

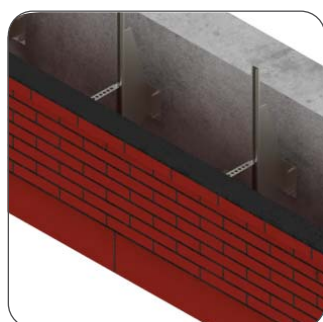
HAZ  
METAL

*Your Fixing Systems Specialist*



## Brickwork Support Systems

Product Technical Catalogue







## Contents

Brickwork Support Systems Overview	1	HMLS Brickwork Lintels	27
Brickwork Support System Product Range	3	HM-SW Precast Lintel Brackets	32
Brickwork Support Systems Application Examples	4	HMP Brickwork Restraint Channels	33
FIX Brickwork Support Brackets	5	HWT-M Brickwork Channel Ties	34
FIX Brickwork Support Bracket Application Guide	9	HRST Restraining Ties	35
FIX-2 Brickwork Support Bracket	15	CMWT Brickwork Wall Ties Product Details	36
HMCS Brickwork Continuous Support Angle	17	HMP-25/14 Brick restraint system	39
HMS-AW & AWS Brickwork Angled Support	19	HMHR Brick head restraints	41
HMS-ES & GS Cast in Inserts	21	Connections Methods to Concrete	43
HMS-AV Restraint channel	22	Scaffolding Anchors Product Details	44
HWP Wind Posts	23	Brickwork Support Systems Design Principles	46

# Brickwork Fixing Systems - Overview

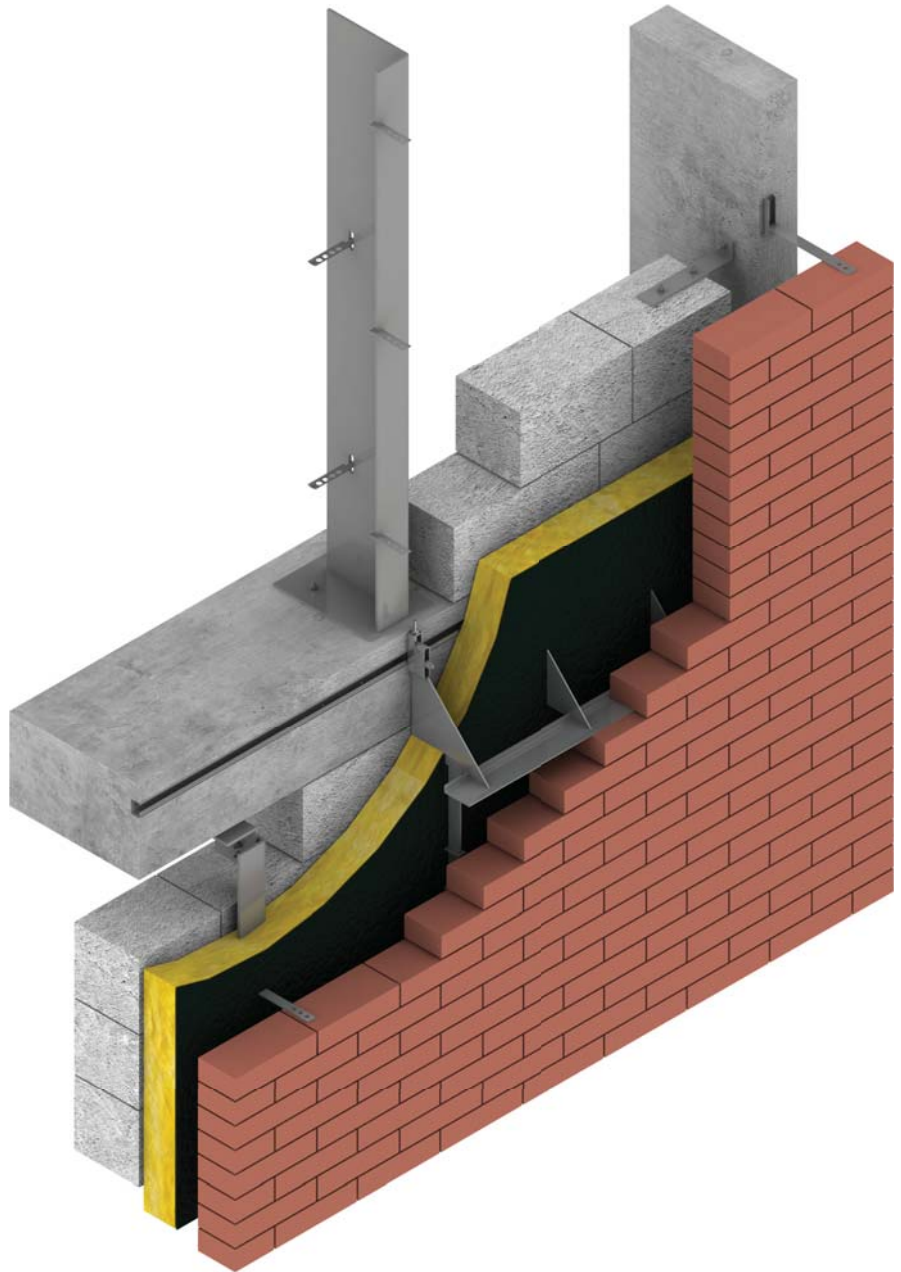
Brickwork fixing systems are used for the secure and easy installation of brickwork wall cladding. Brickwork support brackets are used to transfer the dead loads of non load bearing outer shell brickwork walls to the load bearing inner walls of buildings. Load bearing brickwork support brackets are fixed on to concrete beams which carry the dead load of the cladding wall. Restraint ties or wall ties are used along the rest of the storey height to secure the brickwork wall cladding against wind loads.

Brickwork fixing systems provide support for brickwork as non-load bearing external cladding which is attached on the substrate. The relatively thin outer skin of brick wall will not maintain its integrity unless it is properly supported by properly designed load bearing brackets and restraint ties. In addition, the substrate may move differentially in relation to the cladding, so horizontal soft joints are required to keep the outer skin separate from the frame. Careful design and designation of fixing systems needs to be carried out in order to achieve stable and secure installation.

Brickwork support systems are designed to be positioned at beam level and are fixed on to either anchor channels or on to concrete with expansion or chemical anchor bolts. When fixing is made with anchor channels, quick installation and horizontal adjustability is achieved which increases the rate of productivity.

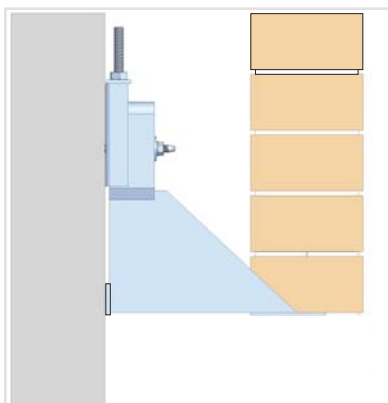
The brickwork wall cladding fixing methods are planned according to each individual cases. There may be a lot of variations in terms of insulation thicknesses, cavity sizes, support heights, height of floor levels etc. Extensive design must be made for corners, lintels, joints as well as the straight facades. There are a wide range of brackets available for different executions.

A technical service is available for proposing fixing system after viewing the details of the project. The fixing system elements are available in stainless steel grade 1.4401 (A4) & 1.4301 (A2).

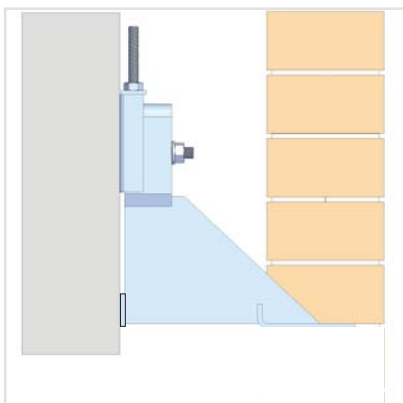


## Application Variations

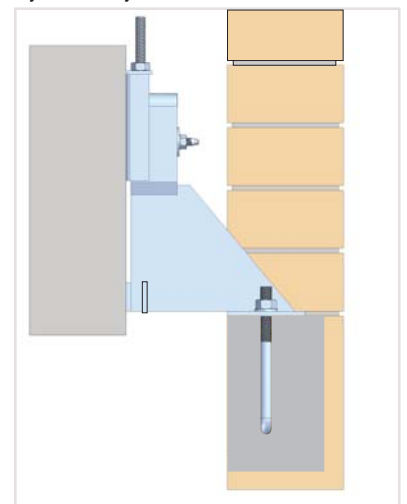
Single brickwork support bracket for the installation of bricks which are layed between two brackets. Fixing on to concrete made with anchor channels, anchor bolts or chemical bolts.



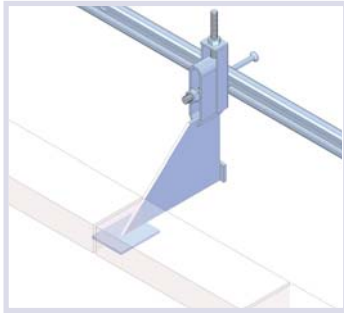
Brickwork support brackets with welded continuous L angles. Brick support is made along the length of the L angles.



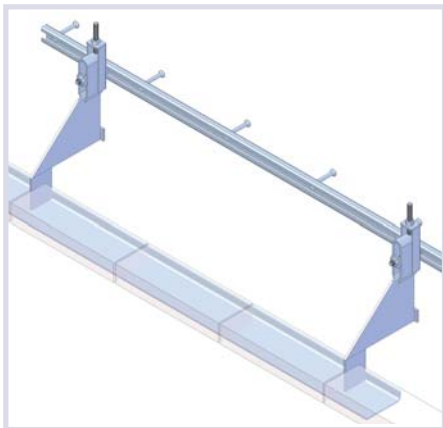
Brickwork support brackets with slot holed welded plates for installing prefabricated components. With cast in channels or u bolt inserts within the component, the fixing is made safely and easily.



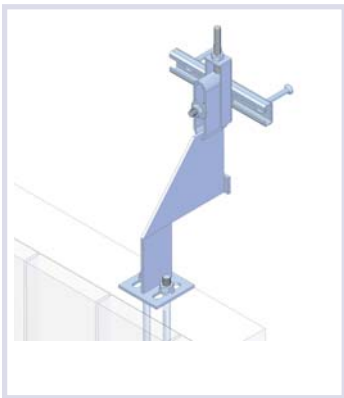
# Brickwork Fixing Systems - Overview



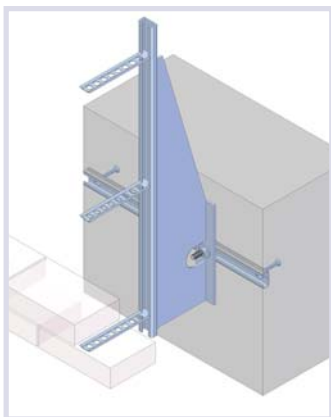
Single support bracket



Continuous angle support bracket



Brackets for soffits



Restraining brackets and ties

## Brickwork Facade

External brickwork walls are formed out of a load bearing inner wall, an insulating layer and an outer wall cladding with bricks. The outer wall cannot be used for load bearing purposes nor can it be used for attachments of various components. The outer wall is a design element that satisfies the aesthetics and also serves as a means of weather protection.

The outer wall which is constructed of layers of brickwork needs to be supported at regular intervals. The load of the brickwork is transferred on to the inner load bearing wall by brickwork support brackets. Restraining of the outer wall is made with restraining wall ties. Therefore, both the inner and outer wall shells are connected to each other with load bearing brackets and restraint wall ties.

## Facade Design

The following points should be carefully evaluated when designing a brickwork facade.

- thickness of insulation and air gap,
- design of details, such as,
- wall areas,
- joints,
- external and internal corners,
- lintels above doors and windows,
- columns.

Many product variations are available for these situations, including the fixing of precast brickwork lintels and prefabricated elements.

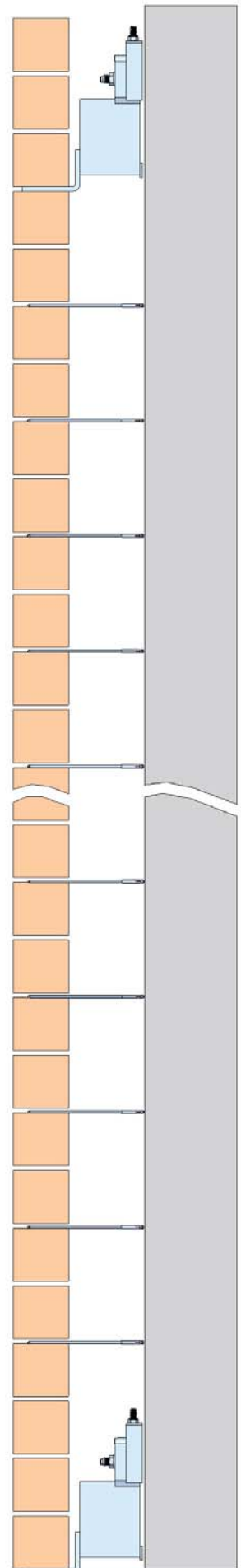
The thickness of the insulation together with the air gap make up the dimension  $a$  for the distance between structural leaf and facing leaf. The greater the distance is between the two leaves, the larger has to be the projection  $K$  of the support brackets.

Brickwork support brackets are suitable for distances between leaves of 40 to 160 mm. The corresponding brickwork support brackets come with projections of 130 to 350 mm. Angle supports are used for any cavity sizes that are less than 40 mm.

In order to cover all the loads within the application of brick works installation, there are various load groups that the brackets can carry. The load categories are 3,5 kN, 7,0 kN and 10,5 kN. 15 kN. 18kN, 22 kN & 24 with projections of up to 350 mm from the substrate. Special design is made to cover higher load and projection requirements

The following standards are used in the design of brickwork support systems:

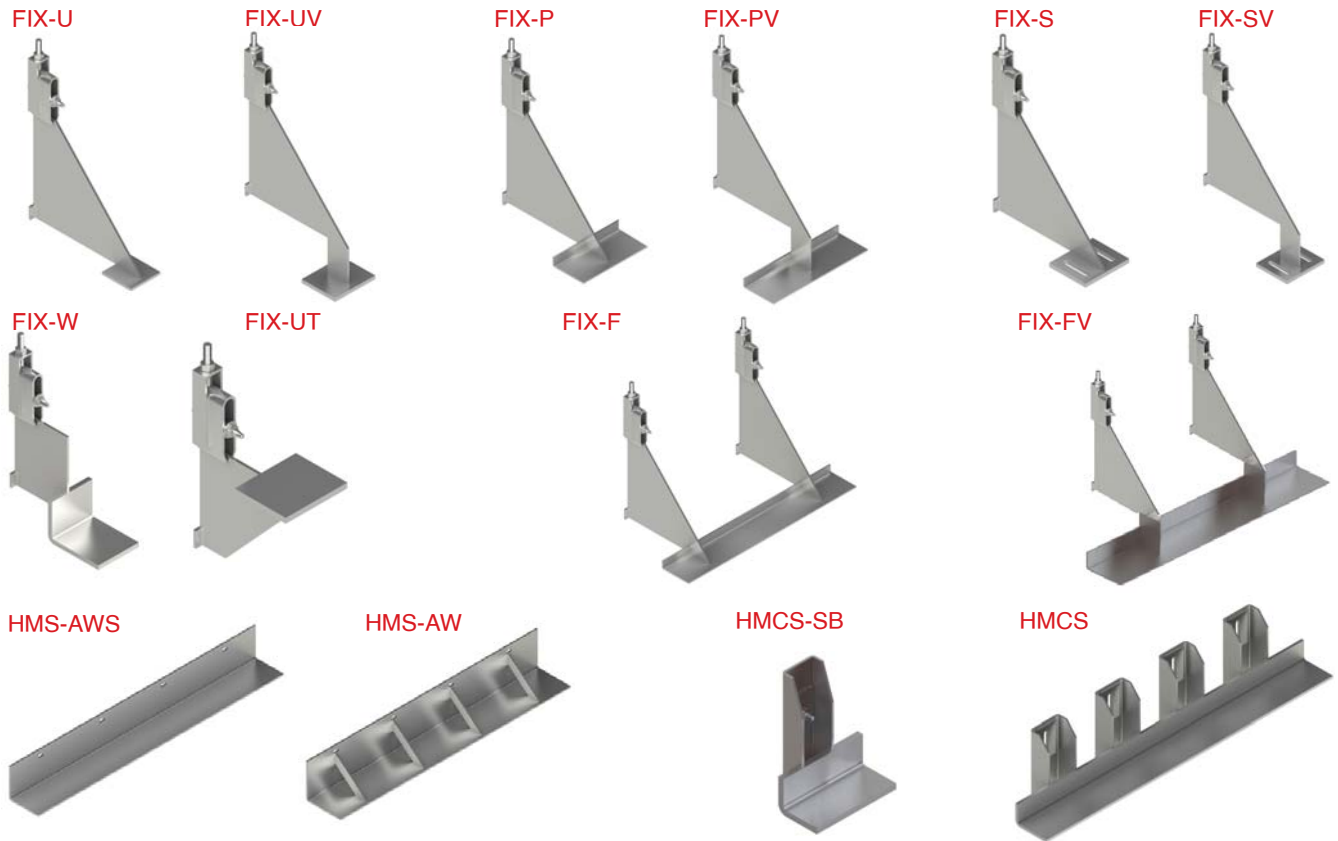
- EN 1996: Eurocode 6 - Design of Masonry Structures
- EN 1990: Eurocode - Basis of Structural Design
- EN 1991: Eurocode 1 - Actions on Structures
- EN 1998: Eurocode 8 - Design of Structures for Earthquake Resistance
- EN 1993: Eurocode 3 - Design of Steel Structures



# Brickwork Systems - Product Range

The production of various types of brickwork support systems is available at HAZ Metal. There is a standard product range shown below. Special parts can be produced according to project requirements. Materials used are stainless steel and galvanized mild steel. Brickwork support anchors are produced from stainless steel 1.4301 (AISI 304) & 1.4401 (AISI 316).

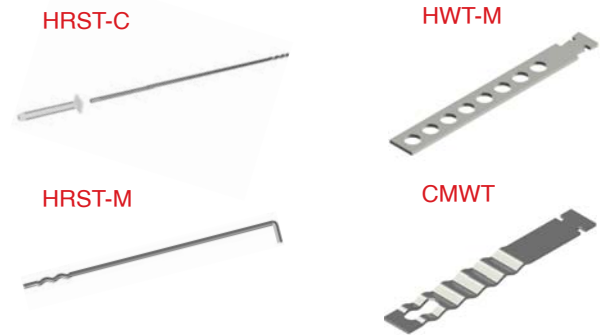
## Load Bearing Brackets



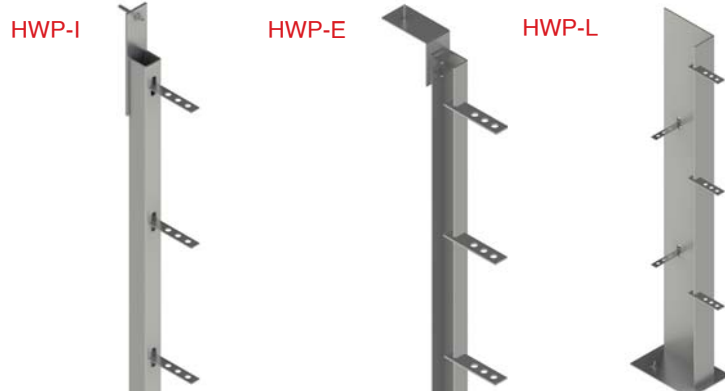
## Accessories



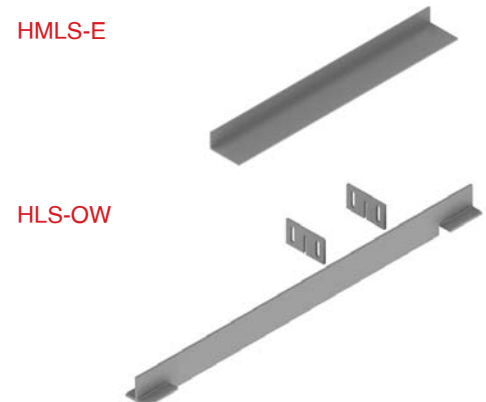
## Wall Restraining Ties



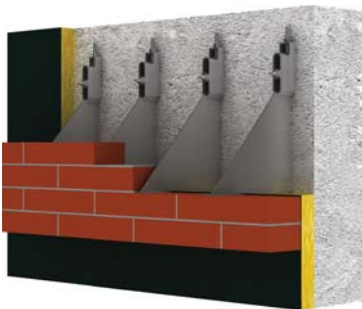
## Windpost Restraints



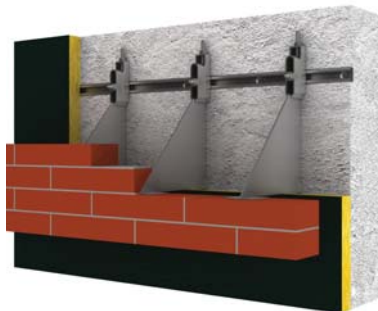
## Lintel Supports



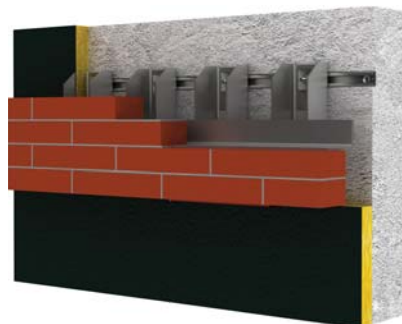
# Brickwork Fixing Systems - Application Examples



- Brickwork facing wall supporting system with **FIX-U** single brackets. Bracket fixing to wall with through bolt.



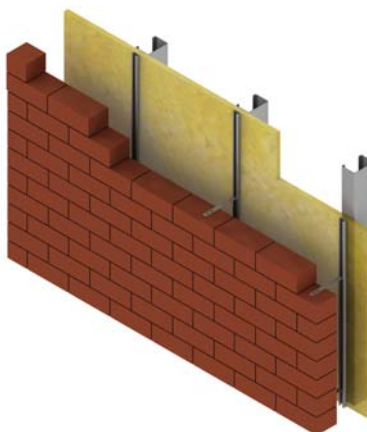
- Brickwork facing wall supporting system with **FIX-U** single brackets. Bracket fixing to wall with cast-in channel.



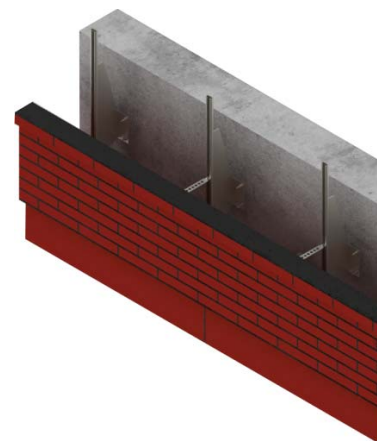
- Brickwork facing wall supporting system with **HMCS** continuous brickwork supports



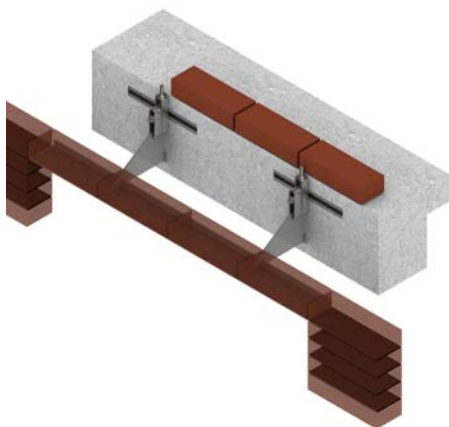
- Brickwork facing wall supporting with **HMS-AW** brickwork support angle



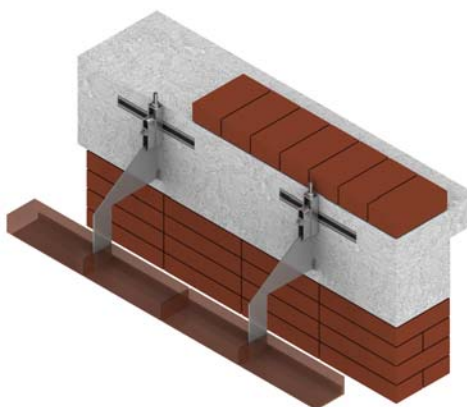
- Brickwork facing walls restraining system with **CMWT** restraint channels & ties



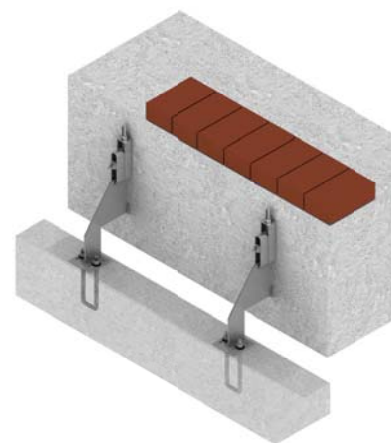
- Brickwork facing walls restraining system with **HMS-AV** restraint channels & ties



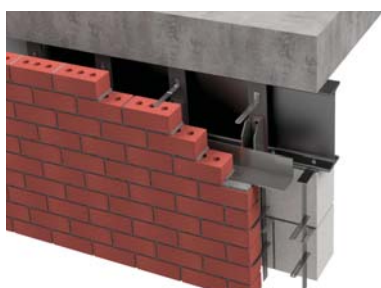
- **FIX-P** brickwork support brackets for supporting bricks above openings



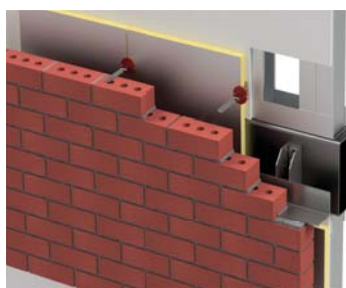
- **FIX-PV** brickwork support brackets for supporting bricks above openings



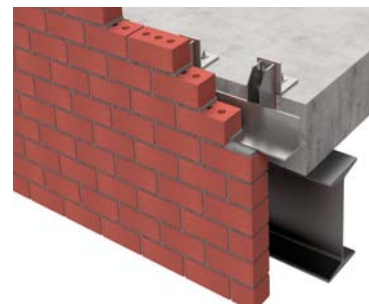
- **FIX-SV** brickwork support brackets for supporting prefabricated components



- **HMCS** Support brackets connected to I beam structural steel with welded plates using hex bolts



- **HMCS** Support brackets connected to RHS Hollow structural steel using blind bolts



- **HMCS** Support brackets connected to top of cleat using L brackets and anchor bolts

# FIX Brickwork Support Brackets - Introduction

**FIX** Brickwork support brackets are adjustable and secure brackets that are designed for the easy and quick installation of brick facing walls.

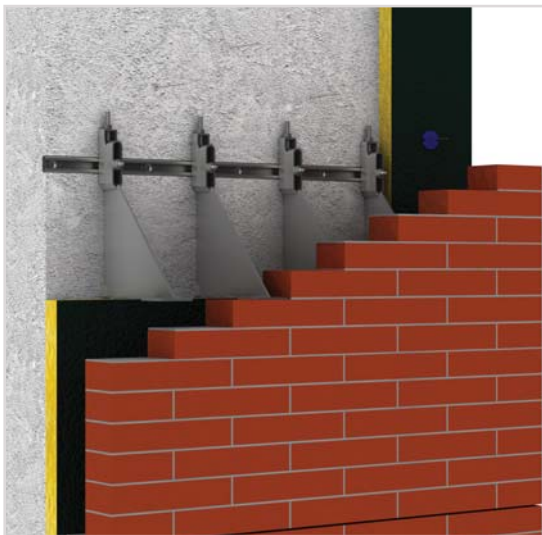
**FIX** support brackets are user friendly and are combined with a patented adjustable profile part that is assembled in the top of the bracket body. The brackets can be mounted by one single person. During the installation no loose parts fall down and the installer always has a hand free for adjusting.

When the **FIX** brickwork brackets are fixed on to walls, the vertical adjustability of the brackets is made by the set screw and nut. There is an adjustability space of 60 mm. The **FIX** brickwork anchors are installed either with expansion bolts or T head bolts into channels.

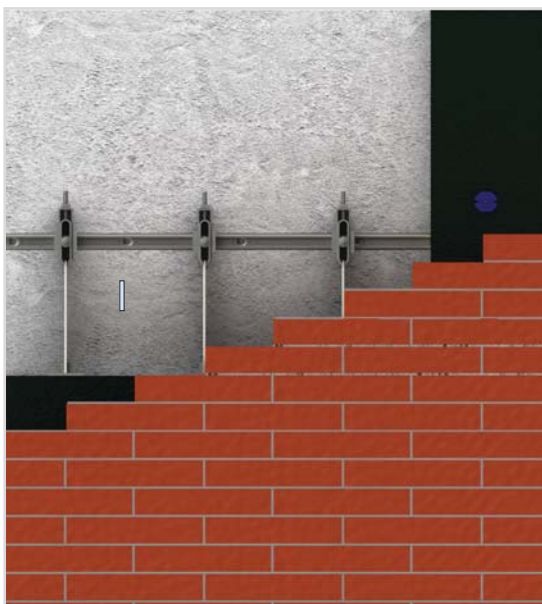
There are various type of **FIX** anchors that can be used for different applications.



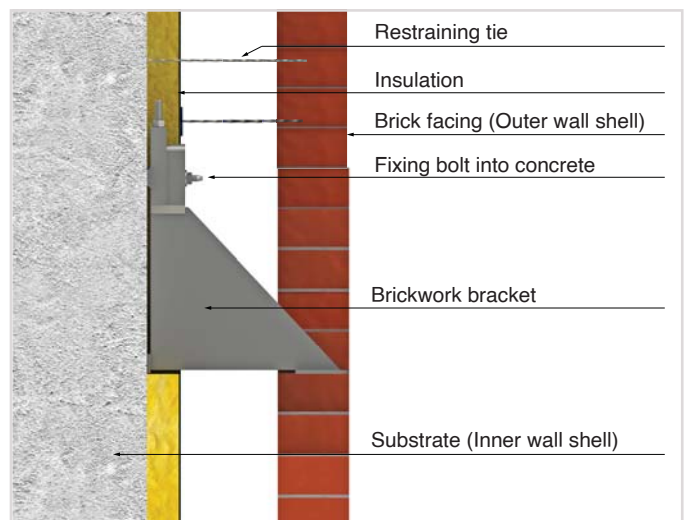
EN 845-1



• Perspective picture of brick facing installation with **FIX-U** brackets.



• Elevation picture of brick facing installation with **FIX-U** brackets



• Section picture of brick facing wall

## FIX Support Bracket - Introduction

The **FIX-AP** adjustable profile is a patented product that is used as a complementary product with the **FIX** brackets.

The adjustable profile enables quick and secure adjustability in the vertical axis. Unlike the traditional set screw, using the adjustable profile offers the installer adjustment the brackets without the need for a second hand assistance.

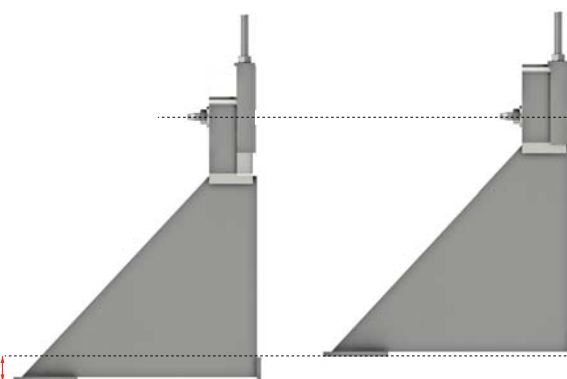
The primary advantage of the adjustable profile is that it eliminates offset moment loads on the bolts, therefore the requirement for bending moment testing on bolts is not necessary.

**FIX-AP** Adjustable Profile



- Adjustability of the bracket is made by the adjustable profile and the threaded bar that is fixed on the profile with a nut. The bar is inserted in the tabbed hole on the upper part of the bracket.

60 mm  
adjustability



## FIX Support Bracket - Execution Types

The **FIX** brackets are available for the complete range of the **FIX** Brickwork support brackets. The patented special adjustable profile is compatible with all the **FIX** type brackets. The adjustable profile and a threaded rod is used instead of a set screw and nut in order to regulate the vertical adjustment.

**FIX-U**



**FIX-UV**



**FIX-P**



**FIX-PV**



**FIX-S**



**FIX-SV**



**FIX-W**



**FIX-UT**



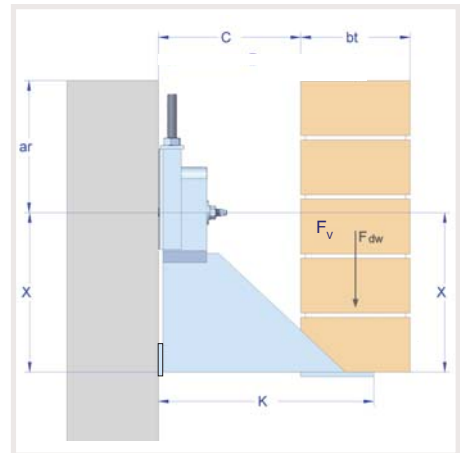
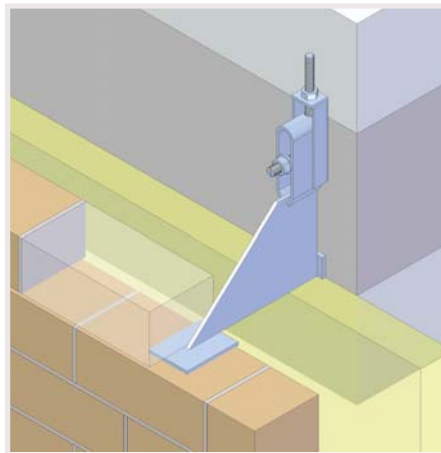
**FIX-F**



**FIX-FV**



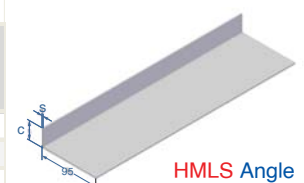
## FIX-U Support Bracket - Technical Details



	Load Category 3,5 kN FRd = 4,7 kN		Load Category 7,0 kN FRd = 9,5 kN		Load Category 10,5 kN FRd = 14,2 kN		
Cavity a (mm)	Projection K (mm)	x size (mm)	Projection K (mm)	x size (mm)	Projection K (mm)	x size (mm)	
60 ± 15	150	150	150	200	150	250	
80 ± 15	170	150	170	200	170	250	
100 ± 15	190	150	190	200	190	250	
120 ± 15	210	150	210	200	210	250	
140 ± 15	230	175	230	250	230	300	
160 ± 15	250	175	250	250	250	300	
180 ± 15	270	200	270	270	270	320	
200 ± 15	290	200	290	290	290	340	
220 ± 15	310	220	310	310	310	360	
240 ± 15	330	240	330	330	330	380	
260 ± 15	350	260	350	350	350	400	
Anchor bolt	HB03 M12x145		HB03 M12x145		HB03 M16x185		
	HB07 M12x190		HB07 M12x190		HB07 M16x210		
Anchor channel	HMPR 38/17		HMPR 49/30		HMPR 54/33		
	with T head bolt M12x80		with T head bolt M16x100		with T head bolt M16x100		

- Specified load-bearing capacities refer to fixings in concrete  $\geq$  C20/25
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4)
- Expansion bolts and anchor channels are provided separately
- Structural calculation reports are available upon order
- The fastenings have to be calculated for each individual case

Distance between supports	Angle Length L (mm)	c (mm)	s (mm)
500	480	30	2
750	730	30	3
1000	980	40	4



HMLS Angle

### FIX-U Brickwork Support Bracket

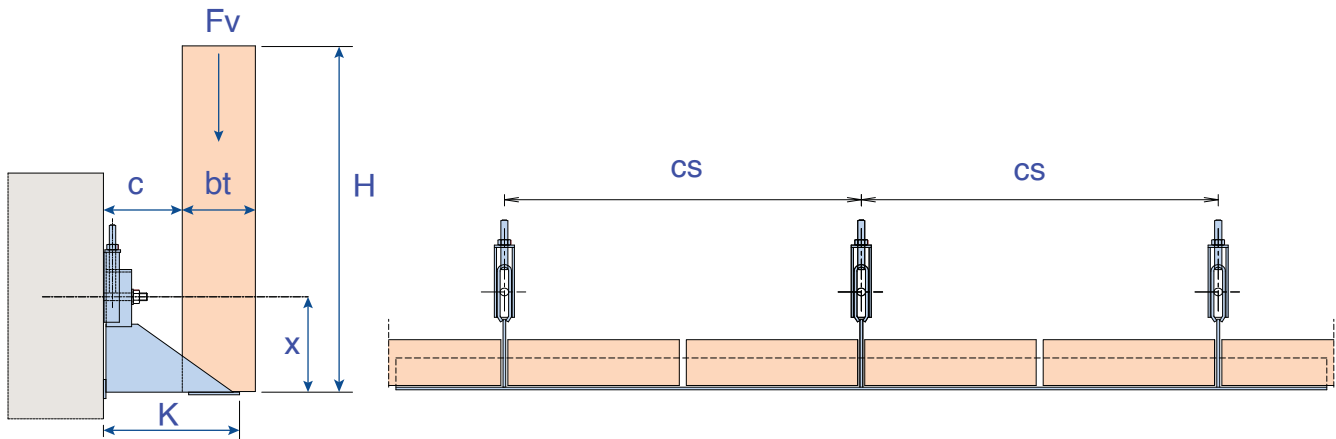
This brickwork support bracket is with a single welded plate used for independent installation of each brick block. This bracket is used for closed surface elevation brick cladding.

#### Product Code Description

FIX-U - 3,5 / 150

- Projection (mm)
- Load Capacity (kN)
- Type

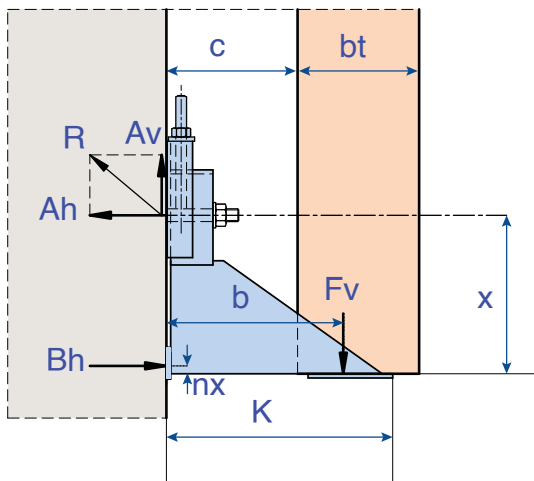
# FIX Support Brackets - Load table with angle support



Load Height H (m)	CS = 250mm	CS = 500 mm	CS = 750 mm	CS = 1000 mm	Load Category
H (m)	Fv (kN)	Fv (N)	Fv (kN)	Fv (kN)	
12	6,2	12,4			
11	5,7	11,4			
10	5,2	10,4			
9	4,7	9,3	14,0		
8	4,1	8,3	12,4		
7	3,6	7,2	10,9		
6	3,1	6,2	9,3	12,4	14,0
5	2,6	5,2	7,8	10,4	10,5
4	2,1	4,1	6,2	8,3	7,0
3	1,6	3,1	4,7	6,2	
2	1,0	2,1	3,1	4,1	
1	0,5	1,0	1,6	2,1	3,5

- Load category 14,0 kN and over is available with special design. Alternatively HMCS brick work supports can be used.
- Load capacity of the brackets are verified by structural calculations. Approvals are subject to application.

## Brackets Load Transfer Values

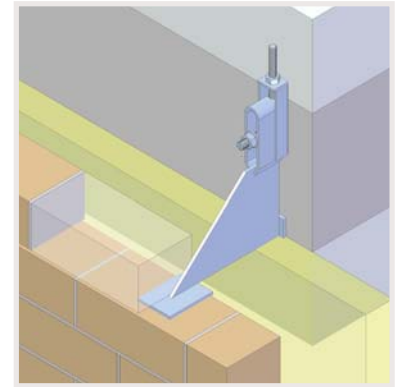
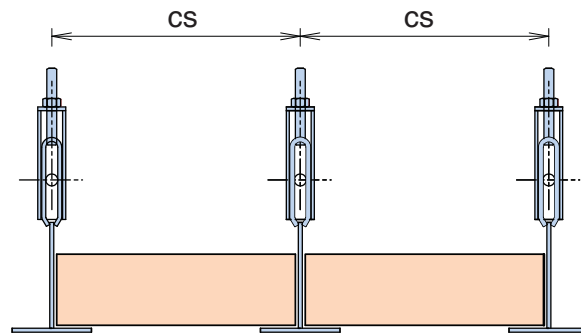
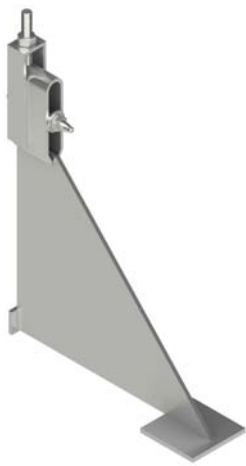


Maximum Transfer Loads - Ah & R for full Bracket load capacity									
a (mm)	Fv = 3,5 kN			Fv = 7,0 kN			Fv = 10,5 kN		
	x (mm)	Ah (kN)	R (kN)	x (mm)	Z (kN)	R (kN)	x (mm)	Z (kN)	R (kN)
60	150	3,60	5,02	200	4,96	8,58	250	5,67	11,93
80	150	4,24	5,50	200	5,83	9,11	250	6,67	12,44
100	150	4,88	6,00	200	6,71	9,70	250	7,67	13,00
120	150	5,51	6,53	200	7,58	10,32	250	8,67	13,61
140	175	5,01	6,11	250	6,44	9,51	300	7,81	13,08
160	175	5,53	6,54	250	7,11	9,98	300	8,61	13,58
180	200	5,10	6,19	300	6,28	9,40	350	8,00	13,14
200	200	5,54	6,55	300	6,82	9,77	350	8,58	13,56
220	220	5,31	6,36	310	7,08	9,97	360	8,97	13,81
240	240	5,13	6,21	330	7,08	9,96	380	9,06	13,87
260	260	4,98	6,10	350	7,08	9,95	400	9,14	13,92

- The maximum load transfer values are applicable for cases where vertical adjustability is at 30 mm and for brick wall thickness of 11.5 cm

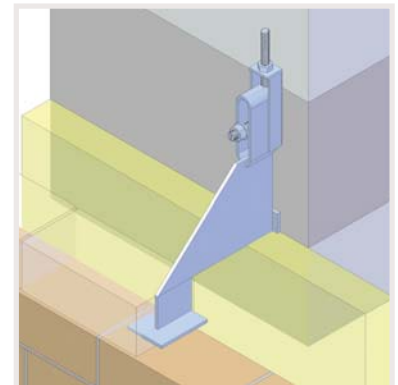
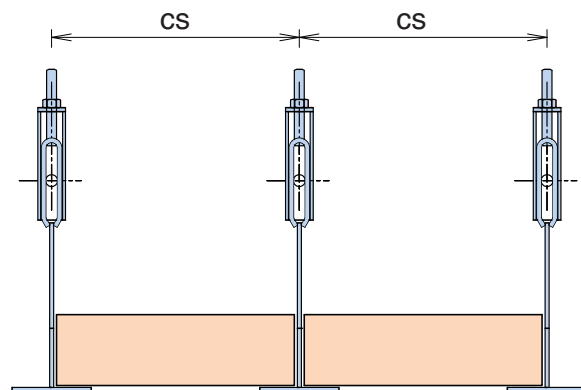
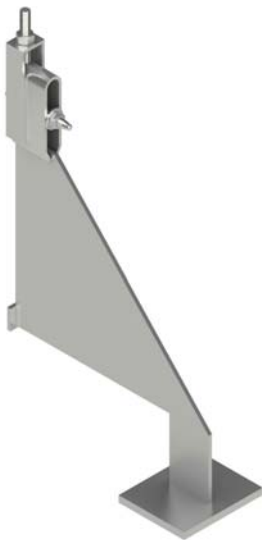
# FIX Support Brackets - Application Guide

## FIX-U Support Bracket



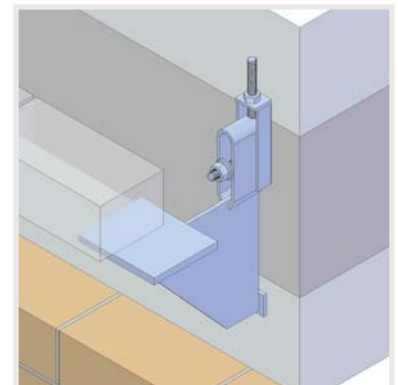
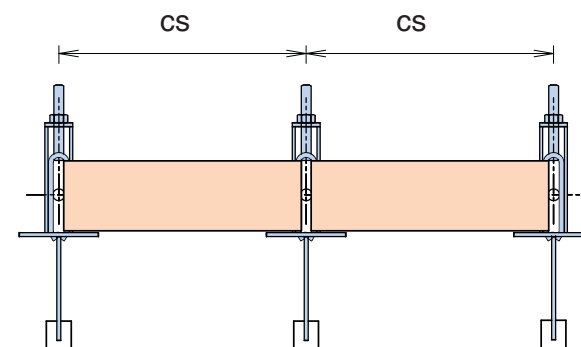
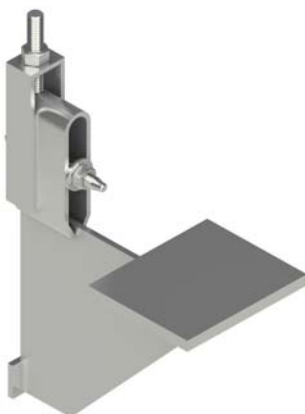
- Single bracket with welded support plate
- This brickwork support bracket is used for independent installation of each brick block
- This bracket is used for closed surface elevation brick cladding
- The offset level plate height distance can be designed according to the application requirement

## FIX-UV Support Bracket



- Single bracket with welded support plate and an offset supporting level plate
- The offset level plate height distance can be designed according to the application requirement
- Used for installing at lower level support than the fixing level on the substrate, such as over openings

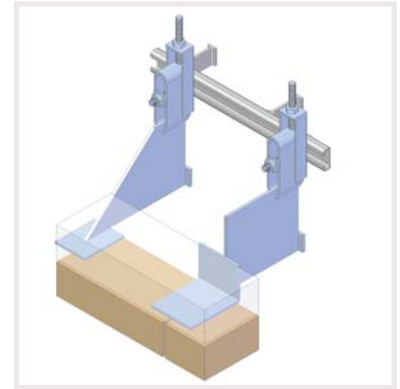
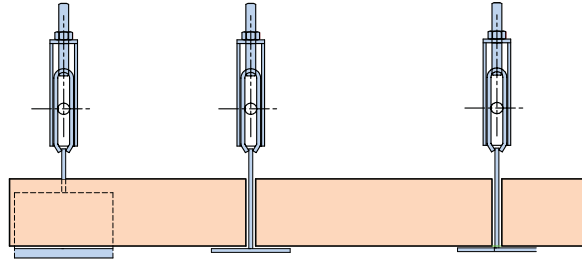
## FIX-UT Support Bracket



- Single bracket with welded high set support plate
- Used for installing bricks at high joint level

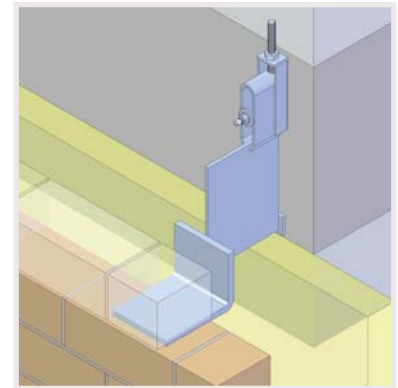
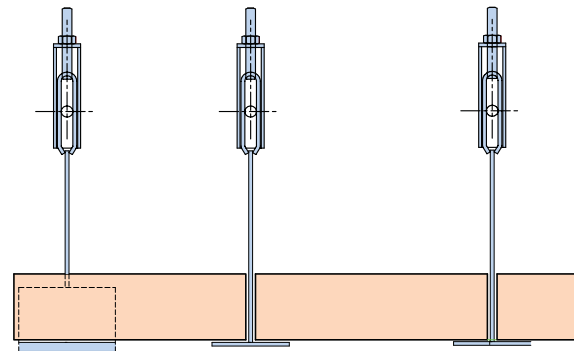
# FIX Support Brackets - Application Guide

## FIX-W Support Bracket



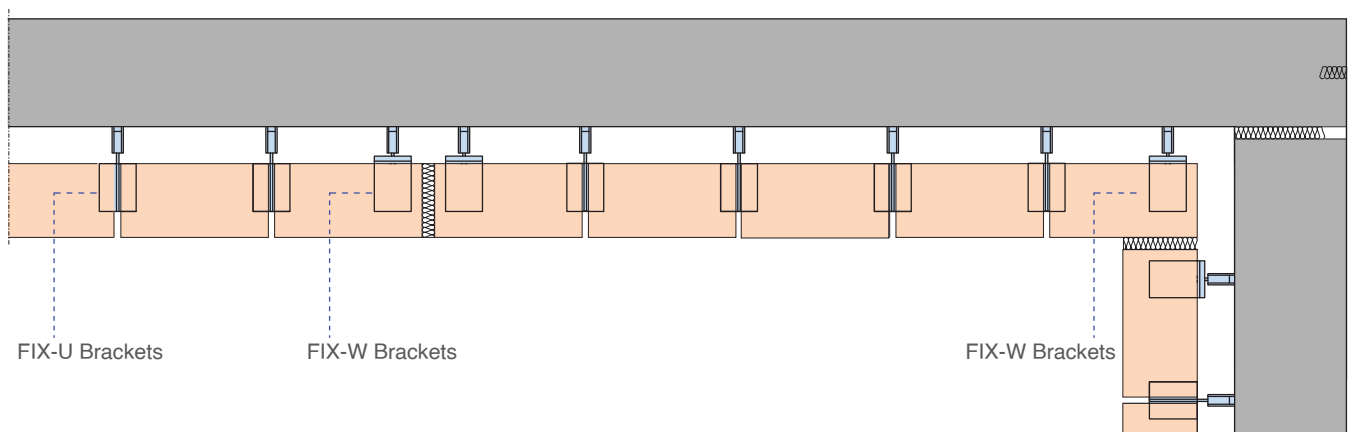
- Single bracket with welded L shaped support plate
- This type of brickwork support bracket is used in areas such as edges, corners and where there are expansion joints
- The welded L shaped support plate can be designed according to application details

## FIX-WV Support Bracket



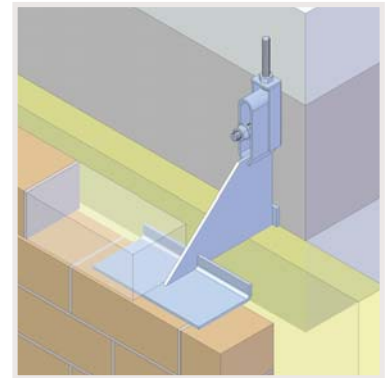
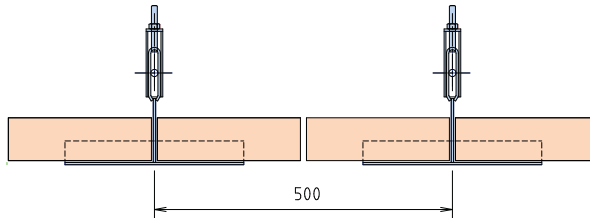
- This support bracket has the same properties as the **FIX-W** bracket with a higher offset level distance
- The offset level height distance can be designed according to the application requirement
- Used for installing at lower level support than the fixing level on the substrate, such as over openings

## FIX-W Support Bracket positioning



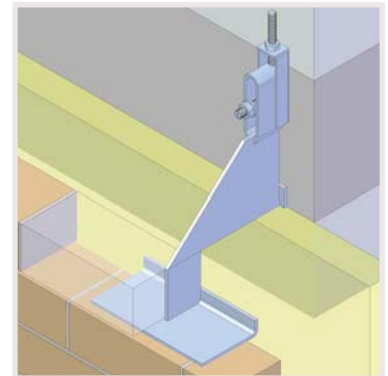
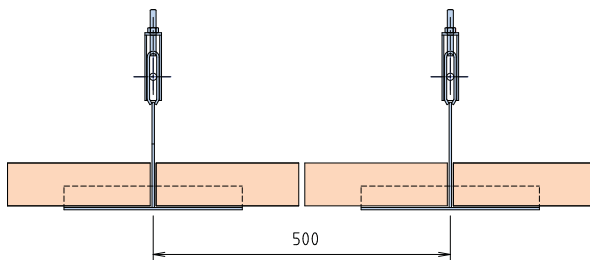
# FIX Support Brackets - Application Guide

## FIX-P Support Bracket



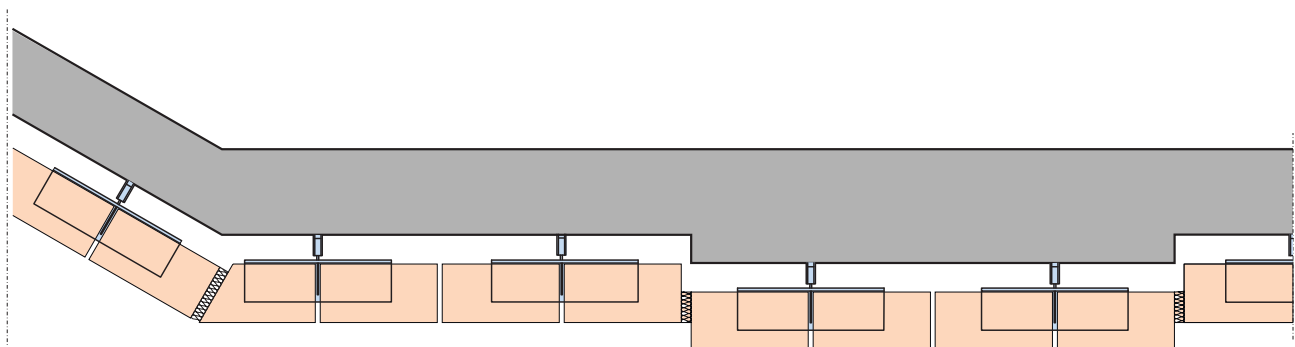
- Single bracket with welded short angle
- The angle can be dimensioned according to the application details
- Preferably used for installing bricks in wall edge situations, where two bricks can be supported with a single bracket

## FIX-PV Support Bracket



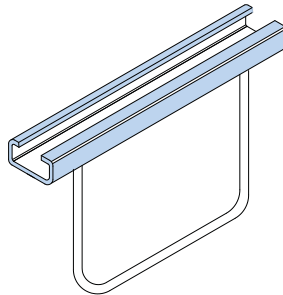
- Single bracket with welded short angle and an offset support level plate
- The angle and the offset plate can be dimensioned according to the application details
- Used for installing at lower level support than the fixing level on the substrate, such as over openings

## FIX-P Support Bracket positioning



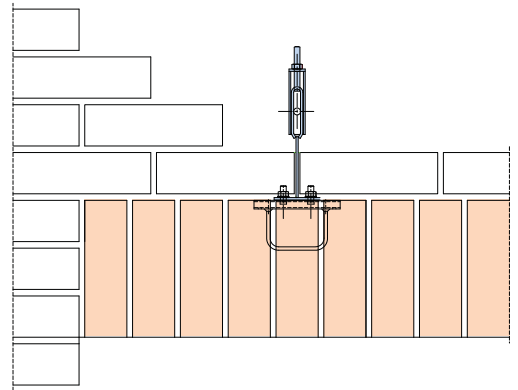
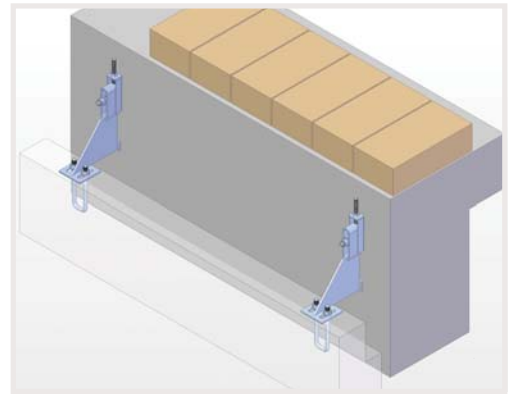
# FIX Support Brackets - Application Guide

## FIX-S Support Bracket

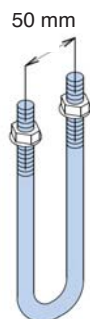


Anchor channel with welded bar

- Single bracket with welded plates with slotted holes
- This bracket is used for supporting precast lintels above openings which do not have bearings at the sides
- Supports are connected to the anchor channels or loops are inserted in the lintels

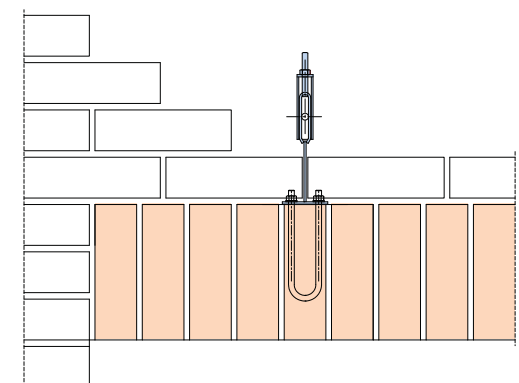
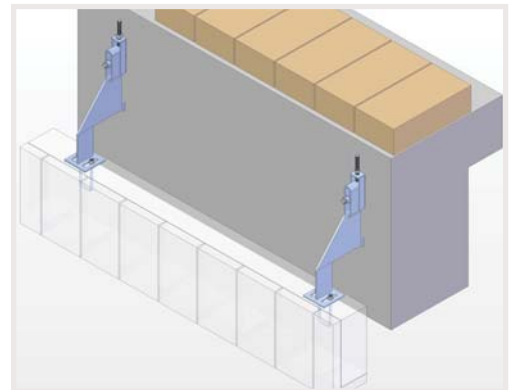


## FIX-SV Support Bracket



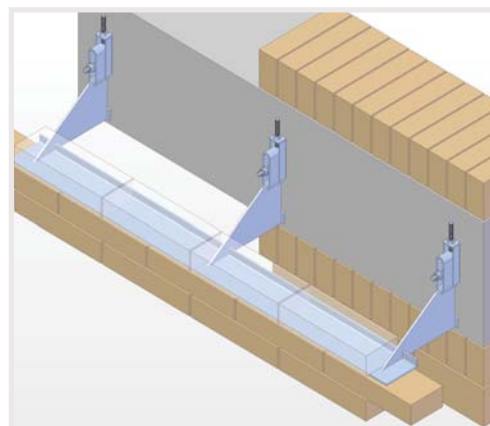
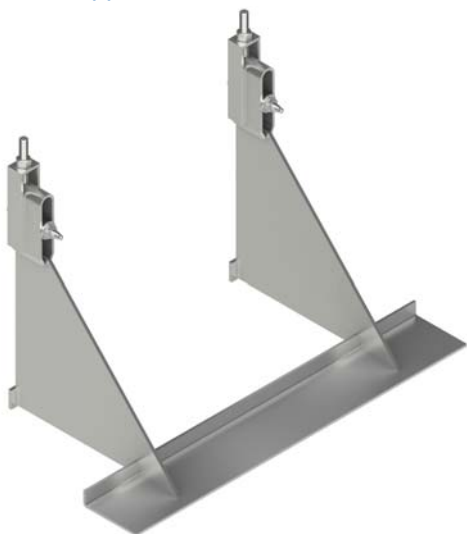
U shaped loop insert

- Single bracket with welded plates with slot holes and an offset level plate
- This bracket is used to support lintels where the support offset level is lower than the fixing level on the substrate
- The offset level plate height distance can be designed according to the application details

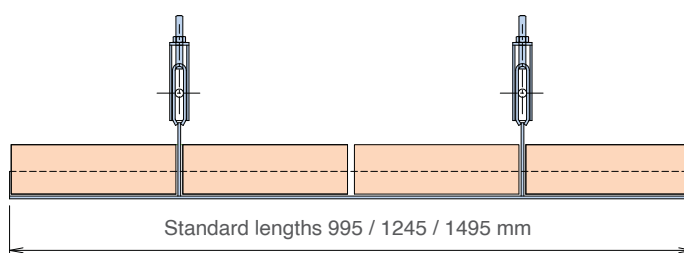


# FIX Support Brackets - Application Guide

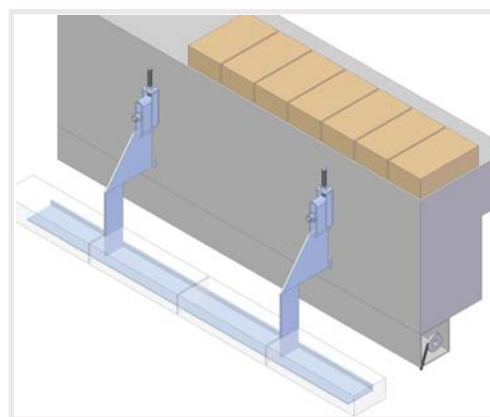
## FIX-F Support Bracket



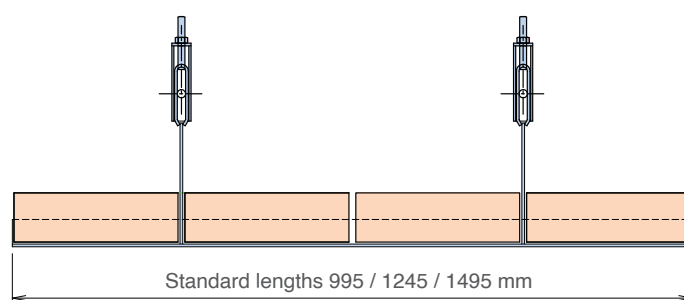
- These brackets are combined supporting brackets with a continuous supporting angle welded on to two or more bracket backs
- They are used to support visible or hidden openings in buildings or outside corners with or without vertical joints
- Available in lengths of multiples of 250 mm with up to three welded bracket backs



## FIX-FV Support Bracket

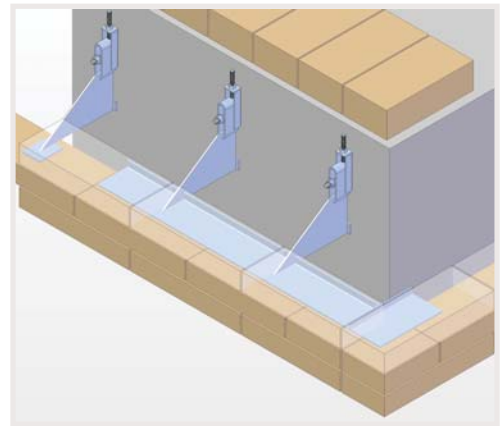
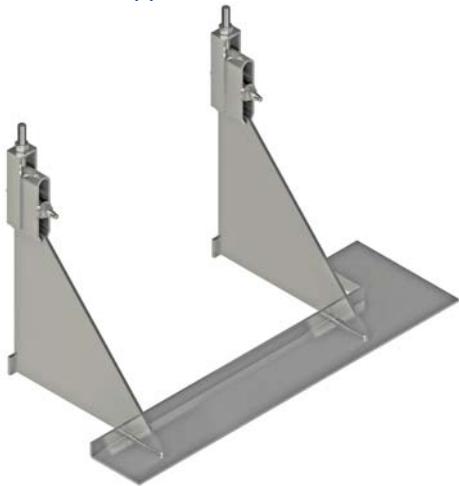


- This continuous support bracket has the same properties as the FIX-F type support, with an additional welded offset level plate
- The use of this bracket is necessary where the support offset level is lower than the level of fixing on the substrate



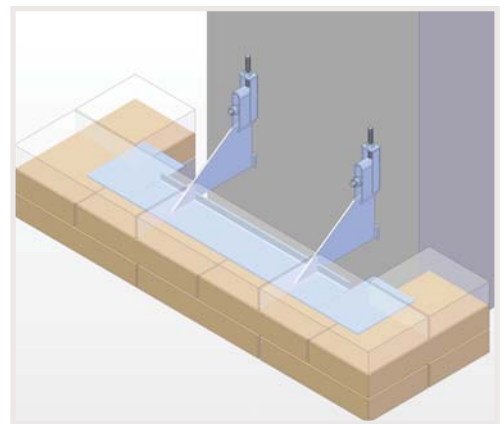
# FIX Support Brackets - Application Guide

## FIX-FSC Support Bracket



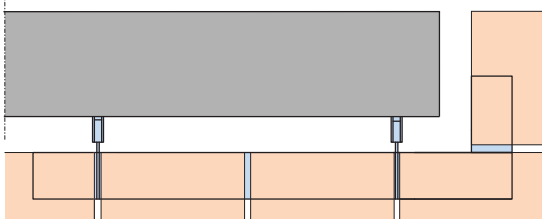
- These brackets are continuous supporting angles with a welded corner part at one end of the angle
- This support bracket is used to allow easy and secure installation of bricks at corner turns

## FIX-FDC Support Bracket

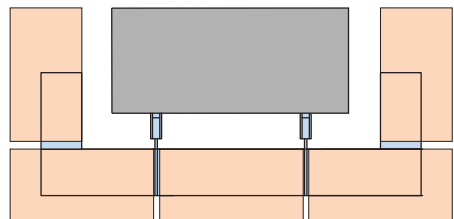


- These brackets are continuous supporting angles with a welded corner part at both ends of the angle
- This support bracket is used to allow easy and secure installation of bricks on to columns

## FIX-FSC Support Bracket positioning



## FIX-FDC Support Bracket positioning



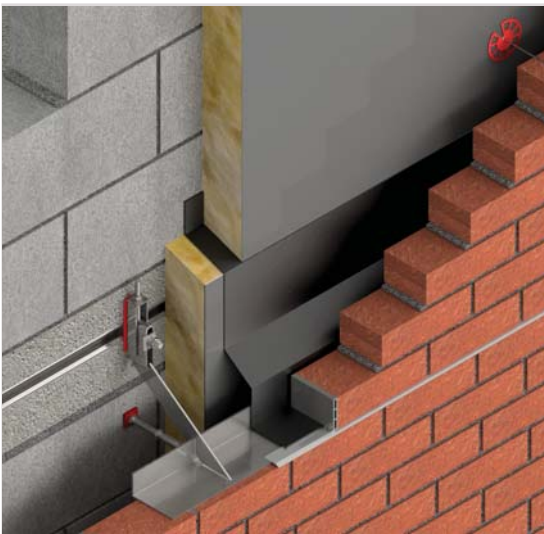
## FIX-2 Brickwork Support Brackets - Introduction

**FIX-2** Brickwork support brackets are further developed versions of the **FIX** bracket. With an optimized design it used less material and results in very low thermal bridging for energy consumption.

**FIX2** has an adjustability feature that accommodate large deviations on the backing substrate. With the help of the welded threaded pipe and a fixed threaded rod in to it, the brackets can be adjusted to be perfectly in plum when installing on the concrete backing walls.



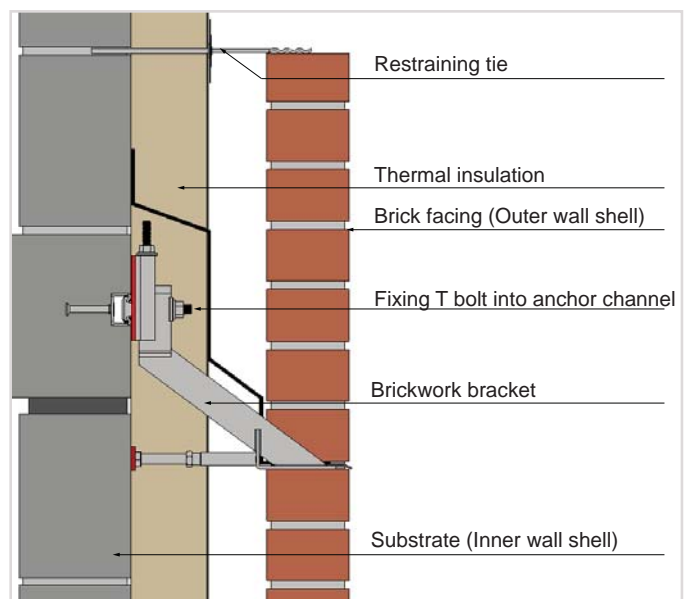
EN 845-1



• Perspective picture of brick facing installation with **FIX-2** brackets.



• Elevation picture of brick facing installation with **FIX-2** brackets



• Section picture of brick facing wall

# FIX2 Support Bracket - Introduction

FIX2 Brickwork support brackets is an environmentally friendly product that helps to reduce energy consumptions. With its patented design, it reduces cold bridging significantly. There is a round part that is laser cut on the body which decreases the rate of cold bridge transfer to the wall. Thermal break pads are also used that reduces the cold bridging effect to the walls. The ISO-FIX product features is available for the whole HMS-FIX range.



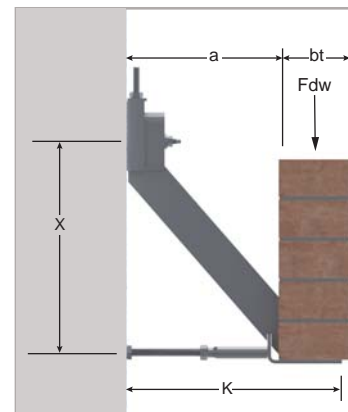
- Significant reduction in cold bridging with its developed design and use of thermal breaks
- No bending moment on the fixing bolts with the use of FIX adjustable plate
- No point load on the fixing bolts because of the FIX adjustable plate
- Fast installation & adjustability in the vertical axis. One person can easily do the installation



FIX2-U Single Support Bracket



FIX2-F Single Support Bracket



	Load Category 4,0 kN FRd = 5,4 kN		Load Category 8,0 kN FRd = 10,8 kN		Load Category 12,0 kN FRd = 16,2 kN	
Cavity a (mm)	Projection K (mm)	x size (mm)	Projection K (mm)	x size (mm)	Projection K (mm)	x size (mm)

120 ± 15	210	148	210	200	210	225
140 ± 15	230	164	230	223	230	254
160 ± 15	250	180	250	246	250	282
180 ± 15	270	196	270	269	270	309
200 ± 15	290	213	290	292	290	337
220 ± 15	310	229	310	315	310	364
240 ± 15	330	245	330	338	330	392
260 ± 15	350	261	350	361	350	419

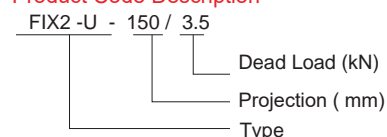
Anchor bolt	HB03 M12x145	HB03 M12x145	HB03 M16x185
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Anchor channel	HMPR 38/17 with T head bolt M12x80	HMPR 49/30 with T head bolt M16x100	HMPR 54/33 with T head bolt M16x100
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## FIX2 Brickwork Support Bracket

This brickwork anchor is designed to reduce cold bridging. There is a laser cut on the body that reduces the transfer of cold bridging to the substrate. Also thermal break pads are used which are positioned between the bracket and the wall.

## Product Code Description



# HMCS Brickwork Continuous Support - Introduction

The **HMCS** brickwork continuous supports consists of a series of U brackets with welded angles. There are welded milled shims on the U brackets that enable secure positioning in the vertical axis, after adjustment.

These brackets are often used in load categories up to 18 kN and can be used for projection sizes from 130 to 230 mm. However special design can be made to accommodate higher loads and cavity sizes. Vertical adjustability is possible up to 25 mm and adjustability of the projection size is made up to 10 mm provided full height shims are used. The **HMCS** brickwork brackets can be designed and manufactured in a wide range of shapes and dimensions to suit the requirements of the project.

The **HMCS** continuous brickwork supports are available in 1,5 metres and can be manufactured with either 3, 4 or 5 U brackets, depending on the load specifications. These products are available in stainless steel 1.4301 (AISI 304) and 1.4401 (AISI 316)



HMCS Brickwork Continuous Support

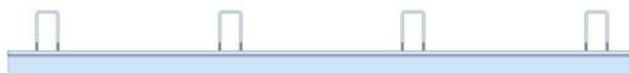


• Perspective picture of brick facing installation with **HMCS** continuous support

Type 1 Continuous support with 5 welded brackets



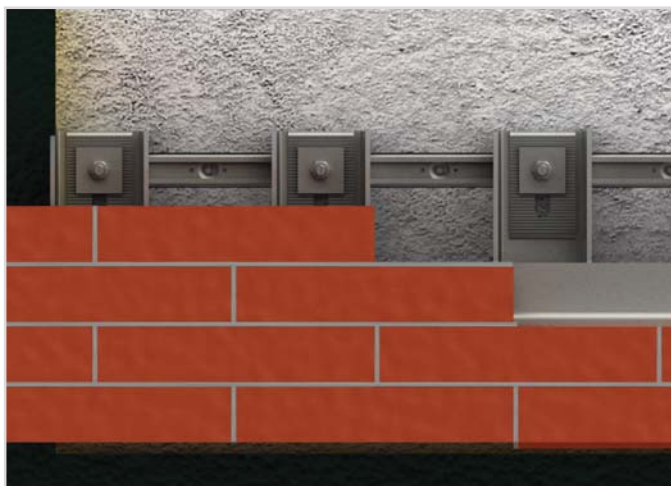
Type 2 Continuous support with 4 welded brackets



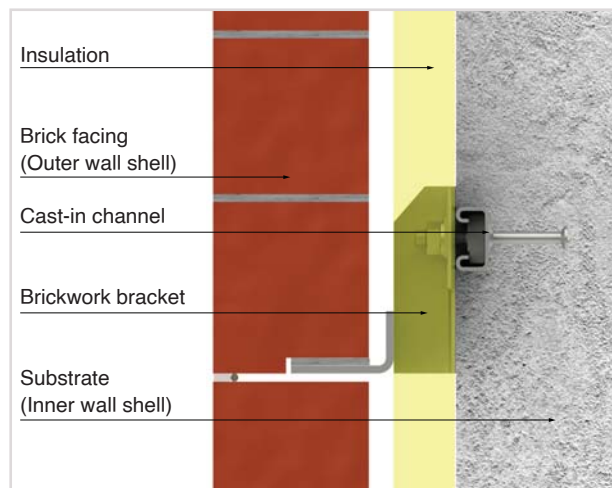
Type 3 Continuous support with 3 welded brackets



• available up to 1,5 metres with 3 different bracket spacings.

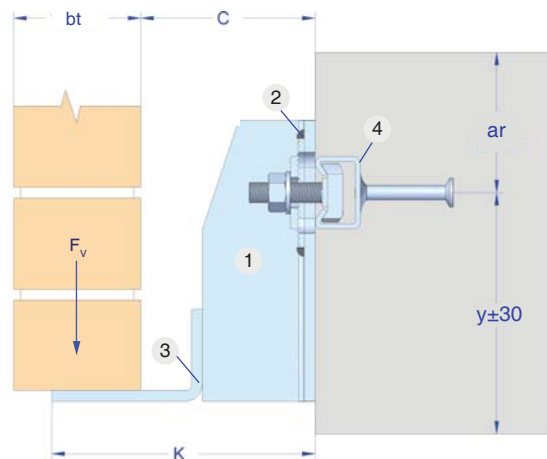
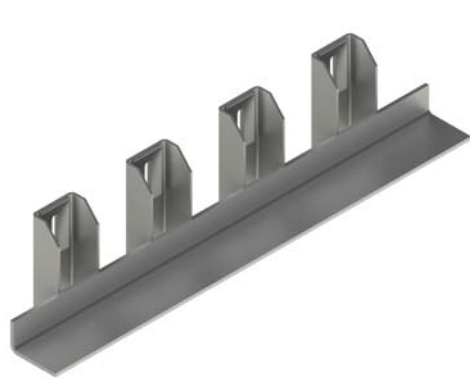


• Elevation picture of brick facing installation with **HMCS** supports



• Section picture of brick facing wall

# HMCS Brickwork Support Bracket - Product Details



Support set elements:

- 1 - U Shaped bracket with vertical slot hole
- 2 - Welded serrated washer
- 3 - Welded support plate
- 4 - Anchor channel for attachments

Product Code	Technical Details						
	Projection	Dead Load	Cavity	Bolt Height	Bolt Size	Bolt Spacing	Anchor Channel
	K (mm)	Fdw (kN)	C (mm)	X (mm)	E.b. (mm)	SC	CI (mm)
HMCS-130/3.5	130	3.50	60	115	M10x90	460	28/15
HMCS-150/3.5	150		80				
HMCS-170/3.5	170		100				38/17
HMCS-190/3.5	190		120				
HMCS-210/3.5	210		140				
HMCS-230/3.5	230		160				
HMCS-130/7	130	7.00	60	115	M12x110	370	38/17
HMCS-150/7	150		80				
HMCS-170/7	170		100				40/25
HMCS-190/7	190		120				
HMCS-210/7	210		140				
HMCS-230/7	230		160				
HMCS-130/10.5	130	10.50	60	135	M12x110	400	40/25
HMCS-150/10.5	150		80				
HMCS-170/10.5	170		100				49/30
HMCS-190/10.5	190		120				
HMCS-210/10.5	210		140				
HMCS-230/10.5	230		160				
HMCS-130/14	130	14.00	60	150	M16x130	350	49/30
HMCS-150/14	150		80				
HMCS-170/14	170		100				
HMCS-190/14	190		120				
HMCS-210/14	210		140				
HMCS-230/14	230		160				
HMCS-130/18	130	18.00	60	150	M16x130	300	49/30
HMCS-150/18	150		80				
HMCS-170/18	170		100				
HMCS-190/18	190		120				
HMCS-210/18	210		140				
HMCS-230/18	230		160				
HMCS-130/22	130	22.00	60	150	M16x130	300	54/33
HMCS-150/22	150		80				
HMCS-170/22	170		100				
HMCS-190/22	190		120				
HMCS-210/22	210		140				
HMCS-230/22	230		160				

• Material : Stainless Steel 1.4301 (AISI 304-A2) & 1.4401 (AISI 316-A4) • Load capacities refer to fixings in concrete  $\geq$  C20/25 • Loads stated are allowable loads  
 • Other sizes are available for production upon request • Bolts and channels are provided separately • Structural calculation reports are available upon order

## HMCS Brickwork Continuous Support

The continuous brickwork supports are available in 1.5 metres as a standard length and can be specially designed to meet the application requirements. Adjustability in the vertical axis is made with milled serrated washers and a maximum of 10 mm lateral adjustability possible with full height shims

### Product Code Description

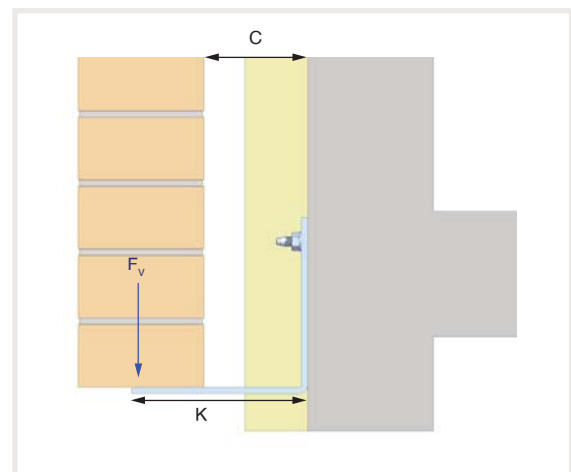
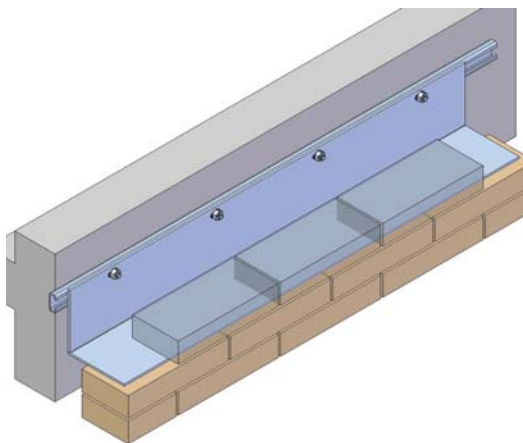
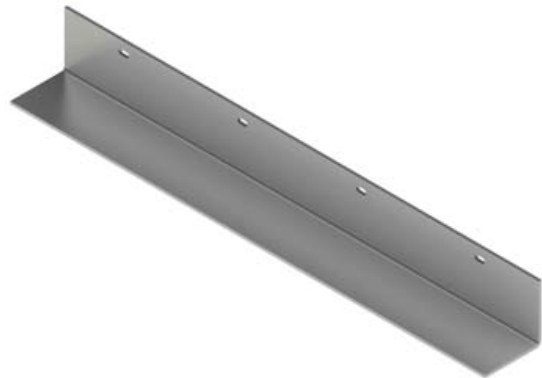
HMCS - 130 / 3.5 - 1500  
 ————— Lenght  
 ————— Dead Load (kN)  
 ————— Projection (mm)  
 ————— Type

# HMS-AW Angled Supports - Product Details

HMS Angled supports are simple fixing systems used for supporting brickwork walls. These anchors do not have vertical adjustability, and horizontal adjustment can be made through the slotted holes drilled at each 25 cm. The use of these types of systems are preferred if the air layer and insulation need to be fully covered. These anchors can be fixed on concrete walls either with cast in channels, expansion bolts or chemical anchor bolts. Available in stainless steel grade 1.4301 (AISI 304) & 1.4401 (AISI 316), they can be produced in any length up to 3 metres according to the desired application.

## HMS-AW Continuous Angled Support

- Used for small cavity space between 20 and 40mm
- Bricks can be positioned in desired position
- Projection sizes of 110 and 130 mm
- Load capacity up to 3.2 kN



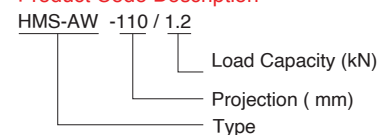
Product Code	Technical Details								
	Projection	Allow.Load Capacity	Cavity	Bolt Height	Angle Size	Expansion Bolt Size	Bolt Spacing	Cast-in Channel	Angle Max Length
	K (mm)	Fdw (kN)	C (mm)	X (mm)	(mm)	E.b. (mm)	SC	CI (mm)	L (mm)
HMS-AW-110/1.2	110	1.20	0-20	84	4x110/110	M10x90	250	38/17	3000
HMS-AW-110/2.1	110	2.10	0-20	83	5x110/110				
HMS-AW-110/3.2	110	3.20	0-20	82	6x110/110				
HMS-AW-130/1.2	130	1.20	20-40	104	4x110/110	M10x90	250	38/17	3000
HMS-AW-130/2.1	130	2.10	20-40	103	5x110/110				
HMS-AW-130/3.2	130	3.20	20-40	102	6x110/110				

- Load capacities refer to fixings in concrete  $\geq$  C20/25
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4)
- Expansion bolts and cast-in channels are provided separately
- Structural calculation reports are available upon order

## HMS-AW Continuous Angle Support

Continuous angle supports are supplied in standard 3 metre lengths. Special lengths can be manufactured according to application details

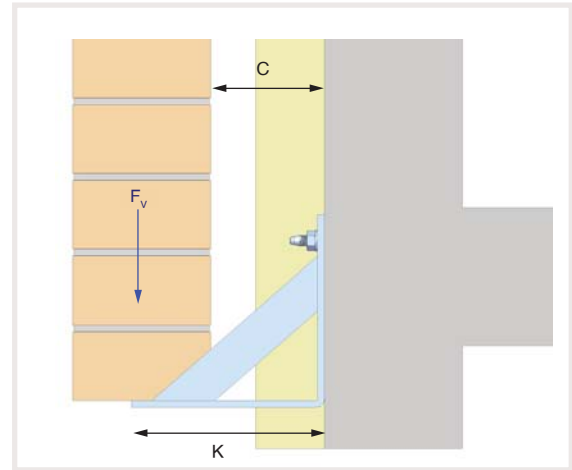
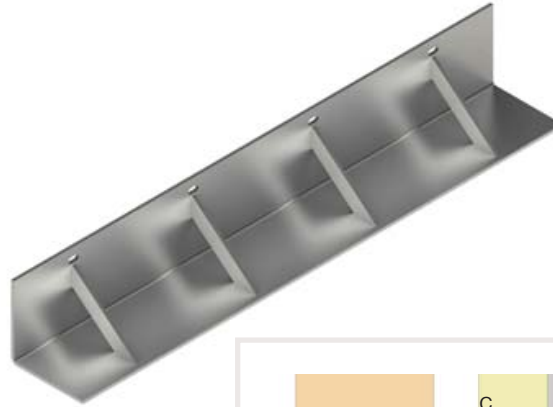
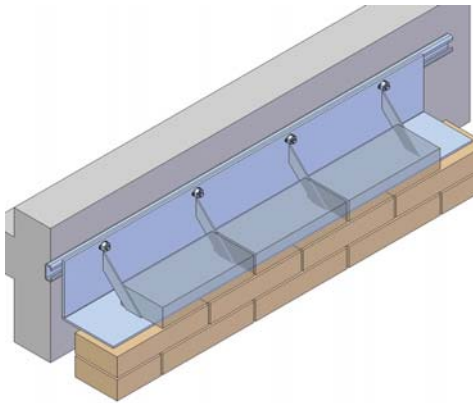
### Product Code Description



# HMS-AWS Angle Supports - Product Details

## HMS-AWS Continuous Angle Support

- Used for cavity spaces between 40 and 240mm
- Welded support plates for loading at high projections
- Projection sizes of 130 to 330 mm
- Load capacity up to 3.2 kN



Product Code	Technical Details								
	Projection	Dead Load	Cavity	Bolt Height	Angle Size	Bolt Size	Bolt Spacing	Cast-in Channel	max Length
	K (mm)	Fdw (kN)	C (mm)	X (mm)	(mm)	E.b. (mm)	SC	CI (mm)	L (mm)
HMS-AWS-130/1.5 HMS-AWS-130/3.2	130	1.50 3.20	40	105 103	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-150/1.5 HMS-AWS-150/3.2	150	1.50 3.20	60	125 123	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-170/1.5 HMS-AWS-170/3.2	170	1.50 3.20	80	145 143	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-190/1.5 HMS-AWS-190/3.2	190	1.50 3.20	100	165 163	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-210/1.5 HMS-AWS-210/3.2	210	1.50 3.20	120	185 183	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-230/1.5 HMS-AWS-230/3.2	230	1.50 3.20	140	205 203	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-250/1.5 HMS-AWS-250/3.2	250	1.50 3.20	160	84 83	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-270/1.5 HMS-AWS-270/3.2	270	1.50 3.20	180	84 83	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-290/1.5 HMS-AWS-290/3.2	290	1.50 3.20	200	84 83	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-310/1.5 HMS-AWS-310/3.2	310	1.50 3.20	220	84 83	4x110/110 5x110/110	M10x90	250	38/17	3000
HMS-AWS-330/1.5 HMS-AWS-330/3.2	330	1.50 3.20	240	84 83	4x110/110 5x110/110	M10x90	250	38/17	3000

- Load capacities refer to fixings in concrete  $\geq$  C20/25
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4)

- Expansion bolts and cast-in channels are provided separately
- Structural calculation reports are available upon order

## HMS-AWS Continuous Angle Support

Continuous angle supports with welded belts are supplied in standard 3 metre lengths. Special lengths can be manufactured according to application details

### Product Code Description

HMS -AWS -150 / 1.5

Load capacity (kN)

Projection ( mm)

Type

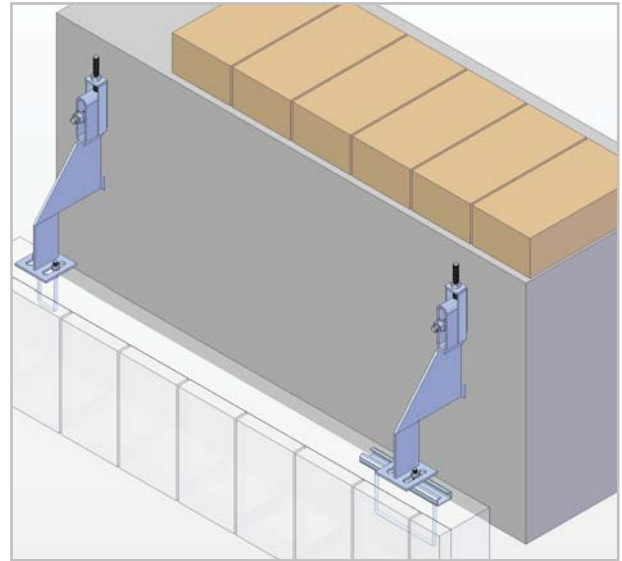
## HMS-ES & GS Inserts - Product Details

The **HMS-ES** and **HMS-GS** inserts are used for the suspension of prefabricated components. The prefabricated components are fitted with these inserts and are then fixed on to the brickwork support anchor type **HMS-S**.

The inserts are supplied with accessories such as T bolts and / or nuts and washers for fastening on to brickwork support anchors. available in stainless steel grade 1.4301 & 1.4401.

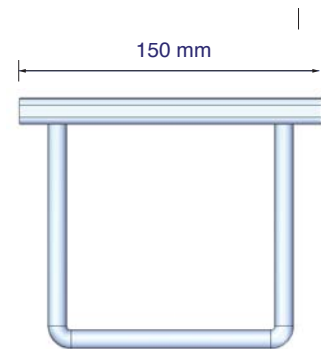
The inserts are designed to carry the loads that are carried by the standard HMS brickwork support anchors. The available load categories are 3.5 kN, 7.0 kN and 10.5 kN.

The structural analysis of the prefabricated component must be made by the prefabrication manufacturer or the structural engineer at the job site, in order to meet the required load performance.



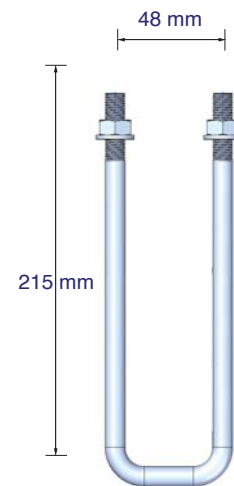
### HMS-ES Channel Insert

Product Code	Technical Details	
	Dead Load	Accessories
	Fdw (kN)	
HMS-ES-3.5	3.5	2x T bolt M10x40 2x DIN 9021 washer M10
HMS-ES-7.0	7.0	2x DIN 934 nut M10
HMS-ES-10.5	10.5	2x T bolt M12x50 2x DIN 9021 washer M12 2x DIN 934 nut M12



### HMS-GS Loop Insert

Product Code	Technical Details	
	Dead Load	Accessories
	Fdw (kN)	
HMS-GS-3.5	3.5	2x DIN 9021 washer M8 2x DIN 934 nut M8
HMS-GS-7.0	7.0	
HMS-GS-10.5	10.5	2x DIN 9021 washer M10 2x DIN 934 nut M10



### HMS Prefabricated Component Inserts

Concrete inserts are supplied in standard types and sizes as shown on the tables above. Special design can also be made to suit application requirements

#### Product Code Description

HMS-GS - 3.5

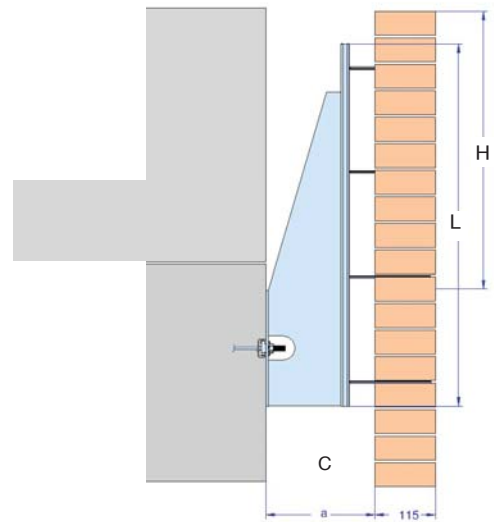
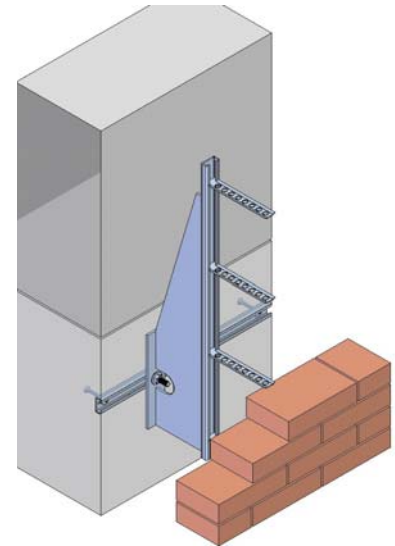
Dead Load (kN)  
Type

## HMS-AV Special Restraint Channel - Product Details

Flat reinforced concrete roof tops can deform due to the effects of weather, thermal and mechanical loading. For this reason, reinforced concrete flat roofs are supported on sliding bearings on the lower walls. Brickwork wall claddings in front of these walls will not be able to absorb the deformations caused in the structure without being damaged. Brickwork walls that extend right up to the roof must not be connected on to the roof side walls.

A special restraint channel is the solution to this problem. A 28/15 channel that is welded with plates that are designed to be fixed on the load bearing beams with two connections can be used to restrain the brick walls. HWT-M wall ties are used to restrain the brick wall and can be positioned anywhere along the length of the channels.

### HMS-AV Special Restraint Channel



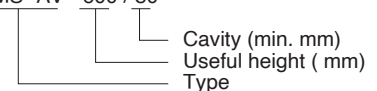
Product Code	Technical Details				
	Cavity	Length	Useful Height	Wall Tie Quantity	Wall Tie Types
	C (mm)	L (mm)	H (mm)	( pcs )	
HMS-AV-600-80	80	600	440-550	3	HWT-M-28-85
HMS-AV-600-90	90				HWT-M-28-120
HMS-AV-600-145	145				HWT-M-28-180
HMS-AV-850-80	80	850	650-800	4	HWT-M-28-85
HMS-AV-850-90	90				HWT-M-28-120
HMS-AV-850-145	145				HWT-M-28-180
HMS-AV-1100-80	80	1100	900-1000	5	HWT-M-28-85
HMS-AV-1100-90	90				HWT-M-28-120
HMS-AV-1100-145	145				HWT-M-28-180

### HMS-AV Special Restraint Channel

This restraint channel is fixed on the concrete wall with anchor channels or expansion bolts. The offset size of the special channel is 75 mm. There are other sizes available upon request.

#### Product Code Description

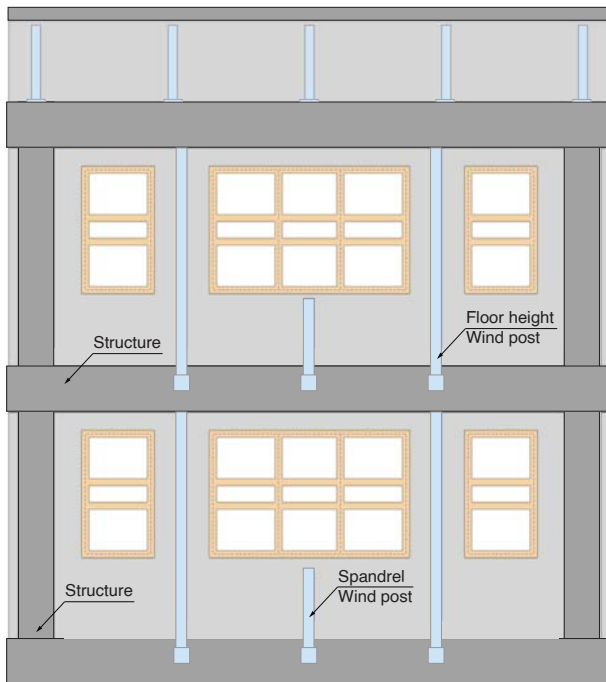
HMS -AV -600 / 80



# HWP Brickwork Windposts - Introduction

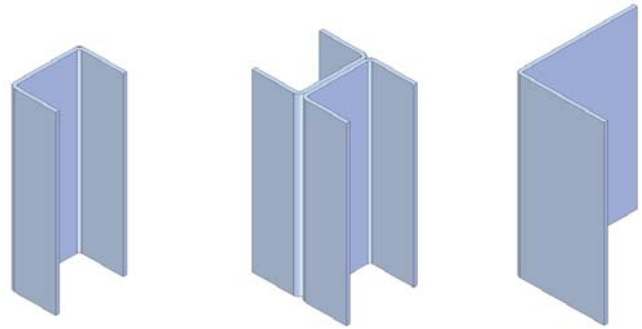
**HWP** Windposts are used in combination with suitable wall ties, to restrain brickwork walls against wind pressure and suction. The windposts are made from specially designed channels that have welded plates with slotted holes in order to be easily and securely fixed on to the reinforced concrete beams.

The windposts can be specially designed and manufactured suitable to withstand the wind loads on the project. The span distances of the channels may be arranged according to the structural integrity and the restrictions of the construction. Structural analysis must be made in view of these limitations. Applications and load requirements can be specifically designed and structural analyses prepared according to the specifications of the project.

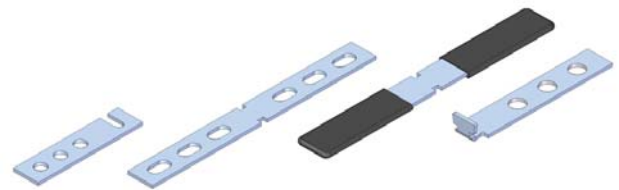


• Building Elevation with windpost positions

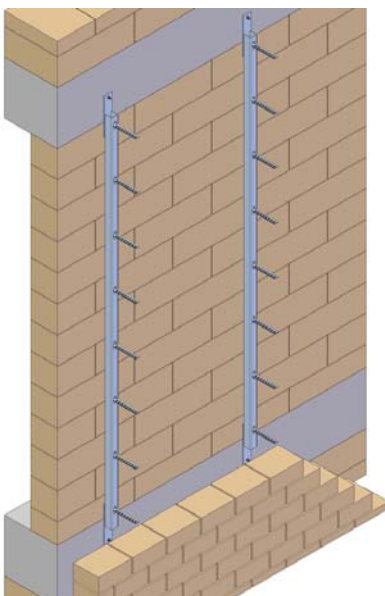
## Windpost Channel Section Types



## Windpost Restraining Tie Types

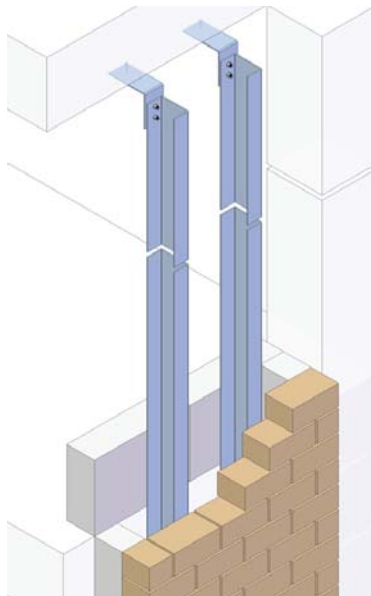


## HWP-I Windpost System



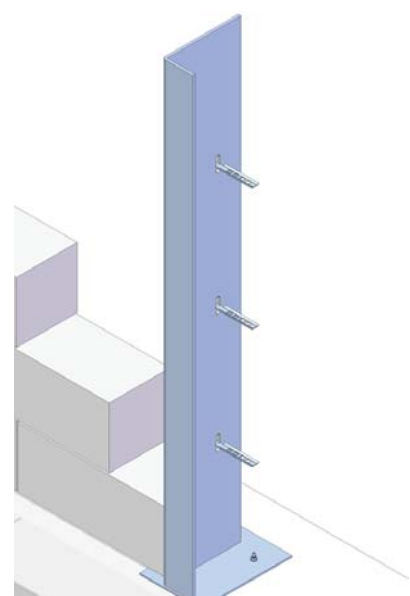
The **HWP-U** Windpost system is used for restraining the outer shell brick facing walls. The windpost channels have welded plates on both ends with slotted holes by which they can be fastened on to concrete beams at floor levels with bolts.

## HWP-E Windpost System



The **HWP-E** Windpost system is used for restraining the outer and inner shell brick facing walls. The windpost channels can be fixed on the beam ceiling and ground by L type brackets which will be fastened to the channels with hex bolts.

## HWP-L Windpost System

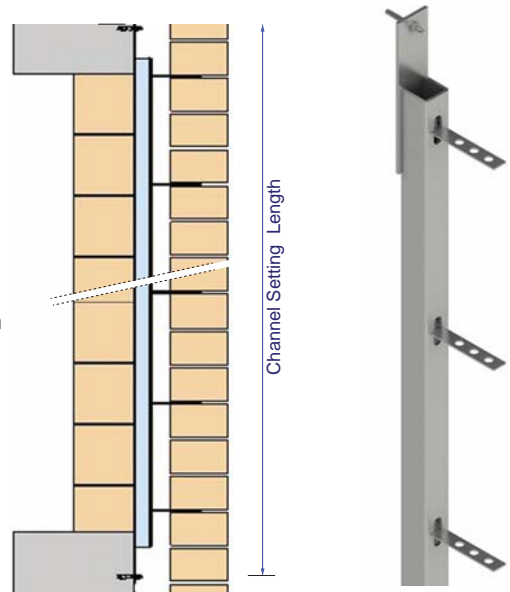
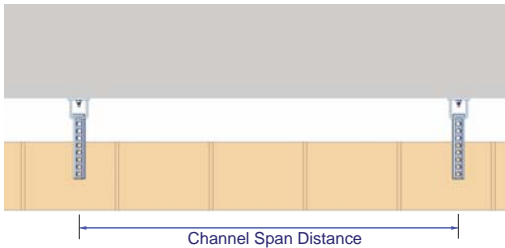


The **HWPS-L** Windpost system is used for restraining the block work constructed in the inner wall. The channels are positioned in between the block work to take the lateral loads. Outer wall brick facing can also be restrained to these channels.

# HWP Brickwork Windpost Channels - Product Information

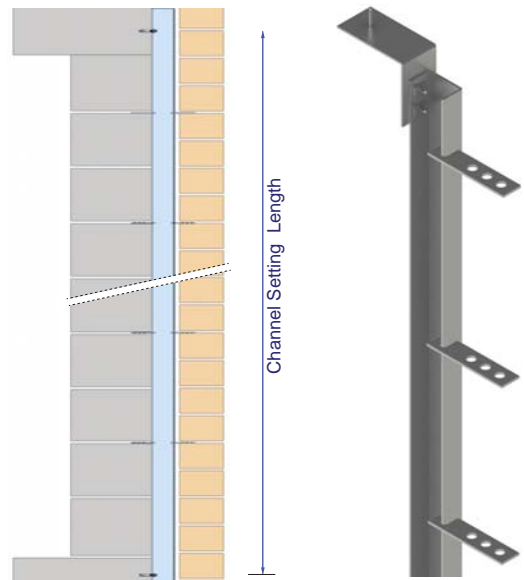
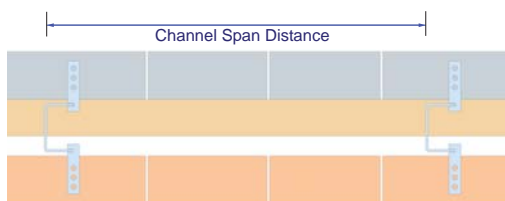
## HWP-I Windpost Channel

- Channels span between floor beams and are fixed to the concrete load bearing beams with expansion bolts. Can also be installed on to cast in channels
- Corresponding wall ties are used to restrain the outer brick facing wall on to the channels. The wall ties slide through the slotted hole on the channels and lock after a 90 degree twist
- Designed wind loads are taken into consideration to determine the dimensions of the channels. Can be used for cavities between 70 - 205 mm



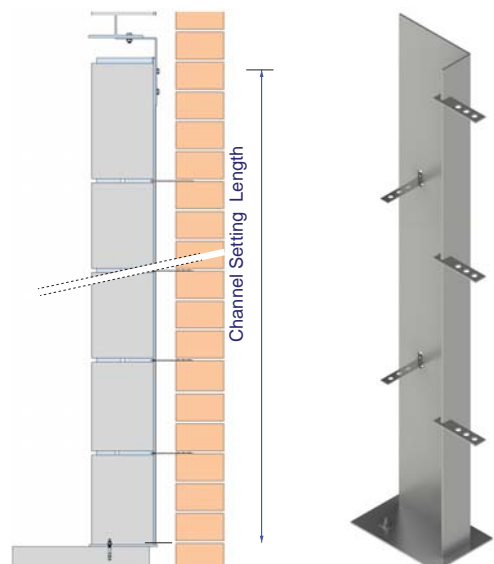
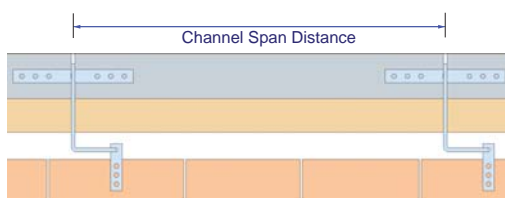
## HWP-E Windpost Channel

- Channels span between floor beams and are fixed on to concrete beams with expansion bolts
- Corresponding wall ties with a loop are hooked on the channel lips for restraining the walls. The slotted hole version can also be manufactured to suit normal wall ties
- L angles are manufactured from 4 and 5 mm thick plates. Channels are manufactured on a project basis and any dimension is possible



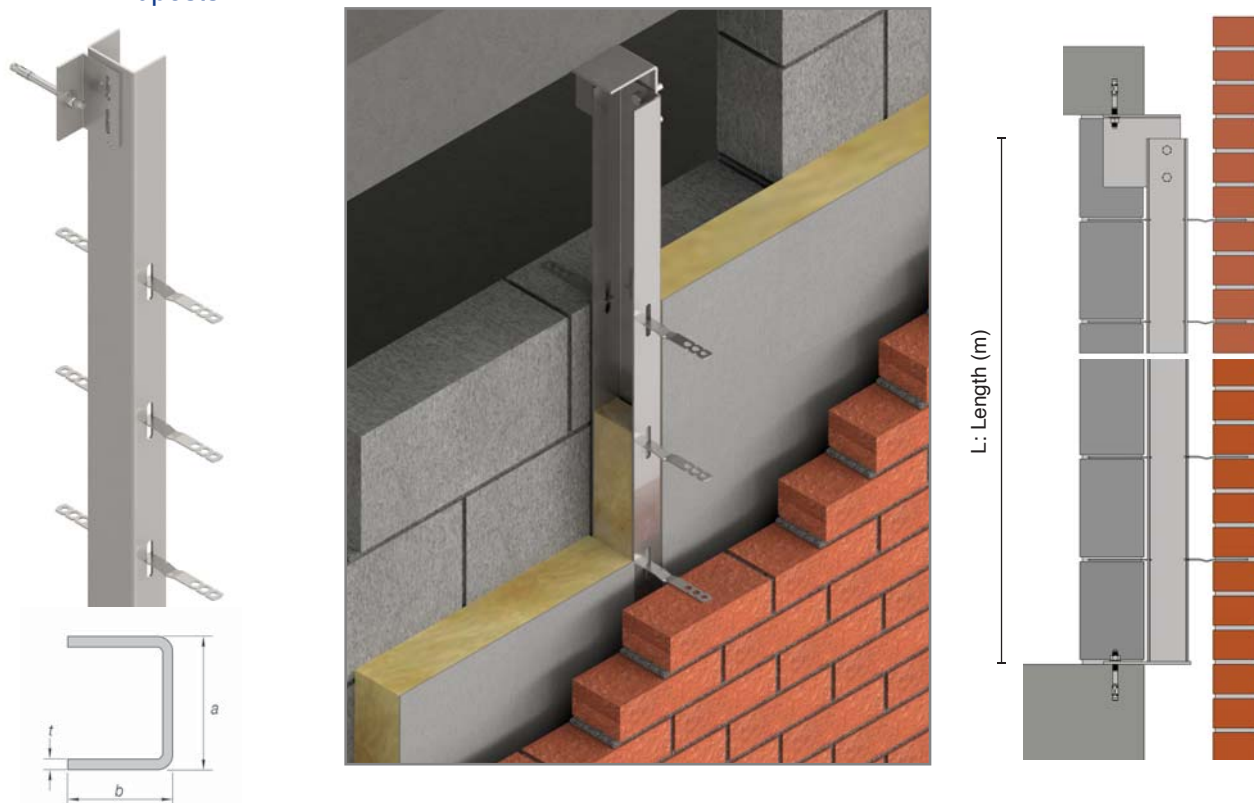
## HWP-L Windpost Channel

- Channels are manufactured with welded plates at the ends of the channels. The channels are fixed on to the beam flooring with expansion bolts.
- Corresponding wall ties with a loop are hooked on the channel lips for restraining the walls. The slotted hole version can also be manufactured to suit the normal wall ties
- Channels are manufactured on a project basis and any dimension is possible



# HWP-E Brickwork Windposts - Technical Details

## HWP-E Windposts



### Technical details

Dimensions		UDL per post (kN design resistant load)							
t x b / a / b mm	L:	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m	5.5m	6.0m

4x55/60/55	3.19	2.22	-	-	-	-	-	-	-
5x55/60/55	3.93	2.73	-	-	-	-	-	-	-
4x60/65/60	4.68	3.26	2.39	1.83	-	-	-	-	-
5x60/65/60	5.8	4.03	2.96	2.27	-	-	-	-	-
4x60/75/60	6.49	4.53	3.33	2.55	-	-	-	-	-
5x60/75/60	8.07	5.63	4.14	3.17	2.5	-	-	-	-
4x60/85/60	8.63	6.03	4.44	3.4	2.69	2.18	-	-	-
5x60/85/60	10.75	7.51	5.54	4.24	3.36	2.72	2.24	-	-
5x60/95/60	13.93	9.72	7.17	5.5	4.35	3.52	2.91	2.45	-
5x60/105/60	16.24	12.22	9.04	6.94	5.49	4.45	3.68	3.09	-

- Specified load-bearing capacities according to EN 1993 EC3
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4) and Hot dip galvanized
- Different sizes available upon request
- Structural calculation reports are available upon order
- Loads are for posts connected at top and bottom.
- Wind posts can be manufactured up to 6 metres length

## HWP-E Windpost

This windpost is a U shaped channel with a welded base plate and an adjustable I cleat for connections to floor slabs. Slot holes are available at designated locations to accommodate fixing of channel ties.

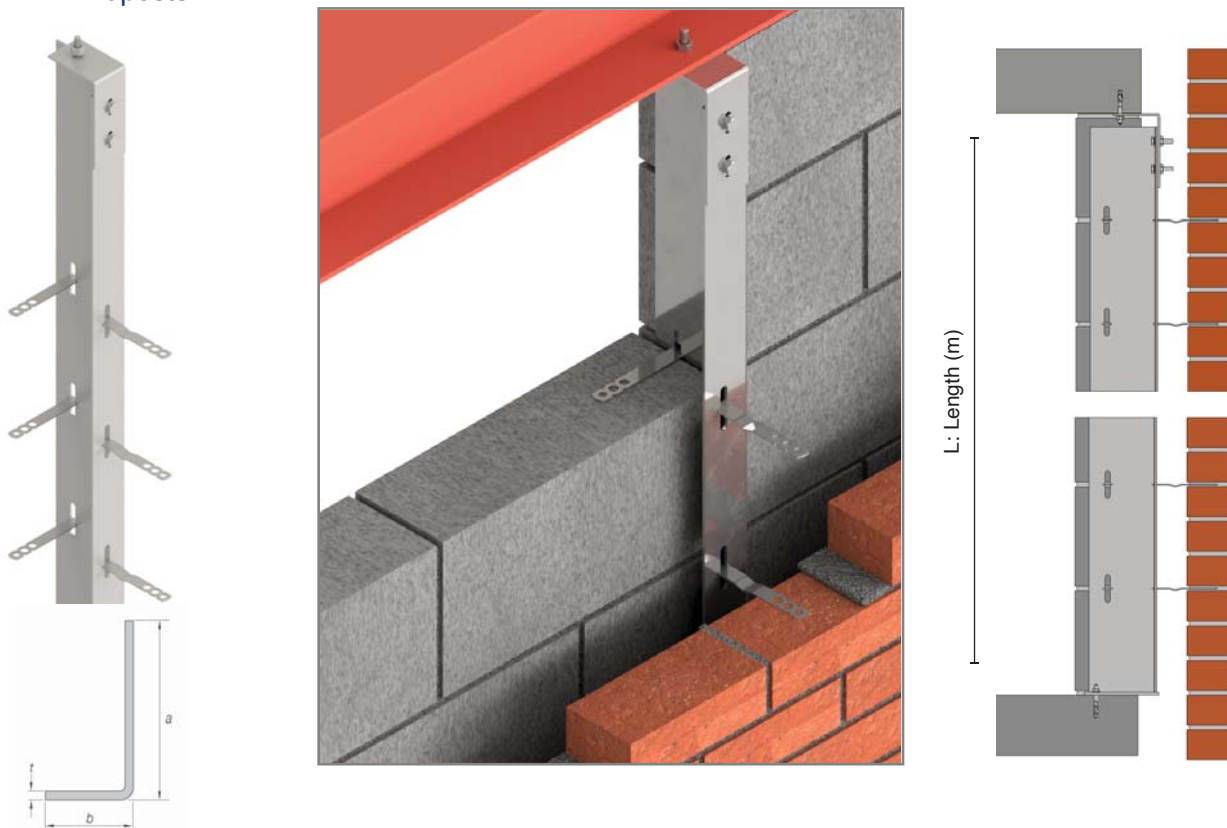
### Product Code Description

HWP-E - 60/55 / 3000

Length (mm)  
Section size (mm)  
Type

# HWP-L Brickwork Windposts - Technical Details

## HWP-L Windposts



### Technical details

Dimensions		UDL per post (kN design resistant load)							
t x b / a mm	L:	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m	5.5 m	6.0 m
4x70/125		9.46	7.07	5.46	4.32	3.48	2.86	2.38	2.01
4x70/140		12.28	9.25	7.2	5.74	4.66	3.84	3.21	2.72
4x70/150		14.21	10.86	8.49	6.8	5.354	4.59	3.85	3.26
6x70/130		15.83	11.93	9.3	7.42	6.03	4.98	4.17	3.53
4x70/170		17.92	14.48	11.41	9.21	7.56	6.3	5.31	4.53
5x70/160		20.33	15.94	12.54	10.11	8.3	6.91	5.82	4.96
6x70/150		21.90	16.64	13.09	10.54	8.64	7.19	6.05	5.15
5x70/170		22.75	18.29	14.44	11.69	9.63	8.04	6.79	5.8
5x70/180		24.76	20.8	16.48	13.37	11.05	9.26	7.85	6.72
8x80/150		24.76	22.59	17.76	14.31	11.74	9.77	8.23	7.01
6x70/185		24.76	26.71	21.24	17.31	14.36	12.08	10.28	8.82
8x80/170		24.76	29.26	23.81	19.31	15.96	13.37	11.33	9.7
8x80/180		24.76	29.26	27.15	22.09	18.31	15.38	13.07	11.22

- Specified load-bearing capacities according to EN 1993 EC3 • Different sizes available upon request
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4) and Hot dip galvanized • Loads are for posts connected at top and bottom.
- Structural calculation reports are available upon order • Wind posts can be manufactured up to 6 metres length

## HWP-L Windpost

This windpost is an L shaped channel with a welded base plate and an adjustable I cleat for connections to floor slabs. Slot holes are available at designated locations to accomodate fixing of channel ties.

### Product Code Description

HWP-L - 60/55 / 3000

Length (mm)

Section size (mm)

Type

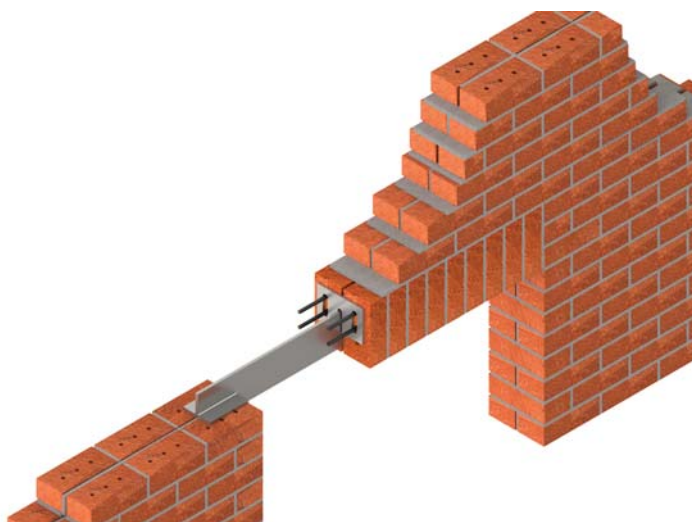
# HMLS Lintels - Introduction

**HMLS** Lintels are used to support brick cladding above openings such as windows and doors. HMLS Lintels are manufactured from cold formed stainless steel and galvanized steel.

There are different types available depending on load capacity categories. The lengths vary depending on the loading and the section size.

Apart from the standard type lintels shown here in, bespoke designed lintels to accommodate the installation parameters.

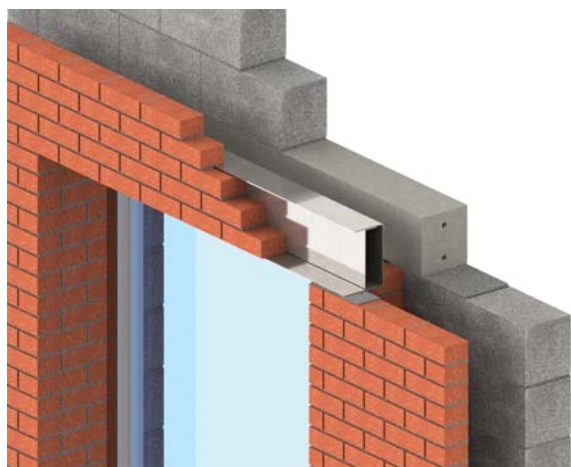
Lintels can be manufactured in stainless steel AISI 304 & 316 as well as hot dip galvanized steel.



The **HMLS-L** Lintel is the low load capacity category which has a dead load capacity of up to 45 kN. L shaped lintel range is designed to carry the external shell of a cavity walls.



The **HMLS-U** Lintel is the high load capacity category which has a dead load capacity of up to 85 kN. U shaped lintel range is designed to carry the external shell of a cavity walls.



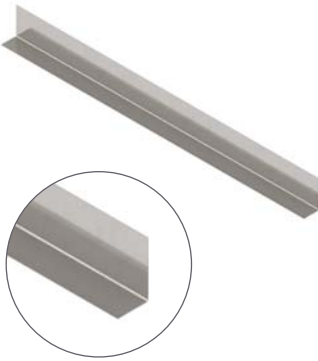
The **HMLS-H** Lintel is the high load capacity category which has a dead load capacity of up to 85 kN where it can be used on higher span distances. The 2 U shaped lintels welded together is designed to carry the external shell of a cavity walls for larger openings.



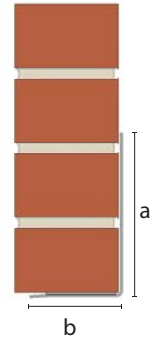
The **HMLS-B** Lintel is a high capacity category which is used inner shell block work cladding support over openings. The box shaped lintel is rigid and strong and has perforated holes to accommodate plastering.

# HMLS Brickwork Lintels - Technical Details

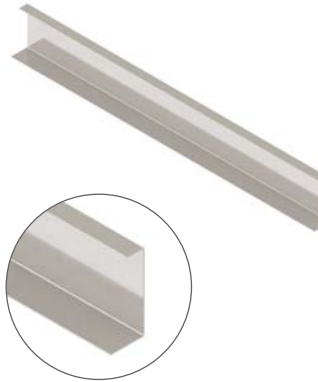
## HMLS-L Lintels



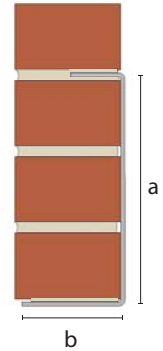
Technical details				
Section	UDL per Lintel (kN design resistant load)			
b / a (mm)	Width (a mm)	Height (b mm)	UDL (kN)	Length (mm)
91/88	91	88	4	900-1200
91/131	91	131	5	1200-1500
91/167	91	167	7	1500-2700
91/188	91	188	10	2100-2400
91/213	91	213	15	2700-3500
91/220	91	220	25	1500-2100
91/232	91	232	35	2100-2700
91/238	91	238	45	1500-2100



## HMLS-U Lintels



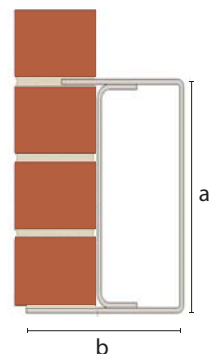
Technical details				
Section	UDL per Lintel (kN design resistant load)			
b / a (mm)	Width (a mm)	Height (b mm)	UDL (kN)	Length (mm)
100/154	100	154	15	750-1800
100/190	100	190	20	1800-2500
100/215	100	215	30	1500-2200
100/230	100	230	40	2100-2700
100/234	100	234	50	1500-2100
100/240	100	240	65	1500-2100
100/244	100	244	75	750-1800
100/248	100	248	85	750-1800



## HMLS-H Lintels



Technical details				
Section	UDL per Lintel (kN design resistant load)			
b / a (mm)	Width (a mm)	Height (b mm)	UDL (kN)	Length (mm)
170/154	170	154	50	2100-2700
170/190	170	190	55	2100-2700
170/215	170	215	60	1800-2500
170/230	170	230	65	1800-2500
200/234	200	234	70	1800-2500
200/240	200	240	75	1800-2500
200/244	200	244	80	1800-2500
200/248	200	248	85	1500-2200



- Specified load-bearing capacities according to EN 1993 EC3
- Different sizes available upon request
- Material : Stainless Steel 1.4301 (A2) & 1.4401 (A4) and Hot dip galvanized
- Minimum 200 mm bearing distance on both sides needs to be adhered to.
- Structural calculation reports are available upon ordering

## HMLS Lintels

Lintels are used to support brick cladding above opening. the suitable type is chose according to the required loadings. Load capacity for each type of Lintel and the application parameters needs to be carefully evaluated to choose the correct type.

### Product Code Description

HMLS-L - 91/88 - 1200

Length (mm)

Section size (mm)

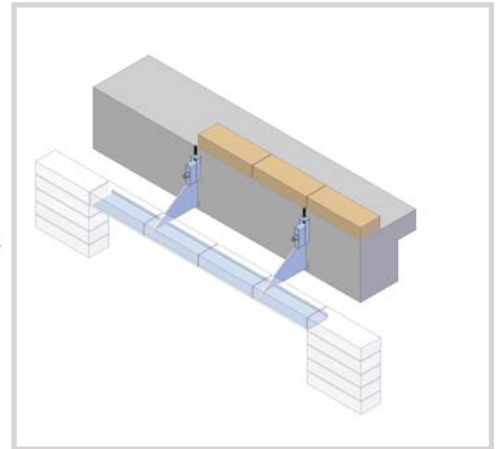
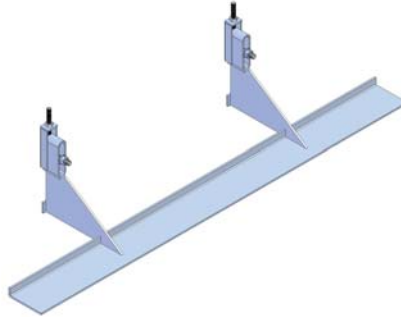
Type

# HMLS Brickwork Lintel Supports - Product Information

The HMLS Brickwork lintel supports are used for supporting brick structures above openings. The lintel supports can be designed and manufactured to suit a wide range of loadings and application circumstances. The majority of the lintel supports are specially designed and manufactured. Allowable loads are determined by structural calculations and local testing if required. HMLS Brickwork lintel supports are produced in stainless steel AISI 304 and AISI 316.

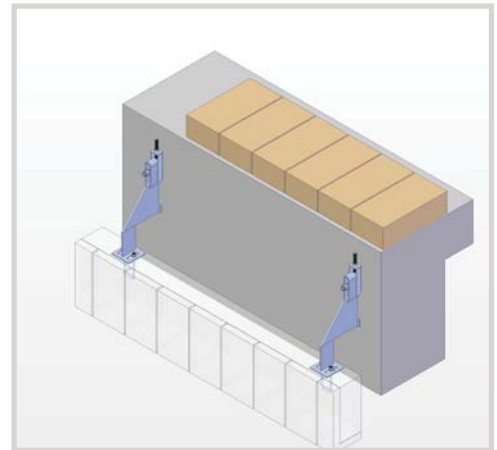
## FIX-F Brickwork Support Bracket For Lintel Support

- Exposed fixing with HMS-F brickwork support brackets
- Welded support angles with lengths up to 1.5 metres available
- Load capacities of up to 10.5 kN



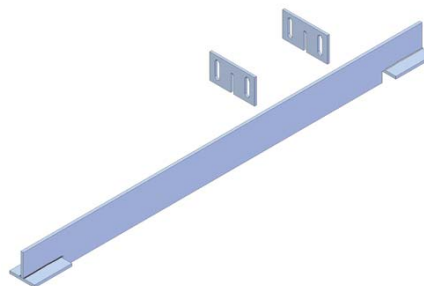
## FIX-SV Brickwork Support Bracket For Lintel Support

- Concealed fixing where HMS-SV brackets are used for prefabricated Lintel component
- U type inserts or cast in channels are cast in the component and are fixed on the slot holes of the brickwork support
- Structural analysis of the prefabricated component must be made by the manufacture

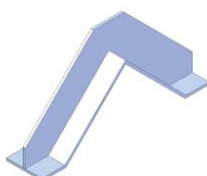


## HMLS-T Lintel Support

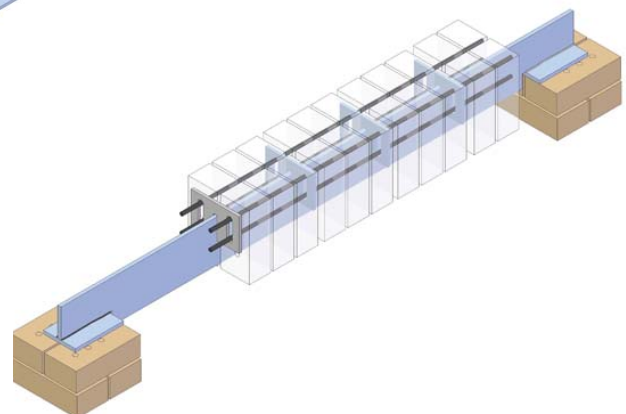
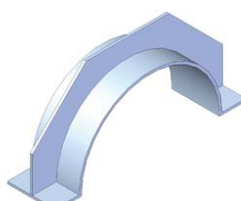
- Concealed fixing where custom designed steel component used in combination with slotted holed plates to support bricks with reinforcement bars
- Minimum bearing of steel component on the wall surface is 150 mm
- Can be custom designed to fit various application requirements



Apex Arch



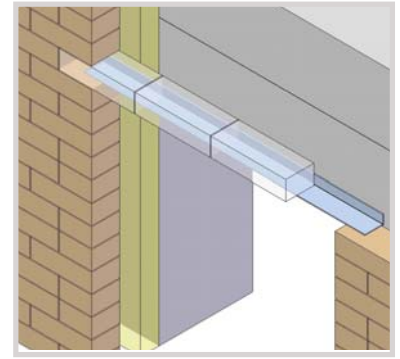
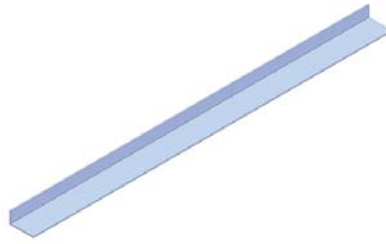
Semi Circular Arch



# HMLS Brickwork Lintel Supports - Product Information

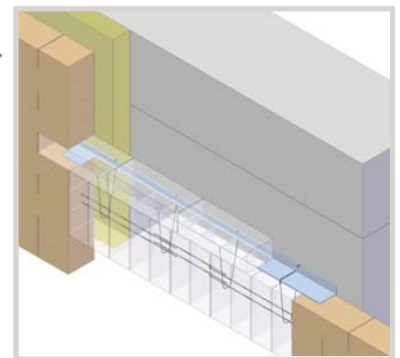
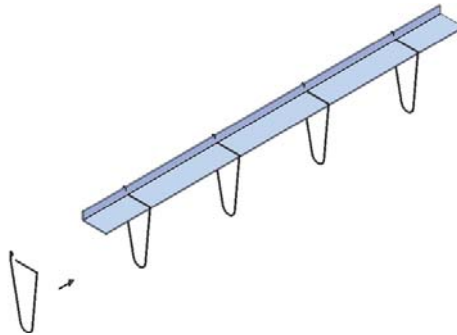
## HMLS-E Lintel Support Angle

- Exposed fixing with L angles are used for mounting bricks on top
- Can be placed on side wall as well as in between brickwork support brackets
- Minimum bearing on the wall surface is 95 mm
- Angle length available up to 2.2 metres and Max span of opening is 2.10 metres
- Technical details can be seen on page 47



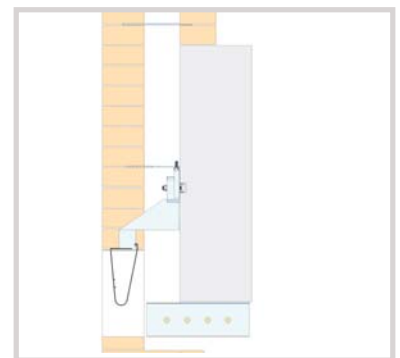
## HMLS-C Lintel Support Angle With Hoops

- Concealed fixing where the L angles are used in combination with suspension hoops to support bricks lintel using reinforcement bars
- When determining the loads both the over laying and underlaying bricks must be taken into consideration
- Brick Lintel must be supported with scaffolding during fixing.
- Technical details can be seen on page 47



## FIX-FV Lintel Support With Hoops

- Concealed fixing where the hoops are used in combination with HMS-FV support brackets to support underlaying bricks
- Angle length available up to 1.5 metres and load capacity up to 10.5 kN



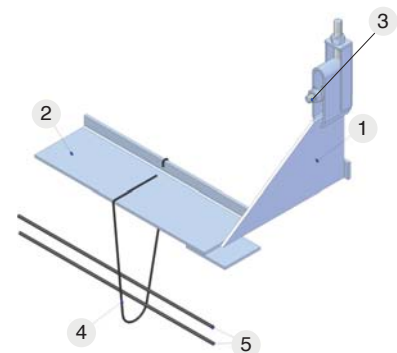
## HMLS-HK Hoops For Lintel Suspension

- Hoops are special wires designed to fit support plates on the brackets or angles for the suspension of lintels
- Standard diameter is 4 and is available in different shapes and sizes to fit the application

Type L for L angles



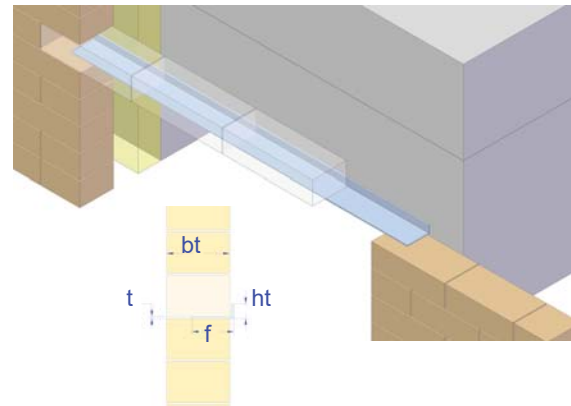
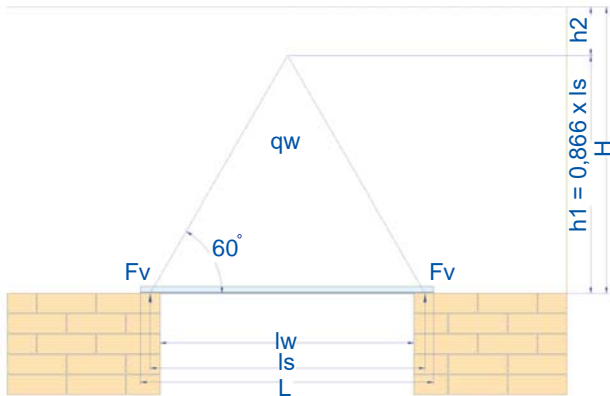
Type B for single brackets



1. FIX-U Bracket
2. HMLS Angle
3. attachment to wall
4. HMS-HK Hoop
5. Reinforcement bars

# HMLS Brickwork Lintel Supports - Technical Details

## HMLS-E Lintel Support Angle

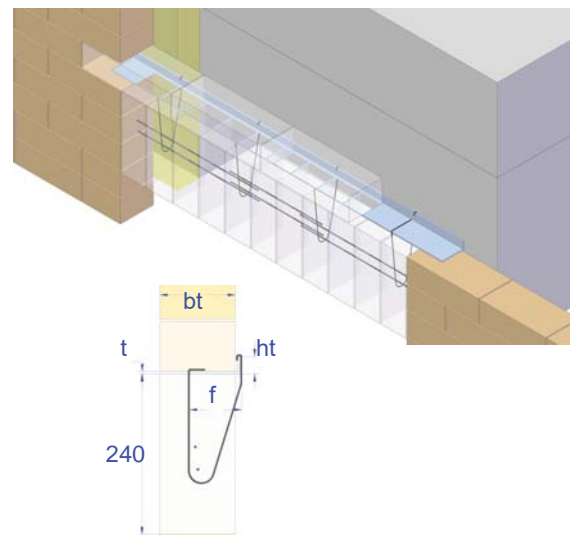
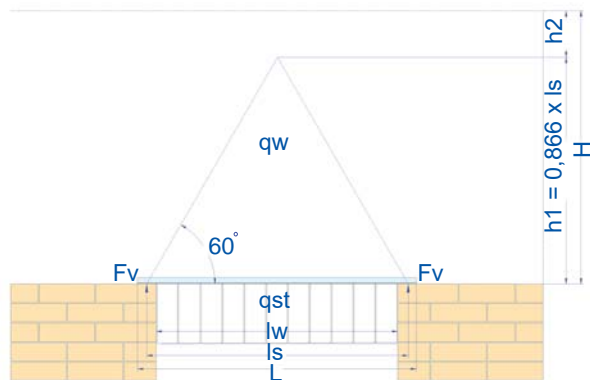


With Arch Action  
in cases where  $H > h$

Angle dimensioning table  $f \times h \times t$  (mm)

lw (mm)	L (mm)	H < 1,00 m	H < 1,25 m	H < 1,50 m	H < 1,75 m	H < 2,00 m	H < 2,25 m	H > 2,25 m	h (m)
510	700	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	0,71
760	950	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	95x30x3	0,94
1010	1200	95x60x3	95x60x3	95x45x3	95x45x3	95x45x3	95x45x3	95x45x3	1,17
1260	1450	95x60x4	95x60x5	95x60x5	95x60x3	95x60x3	95x60x3	95x60x3	1,40
1510	1700	95x90x4	95x90x4	95x90x5	95x90x5	95x90x4	95x90x4	95x90x4	1,62
1760	1950	95x90x4	95x90x5	95x90x5	95x90x6	95x90x6	95x90x4	95x90x4	1,85
2010	2200	95x90x5	95x90x6	95x90x8	95x100x8	95x100x8	95x100x8	95x90x6	2,08

## HMLS-C Lintel Support Angle with suspension loops



### Loading on the lintel support

Without arc action:

load height =  $H$  [m]  
 load  $qw = H \times d \times \gamma$  [kN/m]  
 static span  $ls = lw + 2 \times \text{support length}/3$  [m]  
 $M_{\max} = qw \times ls^2/8$  [kNm]  
 $V_{\max} = qw \times ls/2$  [kN]

With arc action:

load height  $h = 0.866 \times LS$  [m]  
 load  $qw = h \times d \times \gamma$  [kN/m]  
 length of angle  $L = lw + 2 \times \text{support length}$  [m]  
 static span  $ls = lw + 2 \times \text{support length}/3$  [m]  
 $M_{\max} = qw \times ls^2/12$  [kNm]  
 $V_{\max} = qw \times ls/4$  [kN]

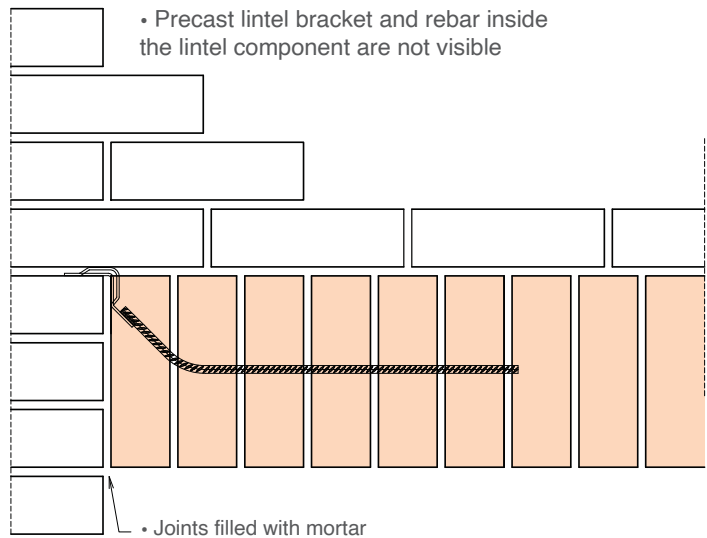
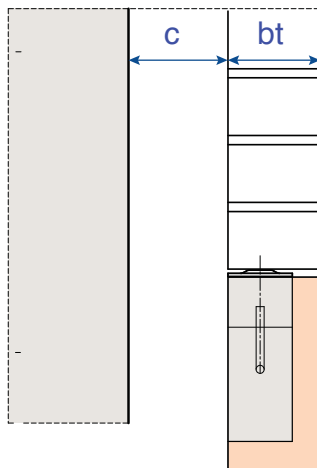
# HM-SW Precast Lintel Bracket - Product Information

## HM-SW Lintel bracket

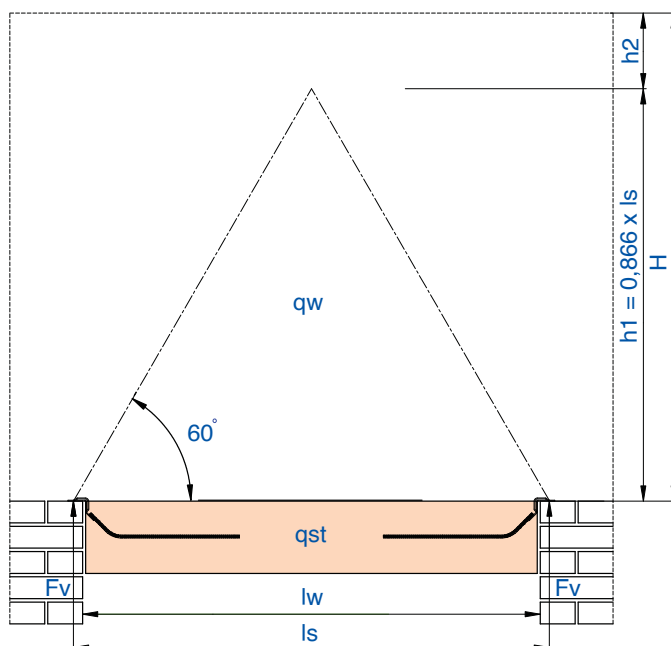


- Used for the support of lintel components on to standing outer walls
- Lintel brackets are cast in to components,
- Static calculation of the lintel must be made seperately

Load (kN)	Product code	Angle width b (mm)	Wall thickness bt (mm)
3,5	SW-3,5-80	80	115
5,3	SW-5,3-80	80	115
6,8	SW-6,8-80	80	115
2,6	SW-2,6-60	60	90
3,9	SW-3,9-60	60	90
5,1	SW-5,1-60	60	90



## Load Calculation Principle with Arch action



### Loading on the lintel support

Load case 1:  $h_2 < 25 \text{ cm}$   $\Rightarrow$  without arc action

$$F_v = \frac{H \cdot l_w \cdot q_w}{2} + \frac{l_w \cdot q_{st}}{2}$$

Fall 2:  $h_2 \geq 25 \text{ cm}$   $\Rightarrow$  with arc action

$$F_v = \frac{h_1 \cdot l_s \cdot q_w}{4} + \frac{l_w \cdot q_{st}}{2}$$

### Loading on brickwork

$bt = 11,5 \text{ cm} \rightarrow q_w = 2,67 \text{ kN/m}^2$   
 $bt = 9,0 \text{ cm} \rightarrow q_w = 1,62 \text{ kN/m}^2$

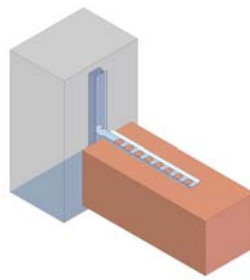
### Loading on Lintel

$bt = 11,5 \text{ cm} \rightarrow q_{st} = 0,62 \text{ kN/m}$   
 $bt = 9,0 \text{ cm} \rightarrow q_w = 0,50 \text{ kN/m}$

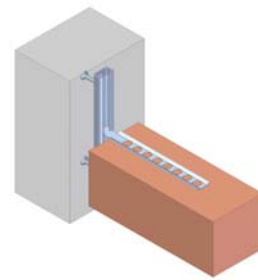
# HMP Brickwork Restraint Channels - Product Details

Brickwork restraint channels and suitable ties are used in combination for restraining outer skin brickwork walls. This system ensures the durable and reliable connection of the brickwork wall easily and efficiently. The wall ties can be positioned anywhere along the length of the channel. Fixing is done by inserting the wall ties in to the slot of the channel and then turning them 90 degrees to effectively locking the wall tie in to the channel. There are different types of channels available that can be cast in and also surface mounted.

HMPR-25/15 & 28/28 Insert

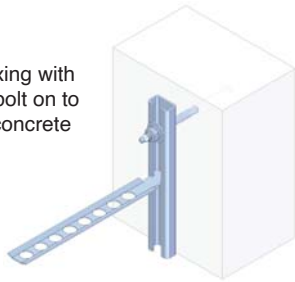


HMPR-28/15 & 38/17 Anchor Channel

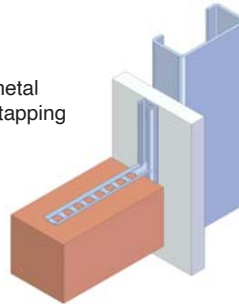


HMP-28/15 & 38/17 & 25/14 C Channels

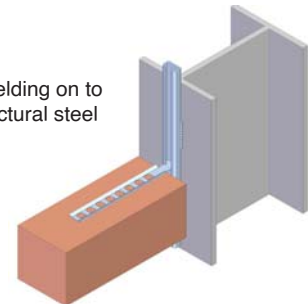
• Surface fixing with expansion bolt on to reinforced concrete walls







• Fixing on to metal studs with self tapping screws



• Welding on to structural steel



Product Code		Technical Details		
		Section Size (mm)	Allowable Pull Out Load At A Distance Of 250 Mm all F (kN)	Wall Tie Type
<b>MAAS-25/15 &amp; HMP-28/28</b>  <b>HMPR-28/15 &amp; HMPR-38/17</b>  <b>HMPB-38/17</b>  <b>HMPB-25/14</b> 	MASS-25/15 & HMP-28/28 Concrete insert	25/15 & 28/28	1.2	HWT-M-28 & HWT-28
	HMPR-28/15 Anchor Channel	28/15	3.0	
	HMPB-28/15 Surface Channel	28/15	3.0	
	HMPR-38/17 Anchor Channel	38/17	4.5	HWT-M-38
	HMPB-38/17 Surface mount channel	38/17	4.5	
	HMPB-25/14 Surface mount channel	25/14	1.2	HWT-25

## HMP Brickwork Wall Tie Channels

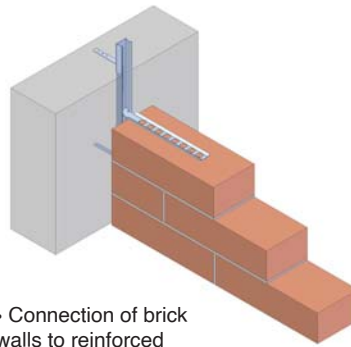
Wall Tie Channels are supplied in 3 and 6 metre lengths as standard. Special lengths can be cut according to project requirements. Channels are available in stainless steel and galvanized steel.

**Product Code Description**  
HMPR - 28/15 -1500  
└───┬───┬───  
Type Section Length

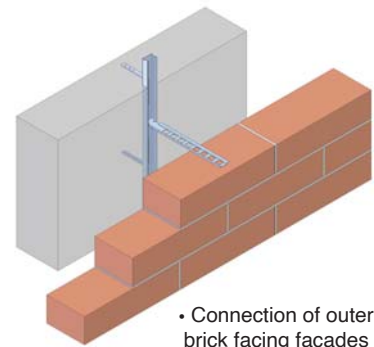
# HWT-M Channel Ties

The **HWT** series channel ties for brickwork and masonry outer shell walls are used in combination with channels for restraining purposes. The channel ties are inserted any where along the channel and pressed into the bearing joint mortar of masonry cladding at recommended distances.

The type of channel ties varies according to the corresponding channel type of 28/15 or 38/17 and in the overall length of the wall tie.



• Connection of brick walls to reinforced concrete walls.



• Connection of outer brick facing facades to reinforced concrete walls.

Product Code		Technical Details			
		Length	Size	Corresponding Channels	Wall Tie Head
		L (mm)	txw (mm)		
<b>HWT-MS 28 &amp; 38</b>	HWT-MS 28-85	85	2x26	HMPR-25/15	To suit 25/15, 28/28 & 28/15 channel
	HWT-MS 28-120	120		HMPR-28/15	
	HWT-MS 28-180	180		HMPB-28/15	
<b>HWT-MS 38 &amp; 38</b>	HWT-MS 38-85	85	2x30	HMPR-38/17	To suit 38/17 channel
	HWT-MS 38-120	120		HMPB-38/17	
	HWT-MS 38-180	180			
<b>HWT-ML 28 &amp; 38</b>	HWT-ML 28-85	85	2x26	HMPR-25/15	To suit 38/17 channel
	HWT-ML 28-120	120		HMPR-28/15	
	HWT-ML 28-180	180		HMPB-28/15	
<b>HWT-ML 38 &amp; 38</b>	HWT-ML 38-85	85	2x30	HMPR-38/17	To suit 25/14 channel
	HWT-ML 38-120	120		HMPB-38/17	
	HWT-ML 38-180	180			
<b>HWT-MT 28 &amp; 38</b>	HWT-MT 28-85	85	2x26	HMPR-25/15	To suit 36/8 channel
	HWT-MT 28-120	120		HMPR-28/15	
	HWT-MT 28-180	180		HMPB-28/15	
<b>HWT-D-25 &amp; 36</b>	HWT-D-25-100,125,150	100,125,150	2x20	HMPR-38/15	To suit 36/8 channel
	HWT-D-25-175,200,225	175,200,225		HMPB-38/15	
	HWT-D-25-250,275,300	250,275,300			
<b>HWT-D-28</b>	HWT-28-125,150	85	2x24	HMPR-28/15	
	HWT-28-175,200	120		HMPB-28/28	
	HWT-28-225,250	180			

## HWT Channel Ties

This brickwork support bracket has a single welded plate used for independent installation of each brick block. This bracket is used for closed surface elevation brick cladding.

### Product Code Description

HWT-M - 28 - 85

Length  
Channel Type  
Type

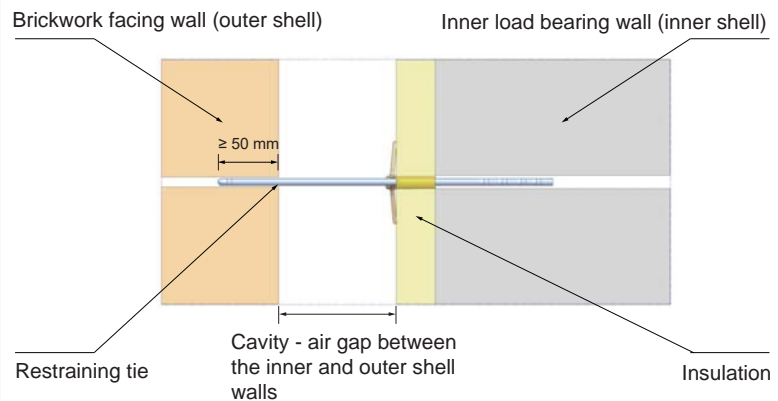
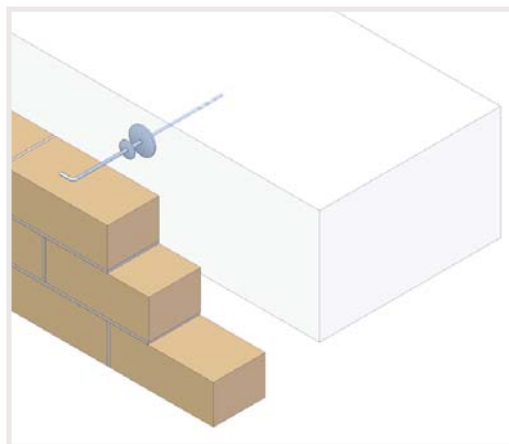
# HRST Restraining Tie - Product Details



Brickwork walls are constructed of an outer shell which is thin and must be restrained against buckling. The wind loads must also be transferred on to the load bearing walls. Depending on the material used to construct the inner load bearing wall, suitable restraining ties are used in restraining the outer shell brickwork walls on to inner load bearing walls. **HRST** restraining ties can be securely and reliably used to restrain the brickwork walls against horizontal loads. These ties are made out of round steel and have wavy forms for embedding into mortar joints. There are two versions that are used for brickwork load bearing walls and concrete load bearing walls.

HRST-C Restraining Tie



HRST-M Restraining Tie

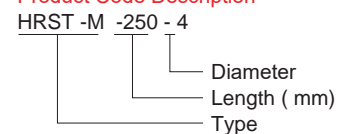


Product Code		Technical Details				
		Length	Cavity	Diameter	Application Area	
					Internal Wall	External Wall
		(mm)	(mm)	(mm)		
	HRST-M-225-4	225	up to 100	4.0	Brickwork wall	Brickwork Wall
	HRST-M-250-4	250	up to 125	4.0		
	HRST-M-275-4	275	up to 150	4.0		
	HRST-M-300-4	300	up to 175	4.0		
	HRST-M-340-4	340	up to 215	4.0		
	HRST-C-160-4	160	up to 25	4.0	Concrete B15	Brickwork Wall
	HRST-C-180-4	180	up to 45	4.0		
	HRST-C-210-4	210	up to 75	4.0		
	HRST-C-250-4	250	up to 115	4.0		
	HRST-C-275-4	275	up to 140	4.0		
	HRST-C-300-4	300	up to 165	4.0		
	HRST-C-320-4	320	up to 185	4.0		
	HRST-C-350-4	350	up to 200	4.0		

## HRST Restraining Ties

The restraining ties are used for restraining the brick facing outer shell walls against wind pressure and suction

### Product Code Description



# CWMT Brickwork Corrugated Wall Tie

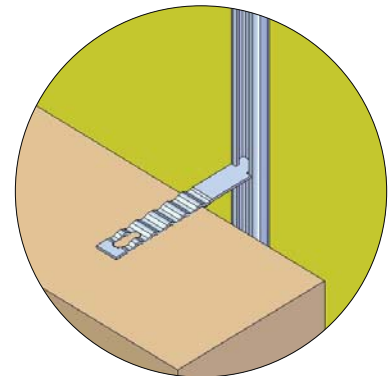
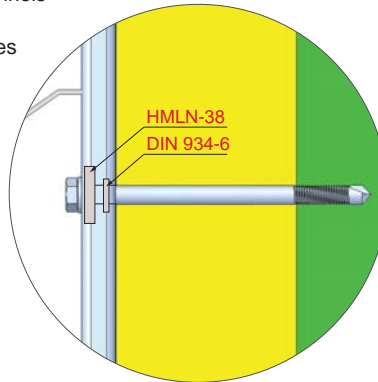
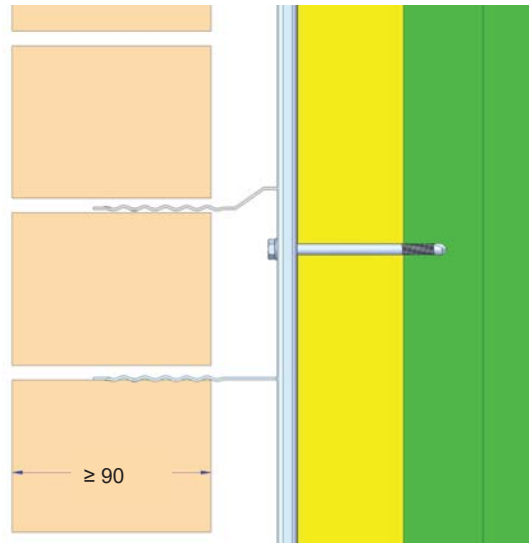
## CWMT-D Brickwork Wall Tie



- Corrugated tie provides multiple drips to prevent moisture bridging cavity
- Provides lateral restraint for wind pressure & suction on brick work without transferring loads on to insulation
- Fixed on to 38/17 cast-in or surface fixed channels
- Positioning any where along the length of the channels
- Available in lengths between 75 and 250 mm
- Tensile loading is 0.7 kN per 600 mm screw centres

Product Code	Length
CMWT-D-75	75
CMWT-D-100	100
CMWT-D-125	125
CMWT-D-150	150
CMWT-D-200	200
CMWT-D-225	225
CMWT-D-250	250

CWMT-D wall ties fixed on surface mounted C channels

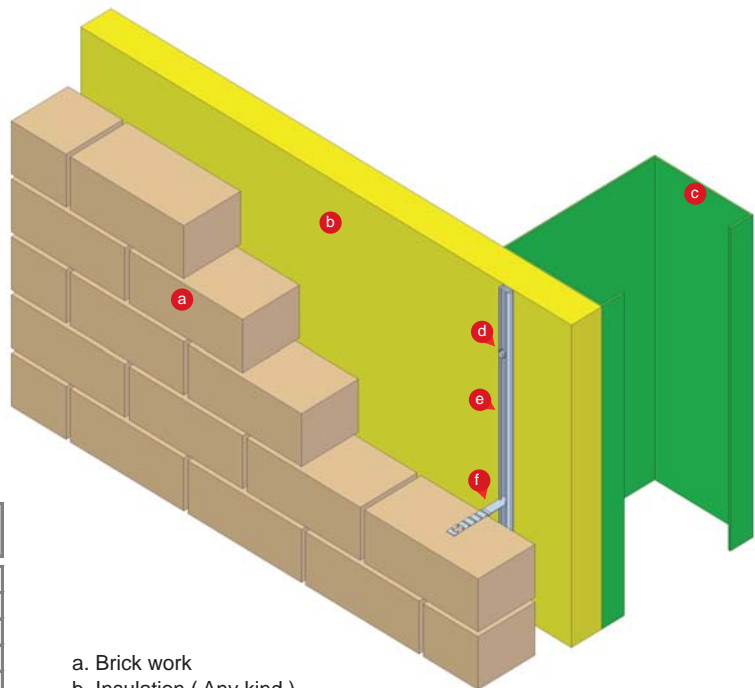


## HJT Self Tabbing Screw



- Self tapping screws with drill adaptor used for quick and easy fixing of surface channels on to metal studs

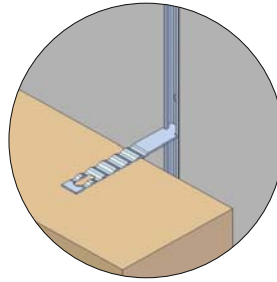
Product Code	Dimensions	Description	Insulation Thickness
For steel sections 1.5-6 mm thickness			
HJT-3-70	5.5x70	Un-washed	20-50
HJT-3-90	5.5x90		40-70
HJT-3-110	5.5x110		60-90
HJT3-130	5.5x130		80-110
For steel sections 1.5-6 mm thickness			
HJT2-120	6x120	Washed	55-105
HJT2-140	6x140		75-125
HJT2-160	6x160		95-145



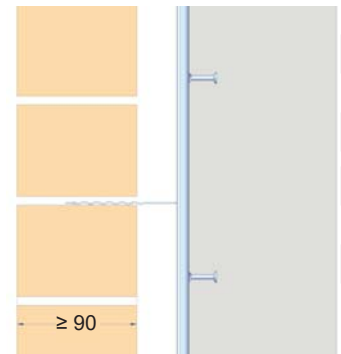
- a. Brick work
- b. Insulation ( Any kind )
- c. Steel section
- d. HJT Self tabbing screws
- e. HMPD-38/17 Surface channel
- f. CWMT-D Corrugated wall tie

# CWMT Restraining Ties & Brackets - Product Details

## CWMT-C Brickwork Channel Tie

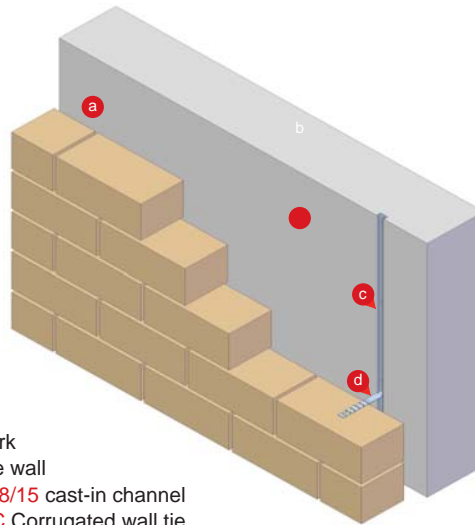


CWMT-D wall ties fixed on cast in channels



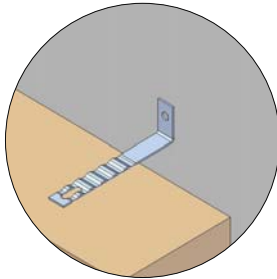
- Fixed on to 38/17 cast-in or surface fixed channels
- Positioning any where along the length of the channels
- Available in lengths between 75 and 250 mm
- Tensile loading is 1.0 kN

Product Code	Length
CMWT-C-75	75
CMWT-C-100	100
CMWT-C-125	125
CMWT-C-150	150
CMWT-C-200	200
CMWT-C-225	225
CMWT-C-250	250

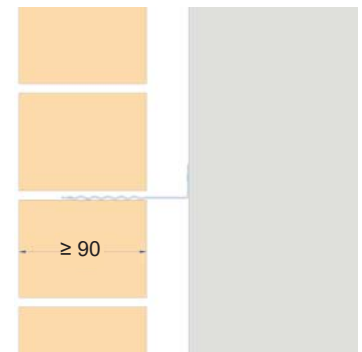


- a. Brick work  
b. Concrete wall  
c. HMPR-28/15 cast-in channel  
d. CWMT-C Corrugated wall tie

## CWMT-B Brickwork Wall Tie

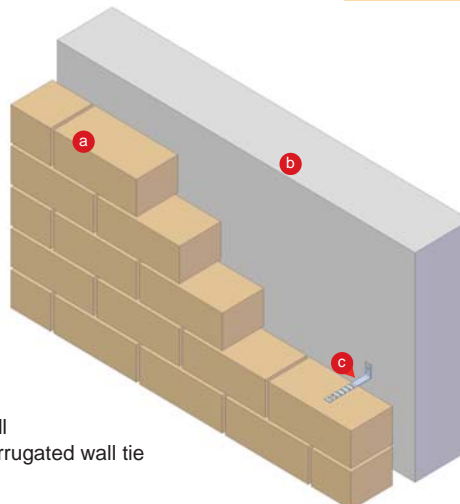


CWMT-B wall ties fixed on cast in channels



- Fixed on to concrete and brickwork walls with facade plugs
- Can be riveted or welded on to structural steel as well
- Available in lengths between 75 and 250 mm

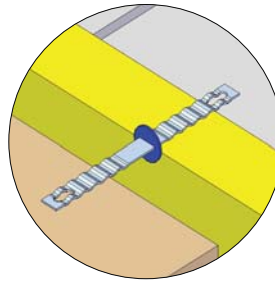
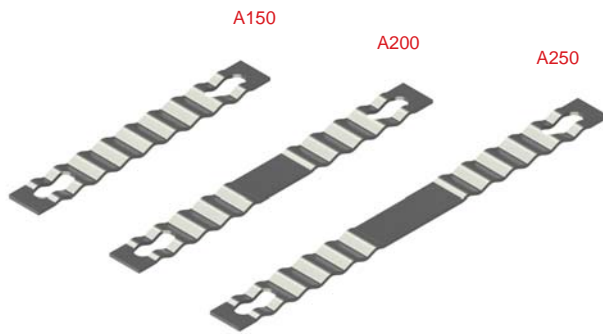
Product Code	Length
CMWT-B-75	75
CMWT-B-100	100
CMWT-B-125	125
CMWT-B-150	150
CMWT-B-200	200
CMWT-B-225	225
CMWT-B-250	250



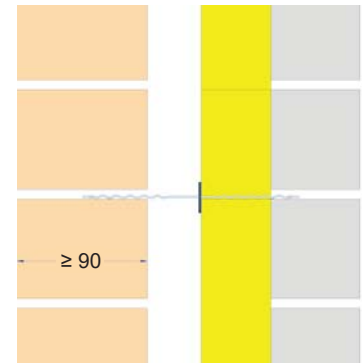
- a. Brick work  
b. Concrete wall  
c. CWMT-B Corrugated wall tie

# CWMT Brickwork Corrugated Cavity Wall Ties

## CWMT-A Brickwork Wall Tie



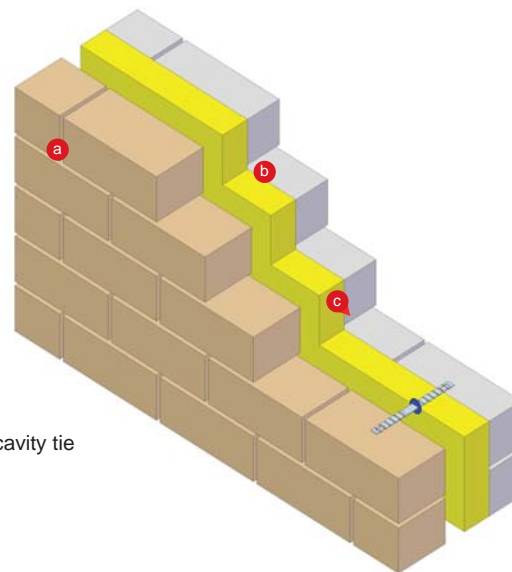
CWMT-A wall ties connected between inner and outer shell walls



- Fixed on to both inner and outer shell walls with mortar
- Quick and easy to install
- Available in 150 , 200 and 250 mm
- Can be supplied in stainless steel and galvanized steel

Product Code	Length
CMWT-A-150	150
CMWT-A-200	200
CMWT-A-250	250

- a. Brick work  
b. Concrete wall  
c. **CMWT-A** Corrugated cavity tie



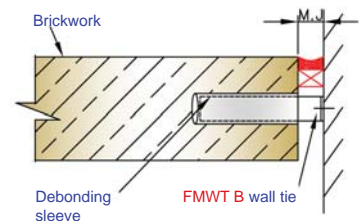
# FMWT Brickwork Wall Ties For Expansion Joints

## FMWT Brickwork Wall Ties For Expansion Joints

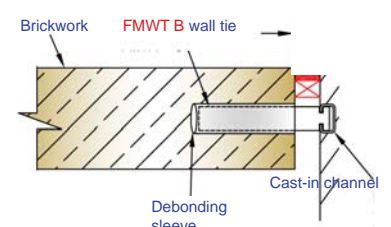
- Wall ties supplied with debonding sleeves
- Used on expansion joints where the debonding sleeves allow movement
- Available to fit the range of the CWMT wall ties



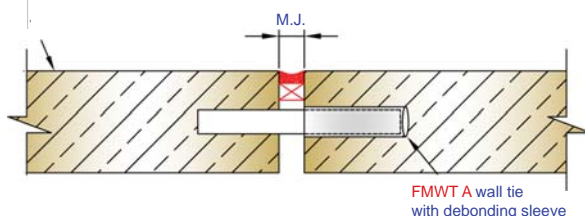
Product Code	Length
FMWT-B-125	125



Product Code	Length
FMWT-C-28-125	125
FMWT-C-38-125	125



Brickwork Product Code	Length
FMWT-A-225	225



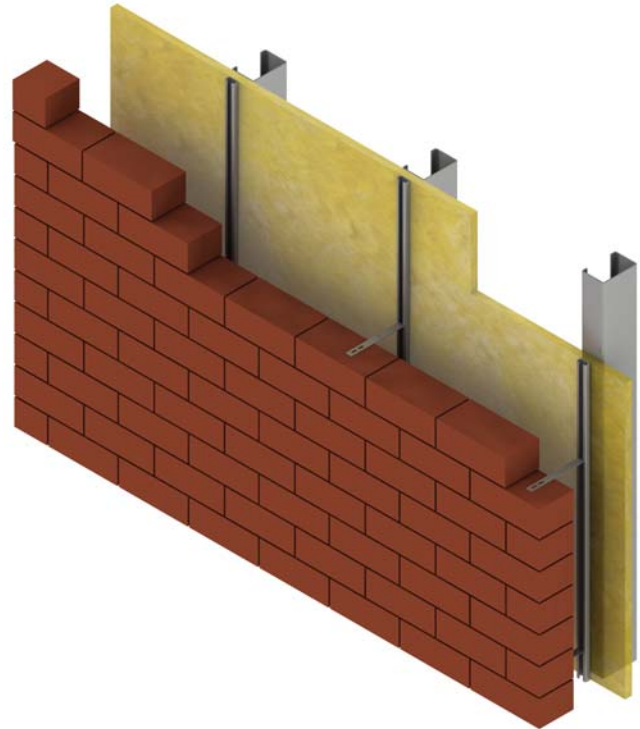
## HMP-25/14 Brick restraining system

Brickwork restraint channels type **HMP-25/14** and the corresponding channel ties type **HWT-D-25** are used to tie back the outer leaf brick cladding wall on to a building substrate. The substrate can be either concrete or steel stud.

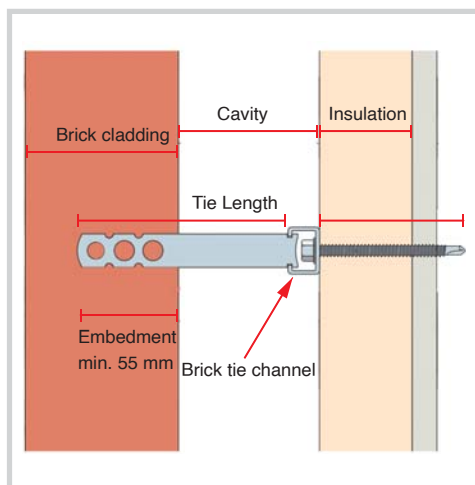
The attachment of the **HMP-25/14** brick tie channel is done with a suitable screw that drills through any type of insulation up to 220 mm thickness. The channels have pre-drilled holes with spacing of 100 mm. Self drilling screws to drill and tab into light gauge steel studs or concrete screws that drills to concrete are used for easy and fast attachments of the brick tie channel.

**HWT-D-25** channel ties are available to suit cavities up to 265 mm. The channel ties fit on to the channel by rotating 90 degrees and easily positioned in any location along the length of the channel.

Compression sleeves are supplied in instances where the restraint system has to be stiffened against high compression loads. The components can be supplied are stainless steel grade AISI 304 and AISI 316.



### HMP-25/14 & HWT-D-25 Installation



#### System Components:

- HMP-25/14 Channel in 2700 mm and 3000 mm as standard lengths.
- Threaded fixing screws available for light gauge steel and concrete. Screws can drill through insulation up to 220 mm thick.
- HWT-D-25 channel ties in different length to accommodate up to 259 mm open cavity.
- Compression sleeves supplied to correspond with the insulation thickness for enabling stability of the restraint system under compression load.
- All components are stainless steel grade AISI 304 - 1.4301 & AISI 316 - 1.4401

### Wall Tie Types as per reference to PD 6697 and BS EN 1991-1-4

Required wall tie type	Application	Building height (m)	Geographical Location
Type 1	Heavy duty tie, suitable for most building types	Any height	Suitable for most sites. However, for relatively small or unusually shaped buildings in vulnerable areas, tie provision should be calculated
Type 2	General purpose tie, suitable for residential and small commercial buildings	15	Suitable for flat sites where basic wind speed is up to 31m/s and altitude is not more than 150m above sea level
Type 3	Basic wall ties, suitable for residential and small commercial buildings	15	Suitable for flat sites in towns/cities where basic wind speed does not exceed 27m/s and altitude is not more than 150m above sea level
Type 4	Light duty tie, suitable for box-form domestic dwellings	10	Suitable for flat sites in towns/cities where basic wind speed does not exceed 27m/s and altitude is not more than 150m above sea level

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

### HMP-25/14 Restriant System Performance Details

Insulation thickness (mm)	Vertical Tie Spacing (mm)	Spacing of the Fixings (mm)	Wind Load Capacity (kN/m <sup>2</sup> )
Max. 220	300	400	3.31
Max. 220	375	400	2.65
Max. 220	450	400	2.21
Max. 220	675	400	1.58

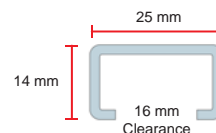
Notes: Centres shown achieve equivalent tie type performances to PD 6697 6.2.2.5

### HMP-25/14 Brick Tie Channel



HMP-25/14 Brick Tie Channel Product Details		
Product Code	Channel Length (mm)	Drilled hole spacing (mm)
HMP-25/14-2700	2700	100
HMP-25/14-3000	3000	100

- Stainless steel AISI 304-1.4301 & AISI 316-1.4401
- 2700 & 3000 mm standard lengths



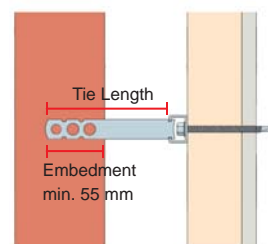
- channels are available in 2700mm & 3000 mm lengths as standard.
- pre-drilled holes are at 100 mm spacings with a 5.2 mm diameter hole and a 9 mm diameter holes.
- Different holes diameters to accommodate different types of fixings.

### HWT-D-25 Channel Tie



HWT-D-25 Channel Ties Product details		
Product Code	Tie Length (mm)	Cavity (mm)
HWT-D-25-100	100	40-60
HWT-D-25-125	125	60-90
HWT-D-25-150	150	90-110
HWT-D-25-175	175	110-140
HWT-D-25-200	200	140-170
HWT-D-25-225	225	165-190
HWT-D-25-250	250	190-215
HWT-D-25-275	275	215-240
HWT-D-25-300	300	240-265

- Stainless steel AISI 304



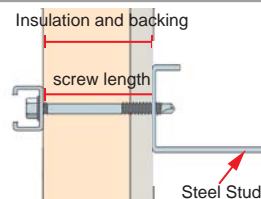
- ties available in various lengths to accommodate the wall cavity.
- ties lock in to channel after rotating the toes 90 degrees.
- min embedment in to mortar should be 55 mm.

### JT2 D6 Self drilling screw



JT2-5.5/6.3 Self Drilling Screws			
Product Code	Screw Length (mm)	Overlay (mm)	Insulation & backing thickness (mm)
JT2 D6 5.5/6.3-62	62	30	25-45
JT2 D6 5.5/6.3-82	82		35-60
JT2 D6 5.5/6.3-102	102		45-80
JT2 D6 5.5/6.3-122	122		60-95
JT2 D6 5.5/6.3-135	135		65-110
JT2 D6 5.5/6.3-152	152		80-125
JT2 D6 5.5/6.3-192	192		130-175
JT2 D6 5.5/6.3-262	262		175-220

- Stainless steel AISI 304



- tabbing screws enable installation on to SFS through insulation
- supplied in various lengths to fulfill the cavity requirement

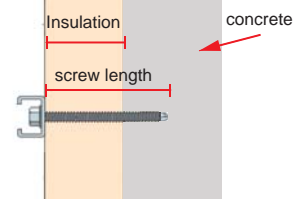
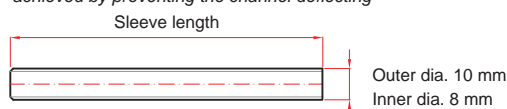
### FBS 6.3 x 60 Concrete screw



FBS R 6.3 x 60 Concrete Screws			
Product Code	Screw Length (mm)	Pilot hole (mm)	Insulation & backing thickness (mm)
FBS R 6.3 x 60	60	5x30	25-45
FBS R 6.3 x 80	80		35-60
FBS R 6.3 x 100	100		45-80
FBS R 6.3 x 120	120		60-95
FBS R 6.3 x 140	140		65-110
FBS R 6.3 x 180	180		100-140
FBS R 6.3 x 220	220		120-160
FBS R 6.3 x 260	262		175-220

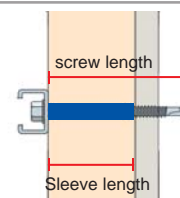
- Hardened steel with corrosion resistant coating

- Corresponds to the insulation thickness
- Supplied in various lengths to accommodate the insulation thickness
- compressive strength and stability of the channel tie system are both achieved by preventing the channel deflecting



- tabbing screws enable installation on to SFS through insulation
- supplied in various lengths to fulfill the cavity requirement
- 5 mm diameter pilot hole required.

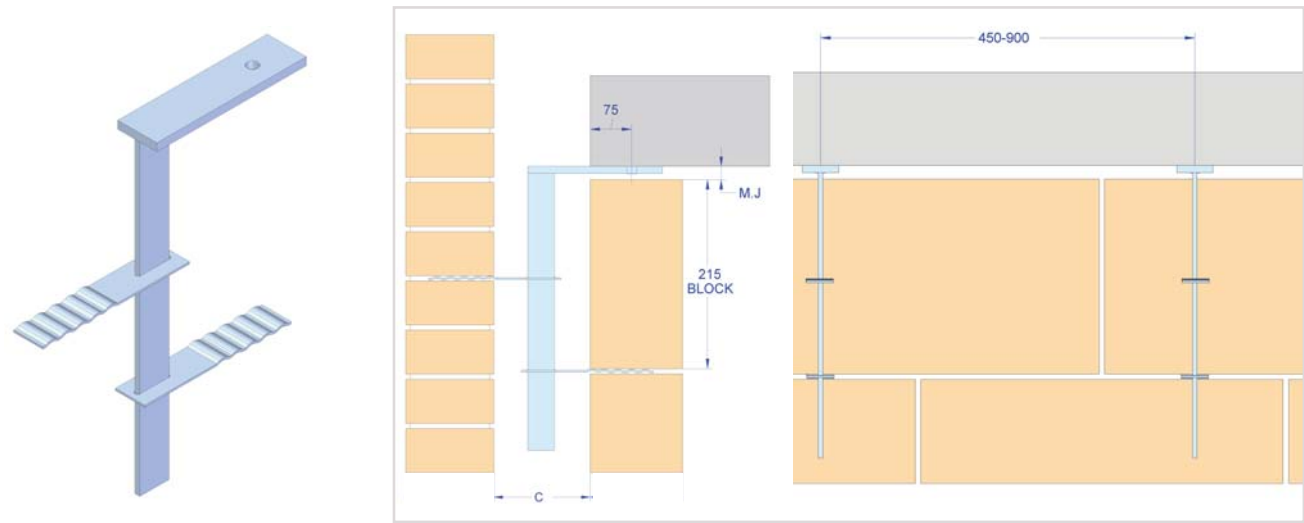
### HM-CPS Compression Sleeve



# HMHR Brickwork Head Restraints

HMHR Brickwork head restraints are specifically designed parts for restraining brickwork below horizontal soft joints by attaching the brickwork to the structure without restricting differential movement. These items are available in stainless steel AISI 304 and AISI 316.

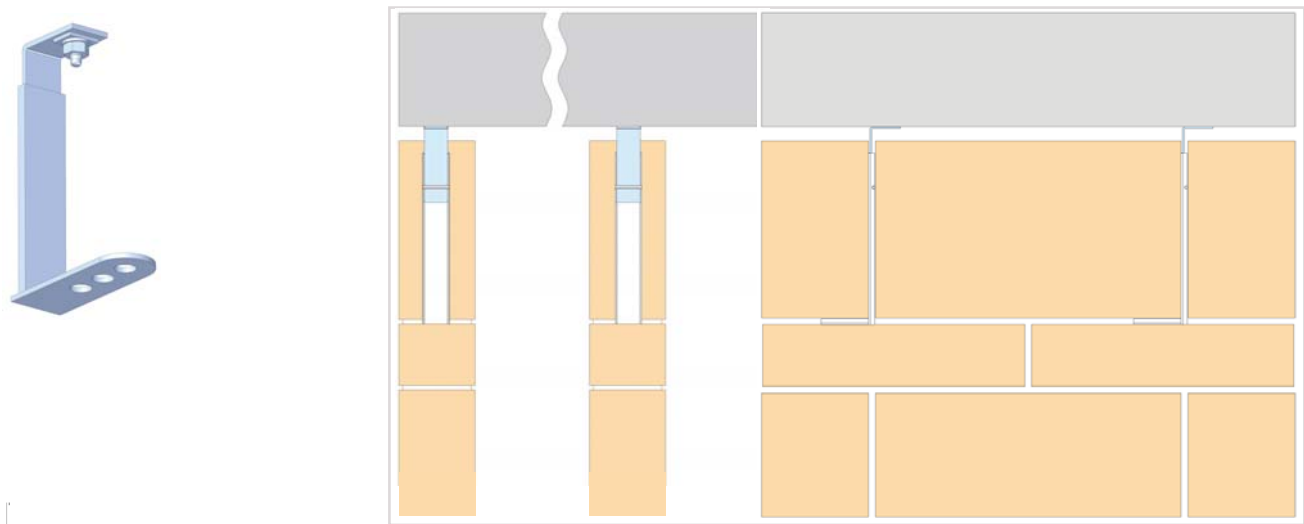
## HMHR-C Cavity Head Restraint



- Corrugated ties prevent dripping and reduces moisture bridging cavity
- Provide lateral restraint for inner and outer wall brick facing
- Service load is 1 kN
- Available in stainless steel and galvanized steel
- Movement joint maximum 25 mm
- Other sizes are available to order

Product Code	Cavity
HMHR-C-75	75
HMHR-C-125	125
HMHR-C-175	175
HMHR-C-225	225

## HMHR-H Hidden Head Restraint

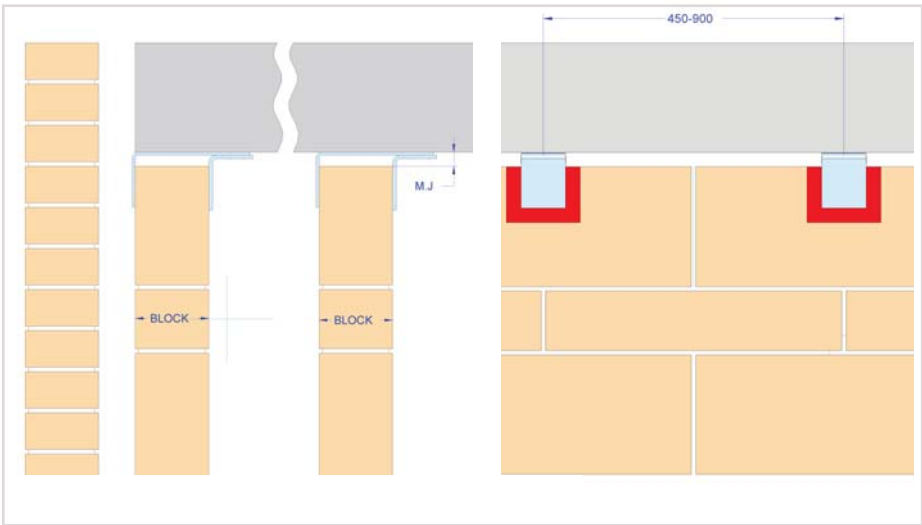
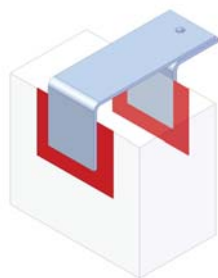


- Hidden head restraint used for areas where aesthetics are a consideration
- Provides vertical tolerance and differential movement with a debonding sleeve
- Vertical joint must be mortar filled
- Available in stainless steel and galvanized steel
- Movement joint maximum 25 mm
- Other sizes are available to order

Product Code	Cavity
HMHR-H-75	75
HMHR-H-125	125
HMHR-H-175	175
HMHR-H-225	225

# HMHR Brickwork Head Restraints

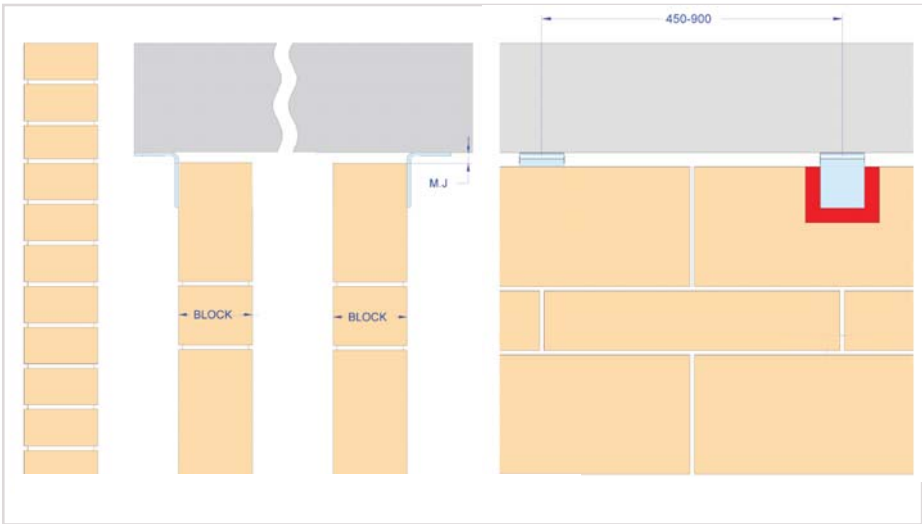
## HMHR-E Exposed Head Restraint



- Exposed head restraint for inner wall
- Provides vertical tolerance and differential movement with a debonding sleeve
- Vertical joint must be mortar filled

Product Code	Cavity
HMHR-E-75	75
HMHR-E-125	125
HMHR-E-175	175
HMHR-E-225	225

## HMHR-S Exposed Head Restraint

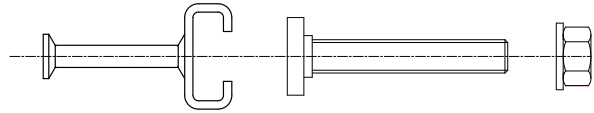
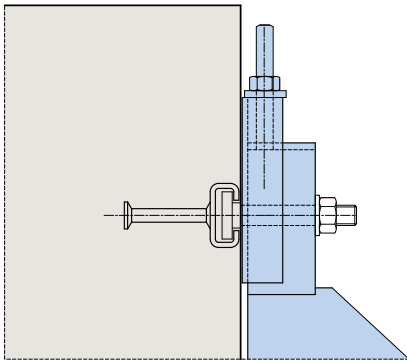


- Exposed head restraint for inner wall
- Provides vertical tolerance and differential movement with a debonding sleeve
- Vertical joint must be mortar filled

Product Code	Cavity
HMHR-E-75	75
HMHR-E-125	125
HMHR-E-175	175
HMHR-E-225	225

# Support Bracket Connections Methods to Concrete

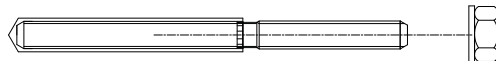
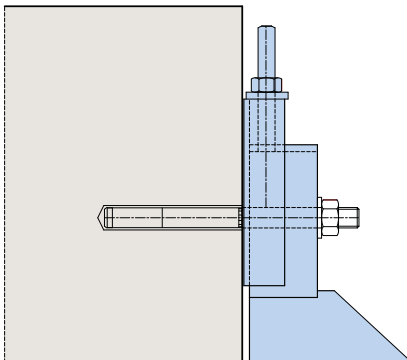
## Fixing Method with HMPR Anchor channels



Recommended loads per FIX Bracket					
Anchor channel types	Short length L = 15 - 25 cm		Long length L > 25 cm		T head bolt Types
	F (kN)	F <sub>Rd</sub> (kN)	F (kN)	F <sub>Rd</sub> (kN)	
28/15	3,5	4,9	3,0	4,2	M10-M12
38/17	7,0	9,8	4,5	6,3	M10-M16
38/17K	7,0	9,8	7,0	9,8	M10-M16
40/25	8,0	11,2	6,0	8,4	M12-M16
49/30	12,0	16,8	10,0	14,0	M16-M20
54/33	22,0	30,8	22,0	30,8	M16-M20

- Recommended loads are determined according to Technișcal Approval Z-21.4-1878
- Calculated according to  $F_{Rd} = 1,4 \times F$

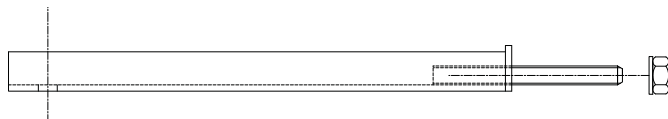
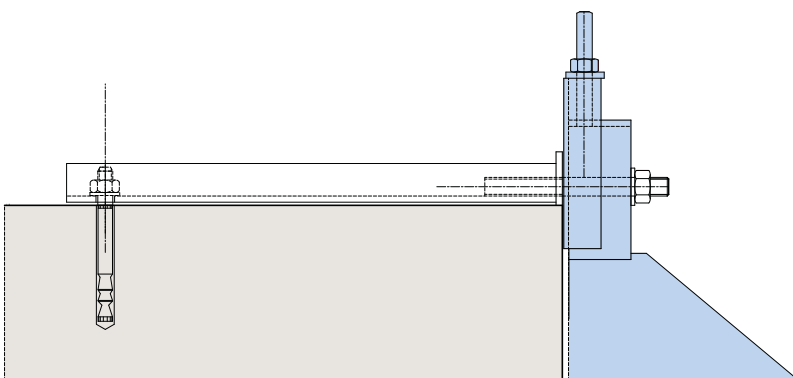
## Fixing Method with HB Anchor bolts



Recommended Anchor bolt types			
Anchor bolt Types	Load category	Load category	Load category
	3,5 kN	7,0 kN	10,5 kN
HBZ Through bolt	HBZ-12/145 M12x145	HBZ-12/145 M12x145	HBZ-16/185 M16x185
HB07 Chemical bolt	HB07-12/190 M12x190	HB07-12/190 M12x190	HB07-16/210 M16x210

- The load capacity of anchor bolts depends on many factors such as concrete strength class, projection etc. and must be verified for each case.

## Fixing Method with HDA Strap anchor

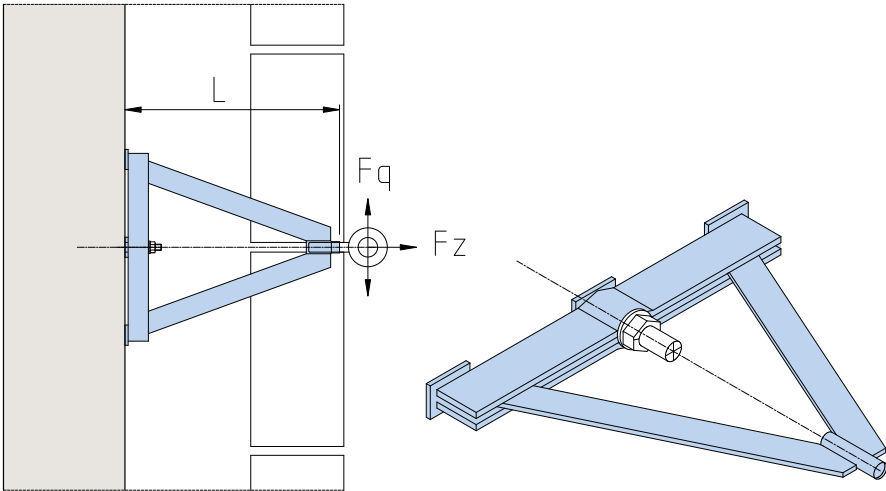


HDA Strap anchor			
Product code	Load 3,5 kN	Length (mm)	Corresponding Anchor bolt
HDA-3,5	3,5 kN	320	HBZ-12/135 HB07-12/160
HDA-7,0	7,0 kN	320	HBZ-12/135 HB07-12/160

- Load capacities must be checked for each case.

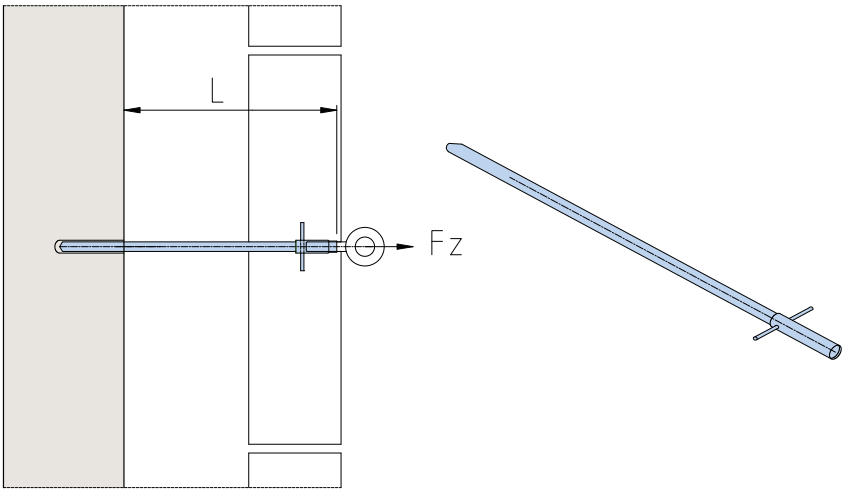
# Scaffolding anchors

HM-GA -Q Scaffolding Anchor



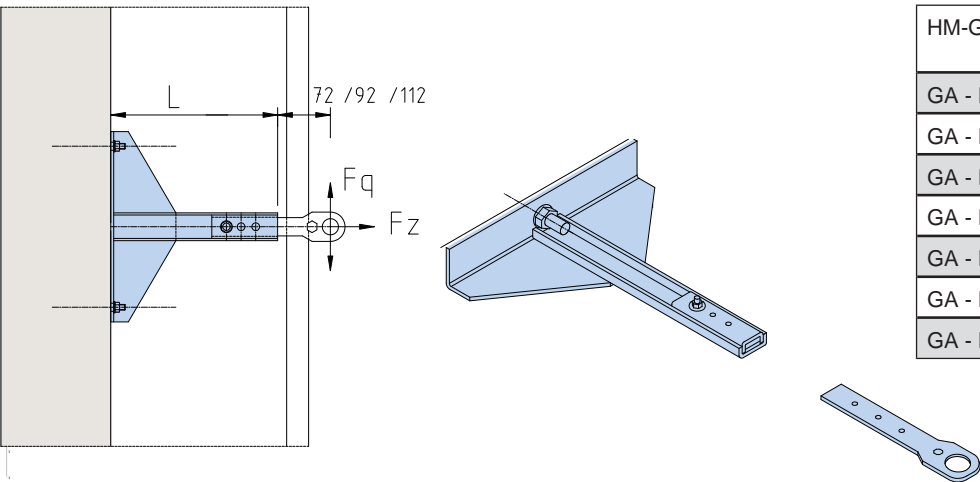
HM-GA-Q	L(mm)	Fz / Fq (kN)
GA - Q - 160	160	5,5 / 1,8
GA - Q - 180	180	
GA - Q - 200	200	
GA - Q - 220	220	
GA - Q - 240	240	
GA - Q - 260	260	
GA - Q - 280	280	

HM-GA -Z Scaffolding Anchor



HM-GA-Z	L(mm)	Fz (kN)
GA - Z - 160	160	5,5
GA - Z - 180	180	
GA - Z - 200	200	
GA - Z - 220	220	
GA - Z - 240	240	
GA - Z - 260	260	
GA - Z - 280	280	

HM-GA -H Scaffolding Anchor



HM-GA-H	L(mm)	Fz / Fq (kN)
GA - H - 160	160	3,5 / 2,0
GA - H - 180	180	
GA - H - 200	200	
GA - H - 220	220	
GA - H - 240	240	
GA - H - 260	260	
GA - H - 280	280	

# Brickwork Support Systems - Design Principles

The brackets are available in three load categories. 3.5 kN, 7.0 kN and 10.5 kN. Projection sizes are available between 130 and 350 mm.

Anchoring positioning is calculated from the lower edge of the brickwork wall to be intercepted at x installation height. All brackets are adjustable in the vertical axis through the set screw from + / - 30 mm.

Fixing system design is formulated according to the utilisation rate, wall distance and the height of the facade.

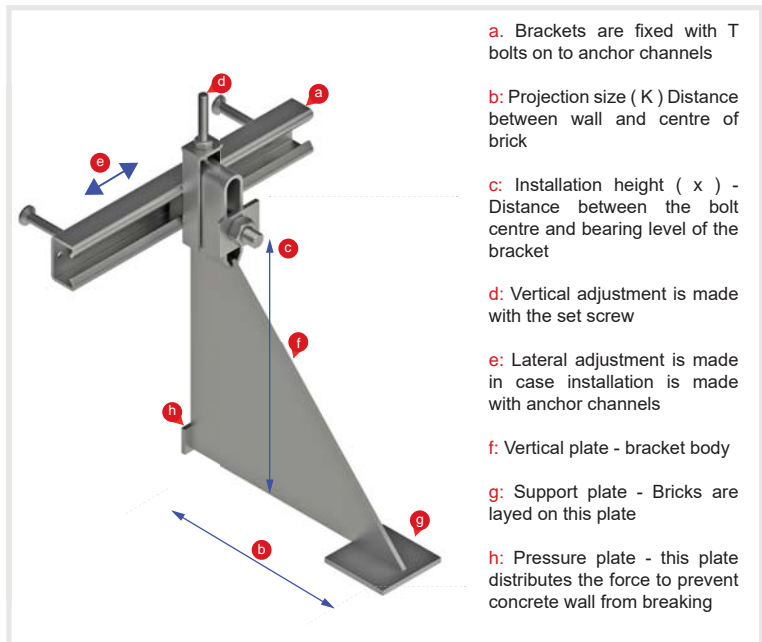
The required connection types on to the walls are as follows.

Load category 3.5 kN: Anchor channel 38/17 or Expansion bolt M12 \*

7.0 kN: Anchor channel 49/30 or Expansion bolt M12 \*

10.5 kN: Anchor channel 54/33 or Expansion bolt M16 \*

\* The fastenings has to be calculated in each individual case



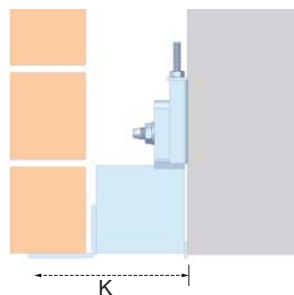
**Facade Height:** Brickwork support brackets can take a maximum height of 12 metres depending on the thicknesses of the bricks. Generally brackets are fixed at floor levels to support the brickwork wall and restraining is done using restraint ties.

**Load Categories:** There are three load categories and anchors are structurally designed to take the mentioned loads.

Load Category		
Allowable Load	Design Resistance	
3.5 kN	4.7 kN	
7.0 kN	9.5 kN	
10.5 kN	14.2 kN	

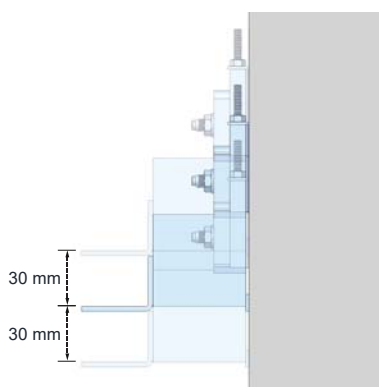


**Projection Size:** There are different projection sizes (K) that the brackets can accommodate. The standard projections are between 130 mm and 350 mm.

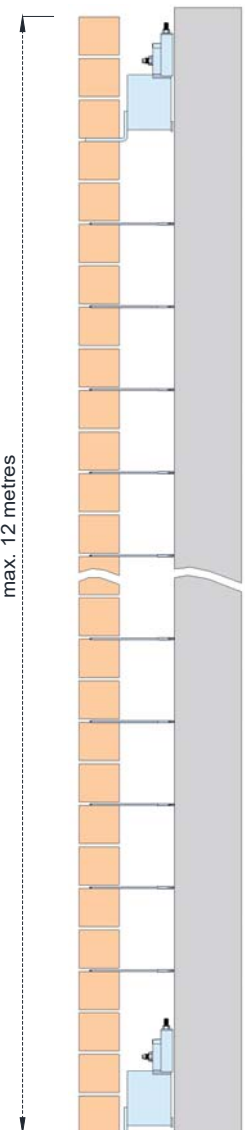
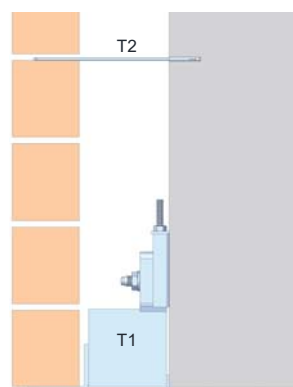


max. 12 metres

**Vertical Adjustability:** Adjustability in the vertical axis is made by swirling the set screw on top of the bracket. A total of 60 mm adjustability is possible.



**Load Bearing & Restraining:** Support of the brickwork walls is made with load bearing brackets (T1). Restraining of the wall is made with restraint ties (T2)



# Brickwork Support Systems - Design Principles

## Load Calculation Principles

When determining the applied loads on the brickwork support brackets, the following principles need to be considered. The applied loads should be lower than the allowable loads.

$$\text{Applied loads (F)} \leq \text{Allowable loads (all. F)}$$

When using the Eurocode standard the conversion from global safety factors to partial safety factors should be adopted. The acting loads should be factored by 1.4 to determine the Design loads.

$$\text{Design Effect Load (F}_{Ed}) \leq \text{Design Resistance (F}_{Rd})$$

The brickwork support anchors are available in the following load categories:

Allowable load:

3.5 kN  
7.0 kN  
10.5 kN

Design resistance load:

4.7 kN  
9.5 kN  
14.2 kN

## Dead Load Calculation:

Dead Load ( $F_v$ ) is important in order to choose the bracket with adequate load bearing capacity. Dead Load should be determined using the following formula:  $\gamma$  is density which is considered to be 18 kN / m<sup>3</sup> for bricks.

$$F_v = H \cdot cs \cdot bt \cdot \gamma$$

(Loading height) \* (Bolt spacing) \* (Brick thickness) \* (density)

$$F_{Ed} = F_v \cdot 1.35$$

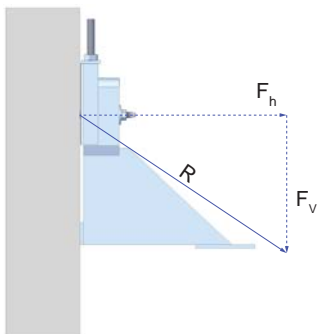
## Resultant Load Calculation:

$$B = C + (d/3) + 15 \text{ mm}$$

$$M = F_v \cdot B$$

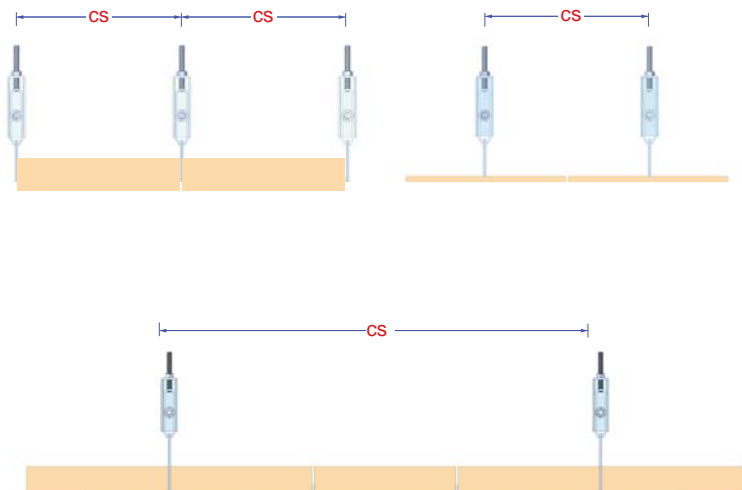
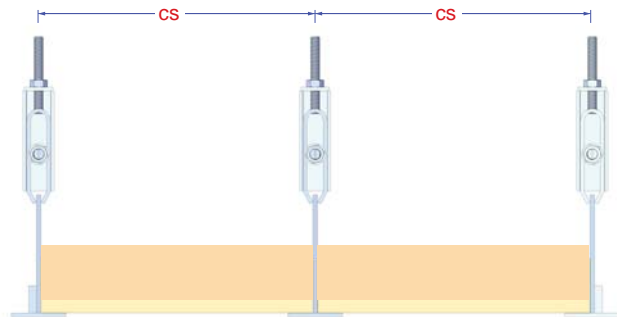
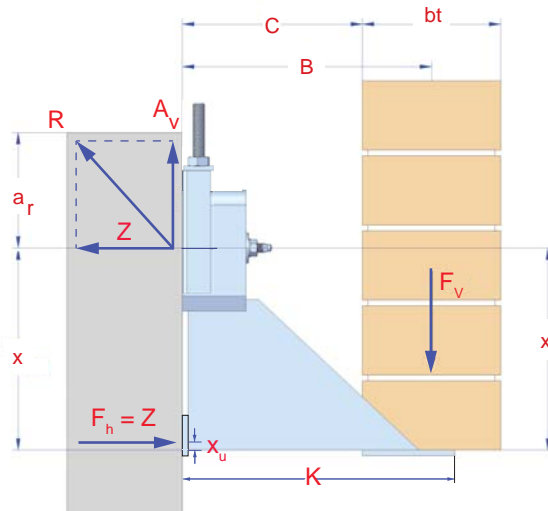
$$Z = M / (x - x_u - 30 \text{ mm})$$

$$R = \sqrt{F_v^2 + F_h^2}$$



## Legend

H:	Loading height	$F_v$ :	Dead load
C:	Wall cavity	$F_h$ :	Horizontal reaction load
K:	Projection	R:	Resultant load
B:	Lever (load distance) (C + (d/3)+15)		
bt:	Brick thickness		
cs:	Bolt spacing		
$\gamma$ :	Density of bricks		

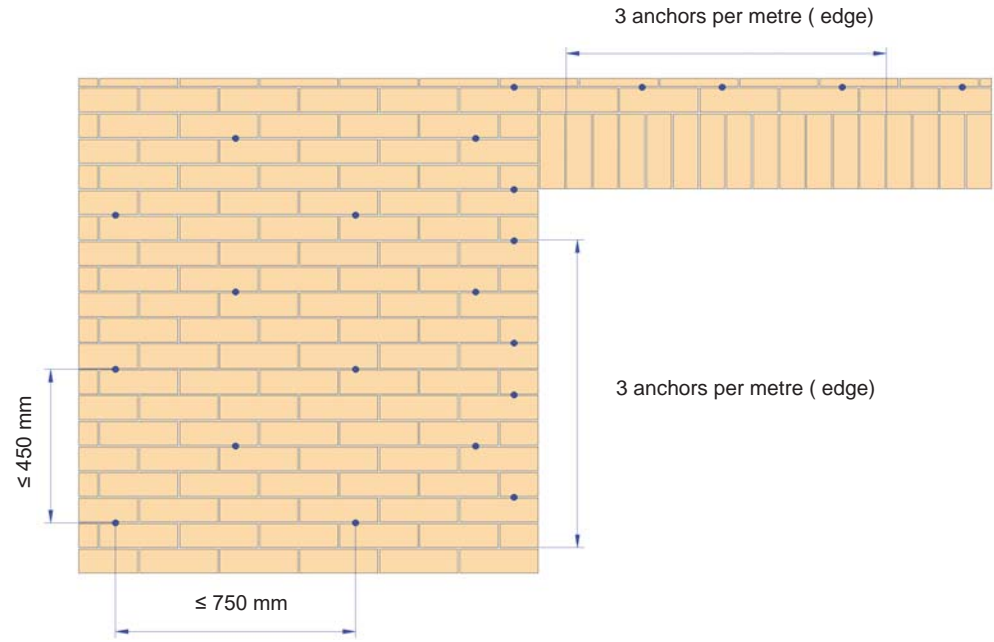


# Brickwork Support Systems - Design Principles

## Restraining Of Facing Shell Brickwork Walls

Brick faced brickwork walls form a thin outer layer shell. This wall needs to be strengthened against buckling and must transfer wind loads into the load bearing walls. The brick shells are to be connected using restraining ties that are produced from stainless steel. The positioning of the restraining ties should be made according to the illustration on the right hand side. The vertical distance between the restraining ties should not exceed 500 mm. The horizontal distance between the ties should not exceed 750 mm.

Along the edges where there are free openings such as corners of buildings, expansion joints, window and door openings, and upper ends of external walls; three restraining ties should be used per metre of edge length in addition to the specifications provided. Restraint ties must absorb a tensile force of 1 kN with a slip of maximum 1 millimetre per tie.



Minimum Quantity And Diameter Of Wire Anchors Per Square Meter

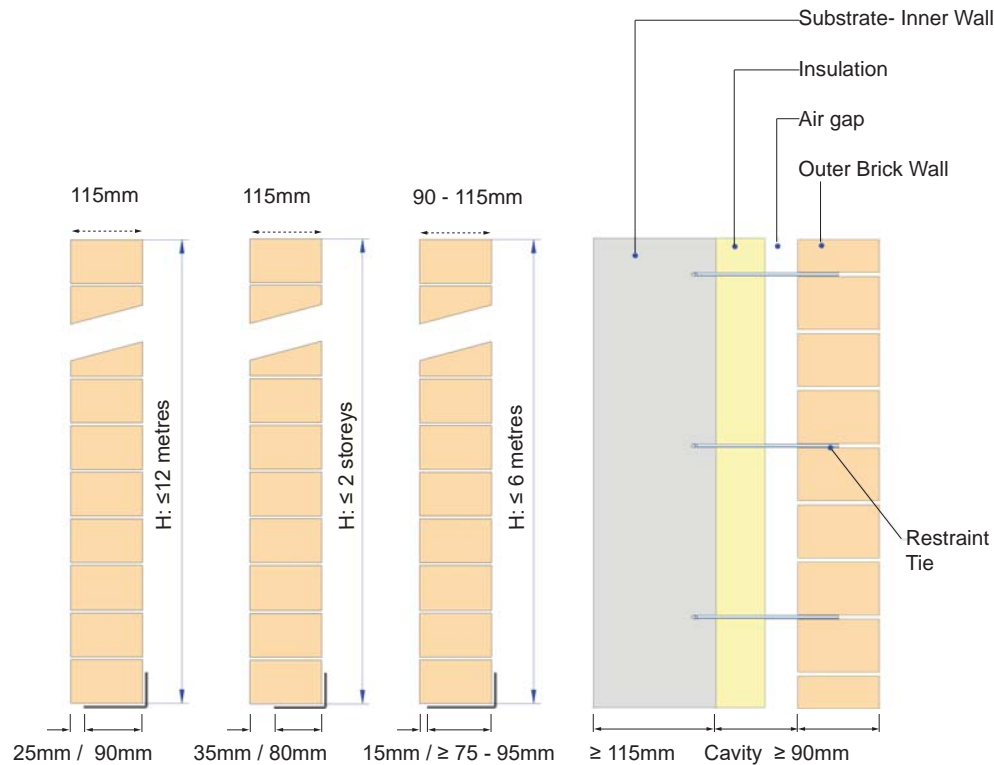
	Minimum quantity	Diameter
1. Wall area higher than 12 m above ground or cavity size from 70 to 120 mm	5	4
2. Cavity from 120 to 150 mm	7	4
3. Cavity from 120 to 150 mm	5	5
4. Cavity from 150 to 170 mm	8	5
5. Cavity from 170 to 200 mm	9	5

## Bearing On The Support Brackets

When designing a non load bearing outer shell brickwork wall in front of a load bearing inner shell, the minimum thickness of the outer shell must be 90 mm. Thinner outer shell walls are classified as claddings and these claddings must be installed so that they are supported individually.

Outer brickwork shells can be supported with a maximum height of 12 metres. They may project up to 25 mm beyond their bearing structure. If the 115 mm thick outer shell is not higher than 2 floors then it may project up to one third of its width from its bearing.

Outer shells with thicknesses less than 115 mm must not be built to a height of more than 20 metres above ground and have to be supported in vertical intervals of about 6 metres.



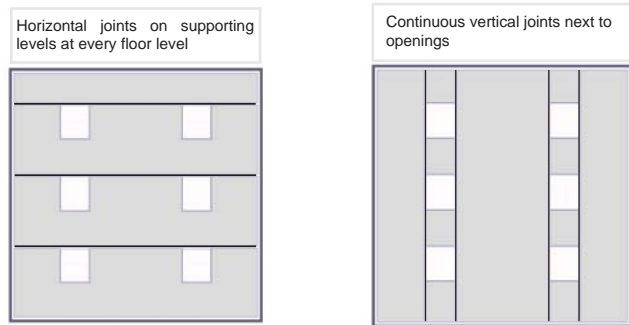
# Brickwork Support Systems - Design Principles

## Layout And Design Of Expansion Joints

Fluctuations in temperature result in changes of lengths and volume of materials. There will also be movements on the building through the deflection of beams and columns. Expansion joints are incorporated on the facade in order to compensate for these movements to avoid any cracking of the brickwork facade.

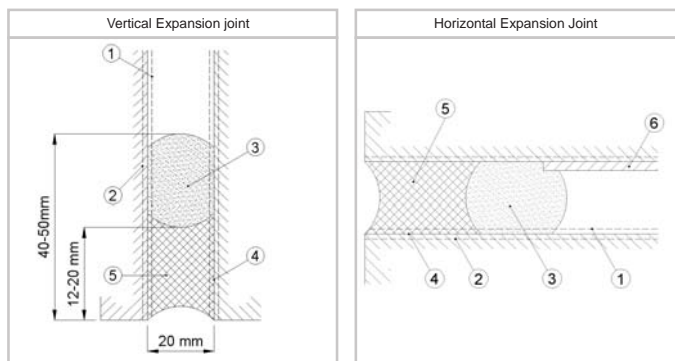
### Positioning Of Expansion Joints:

Horizontal joints are positioned at each supporting level. The distance between the support level thus the expansion joints are determined according to the maximum permissible height on to which the brickwork wall can be built. The distances between vertical expansion joints depend on climatic loads and the type of materials. The expansion joints in the brick facing shell must continue along the facing load bearing structure. The appearance choice of the expansion joints also is a factor that needs to be taken into consideration. Some examples of the expansion joint positioning are shown in the figures on the right.



### Vertical And Horizontal Joint Details:

Expansion joints should be placed in the outer shell of the brick wall. The distances of the expansion joints depend on various factors such as temperature, humidity, the type of materials used, height of the building, type of the load bearing walls etc. The expansion joints should take the movements of the building structure as well as the thermal expansion of the cladding material. Free mobility of the outer shell must be enabled in order to avoid cracking of the brick work. The expansion joints should be filled with suitable material and must be tightly sealed. The structure of the expansion joints should be as shown below:



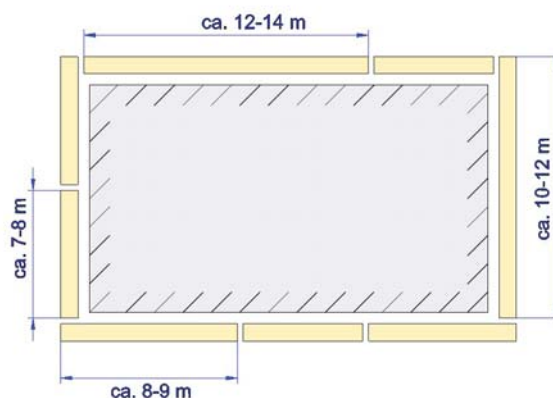
Details:

1. Compressed joint. 2. Elongated joint. 3. Joint gasket.
4. Keyed surface. 5. Joint sealant. 6. Bracket.

### Expansion Joint Arrangement:

The distance between the vertical expansion joints depends on the climate conditions of the geographical area in which the construction will be made. In general, the connected brickwork walls should not be built wider than 7-14 metres in the corner areas. The wall slabs can be interrupted with a vertical joint or continue around the corner as shown in the diagram on the right.

Thermal expansion coefficient	
Claybricks	0.006 mm / m K
Calcium silicate blocks	0.008 mm / m K
Gas concrete	0.008 mm / m K
Concrete	0.012 mm / m K
Steel	0.012 mm / m K





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