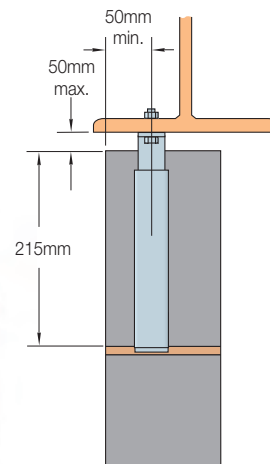
\* Open cavity at column face.

# Wall Ties and Restraint Fixings

Ancon IHR - B Bolted to Concrete,  
Restraining Top of Inner Block Wall



Ancon IHR-H Hammer-On Head Restraint

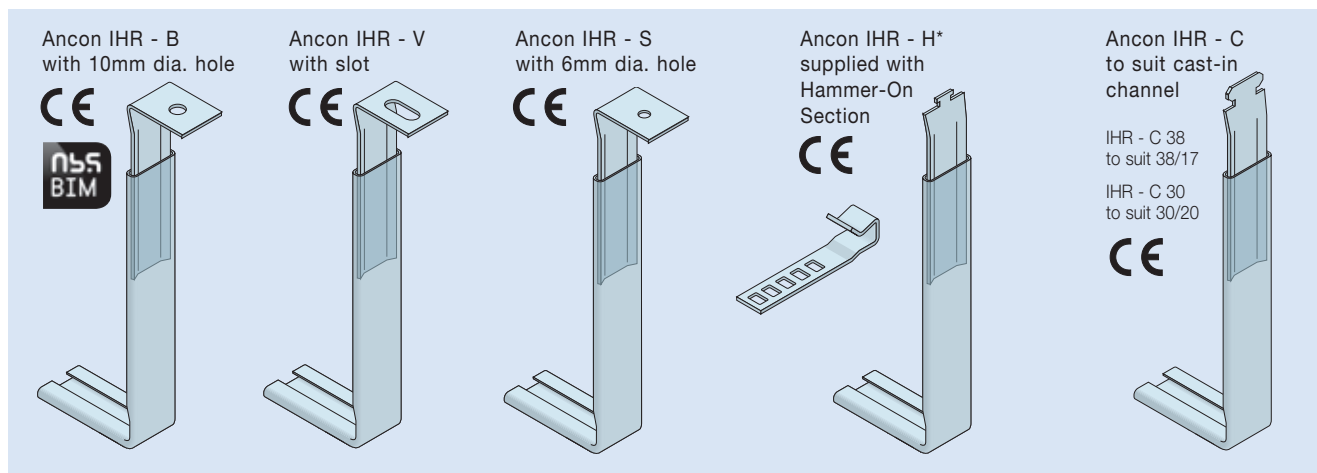


## Ancon Head Restraints

Ancon Head Restraints provide the necessary restraint to the top of masonry walls. They allow for vertical movement to accommodate shrinkage or thermal movement of the wall or structural frame, while restraining wind loads.

Where head restraints are to be connected to a concrete frame, the project Structural Engineer should advise whether the concrete is cracked or un-cracked.

In the absence of this information, Ancon will provide fixings suitable for un-cracked concrete.



## Ancon IHR - Internal Head Restraint

The Ancon IHR is used for restraining the top of internal walls or the top of the inner leaf of a cavity wall. The opening at the front of the channel stem is sealed to prevent mortar ingress and to ensure that vertical movement can take place between the blockwork and the structure. The base of the stem must be built within a bed joint with the centre of the stem no closer than 50mm from the edge of the block. The vertical joint should be filled with mortar each side of the stem. The maximum joint between the top of the blockwork and the

underside of the frame is not normally greater than 50mm. When used at 900mm centres the IHR provides a design resistance of 1714N/m and at 450mm centres provides a design resistance of 3429N/m. The standard IHR will suit a 215mm block; other sizes between 150 - 250mm are available.

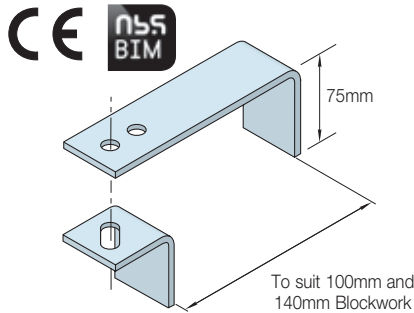
\*The IHR-H, when fixed at 450mm centres staggered each side of the lower beam flange (effective centres 900mm on each side), has a design resistance of 1133N/m in either direction.

The sliding tie can be provided with either a hole (IHR - B) or slot (IHR - V) to suit M8 bolts, with a notch end to fix directly into a 38/17 or 30/20 cast-in channel (IHR - C) and with a notch end to suit the Hammer-On Section (page 20) that attaches to a 6.8mm - 25mm steel flange without site drilling (IHR - H). It is also available to suit the SDTSS-38-5PT self-tapping screw (IHR-S).

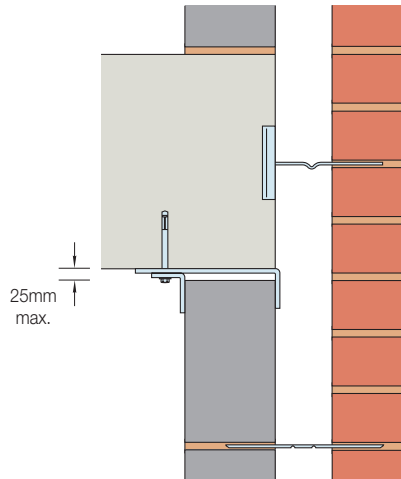


### Ancon FHR - Head Restraint

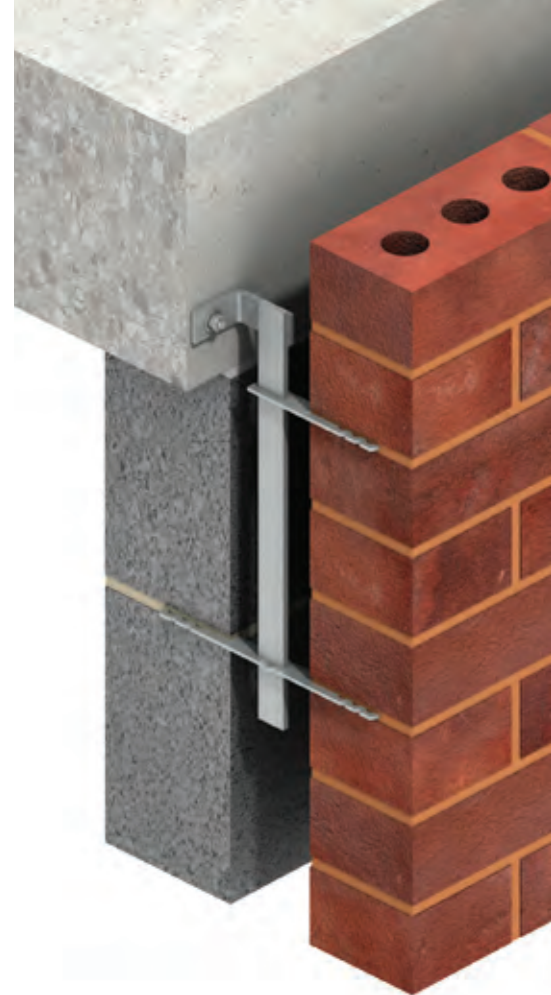
The Ancon FHR Head Restraint is used for restraining the top of internal walls or the internal leaf of a cavity wall. The two angles clamp the top of the wall and have 10mm diameter holes to suit M8 bolts. They are supplied with two holes in the longer angle to allow the restraint to fit 100mm and 140mm blockwork. Each restraint provides a design resistance of 1890N.



Ancon FHR Head Restraint - other sizes available



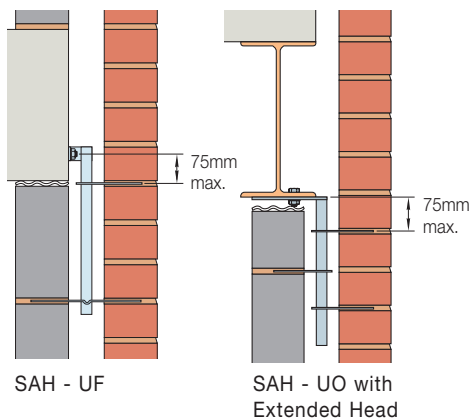
Ancon FHR Head Restraint Fixed to Underside of Floor Slab, Restraining Head of Inner Leaf of Cavity Wall



### Ancon SAH - Sliding Anchors

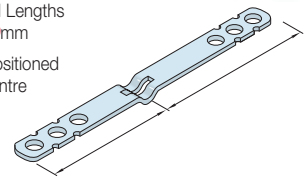
Ancon SAH Sliding Anchors have stems which fit within the cavity and accept ties that slide to accommodate vertical movement. Available with five different head options as standard, they can be supplied with one-way or two-way ties with safety ends.

The standard fixing hole is 12mm diameter to suit Ancon M10 Expansion Bolts (concrete), Ancon M10 Set Screws (steel) or M10 T-Head Bolts to fit Ancon 28/15 Channel. Ancon SAH Sliding Anchors have a design resistance of 755N per stem when the upper tie is within 75mm of the fixing. Ties should be spaced at a minimum of 150mm and at least two ties should be used per stem.



SIS  
Standard Lengths  
**200, 230mm**

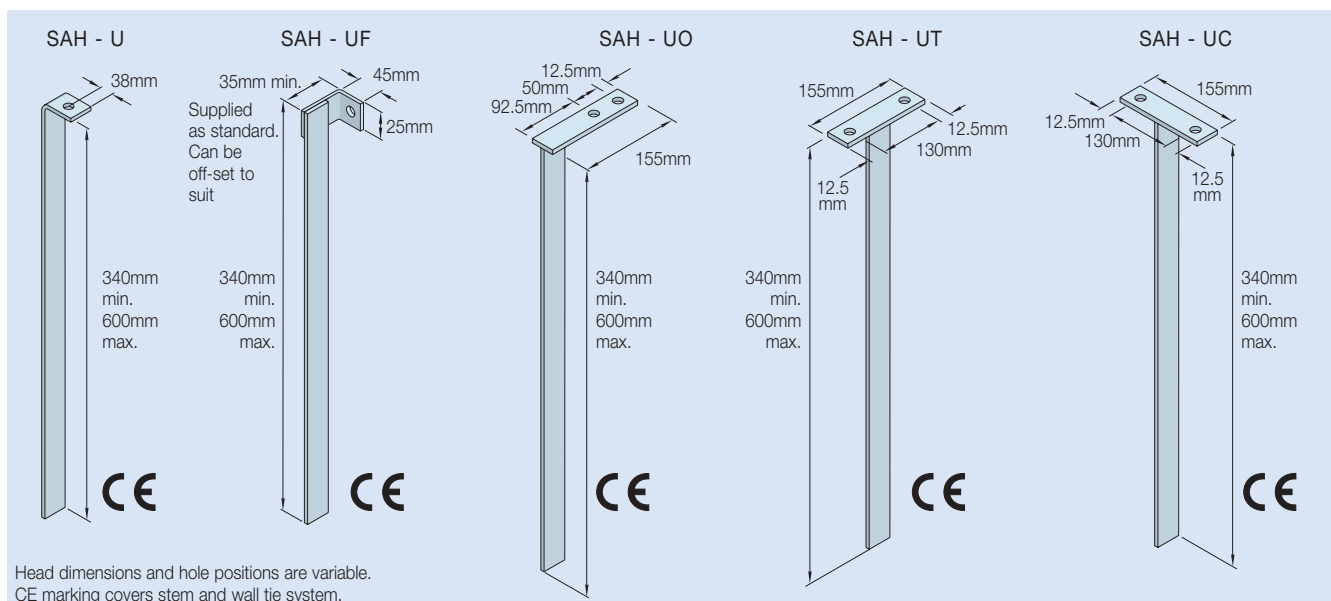
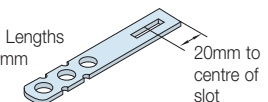
Slot is positioned at the centre of the tie



Other lengths and slot positions available to suit application

SPI  
Standard Lengths  
**135, 150mm**

Other lengths available to suit application



Head dimensions and hole positions are variable.  
CE marking covers stem and wall tie system.

**Note:** These drawings are examples only. All sliding anchors are manufactured to suit individual requirements. Where sliding anchors are to be connected to a concrete frame, the project Structural Engineer should advise whether the concrete is cracked or un-cracked. In the absence of this information, Ancon will provide fixings suitable for un-cracked concrete.

# Wall Ties and Restraint Fixings

## Acoustic Wall Ties

Ancon Acoustic Wall Ties feature a highly engineered, pre-compressed, acoustic isolation element. Products in this range provide the necessary structural performance, while minimising the transfer of airborne noise and vibration. Typical applications include: music rooms, recording studios, cinemas, nightclubs, industrial units, residential developments and mixed-use developments.

The acoustic performance of this range is far superior to other wall tie types and is the result of a carefully engineered balance between mechanical stiffness and high acoustic resilience. See table for comparisons.

## Dynamic Stiffness

Dynamic stiffness, as featured in Approved Document E of the Building Regulations, allows comparisons to be made between ties of different types and lengths. Research has shown that the dynamic stiffness of a wall tie featuring an acoustic isolator is determined by this element alone and is independent of the tie length and cavity width in which it is used (Robin Wilson, Heriot Watt University, 1992).

Approved Document E specifies the use of Type A ties in separating/party walls of new build residential developments in England and Wales. Type A ties must have a dynamic stiffness of less than 4.8 MN/m<sup>3</sup>. The dynamic stiffness of most Type 4 wire wall ties is only marginally below this threshold at a standard tie density of 2.5 ties/m<sup>2</sup>. In contrast, the Ancon Acoustic Wall Tie range, with a comparable dynamic stiffness of just 2.15 MN/m<sup>3</sup> offers a significant improvement over other Type A wall ties.

## Frequency

When considering sound insulation in buildings, the range of frequencies considered are generally between 50Hz and 5000Hz and these are normally banded into the low frequency range [50 – 200Hz], mid-frequency range [201 – 1000Hz] and high frequency range [1001 – 5000Hz].

Ancon Acoustic Wall Ties have been designed to fall within the lowest band.

## Structural Performance

All products in this range offer Type 3 wall tie performance to PD6697 at a standard tie spacing of 2.5 ties/m<sup>2</sup> and are available in incremental lengths of 25mm to suit the cavity range stated. The table shows the calculated tie density to achieve other wall tie types and how this affects the dynamic stiffness (NM/m<sup>3</sup>). Contact Ancon for more information. A CE declaration of performance is available online.



## Comparison of Acoustic Performance of Various Ancon Wall Tie Types

Wall Tie	PD6697 Type	Cavity	Frequency*	Dynamic Stiffness**
SD1	1	150 mm	823 Hz	72.1 MN/m <sup>3</sup>
ST1	1	50 mm	848 Hz	75.8 MN/m <sup>3</sup>
RT2	2	50 mm	500 Hz	25.5 MN/m <sup>3</sup>
HRT4	4	50 mm	208 Hz	4.7 MN/m <sup>3</sup>
<b>Acoustic Tie</b>	<b>4</b>	<b>-</b>	<b>139 Hz</b>	<b>2.15 MN/m<sup>3</sup></b>

\*Mean axial mass-spring-mass resonance frequency of the tie

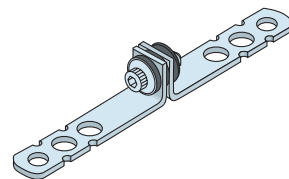
\*\*At a standard tie density of 2.5 ties per sq.m. Test regime described in BRE information paper IP3/01.

## Ancon ACOU Acoustic Range Calculated Tie Density per Wall Tie Type

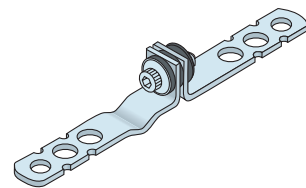
Equivalent Wall Tie Type	Tie Density (Spacing)	Dynamic Stiffness	Type A
<b>Type 4</b> Light Duty	<b>2.5 ties/m<sup>2</sup></b> (900mm x 450mm)	<b>2.15 MN/m<sup>3</sup></b>	✓
<b>Type 3</b> Basic	<b>3.5 ties/m<sup>2</sup></b> (900mm x 450mm)	<b>2.93 MN/m<sup>3</sup></b>	✓
<b>Type 2</b> General Purpose	<b>5.7 ties/m<sup>2</sup></b> (565mm x 450mm)	<b>4.79 MN/m<sup>3</sup></b>	✓
<b>Type 1*</b> Heavy Duty	<b>7.9 ties/m<sup>2</sup></b> (300mm x 450mm)	<b>6.64 MN/m<sup>3</sup></b>	-

For more information on wall tie types, refer to page 5. \* Type M2 (iv) mortar only

## Acoustic Cavity Wall Ties

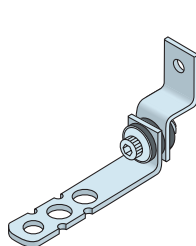


**ACOU SP-SP**  
Plain shank cavity tie  
Suits 50-175mm cavities  
Available with either a central or offset isolator

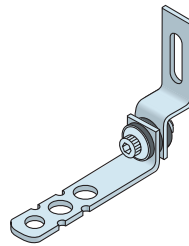


**ACOU SP-SD**  
Cavity tie with integral drip  
Suits 75-175mm cavities  
Available with either a central or offset isolator

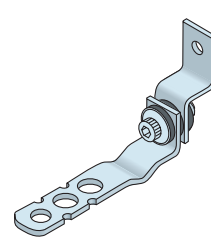
## Acoustic Frame Cramps



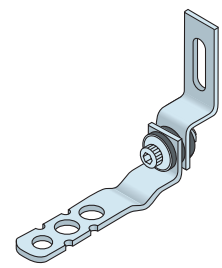
**ACOU SP-ZB**  
Plain shank frame cramp with 7mm fixing hole  
Suits 50-175mm cavities



**ACOU SP-ZV**  
Plain shank frame cramp with 8mm x 30mm fixing slot  
Suits 50-175mm cavities



**ACOU SD-ZB**  
Frame cramp with integral drip and 7mm fixing hole  
Suits 100-175mm cavities



**ACOU SD-ZV**  
Frame cramp with integral drip and 8mm x 30mm fixing slot  
Suits 100-175mm cavities

Other variations are available. Please contact Ancon with details of your application.



## Wall Starter Systems



### 36/8 Wall Extension System

The 36/8 Wall Extension System can be supplied with either SP36 ties or, where some longitudinal movement must be accommodated at the joint, PP36 ties complete with debonding sleeves. The channel can be supplied in lengths of up to 3.4 metres with each length having a series of holes to allow fixing to the existing wall. The system is available as a kit comprising ten ties, a length of 36/8 channel 2400mm long and ten plugs and screws for fixing at 300mm vertical centres. It has a design resistance of 1.6kN per metre.



### Staifix Universal Wall Starter System

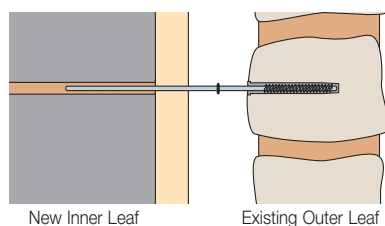
This system includes all necessary fixings to join a single skin of masonry, 2400mm high, to an existing wall and is suitable for wall widths from 60mm to 250mm. Each pack includes 2 fixing strips, 5 plugs, 5 washers, 5 screws and 10 wall ties. Wall Ties slide within the fixing strip to course with the bed joints of any masonry unit. This Universal Wall Starter System has a design resistance of 1.7kN per metre and can be used in line with NHBC standards.



### Staifix QuickStart Wall Starter System

This system includes all the wall ties and fixings needed to join a new wall, 2400mm high, to existing brickwork and is suitable for wall widths from 60mm to 250mm. The stainless steel starter strip features integral wall ties which fold out at pre-set 225mm vertical centres. Each pack contains 2 starter strips (10 integral wall ties), 5 screws, 5 plugs and 5 washers.

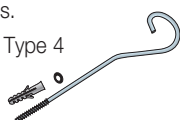
The QuickStart Wall Starter System has a design resistance of 1.7kN per metre and can be used in line with NHBC standards.



### Staifix Cavity Starter Tie

This tie simplifies the building of an inner leaf of blockwork within an existing structure. It is ideal for barn conversions.

The cavity starter tie is a Type 4 tie to PD 6697.



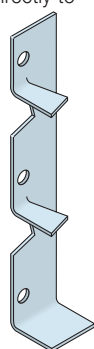
Length mm	Cavity mm	Embedment mm
180	50-70	65-85
200	75-95	65-85
230	100-120	65-85



### Ancon Slip-Brick Ties

Ancon Slip-Brick Ties are bolted directly to blockwork or concrete to give both support and restraint to thin slip brick facings.

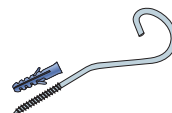
In addition to the standard three brick version, slip brick ties can be manufactured in other multiples on request.



### Staifix Starter Tie

This tie is quick and simple to install. It is suitable for use in brickwork and blockwork of up to 3 storeys or 8 metres in height and can be used in line with NHBC standards.

Supplied complete with an 8mm nylon wall plug, the Starter Tie is fixed into the existing wall at an angle of 30° to the horizontal and bent into the bed joints of the new brickwork. Ties should be fixed at 225mm vertical centres and be central to each leaf of the new wall.

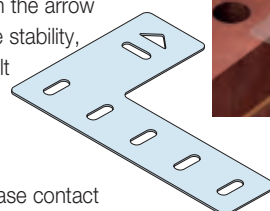


### Reveal Support Plate

The Ancon Reveal Support Plate is designed to support the first few bricks of a full brick (215mm deep) window reveal during construction. The plate will bond into the bed joint of the outer leaf providing a stable bearing for the reveal brick.

The long leg of the plate is built into the bed joint of the external leaf with the arrow pointing inwards. To ensure stability, the outer leaf should be built at least one brick high on top of the plate prior to the reveal brick being placed.

For other reveal depths please contact Ancon.



### Staifix Frame Tie

The Staifix Frame Tie is used to join timber door and window frames directly to brickwork. It is designed for use on buildings of up to 15 metres in height, and can be used in line with NHBC standards. The ties are screwed horizontally into the frame, surrounded by mortar and built into the bed joints of the new brickwork.

The vertical spacing of frame ties depends on the application. Please contact Ancon or your local Staifix stockist for more information.



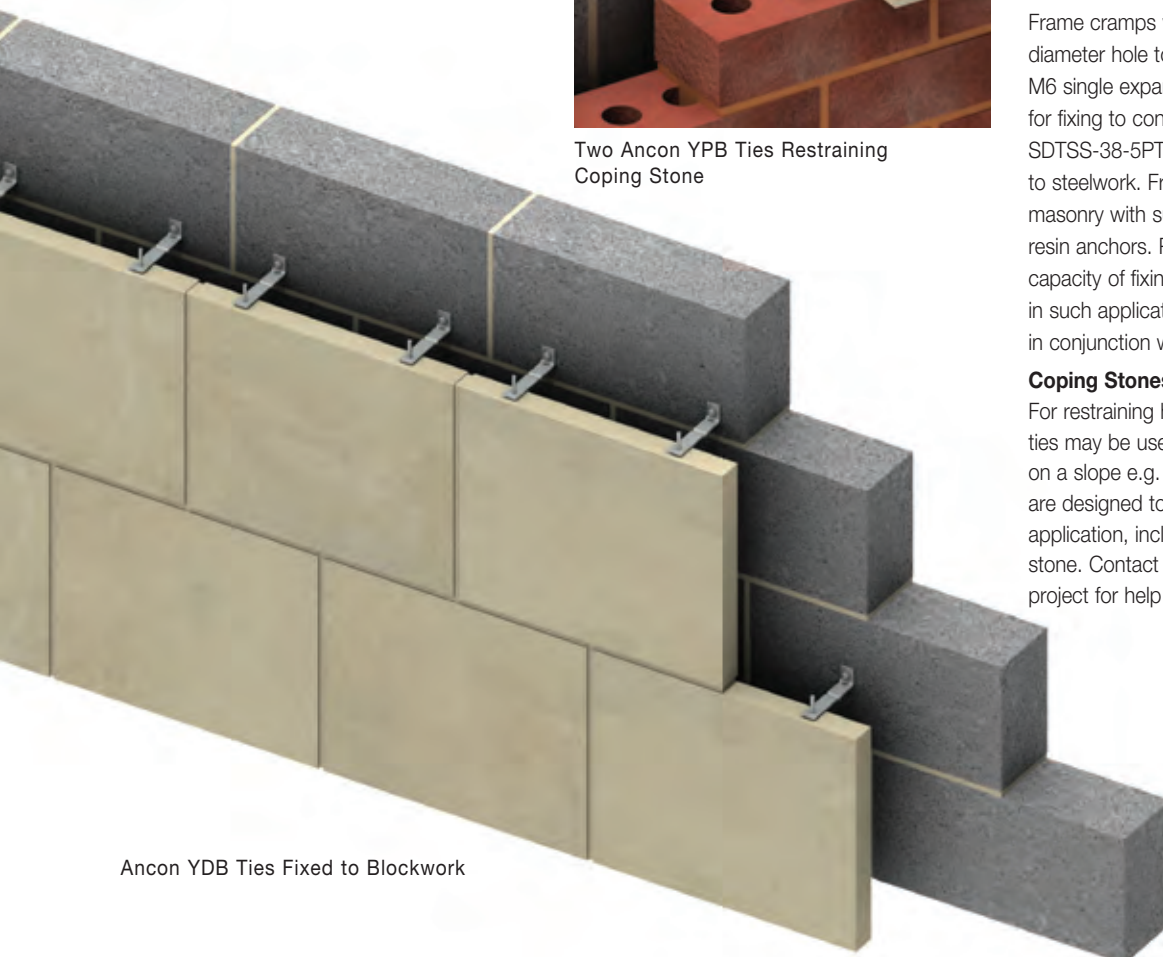
# Wall Ties and Restraint Fixings



Buchanan Galleries, Glasgow



Two Ancon YPB Ties Restraining Coping Stone



Ancon YDB Ties Fixed to Blockwork

## Restraints for Stone Cladding

Reference should be made to BS 8298-2: 2010 "Design and installation of natural stone cladding and lining", when selecting ties for restraining stone cladding. Restraints should be designed to resist wind loads and any imposed loads from, for example, window cleaning equipment.

Each stone will normally be restrained in four places, two at the top and two at the bottom. These are usually situated in the horizontal joints. The restraints should be located in pre-formed mortises or holes positioned in the centre of the thickness of the stone panel, and located at 1/4 points for half bonded stones and 1/5 points for stack bonded stones. Restraints should be kept at least 75mm from any corner with the peripheral distances between any two restraints not exceeding 1200mm.

The embedment of restraint dowels and lips into the stone should be at least 20mm.

To achieve this, lipped ties (LPBs) have a 25mm downstand and dowelled ties (DPBs and YPBs) have 60mm long dowels.

The actual capacity of the restraints will normally be restricted by the breaking load of the stone and/or the restraint fixing bolt. Breaking loads at the fixing should be determined in accordance with BS EN 13364.

Frame cramps with a B end have a 7mm diameter hole to suit a range of fixings. Ancon M6 single expansion bolts are recommended for fixing to concrete and M6 set screws or SDTSS-38-5PT self-drilling screws for fixing to steelwork. Frame cramps can be fixed to masonry with suitable plugs and screws or resin anchors. Poor substrates will limit the capacity of fixings and site testing is advisable in such applications. All fixings should be used in conjunction with a DIN washer.

## Coping Stones

For restraining horizontal coping stones, YPB ties may be used as pictured. For copings on a slope e.g. gable ends, restraint fixings are designed to suit the requirements of the application, including the slope and size of stone. Contact Ancon with details of your project for help with product selection.



## Section of Ties

Restraints for large stones and for use where cavities are in excess of 100mm may require special attention. They may need a much bigger section than standard 20 x 2.5mm; ties formed from 20 x 3mm, 25 x 3mm, 30 x 3mm and 30 x 4mm are frequently used for restraining stone cladding.

## Minimum Section of Dowels

Stone Thickness	Minimum Diameter of Dowels
30mm and below	3mm
40mm	5mm
50mm and above	6mm

## Drip Position

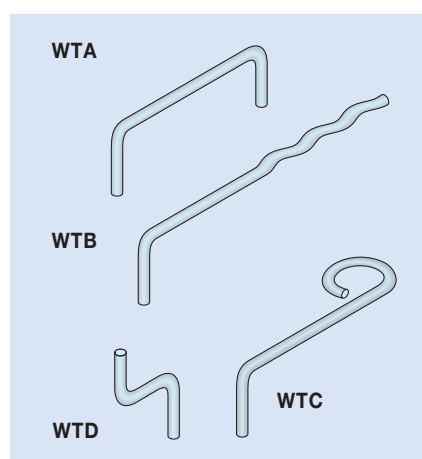
If a drip is required (e.g. YDB) please specify the position, indicating from which end of the tie the measurement is taken.

## Dowels

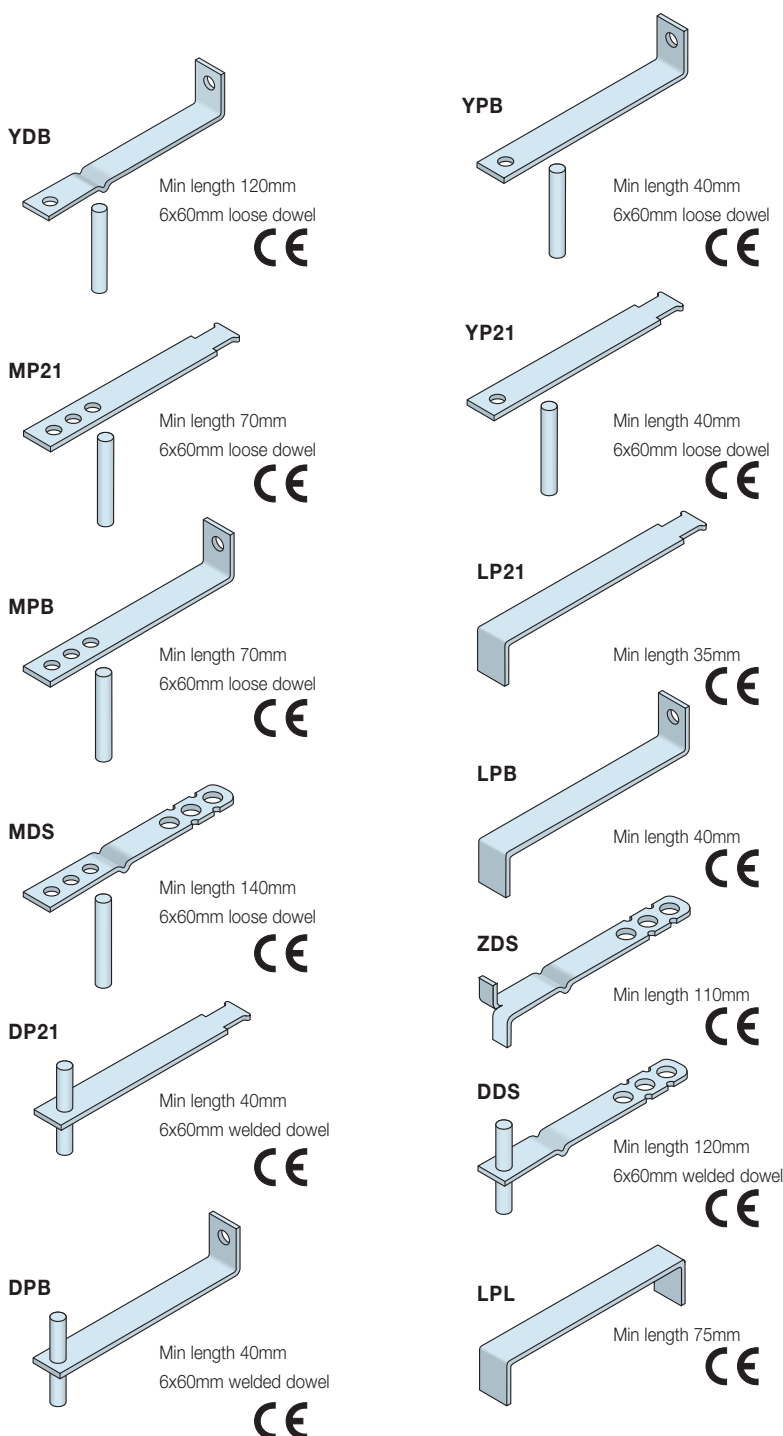
Standard dowels are 6mm in diameter and 60mm long. These will be welded into the tail end of ties referenced D\_\_\_, and supplied loose with ties referenced Y\_\_\_ and the multi-holed M\_\_\_. 8mm and 10mm diameter dowels are also available upon request, as are longer lengths.

## Wire Ties

The traditional method of fixing thin marble, particularly for internal linings and low rise cladding is with wire ties and plaster or mortar dabs. Wire ties are manufactured from 3mm and 5mm diameter wire.



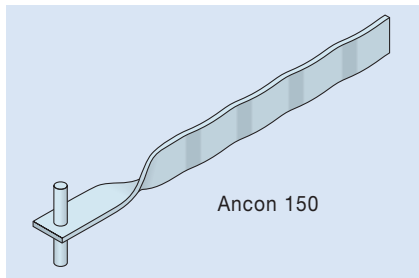
Ancon LD21 Ties Fixed into 21/18 Omega Channel, Restraining Top of Stone



# Wall Ties and Restraint Fixings

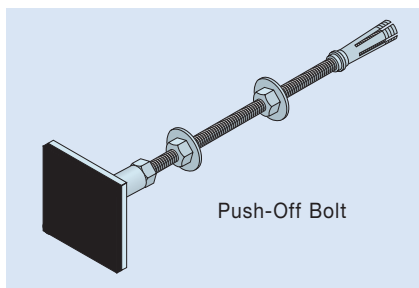
## Ancon 150

The Ancon 150 is a grout-in masonry tie for the restraint of 20 to 30mm thin facings, and suitable for cavities up to 60mm wide. The 12 x 2mm corrugated body provides optimum bond in a 12 x 90mm hole. The 50 x 3mm dowel is supplied loose.



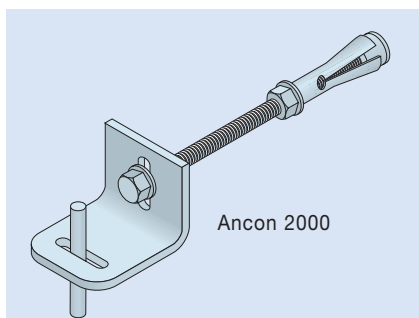
## Ancon Push-Off Bolt

The Push-Off Bolt provides the centre of stone panels with additional resistance to the effects of impact loads, blast loads and positive wind pressure. The Bolt features a mechanical expander at one end which fixes securely into the inner leaf. The external stone panel is positioned with its inner face flush to the bolt's neoprene pad, which cushions the surface and prevents any rattling. The Push-Off Bolt is supplied in a variety of lengths to suit cavities from 100 to 200mm.

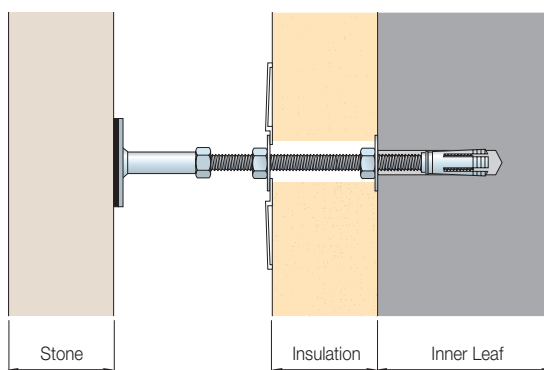


## Ancon 2000

Ancon 2000 restraint fixings are a simple and secure method of fixing thin facing slabs. The fixing is quickly and easily installed with the small diameter hole giving lower drilling costs and minimum disturbance to the structure. Vertical and lateral adjustment is provided by the slotted holes in the fixing clip.



Museum of Scotland, Edinburgh

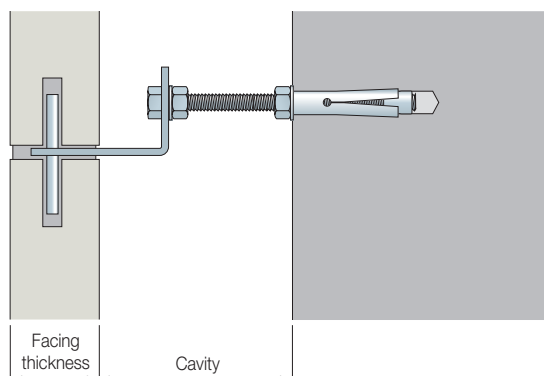


Ancon Push-Off Bolt

## Ancon 2000 Thin Facing Restraints

Reference	Facing Thickness (mm)	Cavity Min. (mm)	Cavity Max. (mm)	Hole Size (mm)	Safe Working Load* (N)
2000/A	20	25	70	8 x 90	600
	25	22	67	8 x 90	600
2000/B	30	30	75	8 x 90	600
	40	25	70	8 x 90	600
2000 - 75	20	60	105	8 x 90	600
	25	57	102	8 x 90	600
	30	55	100	8 x 90	600
	40	50	95	8 x 90	600

Other sizes are available to suit cavities up to 180mm. \*In grade 30N/mm<sup>2</sup> concrete



Ancon 2000

## Remedial Wall Ties

### Corrosion of Cavity Wall Ties

Wall ties are an essential element in the stability of masonry panels. Prior to 1978, wall ties were usually manufactured from galvanised mild steel. These ties were expected to last the lifetime of the building, but it has now been recognised that these wall ties can corrode after only 15 or 20 years.

When these ties corrode, they can expand to seven times their original thickness.

This causes the brickwork to crack at the mortar joints and can result in major damage and sometimes the collapse of walls.

It is crucial that the problem is identified as quickly as possible and the correct remedial action undertaken.

### Testing and Tie Performance

The '63 range, Staifix R/R and Teplo2 have been independently tested in a variety of materials; a summary of the results is given in the tables. The failure loads noted are obtained from standard tests in brick couplets and provide indicative values of tie performance. The couplet test produces results of a conservative nature compared to actual wall tests. Due to the variability of materials, it is advisable to undertake a pull-out test on site to verify the selection of an appropriate tie. Ancon remedial wall ties do not carry CE marking as the test regime in the European Standard EN 845-1 is inappropriate for remedial applications.

### Tie Spacing

Accepted practice is to follow PD 6697: 2010 that is 900mm horizontally and 450mm vertically in a staggered pattern with 300mm vertical centres around openings within 225mm of the opening.

### Fischer FIS VL 410 C Resin

This CE-marked, two part system of vinyl ester and hardener supplied by Ancon is quick setting and suitable for a wide range of applications. The resin and hardener are stored in separate chambers and are safely mixed together inside the nozzle. Automatic mixing ensures an accurate blend and, being mixed only as required, the minimum of wastage. Dispenser guns and additional static mixing nozzles are available.



### Installation of Remedial Wall Ties

Mechanical ties are easily installed by means of a Setting Tool which expands the brass ends in a drilled hole.

To install RM, Staifix Resin/Resin and TeploTie (Type 2) remedial wall ties an extension nozzle and tube is required to pump resin across the cavity and into the inner leaf. The extension tube is supplied in a standard length of 1000mm and is cut to suit on site.

Installation guides are available to download from [www.ancon.co.uk](http://www.ancon.co.uk).



Corroded Steel Wall Tie



Ancon 63 Setting Tool

### Ancon 63 Range

Cavity Widths (mm)	Tie Length (mm)	Drill Diameter (mm)	Drill Depths (inner leaf) (mm)
35-60	200	11	70-75
61-85	225	11	70-75
86-110	250	11	70-75
135-160	300	11	70-75

**Note:** For cavities in the range 111mm to 134mm Ancon recommends a Resin/Resin tie. Ties should not be positioned less than 10mm from the weather side of the outer leaf. Minimum embedment to the inner leaf is 70mm.

### Failure Loads (Pull-Out) for the Ancon 63 Range

Base Material	Failure Load (kN)
Stock or Accrington Brick	3.3
Common Brickwork	3.0
Dense Concrete Blockwork	2.6
Lightweight Concrete Blockwork	2.1
40N Concrete	3.2
30N Concrete	2.9

### Failure Loads (Pull-Out) for Staifix R/R

Base Material	Compressive Strength (N/mm²)	Failure Load (kN)
Dense Concrete Block	7.0 - 10.5	5.78
Lightweight Concrete Block	2.8 - 3.5	2.87
Mortar Bed Joint, 1:1:6 Type (iii) PD 6697	-	5.37

### Ancon Teplo2 Range

Cavity Widths (mm)	Tie Lengths (mm)	Drill Diameter (mm)	Tie Diameter (mm)
126-200	275, 300, 325	8	6
201-300	350, 375, 400, 425	10	7

**Note:** For applications outside those shown above, please contact Ancon.

### Failure Loads (Pull-Out) for the Ancon Teplo2 Range

Base Material	Drill Depths (mm)	6mm Tie Failure Load (kN)	7mm Tie Failure Load (kN)
Hard Brick (Accrington Nori)	50-65	8.98	10.03
Soft Brick (Yellow Imperial)	60-65	5.98	8.70
Portland Stone	50-65	6.33	7.21
Lightweight Concrete Block	70 min.	1.35	1.81
Dense Concrete Block	50-65	1.62	1.62

**Note:** The failure loads given are pull-out tests only. The overall performance of the tie may be limited by other factors such as tie type. For further information please contact Ancon's Technical Department to confirm suitability for specific applications.



# Wall Ties and Restraint Fixings

## Ancon 63 Mechanical/Mechanical

Used when tying together two leaves of solid materials, this tie has mechanical expanders at each end. Requires 11mm Ø holes.

## Ancon 63 Resin/Mechanical

For use when the material in the inner leaf is perforated, of low-density or a friable material. A resin fixing may be used to eliminate any imposed stress. Requires 11mm Ø holes.

## Staifix Resin/Resin

Used where mechanical expanders are unusable. Normally inserted into a 10mm Ø hole, but if test facilities are required, a 12mm Ø hole must be used. A plastic sieve can be used to retain resin and is particularly useful in perforated brick or hollow blockwork. A 12mm Ø hole is required to fit the sieve.

## Stairib Bar

Stainless steel ribbed bar, resin-grouted into the inner and outer leaves. Requires 10mm Ø hole (6mm dia. bar) or 12mm Ø hole (8mm dia. bar).

## Ancon AC 31

Used where bricks are removed then replaced in the outer leaf. The wavy end is resin-bonded into the inner leaf in a 10mm Ø hole. The triangular end sits in the bed joint. Ancon AC 31 can be supplied with a drip or a neoprene ring.

## Ancon AC 31C

Similar to the AC 31 but cranked by 25mm to aid fixing to the inner leaf. Requires 10mm Ø holes.

## TeploTie (Type 2)

This plain-ended basalt fibre wall tie can be resin-fixed in remedial and retrofit applications. This tie has a thermal conductivity of only 0.7 W/mK. Requires 8mm Ø hole (6mm dia. bar) or 10mm Ø hole (7mm dia. bar).

## HRT4/R

Used for tying the two leaves of a cavity wall or separating wall where the first leaf has already been built. The wavy end is resin-bonded into the existing wall in a 10mm Ø hole. The tie is based on the Staifix HRT4 and has similar properties.

## Type A R/R

This is designed as a remedial tie for a separating wall. It will normally be inserted in 10mm Ø holes and resin-bonded into both leaves. It meets the requirements of a Type A wall tie to Approved Document E.

Ancon MM 63  
200mm for 35-60mm cavities  
225mm for 61-85mm cavities  
250mm for 86-110mm cavities  
300mm for 135-160mm cavities

Ancon RM 63  
200mm for 35-60mm cavities  
225mm for 61-85mm cavities  
250mm for 86-110mm cavities  
300mm for 135-160mm cavities

Staifix R/R  
180mm for 40-60mm cavities  
200mm for 61-80mm cavities  
220mm for 81-100mm cavities

Stairib Bar  
Length to order  
6, 8mm dia.

Ancon AC 31  
Lengths 175, 200, 225,  
250, 275, 300mm

Ancon AC 31C  
Lengths 175, 200,  
225mm

TeploTie Teplo2  
Lengths 275, 300, 325,  
375, 400, 425mm

HRT4/R  
Lengths 200, 225,  
250mm

Type A R/R  
Length 225mm



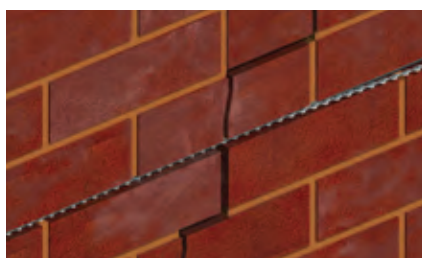
## Staifix-Thor Helical Crack Stitching Kit

The Staifix-Thor Helical Crack Stitching Kit is a high strength, non-disruptive solution for the permanent repair of cracked masonry. It is available from builders merchants and specialist distributors.

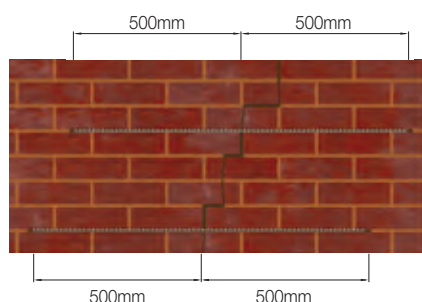
Ideal for either the remedial specialist or the contractor with a one-off repair job, the kit contains 10 Staifix-Thor Helical reinforcing bars (6mm x 1000mm), masonry repair grout (3 litres), a paddle for grout mixing, a grout applicator gun with a flat nozzle and a finger trowel.



Purchase of the Ancon kit, in preference to obtaining all the components individually, guarantees the correct specification and compatibility of reinforcement, grout and tools for this specific application. The kit is supplied in a single box with full installation instructions.



The stainless steel helical bars are chemically bonded into bed joints to stitch cracks, redistributing tensile forces and stabilising the structure. On completion, the bar and grout are concealed, retaining the original character of the wall.



Please note it is essential that the cause of the cracking is established and eliminated prior to the installation of this system.

## Other Ancon Products

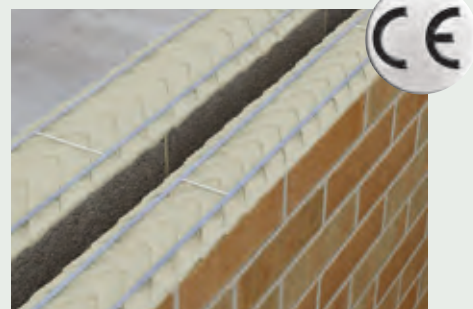
### Masonry Support Systems

Masonry cladding on concrete or steel frames is normally supported from stainless steel support systems. AnconOptima and Ancon MDC Systems create a continuous angle to support the outer leaf of masonry. Ancon Individual Brackets support masonry features such as curves and arches. A full design service is available to specifiers and users of Ancon systems.



### Masonry Reinforcement

Ancon AMR masonry reinforcement improves the structural performance of a wall by providing additional resistance to lateral loads. Located in the bed joint, it has a flattened profile to maintain good mortar cover even when lapped or used with wall ties. It is available in various standard configurations to suit a range of loading conditions and wall widths.



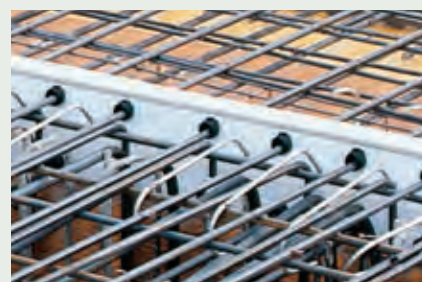
### Windposts and Parapet Posts

Large panels of masonry or panels with openings can often be difficult to justify structurally. Ancon Windposts are designed to provide additional lateral support for panels of brickwork. The range is manufactured from stainless steel and includes Windposts which can be installed into the inner leaf of blockwork and Windposts for installation into the cavity, which leave the blockwork undisturbed. Parapet Posts are used as vertical support for brickwork in either parapet or spandrel panels.



### Insulated Balcony Connections

Ancon's thermally insulated connectors minimise heat loss at balcony locations while maintaining structural integrity. They provide a thermal break and, as a critical structural component, transfer moment, shear, tension and compression forces. Standard solutions are available for concrete-to-concrete, steel-to-concrete and steel-to-steel interfaces.



### Tension and Compression Systems

The use of tie bars in structures and buildings as an architectural as well as a structural element is increasing. Ancon Tension Systems comprise a range of components which can be supplied in carbon steel or stainless steel in a variety of sizes and finishes. The system looks particularly impressive when used with large areas of glazing or timber trusses.



For BIM objects of the above products visit  
[www.ancon.co.uk/BIM](http://www.ancon.co.uk/BIM) or  
[www.NationalBIMLibrary.com/Ancon](http://www.NationalBIMLibrary.com/Ancon)



**Ancon**

Masonry Support Systems

Lintels

Masonry Reinforcement

Windposts and Parapet Posts

**Wall Ties and Restraint Fixings**

Channel and Bolt Fixings

Tension and Compression Systems

Insulated Balcony Connectors

Shear Load Connectors

Punching Shear Reinforcement

Reinforcing Bar Couplers

Reinforcement Continuity Systems

Stainless Steel Fabrications

Flooring and Formed Sections

Refractory Fixings



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These products are available from:

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