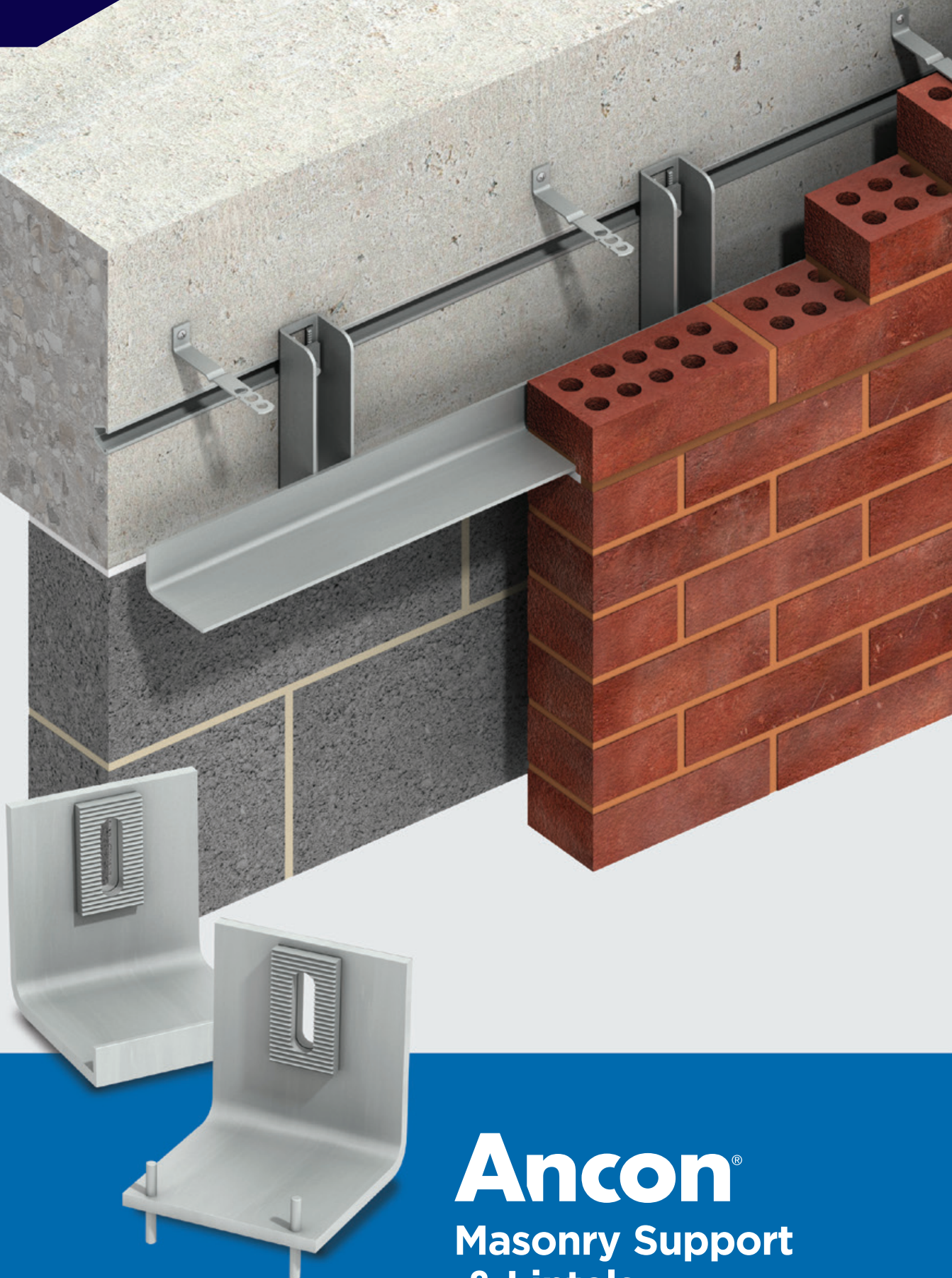


Leviat®



# Ancon®

## Masonry Support & Lintels

for the Construction Industry

February 2023



# Leviat

We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

**Leviat is a world leader in connecting, fixing, lifting and anchoring technology.**

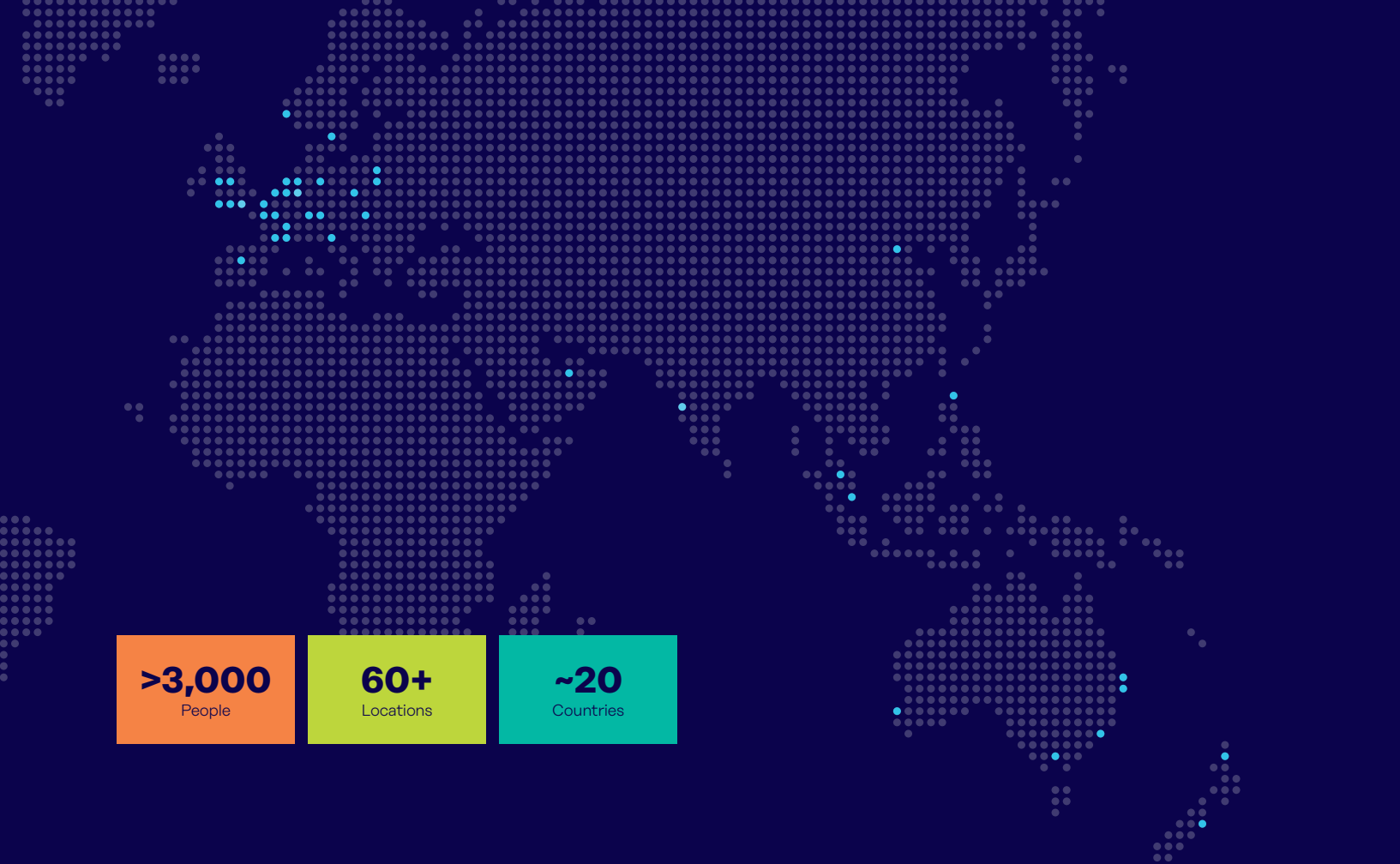
From the build of new schools, hospitals, homes and infrastructure, to the repair and maintenance of heritage structures, our engineering skills are making a difference around the world.

We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

Our technical support services range from simple product selection through to the development of a fully customised project-specific design solution.

Every promise we make locally, has the commitment and dedication of our global team behind it. We employ almost 3,000 people at 60 locations across North America, Europe and Asia-Pacific, providing an agile and responsive service worldwide.



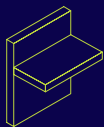


**>3,000**  
People

**60+**  
Locations

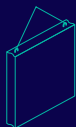
**~20**  
Countries

## Our areas of expertise:



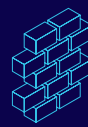
### Structural Connections

Systems to form robust, efficient connections, and continuity of concrete reinforcement as necessary, between walls, slabs, columns, beams and balconies, providing structural integrity as well as enhanced thermal and acoustic performance.



### Lifting & Bracing

Systems for the safe and efficient transportation, lifting and temporary bracing of cast concrete elements and tilt-up panels before permanent structural connections are made.



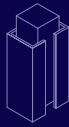
### Façade Support & Restraint

Systems for the safe and thermally-efficient fixing of the external building envelope, including brick and natural stone, insulated sandwich panels, curtain walling and suspended concrete façades, and also the repair and strengthening of existing masonry installations.



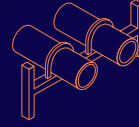
### Anchoring & Fixing

Systems for fixing secondary fixtures to concrete, including anchor channels, bolts and inserts; also tension rod systems for roofs and canopies.



### Formwork & Site Accessories

Non-structural accessories that complement our engineered solutions and help keep your construction environment operating safely and efficiently, including moulds for casting standard and special concrete elements and construction essentials such as reinforcing bar spacers.



### Industrial Technology

Mounting channels, pipe clamps and other versatile framing systems that provide safe fixing in a wide range of industrial applications.

## Leviat product ranges:

Ancon | Aschwanden | Connolly | Halfen | Helifix | Isedio | Meadow Burke | Modersohn | Moment | Plaka | Scaldex | Thermomass

# Masonry Support Systems and Lintels

Masonry cladding on concrete or steel framed structures is normally supported by shelf angle support systems.

Frame type, differential movement, type of cladding, masonry load and cavity width all need to be considered when designing the most appropriate fixing solution.



## Contents

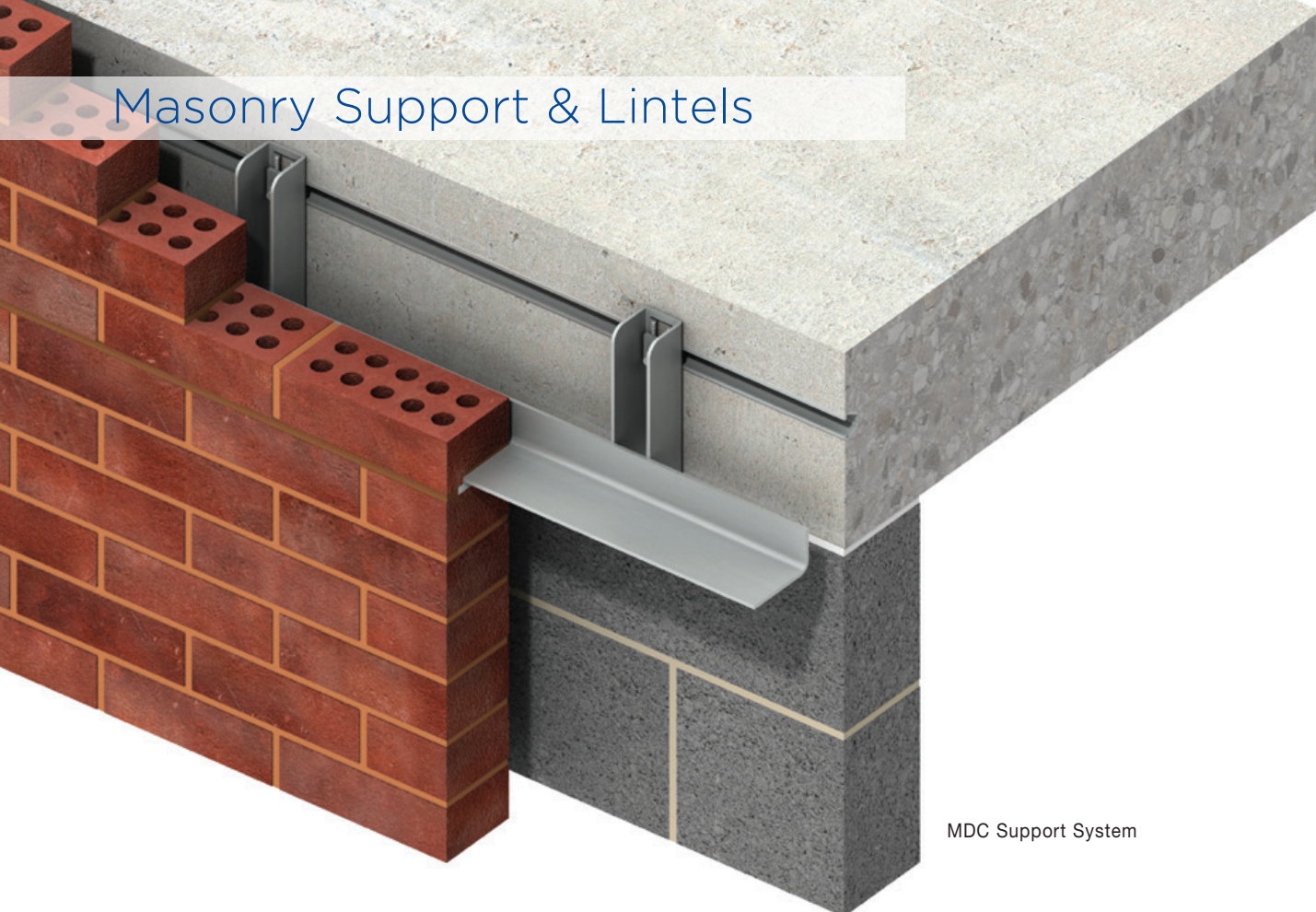
|                                                         |                       |                                        |                       |
|---------------------------------------------------------|-----------------------|----------------------------------------|-----------------------|
| <a href="#">Introduction to Masonry Support Systems</a> | <a href="#">6</a>     | <a href="#">Fixing to Steel Frames</a> | <a href="#">13</a>    |
| <a href="#">Introduction to Lintels</a>                 | <a href="#">7</a>     | <a href="#">CFA Support System</a>     | <a href="#">14-15</a> |
| <a href="#">Design Considerations</a>                   | <a href="#">8</a>     | <a href="#">Individual Brackets</a>    | <a href="#">16-17</a> |
| <a href="#">Tolerances</a>                              | <a href="#">9</a>     | <a href="#">Stonework Support</a>      | <a href="#">18-21</a> |
| <a href="#">MDC Support System</a>                      | <a href="#">10-11</a> | <a href="#">Lintels</a>                | <a href="#">22-26</a> |
| <a href="#">Fixing to Concrete Frames</a>               | <a href="#">12</a>    | <a href="#">Other Ancon Products</a>   | <a href="#">27</a>    |







# Masonry Support & Lintels



MDC Support System

## Masonry Support Systems

Structures with brick or stone cladding will usually necessitate the use of a stainless steel support system for the masonry.

### Bracket Angle Support Systems

Ancon MDC Systems have welded brackets and are designed to suit specific applications. They are available in various configurations and are ideal for supporting runs of masonry and special masonry features. Material content is optimised to ensure the most economic solution is designed (pages 10-11).

### Continuous Angle Support System

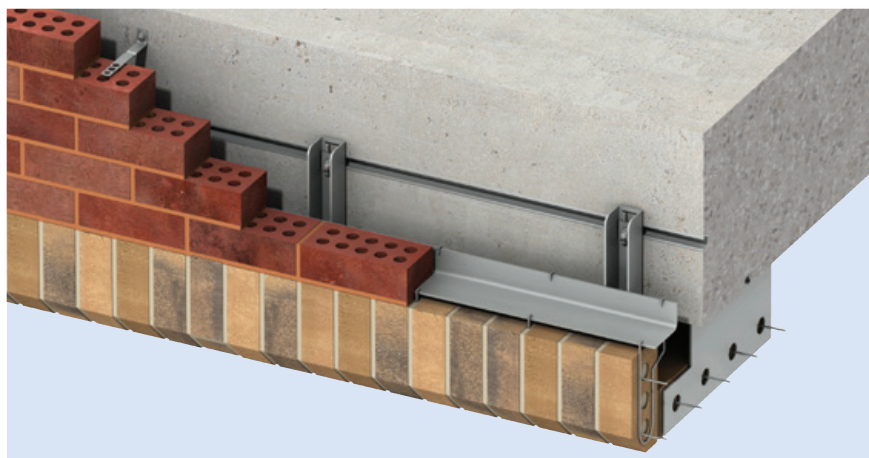
Ancon CFA Systems are mainly used where cavities are small or there is a requirement for the cavity to be closed at the support position (pages 14-15).

### Individual Bracket Support System

Ancon Individual Brackets provide great flexibility in design. They are ideal for the support of brickwork curved on plan (pages 16-17).

### Stonework Support

Natural stone cladding is often a combination of large individually-sized stones and requires particular attention. Ancon MDC/S Stonework Supports can be designed in a variety of configurations to suit the particular application (pages 18-21).



MDC Support System with Stirrups



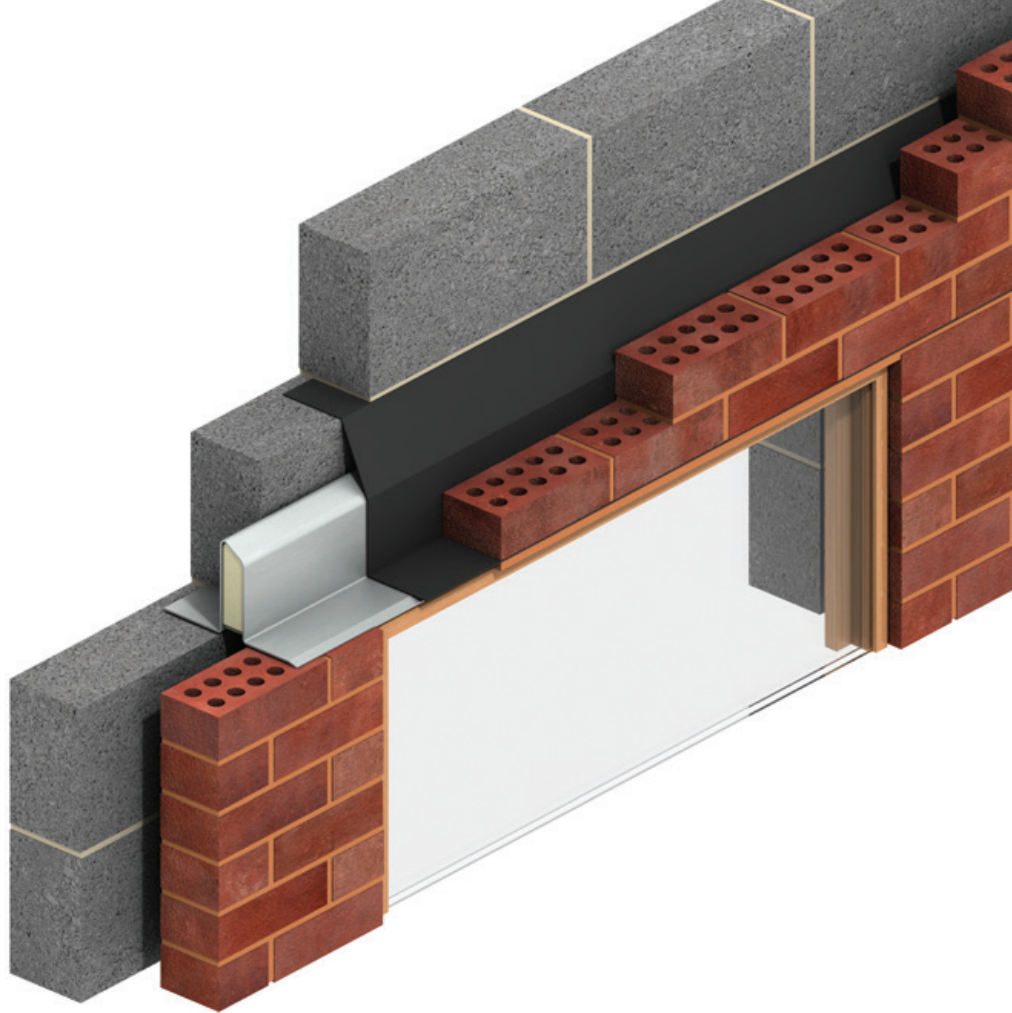
MDC/SD Stonework Support System



## Lintels

Ancon Lintels are manufactured from stainless steel. The Housing and Unilintel ranges are designed to suit the light to heavy duty loading conditions found in the majority of residential and commercial buildings (pages 22-25).

Special lintels can be manufactured to suit architectural features and wall constructions not covered by the standard range (page 26).



Housing Lintel

## Other Products & Services

Leviat also manufactures Wall Ties and Masonry Reinforcement. Free of charge technical services include advice on product selection and CAD details. Contact us for further information.

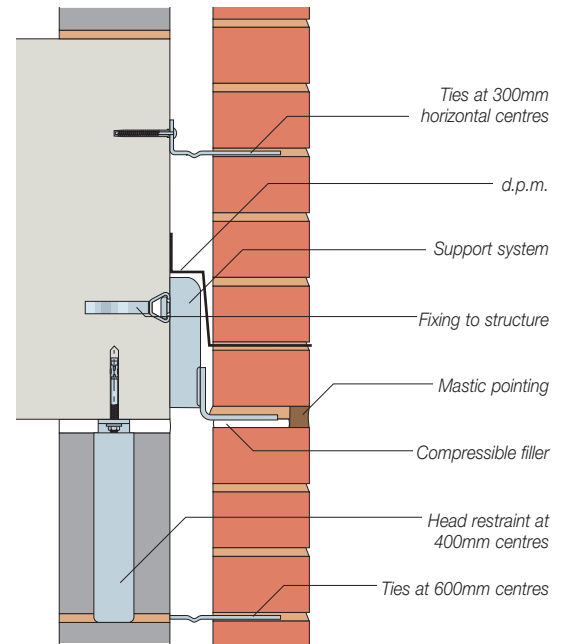
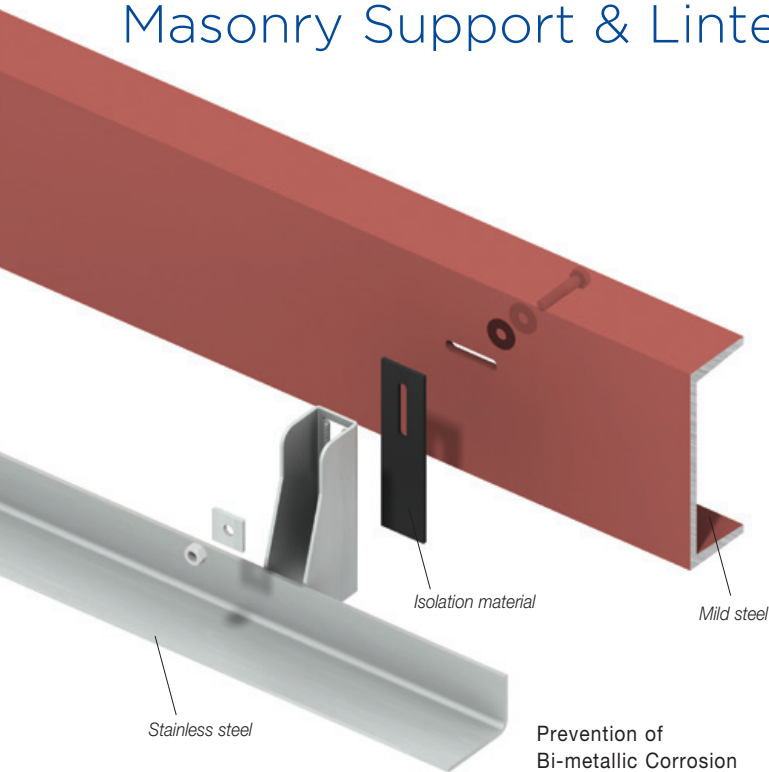
At the end of a long service life, a stainless steel product is 100% recyclable.



Stainless steel typically contains 60% recycled material.



# Masonry Support & Lintels



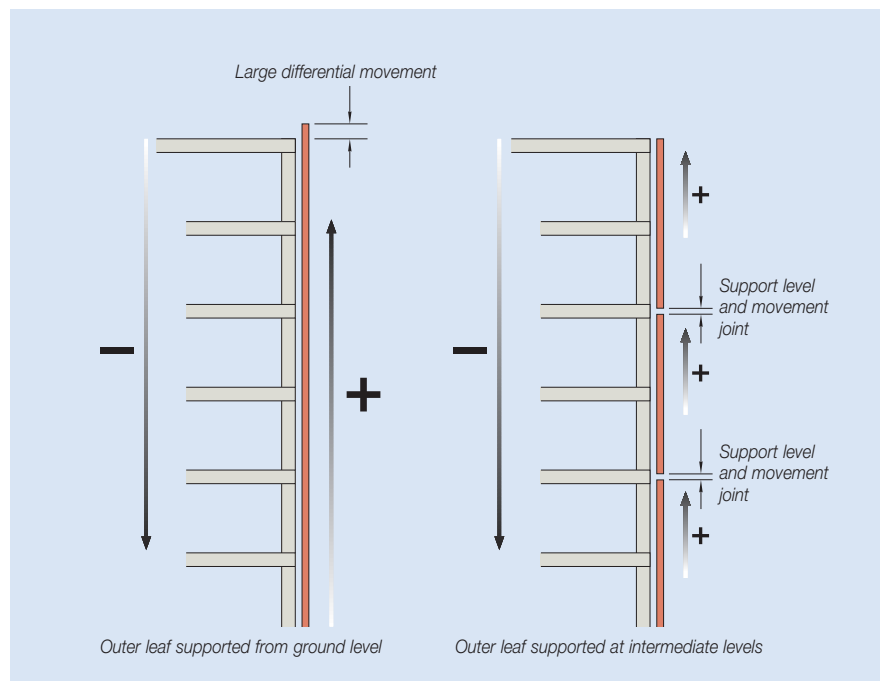
Typical Support Detail

## Design Considerations

Structures with brick or stone cladding will usually necessitate the use of stainless steel support for the masonry over horizontal movement joints. Differential movement, corrosion resistance, type of cladding and frame type, all need to be considered.

### Differential Movement

The maximum size of a masonry panel should be restricted to limit the effects of differential movement. This is particularly important if clay brickwork is used with concrete blockwork and a concrete frame. The outer leaf of buildings not exceeding four storeys or 12 metres in height, whichever is less, may be uninterrupted for its full height. For other buildings, BS 5628 : Part 1 which, since the withdrawal of this British Standard, remains best practice, requires the outer leaf to be supported at intervals of not more than 9 metres or three storeys, whichever is less. To allow for a vertical movement of around 1mm per metre, movement joints are generally positioned at every storey or every second storey. They are also incorporated in many buildings of less than four storeys or 12 metres in height.



Differential Movement Between Masonry Cladding and Frame

### Horizontal Movement Joints

The support will be positioned directly over the horizontal movement joint. The joint will often incorporate a compressible filler and should be of sufficient size to allow for expansion of the masonry below and any shrinkage or deflection of the structural frame. The underside of the support system should be positioned around 2mm above the joint to allow for the support leg to settle when supporting the brickwork above. The clear joint below should be at least

10mm where there is a single storey height of brickwork below the support system. Where there are two storeys or more of brickwork below the support system, the clear joint should be sufficient to accommodate all expected movements. This may result in clear joints in excess of 10mm. Damp-proofing is normally located at the support position. Wall ties should be incorporated within 300mm above and below the support.

Patent No. 2 249 816  
Adjustment of MDC Support System  
Fixed to Concrete

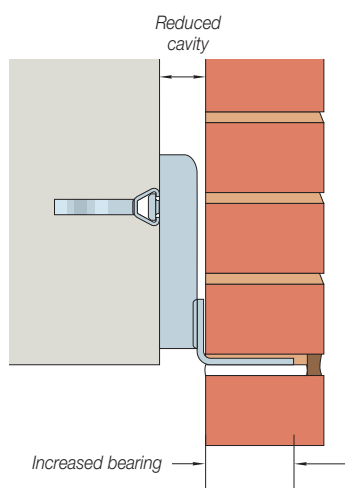


### Tolerances

It is important to select the correct support system to ensure that building tolerances can be accommodated. Adjustment will be required in all three planes.

Ancon brackets have a slot at the back to provide vertical adjustment. A serrated surface prevents any slip. Longitudinal adjustment is provided by an Ancon cast-in channel in concrete structures, or horizontally slotted holes in steel framed structures.

Variations in the structural edge beam can be accommodated by adding shims between the system and the structure, or by increasing the bearing of the brickwork. The maximum thickness of shims should not exceed the outside diameter of the fixing or 16mm, whichever is less.

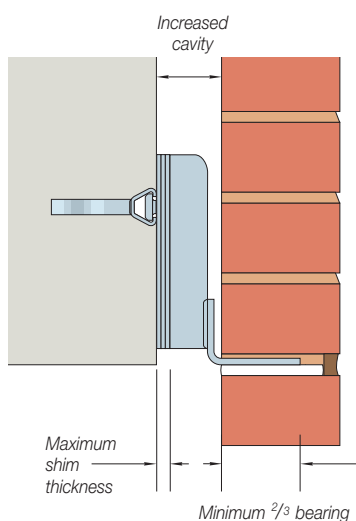


Increased Bearing Used to Accommodate Reduced Cavity

### Corrosion Resistance

Ancon Support Systems are manufactured from grade 1.4301 (304) stainless steel and will be suitable for most building applications. In particularly corrosive environments, or where part of the support will be visible, grade 1.4401 (316) should be considered. Bi-metallic corrosion may occur in a damp environment where the stainless steel support system is bolted to a structural steel frame.

This will not affect the stainless steel, but could slightly increase the corrosion rate of the carbon steel. This can be prevented by excluding moisture from the detail, or by isolating the two dissimilar metals. Isolation patches are available for use with Ancon Support Systems. Further information is given in the Ancon brochure, 'The Use of Stainless Steel in the Construction Industry'.



Shims Used to Accommodate Enlarged Cavity

**Note:** Shims must extend fully to heel of bracket

### Manufacturing Tolerances

Unless otherwise agreed, the tolerances applicable to cold formed sections are shown in the table below.

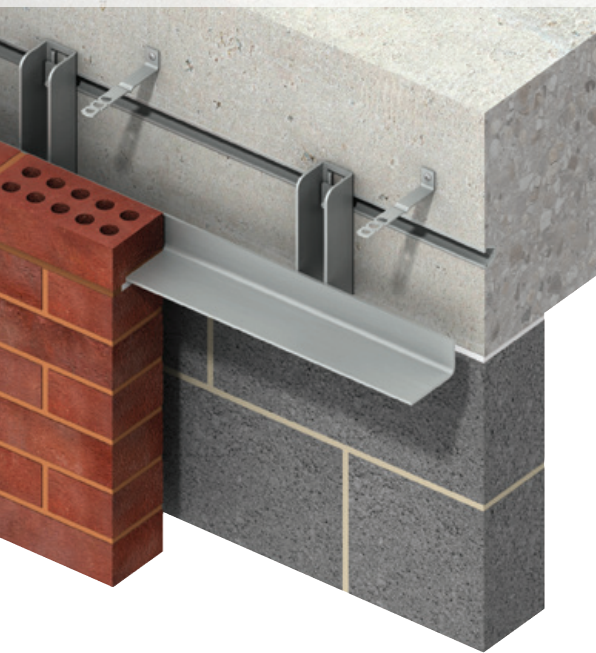
| Element             | Tolerance             |
|---------------------|-----------------------|
| Overall length      | ±5mm                  |
| Thickness           | ±7.5%                 |
| Leg length of angle | ±3mm                  |
| Angle between legs  | ±2°                   |
| Hole or slot centre | ±5mm                  |
| Mitred corners      | ±1°                   |
| Bow on either axis  | ±3mm per metre length |

### Fixing Methods

There are various methods of fixing Ancon Support Systems to the structure. Cast-in channels with 'T' bolts or site drilled expansion bolts can be used with concrete frames. For steel frames the choice is set screws or Ancon Steelgrip into holes in the steel edge member. A range of suitable fixings is included on page 32. Further information is given on pages 12 and 11, and in the Ancon Channel and Bolt Fixings brochure.



# Masonry Support & Lintels



MDC Bracket Angle Support System

## Ancon MDC Bracket Angle Support System

Ancon MDC Bracket Angle Support Systems can carry over 8 metres of brickwork and accommodate any width of cavity from 40mm in its standard form. The brackets are welded to the angle and the material content of both components is optimised to ensure the most economic solution is designed.

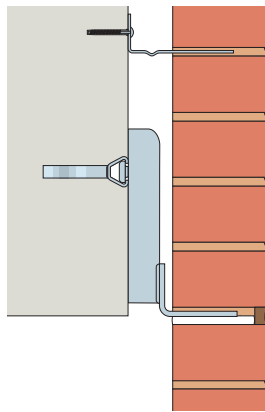
### Design Variations

The Ancon MDC System can be supplied in a variety of configurations to suit particular applications and support special masonry features. The size of the support angle can be varied to suit the thickness and height of the masonry to be carried. Bracket spacing, depth and height are all varied to suit loadings, fixing position and cavity width.

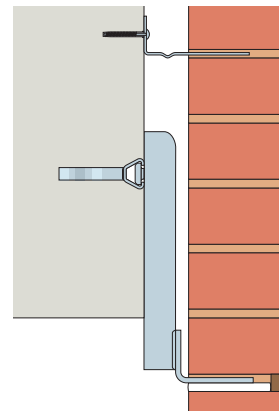
There are several variations of the standard MDC System. MDC/P has the bracket projecting below the structure, MDC/R has a reversed angle welded to the bracket, and MDC/I is a specially inverted system with the support angle at the top of the bracket. These variations allow the support leg of the angle to be positioned anywhere from the top of the bracket to a position below the bottom of the bracket.

Soldier courses can be suspended from MDC systems by using stirrups at 255mm centres. The stirrups fit over the angle and stitching rods span between the stirrups, supporting cored or holed bricks.

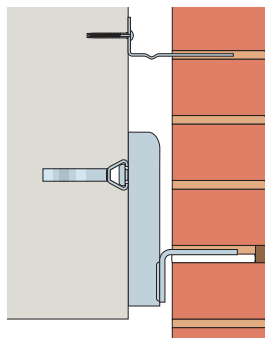
The Ancon MDC system can be supplied with extra components to suit the application e.g. closer plates, expanded metal etc.



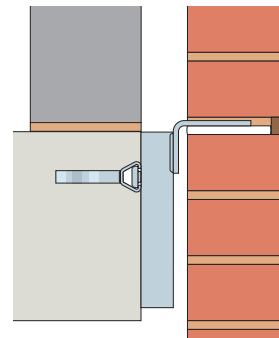
Standard MDC Support System



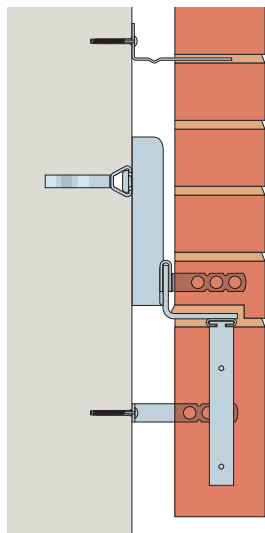
MDC/P Support System



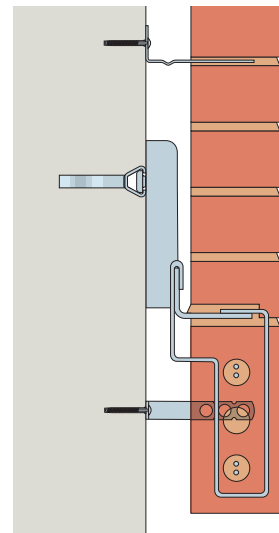
MDC/R Support System



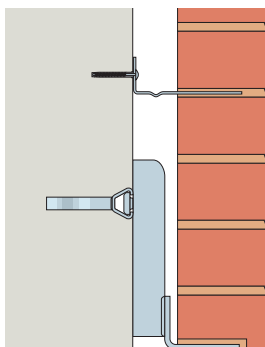
MDC/I Support System



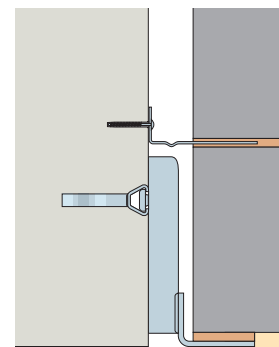
MDC with 36/8 Channel and Hangers Supporting a Soldier Course



MDC with Stirrups Supporting a Soldier Course



MDC with Closer Plate Welded to Underside



MDC with Expanded Metal Welded to Underside

### Setting Out

We can provide drawings showing the location of the fixings (cast-in channels for concrete frames, bolt positions for steel frames). Bracket angle units will be referenced and scheduled and all details submitted for approval before manufacture.

### Details for Specification and Ordering

Ancon MDC Systems are tailored to suit each contract, and are based on the cavity size at the support and the masonry load to be carried. We will design an economical configuration of channel, bracket and angle. Specification is as follows:-

**MDC / type / cavity / masonry load**

e.g. MDC / R / 50 / 6.6

We will design a system with a reversed angle to suit a 50mm cavity and carry 6.6 kN/metre run of masonry.

### References

MDC Standard system

MDC/R System with reversed angle

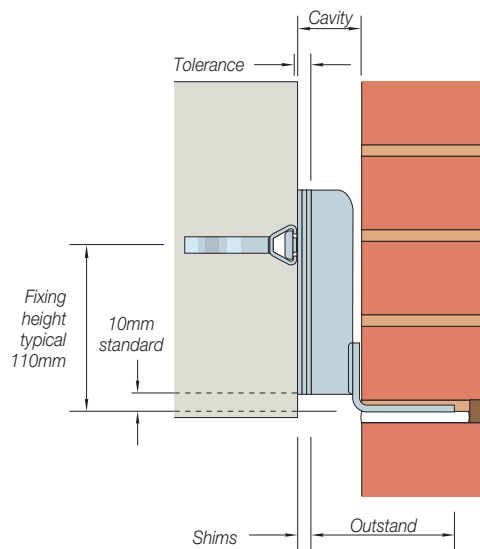
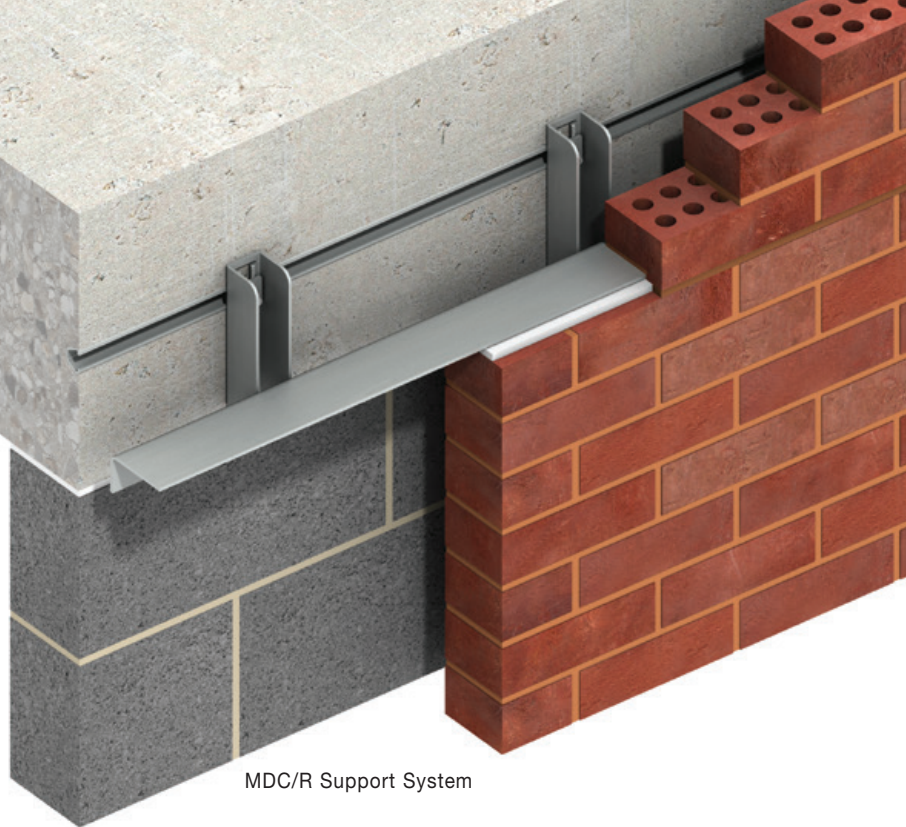
MDC/I Inverted system

Some applications demand that the support leg is below the soffit of the structure. Where this is no more than 150mm, this can be specified as a suffix to the standard reference by . . . . . **P projection**.

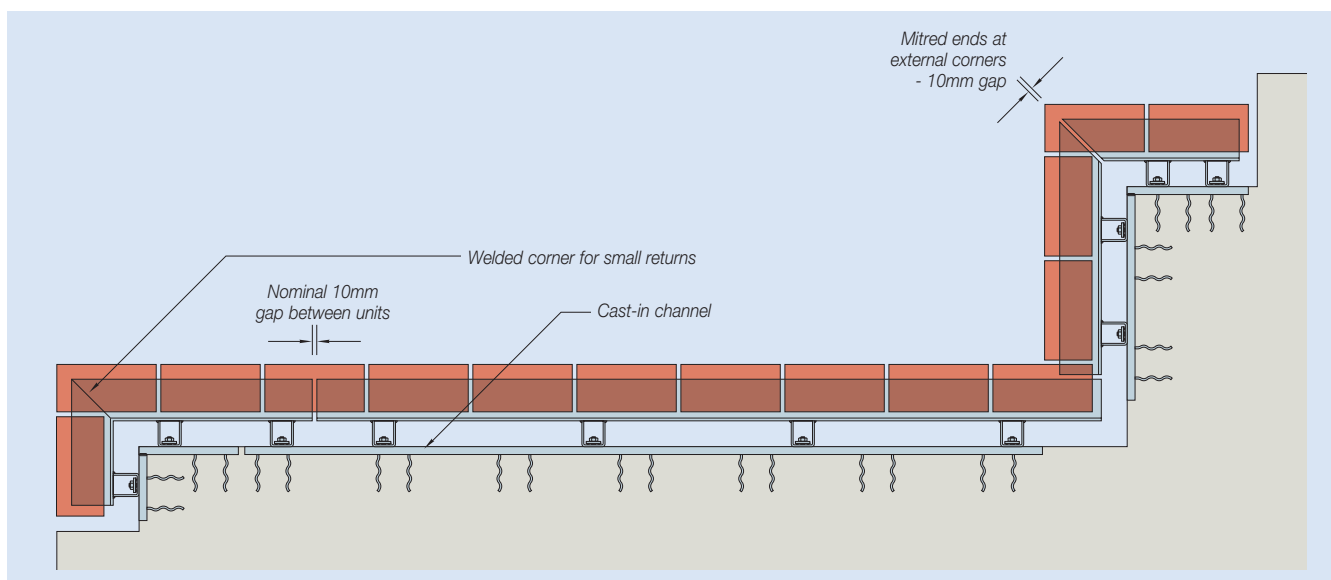
**MDC / cavity / masonry load / projection**

e.g. MDC / 50 / 6.6 / P 75

We will design a standard system to suit a 50mm cavity, carry 6.6kN/m, with a bracket projection of 75mm.



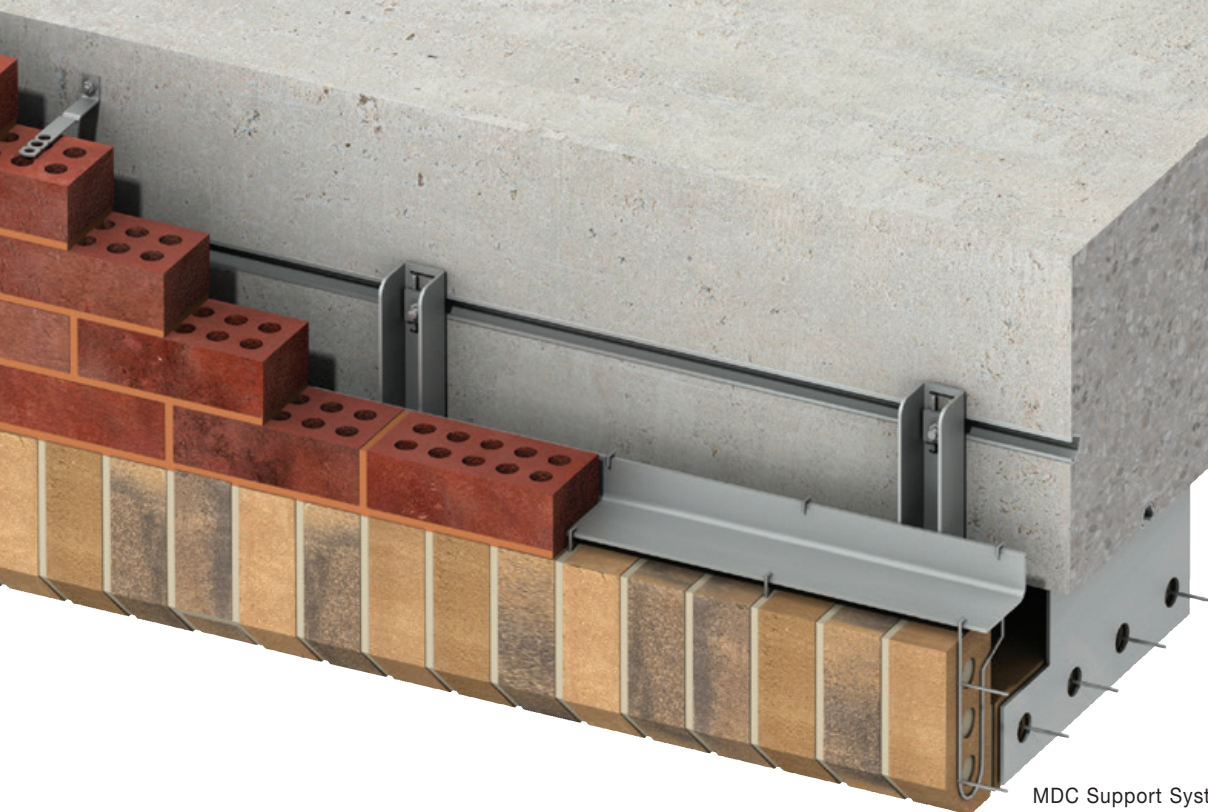
MDC Support System with Shims



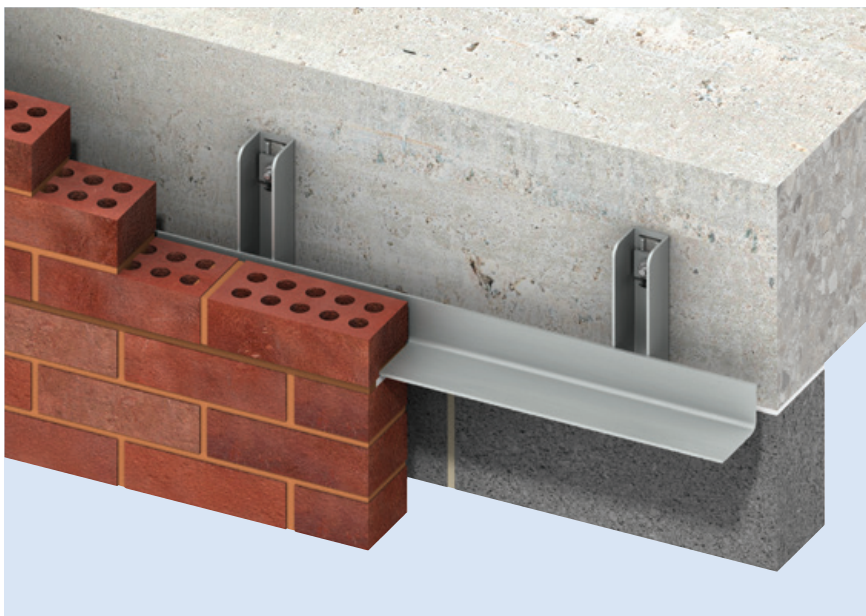
Typical Layout of MDC Support System



# Masonry Support & Lintels



MDC Support System with Stirrups fixed to 30/20 Cast-in Channel



MDC Support System fixed with Single Expansion Bolts

## Concrete Frames

Ancon Masonry Support Systems are generally fixed to Ancon 30/20 Channels cast into the edge of the concrete. For applications where particularly high loads are involved Ancon 40/25 Channel may need to be considered. Details of these channels are shown on page 32. The use of cast-in channels allows the support system to be fixed to the structure with 'T' bolts and moved along the line of the channel into the correct position. The slot in the back of the bracket allows vertical adjustment. This permits greater freedom in the positioning of the cast-in channel to avoid horizontal reinforcement.

As an alternative, Ancon Expansion or Resin Bolts can be used when cast-in channels have not been included in the edge beam.

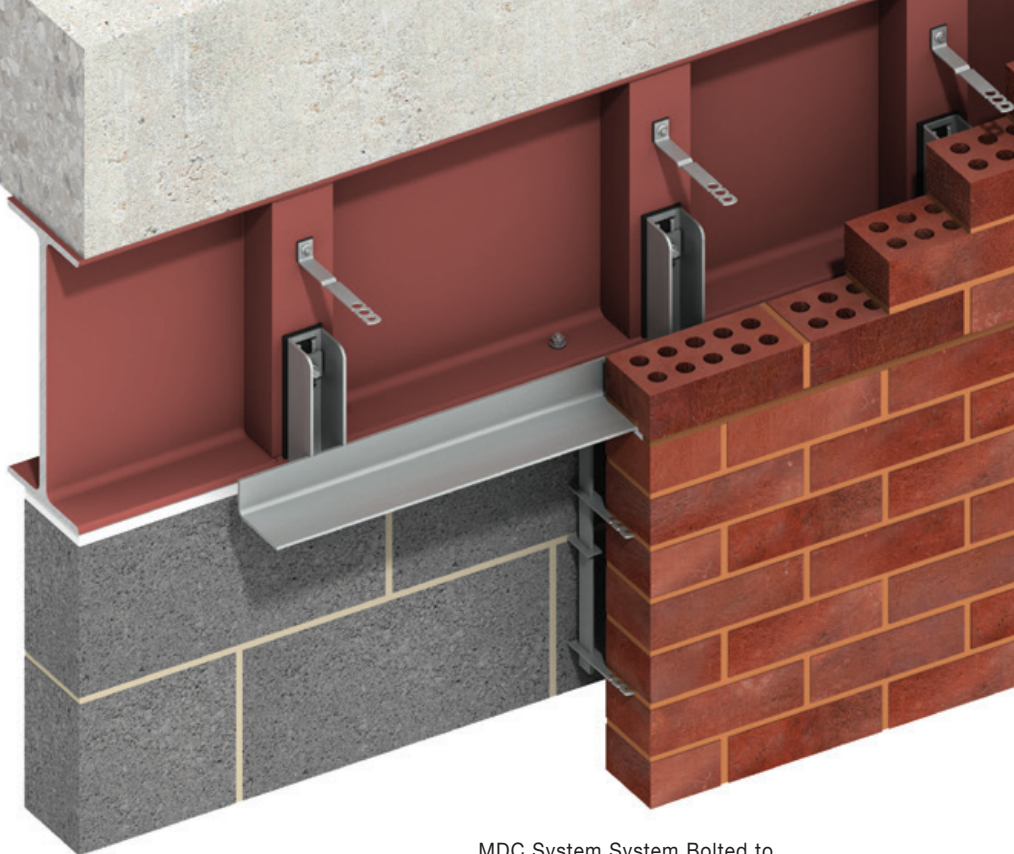
## Steel Frames

Ancon Support Systems can be fixed directly to uncased structural steel frames. The fixing positions can usually be at constant centres to simplify the fabrication of the steelwork.

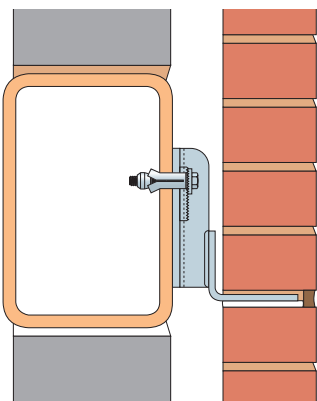
For cavities larger than 75mm there may be a requirement for additional fixings near external corners. **When fixing any Ancon System horizontal slots should be provided in the steel edge beam stiffeners to allow lateral tolerance.**

If excessive movement of the support system is to be avoided, the structural edge member must be designed to minimise deflections and accommodate the torsional forces created by the eccentric load from the brickwork.

Ancon Support Systems can be fixed to Rolled Hollow Sections using Ancon Steelgrip fixings. These fixings are designed for use where access is only available from one side.

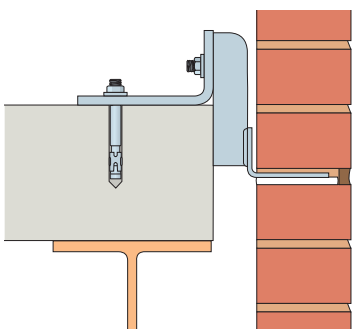


MDC System Bolted to Steel Edge Beam Stiffeners

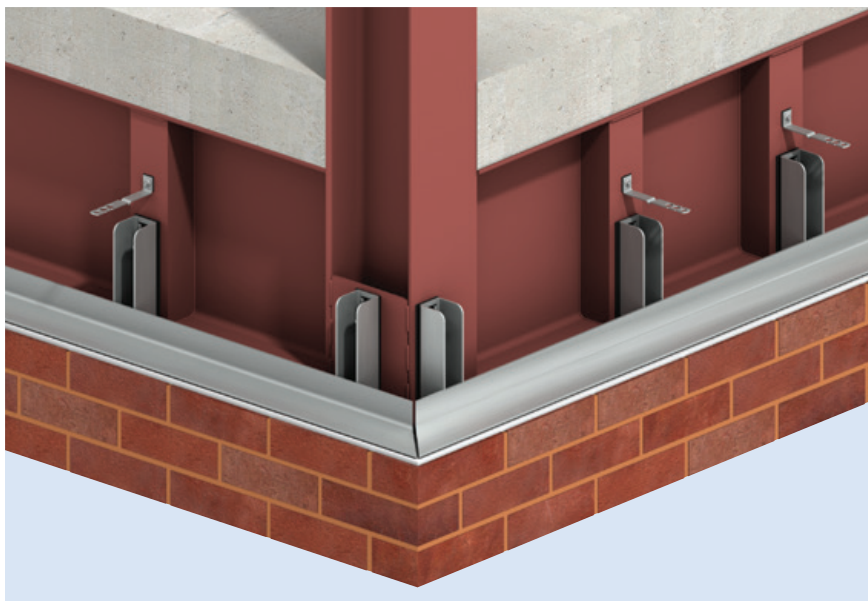


MDC Support System fixed to face of RHS using Ancon Steelgrip

Ancon MDC/TC Top Cleat System can be employed to fix directly to the top of a concrete beam using expansion bolts.



MDC/TC Support System incorporating individual Top Cleat and Expansion Bolt



MDC Support System Bolted to Steel Edge Beam Stiffeners and a Corner Column

### Bi-metallic Contact

Corrosion of the steel frame may be slightly increased where there is direct contact with stainless steel in a damp environment. This will not affect the stainless steel and can be avoided by isolating the two dissimilar metals. This can be achieved by painting the contact area or by incorporating a separating membrane that can be supplied with the Ancon Support System. For further information see pages 8-9.



# Masonry Support & Lintels



CFA Support System Fixed to 30/20 Channel

## Ancon CFA Continuous Angle Support System

Ancon CFA Systems can carry over 8 metres of brickwork and accommodate various cavity widths. For many applications, particularly where large cavities are involved, the Ancon MDC Support System may prove to be a more economical solution. Continuous angles are more suitable for applications where cavities are small or there is a requirement for the cavity to be closed at the support position. The angles are cold formed and will normally be supplied in lengths of up to 4 metres.

### Design Variations

In addition to variations in angle size and thickness, an inverted version, the CFA/I, has the support leg at the top and the fixing slots positioned closer to the corner of the angle.

### Steel Frames

Ancon CFA Support Systems can be fixed directly to uncased structural steel frames. Universal beams will require an angle to be welded between the flanges at each bracket position. **Horizontal slots should always be provided in the steel edge beam to allow lateral tolerance.** The angle will have vertical slots with serrated pads welded to the angle.

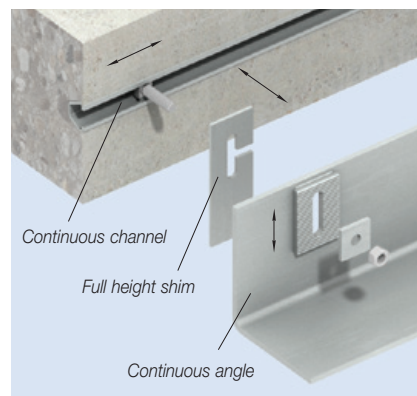
The structural edge member must be designed to minimise deflections and accommodate the torsional forces created by the eccentric load from the brickwork, if excessive movement of the support system is to be avoided.

### Concrete Frames

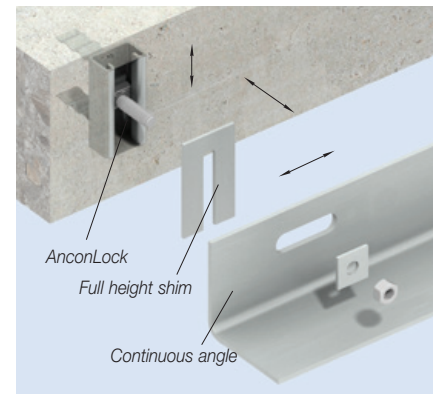
The CFA System can be fixed to cast-in channels or with expansion bolts. The support angle will either be provided with horizontal slots to suit AnconLock Toothed Channels or with vertical slots and serrated pads to suit continuous channels cast horizontally. For further information see page 32.

### Adjustment

Adjustment is provided in every direction to allow for tolerance in the structural frame. Vertical slots in the angle with serrated pads allow  $\pm 25\text{mm}$  adjustment. Horizontal adjustment is virtually unlimited when fixing to a continuous cast-in channel and will depend on the length of the slotted holes in the edge member when fixing to steel.

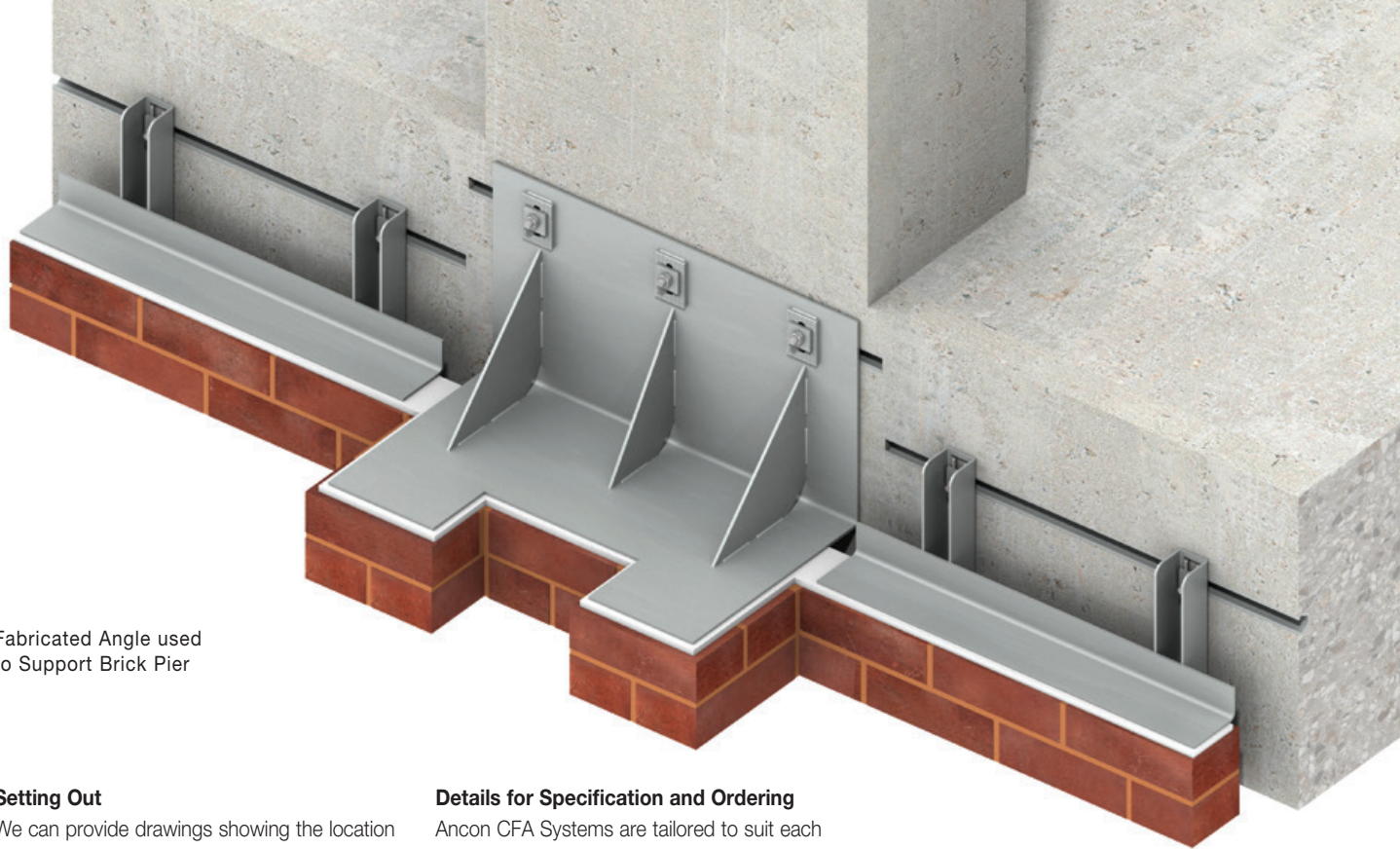


The serrated lips of the AnconLock Channel permit a vertical adjustment of up to  $\pm 28\text{mm}$ . Slotted holes ( $18 \times 60\text{mm}$ ) in the angle allow horizontal adjustment of  $\pm 22\text{mm}$ . Shims can be included between the bracket and the frame up to a maximum thickness of the outside diameter of the fixing bolt, or  $16\text{mm}$  whichever is less.



### Bi-metallic Contact

Corrosion of the steel frame may be slightly increased where there is direct contact with stainless steel in a damp environment. This will not affect the stainless steel and can be avoided by isolating the two dissimilar metals. This can be achieved by painting the contact area or by incorporating a separating membrane that can be supplied with the Ancon CFA Support System. For further information see pages 8-9.



Fabricated Angle used to Support Brick Pier

### Setting Out

We can provide drawings showing the location of the fixings (cast-in channels for concrete frames, bolt positions for steel frames). Angle units will be referenced and scheduled and all details submitted for approval before manufacture.

### Fabricated Angles

Many features will need special design attention, especially if double skin brickwork is to be supported. Fabricated angles with stiffeners, used in conjunction with the Ancon MDC System for adjacent single skin brickwork, is often the best solution.

### Curved Masonry

Curved angles can be supplied for arches or other applications. Where masonry is curved on plan, We can provide either curved angles, individual brackets (pages 16-17) or an MDC System (pages 10-11) in short angle lengths.

### Details for Specification and Ordering

Ancon CFA Systems are tailored to suit each job, based on the cavity size at the support and the load to be carried. We will design the most economical system. Specification is as follows:-

**CFA / type / cavity / masonry load**  
e.g. CFA / I / 30 / 6.0

We will design a system with an inverted angle to suit a 30mm cavity and carry 6.0kN/metre run of masonry.



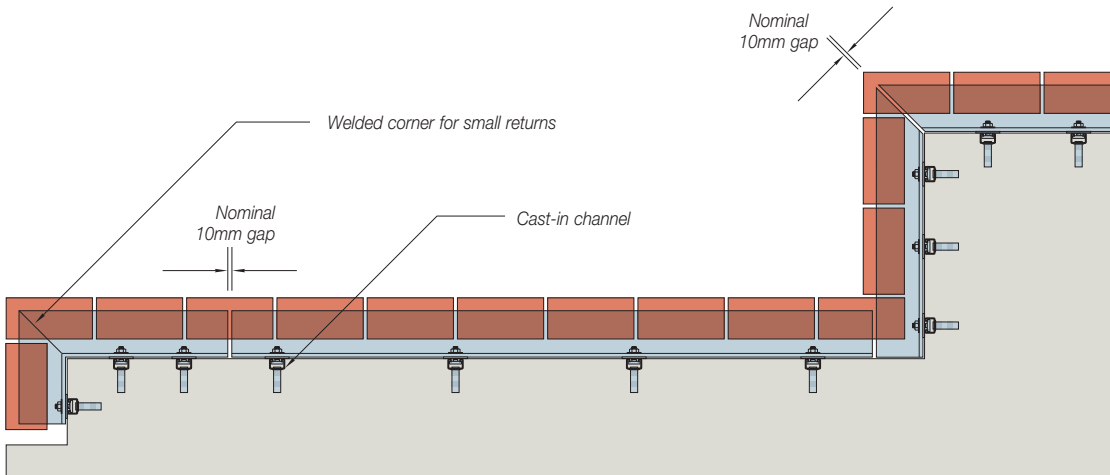
### References

CFA Standard system  
CFA/I Inverted system

Some applications demand that the support leg is below the soffit of the structure. Where this is no more than 75mm, this can be specified as a suffix to the standard reference by . . . . . **D drop**.

**CFA / cavity / masonry load / drop**  
e.g. CFA / 30 / 5.6 / D 50

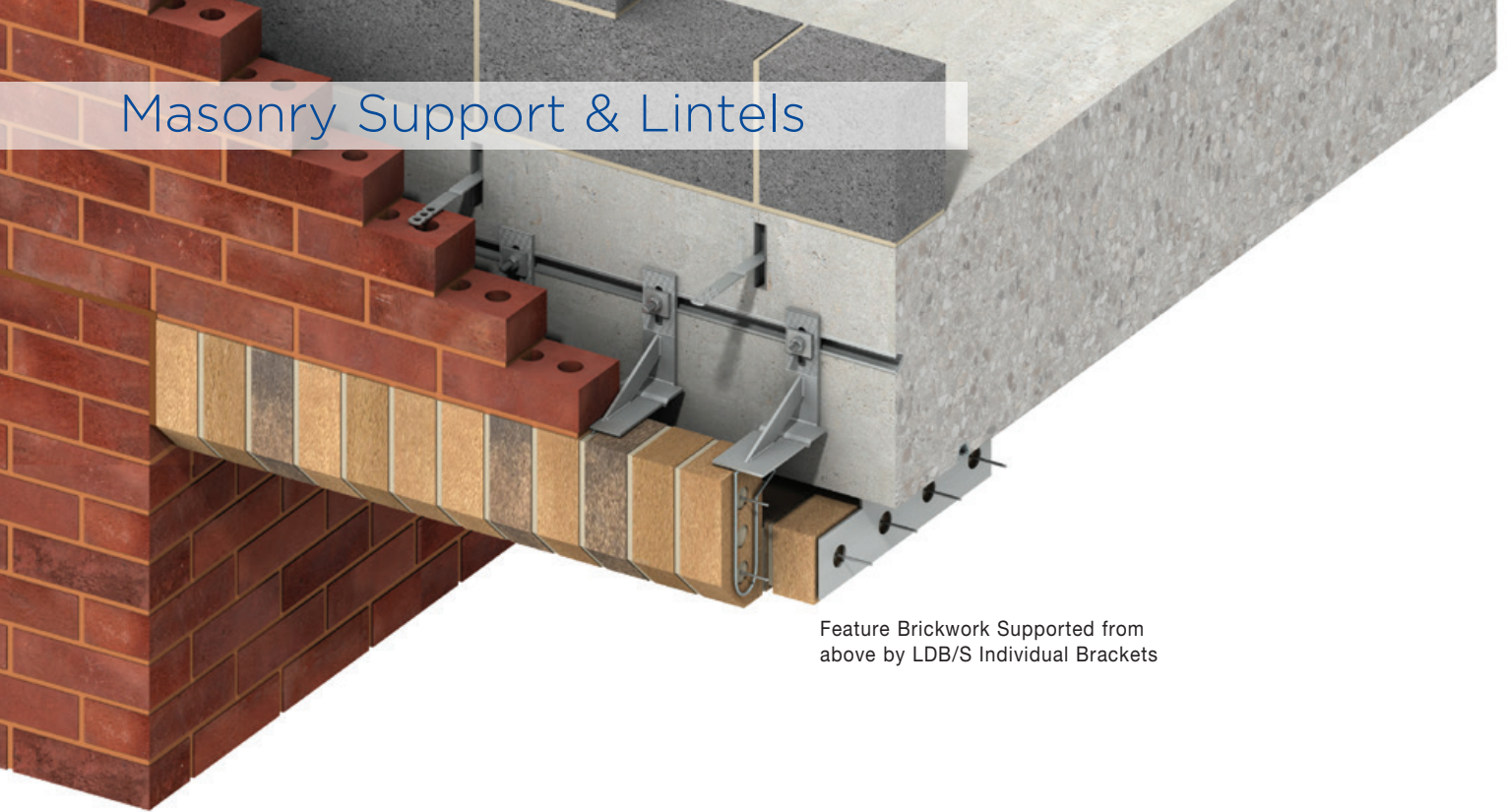
We will design a standard system to suit a 30mm cavity, carry 5.6kN/m, with an angle drop of 50mm.



Typical Layout of CFA Support System



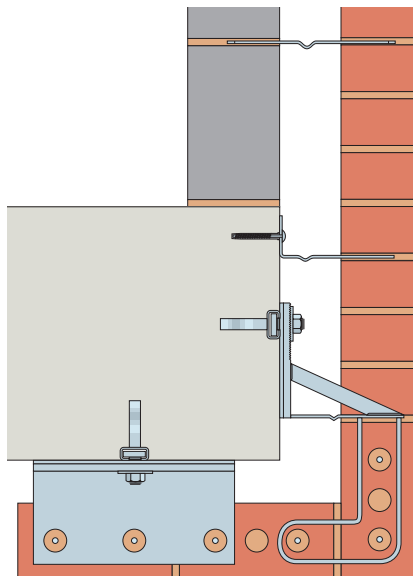
# Masonry Support & Lintels



Feature Brickwork Supported from above by LDB/S Individual Brackets

## Ancon Individual Bracket Support System

Three versions of the Ancon Individual Bracket Support System are available, MDB, LDB and AMK. MDB brackets at 255mm centres will carry approximately 8 metres of brickwork and LDB brackets will carry approximately 4 metres.



Soffit Support using LDB/S and Soffit Angle

The system comprises individual brackets positioned at each perpend, bolted back to a continuous channel cast into the edge of the concrete. The 4mm thick support plate of the standard bracket can be accommodated within a 10mm bed joint. LDA and MDA angle support brackets will generally be required at vertical movement joints and corners. These brackets have thicknesses of 6mm and 8mm respectively.

## Design Variations

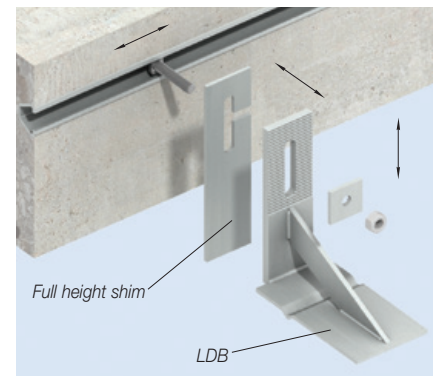
Two applications for individual brackets are for the support of soldier courses from above, and for the support of non-structural arched brickwork. Both these applications involve individual brackets at 255mm centres that have stirrups welded to the underside. Stitching rods span the stirrups and support the three bricks between the brackets.

The use of LDB/IS brackets with the stiffener below the support plate provides greater freedom for the brickwork above.

Ancon Soffit Angles are used in conjunction with LDB/S brackets to extend the support of soffit brickwork. These are usually spaced at 255mm centres and fixed to Ancon 28/15 Cast-in Channel.

## Adjustment

Adjustment is provided in every direction to allow for tolerance in the structural frame. The serrated and slotted face of the bracket allows for vertical adjustment. Cast-in channel will provide virtually unlimited horizontal adjustment. Shims can be included between the bracket and the frame up to a maximum thickness of the outside diameter of the fixing bolt or 16mm, whichever is less.



Adjustment of Individual Bracket Support System



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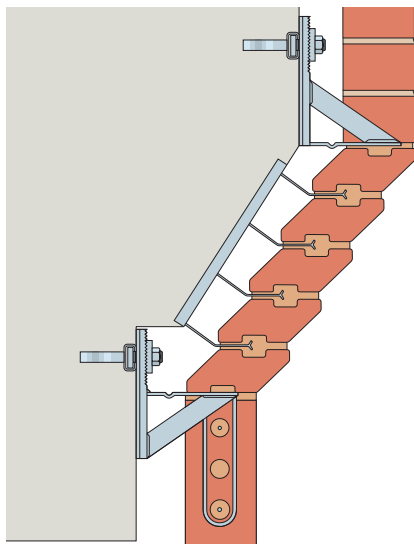
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### Curved Brickwork

Ancon LDBs and MDBs are ideal for supporting brickwork that is curved on plan. As an alternative, special MDA brackets can be designed to suit a wider range of loads and cavity widths. When fixing to concrete, Ancon 28/15, 30/20 or 38/17 channel can be supplied curved to suit the radius or expansion bolts can be used.

### Corbelled Brickwork

Individual brackets can be used to support brickwork at the top of the corbel. Ancon SC28 Corbel Ties restrain the corbelled brickwork to 28/15 channel cast into the sloping face of the concrete. LDB/IS can be used to suspend a soldier course over openings.



Corbelled Brickwork

### References

|        |                                              |
|--------|----------------------------------------------|
| LDB    | Standard bracket with stiffener              |
| LDA    | Bracket with angle                           |
| LDB/S  | Bracket with stirrup                         |
| LDB/IS | Bracket with stirrup and the stiffener below |
| MDB    | Standard bracket with stiffener              |
| MDA    | Bracket with angle                           |
| AMK    | Standard bracket                             |

Support to brickwork around external corners may involve special details.

| Bracket Reference | SWL/Bracket (kN) | Typical Bolt |
|-------------------|------------------|--------------|
| LDB/LDA           | 2.0              | M10          |
| MDB/MDA           | 4.0              | M12          |
| AMK 3.5           | 3.5              | M12          |
| AMK 7.0           | 7.0              | M16          |
| AMK 10.5          | 10.5             | M16          |

Special MDA Brackets Supporting Brickwork Curved on Plan

### Setting Out

We can provide drawings showing the location of the cast-in channels. Brackets will be referenced and scheduled, and all details submitted for approval before manufacture.

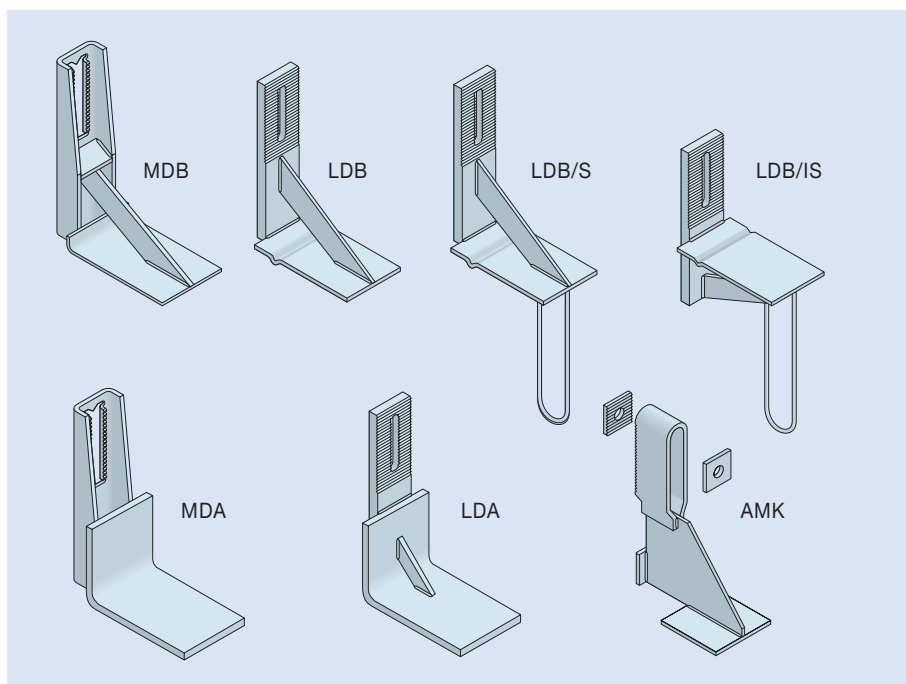
### Details for Specification and Ordering

Ancon Individual Brackets are available to suit most cavity sizes and can be specified as follows:-

**Type / cavity / masonry load**

e.g. LDB / 50 / 8.0

We will design an LDB system to suit a 50mm cavity and carry 8.0 kN/metre run of masonry.





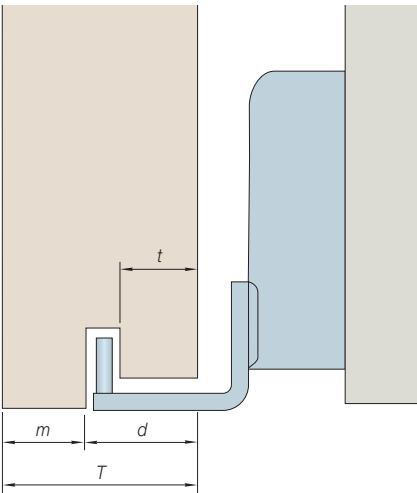
# Masonry Support & Lintels

## Stonework Support

Stone cladding is often a combination of large individually sized stones. These can sometimes vary in thickness and may include cornice or other stones that stand out from the general line of the cladding. Support for the stonework will usually be positioned over the horizontal movement joint at each floor level and over openings.



The most efficient method is for individual corbel supports to be positioned at the vertical joint between two adjacent stones. As an alternative, two smaller supports can be located near each end of each stone. The support of cornice and other particularly large stones will need special attention.



Recommended Minimum Dimensions

### Minimum Dimensions for Stonework

| Type of Stone                                 | Less than 3.7m above ground including facias |        |        |        | More than 3.7m above ground including facias |        |        |        |
|-----------------------------------------------|----------------------------------------------|--------|--------|--------|----------------------------------------------|--------|--------|--------|
|                                               | T (mm)                                       | d (mm) | m (mm) | t (mm) | T (mm)                                       | d (mm) | m (mm) | t (mm) |
| Granite<br>Slate<br>White Marble<br>Quartzite | 30                                           | 20     | 7      | 12     | 40                                           | 25     | 7      | 15     |
| Hard Limestone<br>Travertine                  | 30                                           | 20     | 7      | 12     | 40                                           | 25     | 7      | 15     |
| Limestone<br>Sandstone                        | 50                                           | 25*    | 20     | 20*    | 75                                           | 37*    | 20     | 30*    |

**Notes:** Extract from BS8298: 1994 Code of practice for the design and installation of natural stone cladding and lining.  
 \* T/2 if stone thickness (T) is greater than 75mm

## Design Considerations

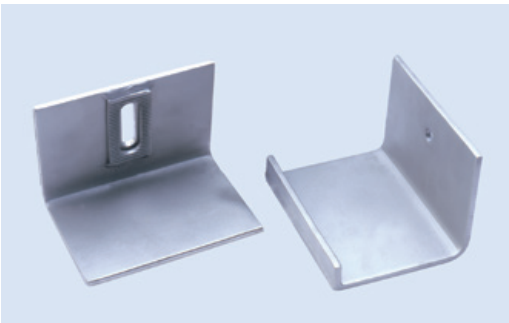
The design of stone cladding should be in accordance with BS 8298 : 1994 Code of practice for the design and installation of natural stone cladding and lining.

The minimum bearing at the support is generally 50% of the thickness of the stone.

A single support carrying two stones should be at least 75mm long. Where individual supports are used, these should be at least 50mm long.



Individual MDC/SC Stonework Support Brackets



Individual CFA/SC and CFA/SL Stonework Corbel Angles



## Ancon CFA/S Stonework Supports

### CFA/S Corbel Angles

These are individual angles that accommodate a fixing bolt in the vertical leg. The dimensions are chosen to suit the application. The angles can also be supplied with a lip or dowels to restrain the base of each stone (Ref CFA/SL or CFA/SD).

### CFA/SC Corbel Angles

These are similar to the CFA/S, but the bottom leg is inclined at 15° to provide restraint where the support has to be positioned above the base of the stone.

Ancon Corbel Angles are designed to suit each application. The table shows examples of CFA/S and CFA/SC supports. Please contact our Technical Services Team to discuss specific requirements.

Individual CFA/SC Stonework Corbel Angle

Typical Sizes for CFA/S and CFA/SC Supports 150mm Long

| Load Position<br>e (mm) | Thickness<br>t (mm) | Fixing Height<br>c (mm) | Overall Height<br>a (mm) | Outstand<br>b (mm) | SWL (kN) | Fixing Bolt Reference |
|-------------------------|---------------------|-------------------------|--------------------------|--------------------|----------|-----------------------|
| 60                      | 8                   | 70                      | 100                      | 73                 | 3.4      | FBNII 12/20 A4-126    |
|                         | 10                  | 70                      | 100                      | 73                 | 5.4      | FBNII 12/20 A4-126    |
| 80                      | 8                   | 70                      | 100                      | 93                 | 2.5      | FBNII 12/20 A4-126    |
|                         | 10                  | 70                      | 100                      | 93                 | 3.9      | FBNII 12/20 A4-126    |
|                         | 12                  | 100                     | 130                      | 93                 | 5.8      | FBNII 12/20 A4-126    |
| 100                     | 8                   | 70                      | 100                      | 113                | 1.8      | FBNII 12/20 A4-126    |
|                         | 10                  | 70                      | 100                      | 113                | 3.1      | FBNII 12/20 A4-126    |
|                         | 12                  | 100                     | 130                      | 113                | 4.5      | FBNII 12/20 A4-126    |
| 120                     | 12                  | 100                     | 130                      | 133                | 3.5      | FBNII 12/20 A4-126    |
|                         | 15                  | 120                     | 150                      | 133                | 5.7      | FBNII 12/20 A4-126    |
| 140                     | 15                  | 120                     | 150                      | 153                | 4.3      | FBNII 12/20 A4-126    |

**Notes:** Recommended fixings assume a minimum edge distance (all directions) of 115mm and a minimum bolt spacing of 230mm. Fixings are based on un-cracked concrete, min. 30MPa. For specific applications please contact us.

### References

CFA/S Standard corbel angle

CFA/SC Corbel with angle leg inclined 15°

CFA/SD Corbel angle with dowels

CFA/SL Corbel angle with lip



CFA/S



CFA/SD



# Masonry Support & Lintels



Adjustment of  
MDC/S Bracket

MDC/S



Individual MDC/SD Stonework Support  
Bracket

## Ancon MDC/S Stonework Supports

Ancon MDC/S Stonework Supports are based on the MDC masonry support system. The bracket height and depth are varied to suit the cavity size and the loadings. The dimensions of the angle are selected to suit the stonework to be supported.

### Design Variations

The MDC/S Stonework Support can be supplied in a variety of configurations to suit the particular application.

Ancon MDC/SD has a dowel to restrain the base of each stone, MDC/SC has the bottom leg of the angle inclined at 15° to provide restraint where the support has to be positioned above the base of the stone.

### Adjustment

The serrated and slotted face of the MDC/S bracket allows for vertical adjustment. Cast-in channel will provide horizontal adjustment, but because fixing positions can be difficult to predetermine, expansion bolts are often used. Shims can be included between the bracket and the frame up to a maximum thickness of the outside diameter of the fixing bolt, or 16mm, whichever is less.

## Details for Specification and Ordering

Ancon Stonework Supports are generally designed to suit specific contracts. Our technical staff will be pleased to discuss the most appropriate support system. Standard stonework supports may however be specified as follows:-

**MDC / type / cavity / stone width / load**  
e.g. MDC / SD / 50 / 75 / 4

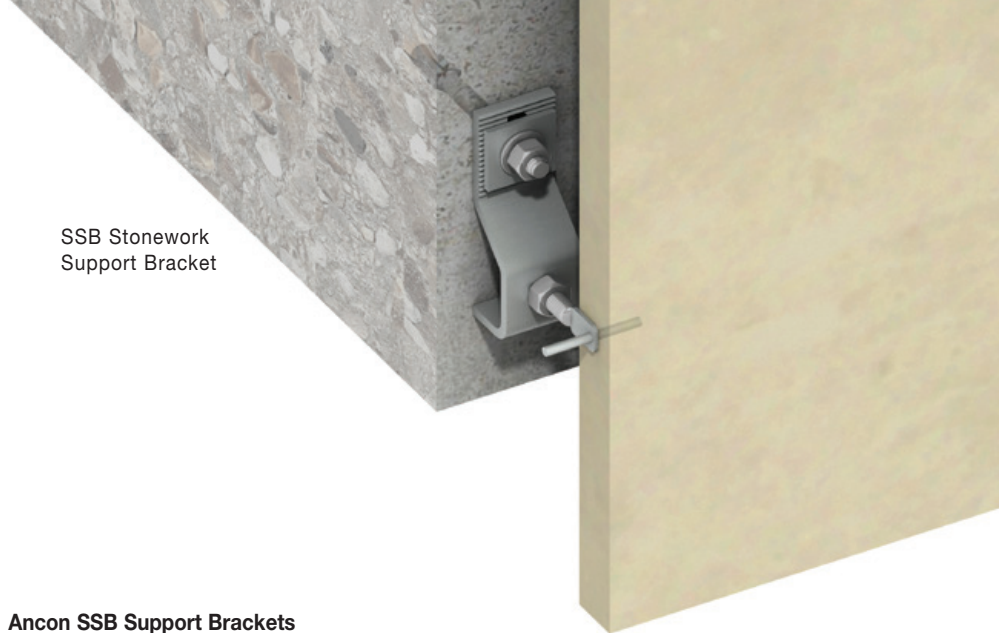
We will design individual MDC/SD supports with dowels to suit 75mm thick stone with a 50mm cavity behind. Each bracket will support a load of 4kN.

### References

|        |                                     |
|--------|-------------------------------------|
| MDC/S  | Standard MDC Stonework Bracket      |
| MDC/SC | Bracket with angle leg inclined 15° |
| MDC/SD | Bracket with dowels                 |
| MDC/SL | Bracket with lip                    |

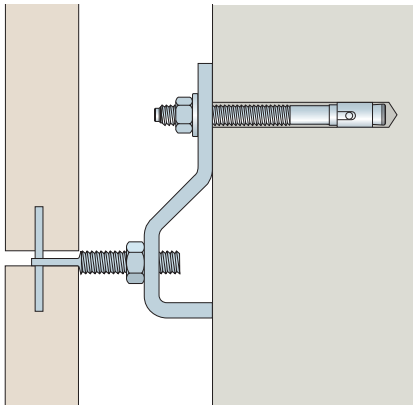


SSB Stonework Support Bracket



## Ancon SSB Support Brackets

The Ancon SSB Bracket supports and restrains stonework with a facing thickness of between 25mm and 40mm. They can be positioned in either the vertical or the horizontal joints and allow adjustment without the need for shims.



SSB Stonework Support Bracket

Ancon SSB Support Brackets

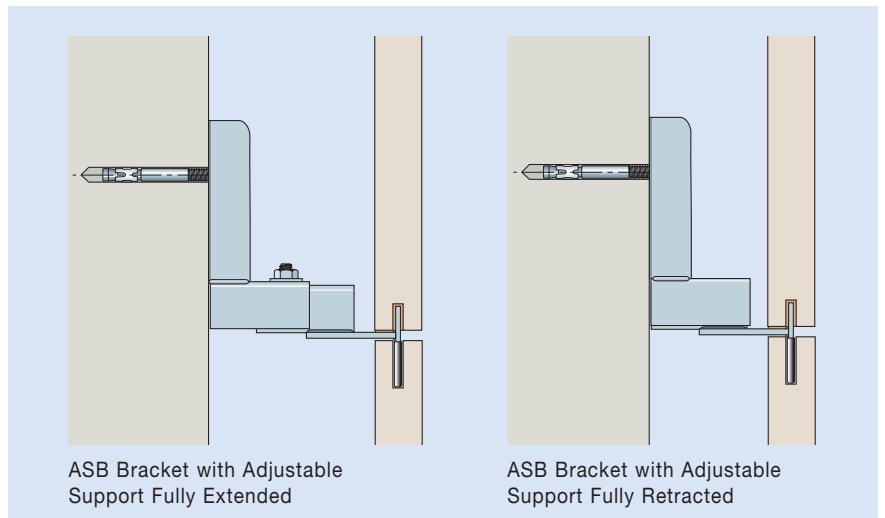
| Reference | Facing Thickness (mm) | Cavity Size (mm) | Adjustment +/- (mm) | Dead Load (N) | Wind Load (N) | Fixing Height (mm) | Fixing Load SWL (N) |
|-----------|-----------------------|------------------|---------------------|---------------|---------------|--------------------|---------------------|
| SSB-1     | 25                    | 50               | 10                  | 450           | 400           | 107                | 736                 |
|           | 30                    |                  |                     |               |               |                    |                     |
|           | 40                    |                  |                     |               |               |                    |                     |
| SSB-1a    | 25                    | 60               | 10                  | 450           | 400           | 107                | 779                 |
|           | 30                    |                  |                     |               |               |                    |                     |
|           | 40                    |                  |                     |               |               |                    |                     |
| SSB-2     | 25                    | 60               | 10                  | 850           | 750           | 132                | 1330                |
|           | 30                    |                  |                     |               |               |                    |                     |
|           | 40                    |                  |                     |               |               |                    |                     |
| SSB-2a    | 25                    | 75               | 10                  | 850           | 750           | 132                | 1426                |
|           | 30                    |                  |                     |               |               |                    |                     |
|           | 40                    |                  |                     |               |               |                    |                     |
| SSB-2c    | 25                    | 100              | 10                  | 700           | 600           | 132                | 1289                |
|           | 30                    |                  |                     |               |               |                    |                     |
|           | 40                    |                  |                     |               |               |                    |                     |

## Ancon ASB Bracket

The ASB is an adjustable bracket for the support of thin stone and rain-screen cladding. It offers exceptional capacity for adjustment without cutting on-site, allowing rapid and accurate installation of stone panels. Vertical adjustment in 1mm increments is provided by the slot in the bracket and the use of shims between the two components of the bracket. These shims are supplied as standard.

Very large cavities of up to 270mm are easily accommodated. The standard  $\pm 20$ mm horizontal adjustment can be increased to  $\pm 25$ mm with the use of optional shims.

Each bracket can support up to 250kg, and is designed for stone up to 50mm thickness.



## Ancon Soffit Fixing

Ancon Soffit fixings are a simple and secure method of fixing thin facing slabs. This heavy duty support and restraint fixing comprises a stainless steel head and bolt and is quick and easy to install. The disc fixing is fully adjustable and able to support a safe working load of 600N in tension.

The stone should be checked to ensure it is capable of withstanding the localised bearing stress under the disc.

| Ref.  | Torque   | Length | Disc size | Hole size |
|-------|----------|--------|-----------|-----------|
| SF150 | 8 - 10Nm | 150mm  | 50 x 5mm  | 8 x 65mm  |

**Note:** Other sizes can be manufactured on request.



Soffit Fixings



# Masonry Support & Lintels

## Lintels

Leviat manufactures a complete range of stainless steel lintels.

The Housing and Unilintel ranges are designed to suit the loading conditions found in the majority of residential and commercial buildings. Our comprehensive standard range consists of:

- Housing Lintels
- Unilintels
- Channel Lintels
- Solid Wall Lintels
- Single Leaf Lintels

Bespoke lintels can also be manufactured to suit heavy duty situations, special shapes and wall constructions not covered by our standard range.

## Corrosion Resistance

Ancon Lintels are manufactured from Austenitic stainless steel.

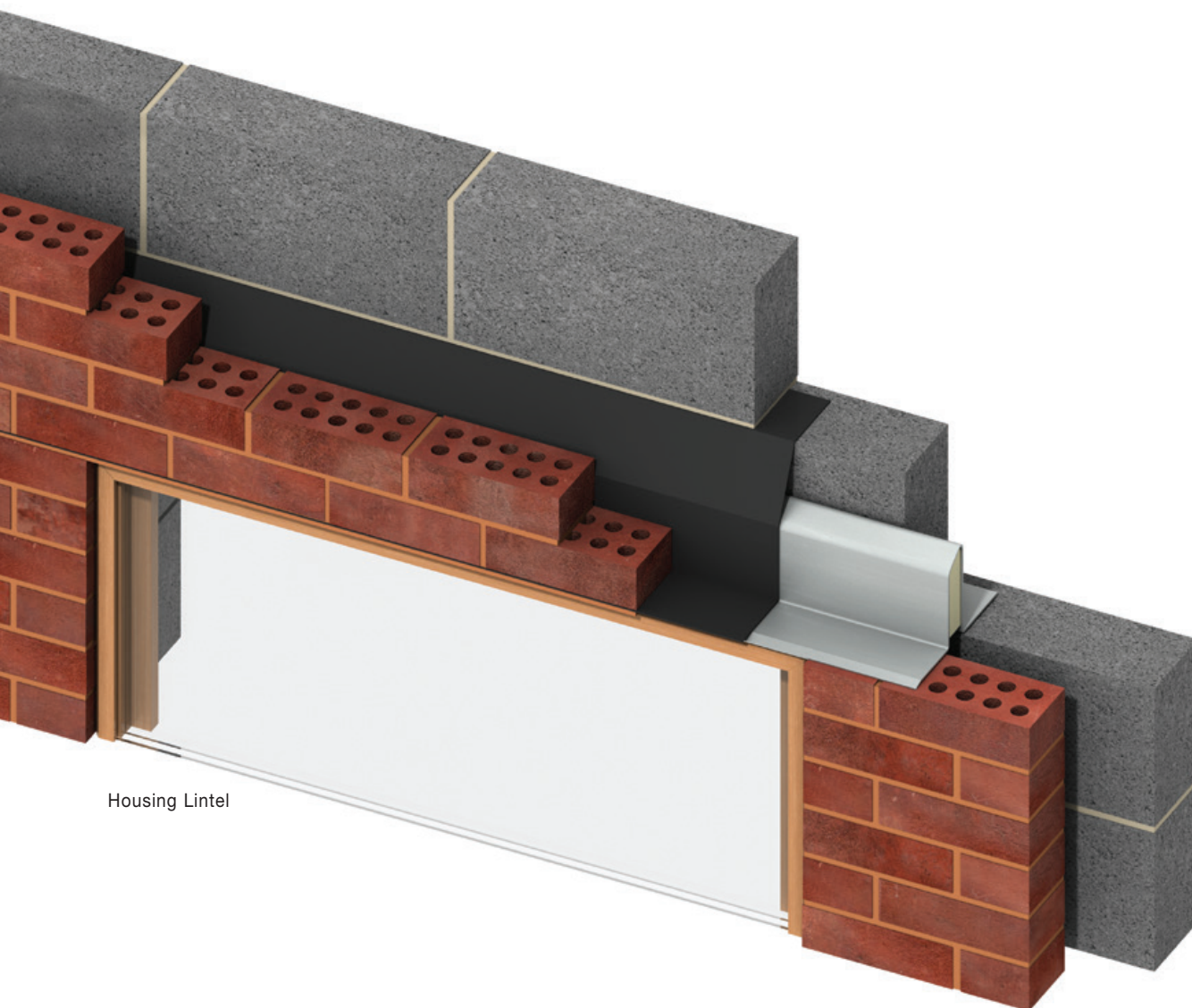
## Thermal Performance

The thermal transmittance, i.e. 'U' value, of any wall construction depends on the thermal characteristics of the individual components being used. The design of both the Housing Lintel and Unilintel is such that it allows for continuity of construction down to window head level.

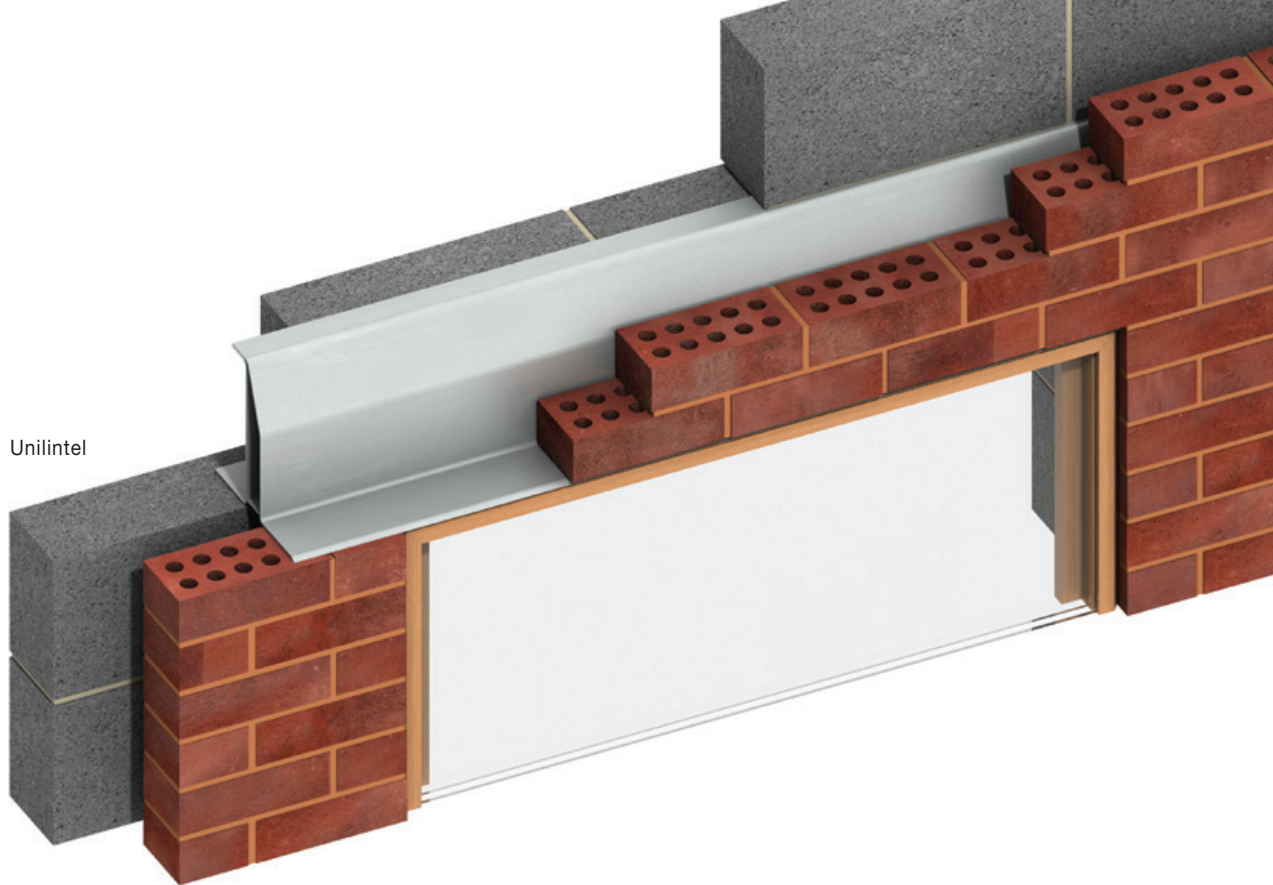
Housing Lintels can be supplied insulated with CFC-free, high density polystyrene manufactured in accordance with BS 3837 : Part 1 : 2004 to be CFC-free with an ozone depletion potential of zero.

## Structural Performance

The safe working loads are derived by calculation and supported by tests to establish their validity.



Housing Lintel



### Load Ratios

The safe working loads for Housing Lintels and Unilintels in the tables on page 24 are for situations where the total distributed load on the lintel is shared between the inner and outer leaves in ratios of between 1:1 and 3:1 respectively. For other load ratios, point loads or lintels carrying concrete floors, please contact our Technical Services Team.

### Installation

The lintel should be firmly bedded in mortar with at least 150mm end bearing onto a full brick/block. Please consult us when using limited bearing. The front and back of the lintel must be level before proceeding and a separate dpc incorporated if required.

When installing Housing Lintels and Unilintels the inner and outer leaves should be raised together to avoid twisting the lintel; blocks should continue for the full length of the inner flange. Masonry should have a maximum overhang of 30mm and blockwork should be built as close as possible to the upstand. Point loads should be applied at least 150mm above lintel flanges.

Although the lintels have a drip edge on the external flange to shed moisture, good practice should be followed at the junction of the window head and lintel by sealing with a suitable mastic, thereby ensuring that driving rain does not penetrate.

Weep vents are generally required above lintels at a maximum of 480mm centres. Each opening should have at least two weep holes and stop ends are required to prevent moisture penetration.

Long spanning lintels and all single leaf lintels will require propping during installation to limit deflections.

### Technical Assistance

Our Technical Services Team is available to advise on specification, design, installation and structural loading conditions.



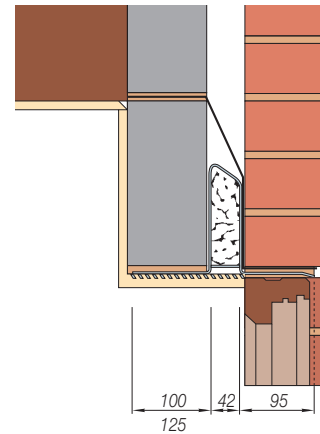
# Masonry Support & Lintels

## Housing Lintels

These are suitable for most domestic, small commercial developments and framed structures. They are supplied complete with insulation and metal lathing to provide a plaster key. Housing lintels require a separate dpc.

When installing Housing Lintels and Unilintels the inner and outer leaves should be raised together to avoid twisting the lintel; blocks should continue for the full length of the inner flange. Masonry should have a maximum overhang of 25mm and blockwork should be built as close as possible to the upstand. Point loads should be applied at least 150mm above lintel flanges.

| Cavity (mm) | Inner Leaf (mm) | Wall Widths (mm) | Ref.   | Nom. Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm)                        | SWL (kN)       |
|-------------|-----------------|------------------|--------|------------------|------------|------------------------|------------------------|------------------------------------|----------------|
| 50-74       | 100-124         | 250-285          | SH221  | 150              | 2.0        | 306.9                  | 29.9                   | 750-2100                           | 20             |
|             |                 |                  | SH321  | 150              | 3.0        | 460.4                  | 44.8                   | 750-1650<br>1800-2550<br>2700-3000 | 33<br>24<br>20 |
|             |                 |                  | SH331  | 200              | 3.0        | 1300.0                 | 89.4                   | 750-2550<br>2700-3300<br>3450-3900 | 50<br>35<br>30 |
|             |                 |                  |        |                  |            |                        |                        |                                    |                |
| 50-74       | 125-150         | 275-310          | SH221E | 150              | 2.5        | 402.0                  | 38.0                   | 750-2550                           | 20             |
|             |                 |                  | SH321E | 150              | 3.0        | 482.4                  | 45.6                   | 750-1650<br>1800-2550<br>2700-3000 | 30<br>20<br>18 |
|             |                 |                  | SH331E | 200              | 3.0        | 1345.0                 | 90.8                   | 750-2550<br>2700-3300<br>3450-3900 | 40<br>30<br>25 |
|             |                 |                  |        |                  |            |                        |                        |                                    |                |

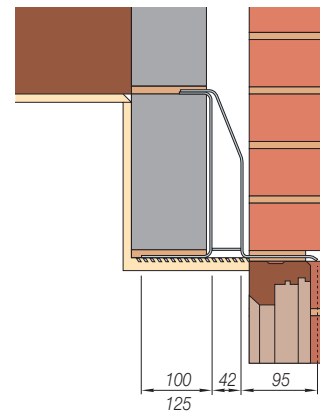


50-74mm Cavity

## Unilintels

Unilintels are designed for the heavy duty loading conditions often found in commercial developments and have the top flange built into the inner leaf. They are complete with metal lathing to provide a plaster key. Insulation can be supplied as an optional extra.

| Cavity (mm) | Inner Leaf (mm) | Wall Widths (mm) | Ref.   | Nom. Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm)            | SWL (kN) |
|-------------|-----------------|------------------|--------|------------------|------------|------------------------|------------------------|------------------------|----------|
| 50-74       | 100-124         | 250-285          | SU221  | 157              | 2.5/2.0    | 535.8                  | 57.5                   | 750-2100<br>2250-2700  | 30<br>25 |
|             |                 |                  | SU321  | 157              | 3.0/2.0    | 590.5                  | 63.5                   | 750-2100<br>2250-2700  | 38<br>31 |
|             |                 |                  | SU231  | 200              | 2.5/2.0    | 1317.4                 | 99.6                   | 750-2100<br>2250-2700  | 50<br>48 |
|             |                 |                  | SU331  | 200              | 3.0/2.0    | 1462.0                 | 110.7                  | 2550-3150<br>3300-3900 | 48<br>36 |
|             |                 |                  | SU431  | 200              | 4.0/4.0    | 2391.6                 | 180.4                  | 3000-3900              | 58       |
|             |                 |                  | SU531  | 200              | 5.0/5.0    | 2989.4                 | 225.6                  | 3000-3900              | 65       |
| 50-74       | 125-150         | 275-310          | SU221E | 157              | 2.5/2.0    | 562.7                  | 58.8                   | 750-2100<br>2250-2700  | 30<br>25 |
|             |                 |                  | SU321E | 157              | 3.0/2.0    | 622.7                  | 65.0                   | 750-2100<br>2250-2700  | 38<br>31 |
|             |                 |                  | SU231E | 200              | 2.5/2.0    | 1380.7                 | 101.9                  | 750-2100<br>2250-2700  | 50<br>48 |
|             |                 |                  | SU331E | 200              | 3.0/2.0    | 1527.7                 | 112.8                  | 2550-3150<br>3300-3900 | 48<br>36 |
|             |                 |                  | SU431E | 200              | 4.0/4.0    | 2505.6                 | 186.0                  | 3000-3900              | 58       |
|             |                 |                  | SU531E | 200              | 5.0/5.0    | 3132.0                 | 232.5                  | 3000-3900              | 65       |

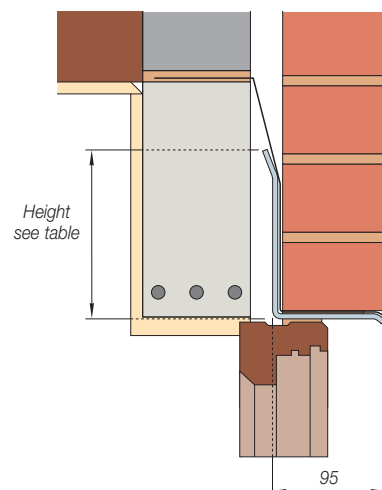


50-74mm Cavity

### Single Leaf Lintels/Angle Lintels

These lintels carry a single leaf, usually the external leaf, of a cavity wall. The lintel can be supplied with lips to either leg if required. Single leaf lintels require propping during installation to limit deflections. A separate dpc is required.

| Outer Leaf (mm) | Ref. | Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm)           | SWL (kN) |
|-----------------|------|-------------|------------|------------------------|------------------------|-----------------------|----------|
| 95-120          | SL31 | 95          | 3          | 50.7                   | 7.2                    | 750-1800              | 4        |
|                 | SL41 | 95          | 4          | 66.5                   | 9.5                    | 750-2400              | 6        |
|                 | SL32 | 150         | 3          | 175.4                  | 17.1                   | 750-2400              | 8        |
|                 | SL42 | 150         | 4          | 231.2                  | 22.6                   | 750-2400<br>2550-3300 | 12<br>10 |
|                 | SL33 | 200         | 3          | 379.7                  | 29.1                   | 750-2400<br>2550-3300 | 15<br>12 |
|                 | SL43 | 200         | 4          | 502.5                  | 38.6                   | 750-2400<br>2550-3300 | 20<br>14 |
|                 | SL53 | 200         | 5          | 622.3                  | 48.0                   | 750-1800<br>1950-3300 | 30<br>26 |



Single Leaf Lintel

### Channel Lintels

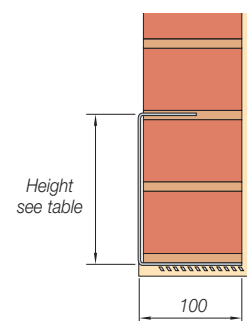
The Channel Lintel can be supplied with welded metal lathing on any side to provide a plaster key. For wall widths over 100mm, please contact us.

#### Width 100mm

| Ref.  | Nom. Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm) | SWL (kN) |
|-------|------------------|------------|------------------------|------------------------|-------------|----------|
| SC322 | 170              | 3.0        | 328.4                  | 37.3                   | 750-1500    | 20       |
| SC422 | 170              | 4.0        | 437.8                  | 49.7                   | 1650-2100   | 20       |
| SC522 | 170              | 5.0        | 547.3                  | 62.2                   | 2250-3000   | 20       |
| SC332 | 255              | 3.0        | 837.7                  | 65.4                   | 750-1500    | 20       |
| SC432 | 255              | 4.0        | 1117.0                 | 87.2                   | 1650-2100   | 30       |
| SC532 | 255              | 5.0        | 1396.2                 | 109.1                  | 2250-3000   | 40       |

#### Note: Channel Lintels

These lintels have been tested using composite action with surrounding masonry to BS 5628, and should be suitably restrained during construction.



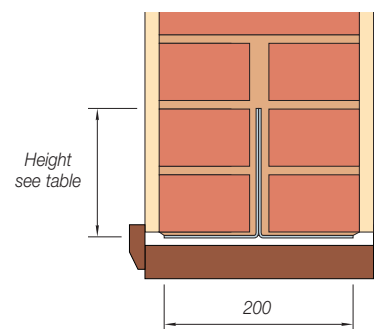
Channel Lintel

### Solid Wall Lintels

For use with solid walls, the Standard Duty has a top flange built into the brickwork. The Light Duty version is suitable for spans up to 2700mm.

#### Width 200mm (Light Duty)

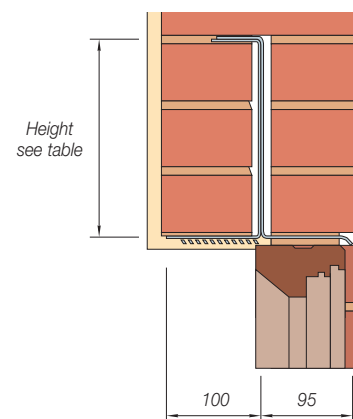
| Ref.  | Nom. Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm)                    | SWL (kN)       |
|-------|------------------|------------|------------------------|------------------------|--------------------------------|----------------|
| SS312 | 75               | 3.0        | 57.3                   | 9.7                    | 750<br>900-1500                | 12<br>10       |
| SS422 | 150              | 4.0        | 371.3                  | 35.4                   | 1650<br>1800-1950<br>2100-2700 | 15<br>14<br>13 |



Light Duty Solid Wall Lintel

#### Width 200mm (Standard Duty)

| Ref.  | Nom. Height (mm) | Gauge (mm) | Ixx (cm <sup>4</sup> ) | Zxx (cm <sup>3</sup> ) | Length (mm)                        | SWL (kN)       |
|-------|------------------|------------|------------------------|------------------------|------------------------------------|----------------|
| SS321 | 170              | 3.0        | 503.6                  | 58.7                   | 750-1800<br>1950-2700              | 40<br>30       |
| SS331 | 255              | 3.0        | 1581.2                 | 125.9                  | 750-1800<br>1950-2700<br>2850-3600 | 60<br>50<br>40 |
| SS431 | 255              | 4.0        | 2108.3                 | 167.8                  | 750-3900                           | 55             |



Standard Duty Solid Wall Lintel



# Masonry Support & Lintels

## Custom Lintels

In order to meet the requirements of today's challenging industry, we can design and manufacture special lintels for applications where standard lintels are unsuitable.

Solutions can be supplied for complex features such as corbels and other architectural details.

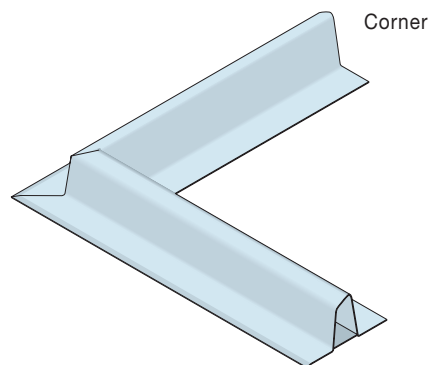
Special cranked, bay, corner and cantilevered corners are available in addition to the following arch shapes:

- Segmental arch
- Semi-circular arch
- Apex arch
- Gothic arch
- Flat top arch
- Double arch
- Arched on plan

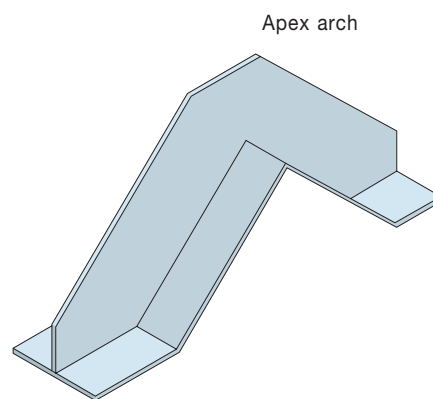
Our Technical Services Team will offer advice on the most appropriate lintel or alternative method of supporting masonry.

The following information will aid the design of a custom lintel and if available should be supplied with your enquiry.

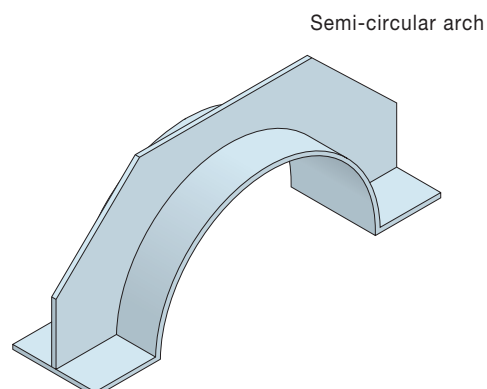
- Wall construction: outer leaf, inner leaf and cavity size.
- Clear span of opening.
- Bearings available (if less than 225mm).
- Radius or rise of arch and angles for apex/ cranked and corner lintels.



Corner



Apex arch



Semi-circular arch

## Projects



AM60 Building, Brisbane



Orange Hospital, New South Wales



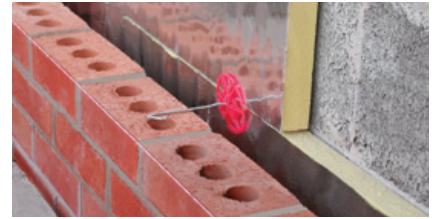
Woolworths Corporation Centre, New South Wales



Trinity Apartments, New South Wales

### Wall Ties and Restraint Fixings

In addition to standard cavity and veneer wall ties, Leviat manufactures ties in a variety of lengths and types for restraining brickwork, blockwork and stonework. These ties can be fixed to concrete and structural steelwork, as well as any type of masonry.



### Tension Systems

Tie bars are increasingly being used in structures and buildings as an architectural as well as a structural element. Ancon Tension Systems comprise a range of components which can be supplied in carbon steel or stainless steel in a variety of sizes and finishes. A variety of assemblies can be created from simple tie bars to complex bracing systems involving several bars joined at one point.



© Darcy Schack JAM Photography Ltd

### Shear Load Connectors

Ancon DSD and ESD Shear Load Connectors are used to transfer shear across expansion and contraction joints in concrete. They are more effective at transferring load and allowing movement to take place than standard dowels, and can be used to eliminate double columns at structural movement joints in buildings. The Q version features a rectangular box section to allow lateral movement in addition to longitudinal movement. A 'Lockable' dowel is also available for temporary movement joints in post-tensioned concrete frames.



Design Program Available

### Reinforcing Bar Couplers

The use of reinforcing bar couplers can provide significant advantages over lapped joints. Design and construction of the concrete can be simplified and the amount of reinforcement reduced. The Ancon range includes parallel threaded and mechanically bolted couplers.



### Punching Shear Reinforcement

Ancon Shearfix is used within a slab to provide additional reinforcement from punching shear around columns. The system consists of double-headed steel studs welded to flat rails and is designed to suit the load conditions and slab depth at each column using our free calculation software.



Design Program Available



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