

CI/SfB		Xt6	
January 2006			

series/0.2

2.0

Masonry Support Systems



WINCRO



Ties & Restraints

Masonry Support Systems

Lintels

Channel & Bolt Fixings

Windposts

Reinforcement

Flooring Systems

2.0

MASONRY SUPPORT SYSTEMS

We have developed an extensive range of high integrity masonry support systems. Our products should be used wherever horizontal movement joints are incorporated at each floor level, or at levels not exceeding three storeys, in the masonry cladding of frame structures.

COMPANY PROFILE

Wincro Metal Industries is a long established company founded on the principles of innovative design, quality manufacture and outstanding customer service. Our steadfast commitment to those values over the years has firmly established Wincro as one of today's leading designers and manufacturers of Stainless Steel Building Products. It has also earned the company an excellent reputation for quality and reliability amongst the many architects, specifiers, engineers and building contractors that the business serves.

Wincro is based in Sheffield, the home of stainless steel. We produce a wide range of corrosion resistant fixings, support systems, flooring and access equipment. Our range is constantly evolving and developing in order to keep pace with the demands of a fast-moving industry and the changing needs of our clients.

DESIGN SERVICE

All designs and details are supplied by Wincro's team of experienced technical design professionals who work closely with architects, engineers, specifiers, designers and contractors. Assistance can range from simple guidance or advice on standard product selection to a fully computerised design service and detailed consultations on incorporating special designs. Site visits can also be arranged.

MAINTAINING HIGH STANDARDS

We maintain the highest standards both in terms of the materials from which our products are made and the techniques we employ in manufacturing. Our products comply with and, in many cases, exceed all relevant British standards. We have invested in some of the most advanced machinery in the industry to help assure product quality and to enable us to provide a rapid turn-round of all orders, large or small, standard or bespoke.

QUALITY STAINLESS STEEL

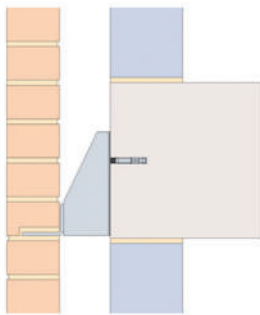
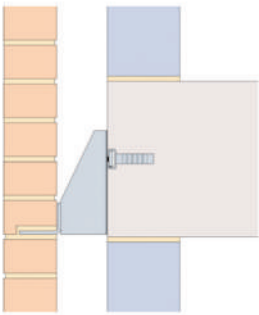
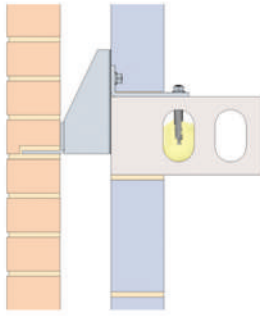
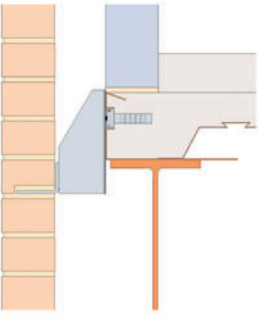
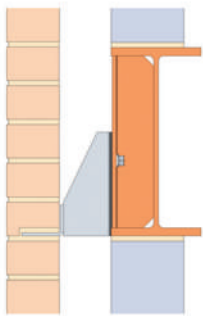
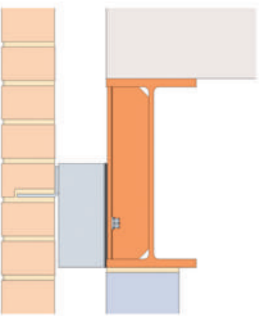
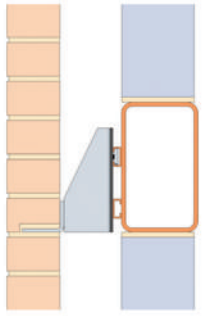
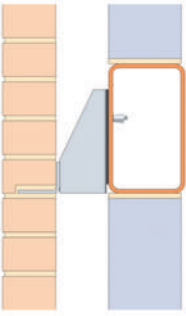
All our masonry support systems are manufactured from high quality grade 1.4301 (304) stainless steel for optimum performance and long life. Grade 1.4401 (316) stainless steel can be specified for use in corrosive environments.

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SYSTEM APPLICATIONS

The Wincro Masonry support systems range covers various applications including fixing to concrete, steel beam and steel RHS framed structures. Our systems are usually based on the use of a continuous thin angle support and welded brackets. For special masonry features, Wincro can design specific support solutions to suit your exact needs.

<p>1.0 / 1.1 Fixing to Concrete Floor Slabs</p> <p>1.0 Using WBEB Expansion Bolt directly into concrete</p> <p>1.1 Using WC38 Cast-in Channel with WBT38 T Head Bolt</p> <p>For further information go to page 6</p>	<p>1.0</p> 	<p>1.1</p> 
<p>2.0 / 2.1 Fixing to Concrete Precast Planks and Reduced Depth Concrete Floor Slabs</p> <p>2.0 Using Stainless Steel Top Cleat fixed to floor slab with WBRB Resin Bolt and Mesh Sleeve</p> <p>2.1 Using WSQD Quickdeck with WBT38 T Head Bolt</p> <p>For further information go to page 9</p>	<p>2.0</p> 	<p>2.1</p> 
<p>3.0 / 3.1 Fixing to Steel Beams</p> <p>3.0 Using WBXS Xylan Coated Hex-Head Setscrew complete with Isolation Patch</p> <p>3.1 Using WBXS Xylan Coated Hex-Head Setscrew complete with Isolation Patch Inverted Bracket System to suit coursing</p> <p>For further information go to page 12</p>	<p>3.0</p> 	<p>3.1</p> 
<p>4.0 / 4.1 Fixing to Steel RHS Sections</p> <p>4.0 Using WBT38 coated T Head Bolt and Isolation Patch to Galvanised Mild Steel Channel</p> <p>4.1 Using WBGB Wincro Grip Bolt and Isolation Patch</p> <p>For further information go to page 16</p>	<p>4.0</p> 	<p>4.1</p> 

DESIGN CONSIDERATIONS

Widely used for brick, rendered blockwork or stone clad structures, stainless steel support is placed over a horizontal movement joint large enough to allow the masonry below to expand. The design should take into account the type of cladding and frame. Differential movement and corrosion resistance should also be considered.

<p>1.0</p>	<p>1.1</p>	<p>1.0 / 1.1 Typical Support Detail Fixing to Steel Beam</p> <p>1.0</p> <ul style="list-style-type: none"> 1 WSC Masonry Support System 2 WBXS Xylan Coated Hex-Head Setscrew 3 WBAW Wincro Adjustment Washer 4 WIP Isolation Patch 5 WTS2U Frame Cramp @ 450mm horizontal centres 6 WT75L Sliding Brick Anchor @ 450mm horizontal centres <p>1.1 Cladding needs to be tied to the inner leaf (or light steel frame) at a recommended maximum horizontal spacing of 450mm within 300mm above and below the support angle.</p>
<p>2.0</p>	<p>2.1</p>	<p>2.0 / 2.1 Bi-metallic Corrosion</p> <p>Bi-metallic corrosion can occur where there is dampness and where two dissimilar metals, such as the carbon steel of a structural frame and the stainless steel of the support system, come into contact. To eliminate this possibility Wincro recommends the use of neoprene isolation washers and/or neoprene isolation patches along with suitably coated screws or nuts and bolts.</p>
<p>Building Tolerances</p> <p>Wincro Masonry Support Systems are designed to accommodate building tolerances by providing adjustment in all three planes. The Wincro serrated slot in the back of the bracket provides vertical adjustment of +/- 26mm. Horizontal adjustment is provided by either the use of cast-in channels into concrete framed structures or horizontally slotted holes in steel framed buildings. Lateral adjustment is provided by the use of stainless steel packing shims between the system and structure. Typically, the maximum thickness of shims should not exceed the diameter of the fixing bolt or 16mm, whichever is the less.</p>		

3.0 / 3.1

Differential Movement

Differential movement can occur between masonry cladding and the frame of the building. To counter the effects of this movement, the size of the masonry panel should be restricted.

The outer leaf of buildings that do not exceed four storeys or 12 metres in height, whichever is less, can be supported from ground level and uninterrupted for their full height. However, where differential movement is a concern for buildings within these height parameters, the use of support angles is perfectly acceptable.

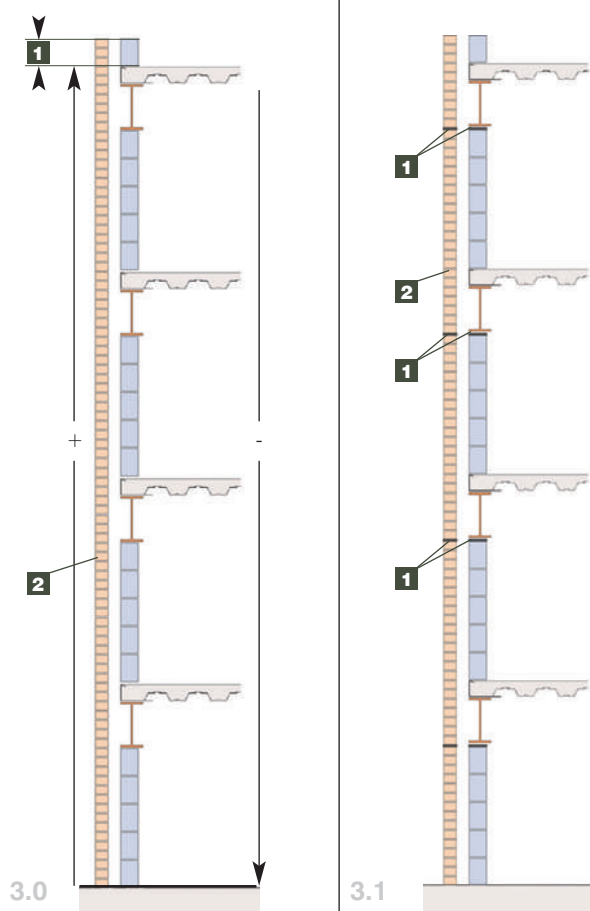
For other buildings, BS5628: Part 1 stipulates that outer leaf support should be provided at intervals of not more than 9 metres or three storeys, whichever is less. To allow for vertical movement of 1mm per metre, movement joints are usually placed at every two storeys.

3.0

- 1 Large differential movement
- 2 Outer leaf supported from ground level

3.1

- 1 Angle level & expansion joint
- 2 Outer leaf supported at intermediate floor levels

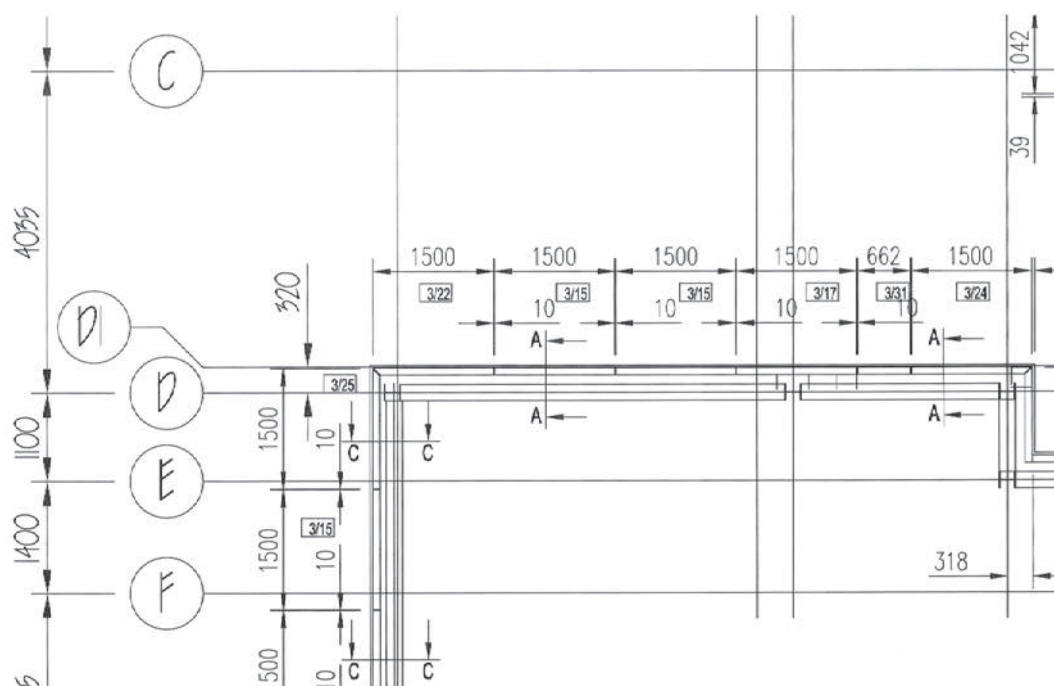


4.0

Support Detailing

Our Technical Design Team is always available to offer you advice and provide optimum designs for all applications. The diagram below shows a typical Wincro layout drawing. Once the drawings are approved by the Architect/Structural Engineer these will be issued for construction status, complete with systems referenced with mark numbers for ease of installation.

Typical example of Wincro Support Systems detailing



4.0

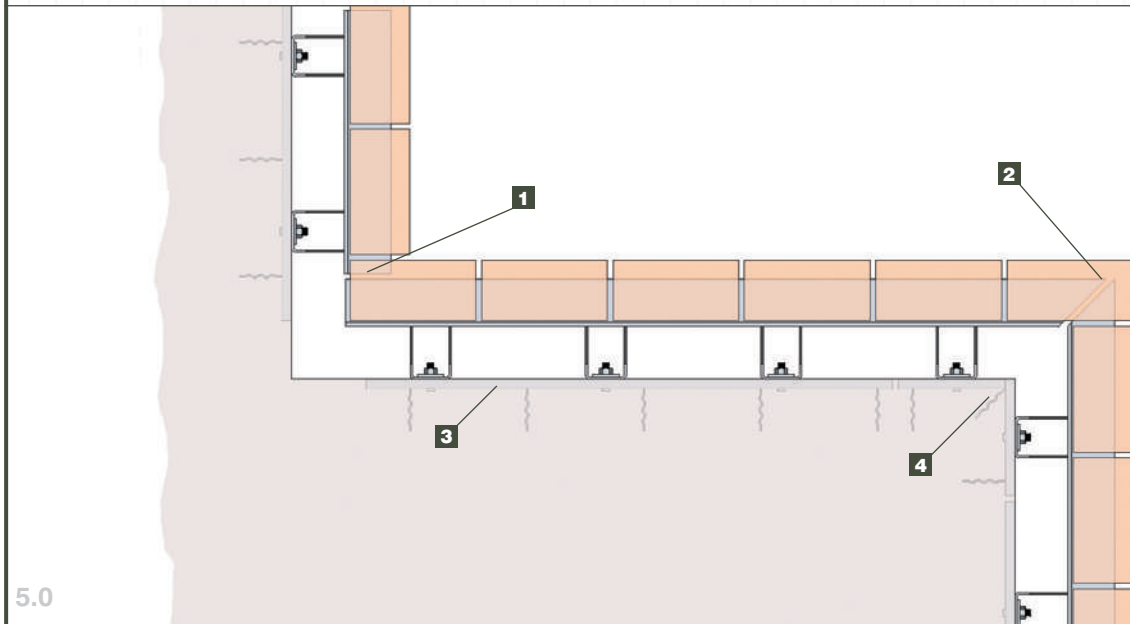
5.0

Setting Out

Wincro provide layout drawings showing all the relevant products required for approval before commencement of manufacture. For example, in concrete framed structures, positions of cast-in channels are provided or in steel framed structures, bolt-fixing positions are given.

Corners can be accommodated by use of open mitred corner angles or fully welded corner units, depending on application. Typically, a 10mm gap is designed in between all angle units to provide ease of installation.

- 1** Internal Corner (open 10mm joint) **2** External Corner (open 10mm mitre joint) **3** Continuous WC38 Cast-in Channel
4 Special Welded Cast-in Channel Corner Section



5.0

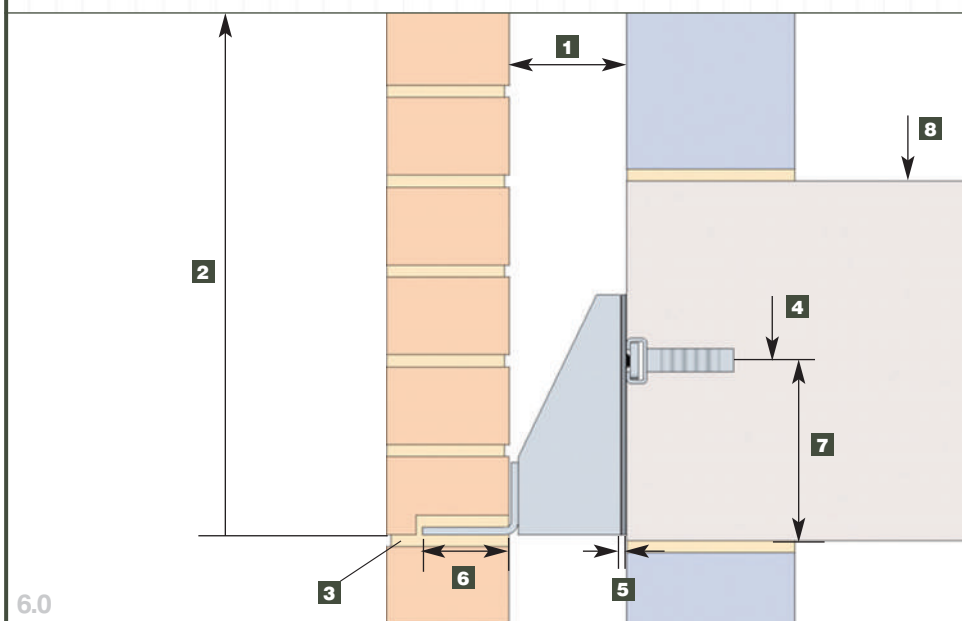
6.0

Typical Detail

Wincro support systems are located directly over horizontal movement joints, sufficient in size to permit expansion of the masonry. Suitable wall ties should be built in within 300mm above and below the support system. Systems are designed to suit cavity size, masonry load and the structural considerations. Our Technical Design Team will design the most appropriate and cost-effective system for your situation.

Early involvement in any project enables our Technical Design Team to liaise with the Architect and Structural Engineer to ensure compatibility with all other design components and finalise the design situation more efficiently.

- 1** Cavity **2** Brickwork Height **3** Horizontal Movement Joint **4** Fixing Datum **5** Shims **6** 2/3 Bearing **7** Minimum Edge Distance
8 Structural Slab Level



6.0

WSC System Specification Guide:

WSC cavity/masonry height/fixing type/other.**Example: WSC100/4.0/T**

WSC = Wincro System Continuous

100 = Cavity width in mm

4.0 = Masonry height in metres

Fixing Type

E = Expansion Bolt to concrete

T = T Head Bolt to Cast-in Channel

R = Resin Anchor Bolt to concrete

Other

P# = Bracket projecting below structure

D# = Angle projecting below brackets

RD# = Rendered masonry of # thickness

TF = Top Fixing Cleat utilised

ST# = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC# = Stonework of # thickness with angle inclined at 15° to provide restraint

I = Inverted brackets welded to angle

IA = Inverted Angle welded to brackets

IIA = Fully inverted system

WINCRO SOLUTIONS FOR FIXING TO CONCRETE

WSC BRACKET SYSTEM

Wincro WSC Bracket System comprises of a continuous thin angle support complete with welded brackets incorporating a serrated slot and adjustment washer.

Capable of supporting masonry over 9m in height and designed to suit cavities greater than 40mm, Wincro WSC systems are ideal for most applications.

Various solutions are available for fixing to concrete framed structures including the use of T Head bolts into cast-in channels, site drilled expansion bolts or the use of resin anchor products.

1.0 / 1.1

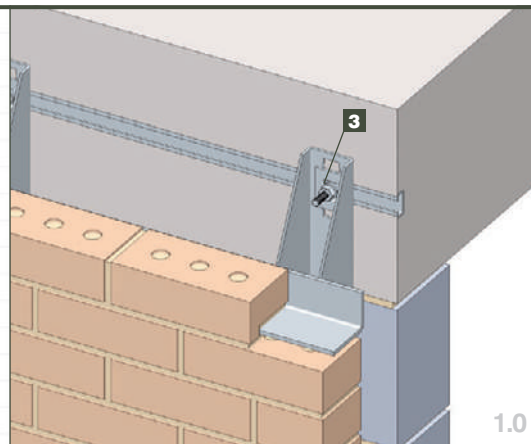
WSC Bracket System to Cast-in Channel

- 1** WC38 Cast-in Channel **2** WBT38 T Head Bolt
3 WBAW Wincro Adjustment Washer

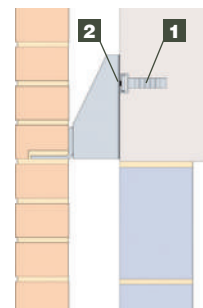
The WSC Bracket System fixed to concrete using:

- WC38 horizontally cast-in channel for horizontal adjustment
- WBT38 T Head Bolt

Example specification: WSC100/3.0/T
 System to suit 100mm cavity and 3.0m of masonry, fixing to Cast-in Channel



1.0



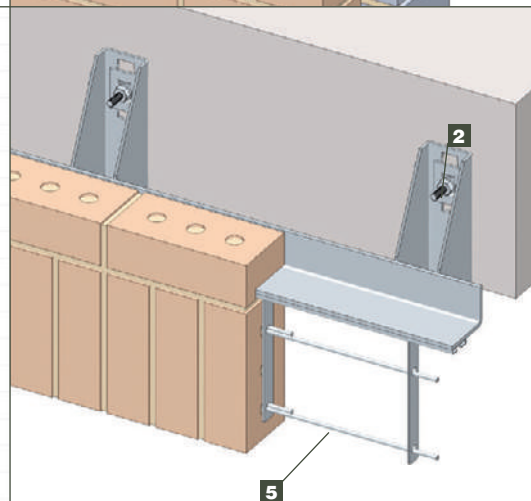
1.1

2.0 / 2.1

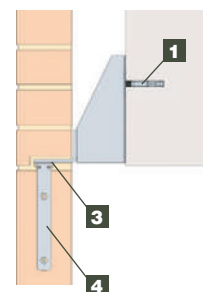
WSC Bracket System with Stirrups to carry the soldier course of brickwork

- 1** WBEB Expansion Bolt
2 WBAW Wincro Adjustment Washer
3 WC36 Channel
4 WTC36 Channel Tie @ 225mm centres
5 6 mm stitching rods

Example specification: WSC120/6.0/E/36
 System to suit 120mm cavity and 6.0m of masonry, fixing to concrete with Expansion Bolt. System complete with WC36 channel hanger system to carry soldier course of brickwork.

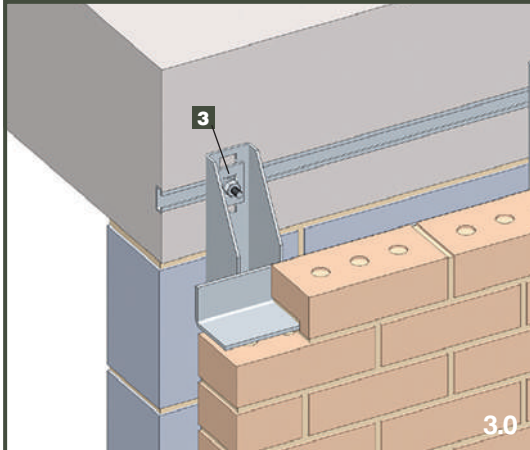
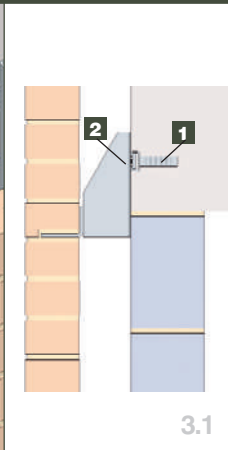
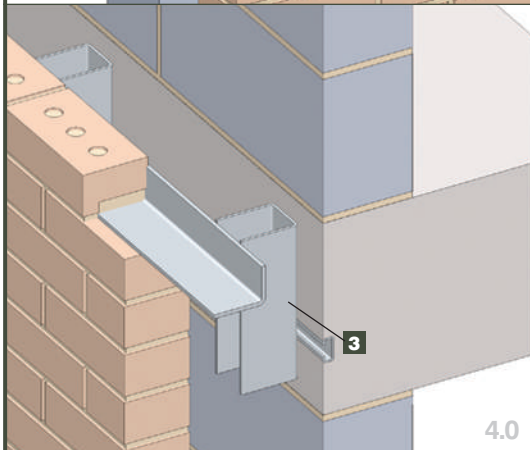
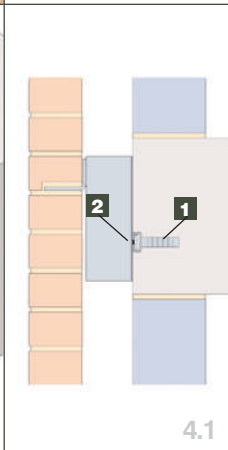
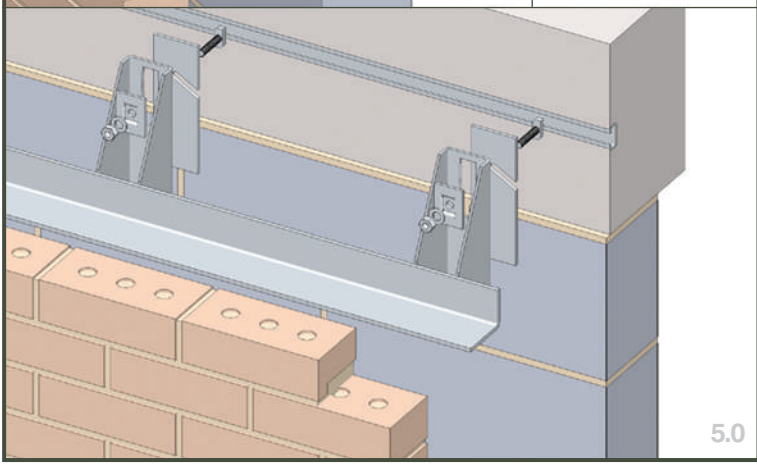


2.0



2.1

All systems are carefully designed by our Technical Design Team to suit specific applications. Our 'Optimiser' design package ensures the most cost-effective system is designed quickly and safely. Flexibility is a key feature of the Wincro WSC Bracket System. Systems are designed to suit the masonry height to be supported, the cavity width and structural fixing position. Bracket sizes and spacings, together with the section of the supporting angle are all designed to suit particular situations. In addition, our systems can be adapted to suit special masonry details including the support of soffit brickwork or atypical coursing positions. Wincro WC28 or WC38 cast-in channels provide almost unlimited horizontal adjustment, while our Wincro serrated slot fixing gives vertical adjustment of +/- 26mm.

 <p>3.0</p>	 <p>3.1</p>	<h3>3.0 / 3.1</h3> <h4>WSC Bracket System</h4> <p>1 WC38 Cast-in Channel 2 WBT38 T Head Bolt 3 WBAW Wincro Adjustment Washer</p> <p>This system offers you the flexibility of positioning the angle below the structure when required.</p> <p>Example specification: WSC100/2.0/T/P35 System to suit 100mm cavity and 2.0m of masonry, fixing to Cast-in Channel. Bracket projecting 35mm below structure (slab)</p>
 <p>4.0</p>	 <p>4.1</p>	<h3>4.0 / 4.1</h3> <h4>WSC Inverted Bracket System</h4> <p>1 WC38 Cast-in Channel 2 WBT38 T Head Bolt 3 WBAW Wincro Adjustment Washer</p> <p>This system offers you the additional option of positioning the angle above the bracket fixing position to suit coursing if required.</p> <p>Example specification: WSC/100/3.0/T/I System to suit 100mm cavity and 3.0m of masonry, fixing to Cast-in Channel. Inverted brackets welded to angle</p>
 <p>5.0</p>		<h3>5.0</h3> <h4>Adjustment</h4> <p>This diagram illustrates the use of stainless steel shims for lateral adjustment on all the systems featured in this section. Typically, the maximum thickness of shims should not exceed the diameter of the fixing bolt or 16mm, whichever is the less. For non-standard situations, please contact our Technical Design Team for further advice. The WSC Bracket System allows for adjustment in all three planes. cast-in channels allow for almost unlimited horizontal adjustment. The Wincro Serrated Slot and Washer allows for vertical adjustment of +/- 26mm and lateral adjustment is provided by the use of stainless steel packing shims between the system and structure.</p>

WSP System Specification Guide:

WSP cavity/masonry height/fixing type/other.

Example: WSP 50/2.0/E

WSP = Wincro System Individual Brackets

50 = Cavity width in mm

2.0 = Masonry height in metres

Fixing Type

E = Expansion Bolt to concrete

T = T Head Bolt to Cast-in Channel

R = Resin Anchor Bolt to concrete

Other

P# = Bracket projecting below structure

D# = Angle projecting below bracket

RD# = Rendered masonry of # thickness

ST# = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC # = Stonework of # thickness with angle inclined at 15° to provide restraint

I = Inverted bracket welded to angle

IA = Inverted Angle welded to bracket

IIA = Fully inverted system

WSP INDIVIDUAL BRACKET SYSTEM

Wincro WSP Individual Bracket Systems provide greater design options for supporting brickwork or stonework, particularly curved on plan masonry or special corbelled brickwork.

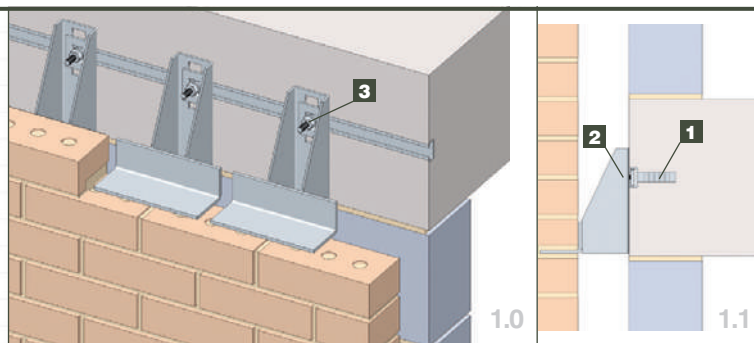
The system utilises a thin support angle complete with welded bracket incorporating the Wincro serrated slot and adjustment washer. Various solutions are available for fixing to concrete framed structures including the use of T Head bolts into cast-in channels, site drilled expansion bolts or the use of resin anchor products.

Brackets are usually designed at 225mm centres for supporting brickwork and 450mm centres for blockwork. Systems to suit stone cladding are generally at the vertical joint between adjoining stones and should be in accordance with BS8298:1994 Code of practice for the design and installation of natural stone cladding and lining. Please consult our Technical Design Team for further information.

1.0 / 1.1**The WSP Individual Bracket System fixed into concrete using:**

- 1** WC38 Cast-in Channel for horizontal adjustment
- 2** WBT38 T Head Bolt
- 3** WBAW Wincro Adjustment Washer

This system is supplied with Wincro patented Adjustment Washer WBAW.

**2.0 / 2.1 / 2.2****Curved Brickwork Applications**

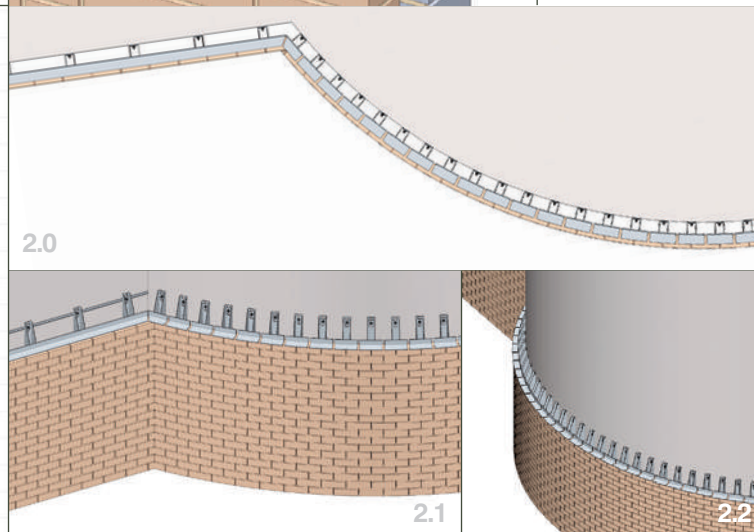
The WSP System can be designed to suit brickwork up to 10 metres in height.

2.0

The WSP Individual Bracket System fixed to curved concrete using:

- WBEB Expansion Bolt
- WBAW Wincro Adjustment Washer

Example specification: WSP/100/1.5/E
System to suit 100mm cavity and 1.5m of masonry, fixing to concrete with Expansion Bolt



WSC System Specification Guide:

WSC cavity/masonry height/fixing type/other.**Example: WSC 100/3.0/E/TF**

WSC = Wincro System Continuous

100 = Cavity width in mm

3.0 = Masonry height in metres

Fixing Type

E = Expansion Bolt to Concrete

T = T Head Bolt to Wincro Quickdeck (Channel)

R = Resin Anchor Bolt to concrete

Other

P# = Bracket projecting below structure

D# = Angle projecting below brackets

RD# = Rendered masonry of # thickness

TF = Top Fixing Cleat utilised

ST# = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC # = Stonework of # thickness with angle inclined at 15° to provide restraint

I = Inverted brackets welded to angle

IA = Inverted Angle welded to brackets

IIA = Fully inverted system

WINCRO SOLUTIONS FOR FIXING TO REDUCED DEPTH CONCRETE FLOOR SLABS AND PRECAST PLANKS

WSC BRACKET SYSTEM

WSC BRACKET SYSTEM TO PRECAST PLANKS: This system utilises a Top Fixing Cleat as a solution for fixing to reduced depth concrete where fixing to the side of the structure is not viable, or in situations of high masonry loads.

		<p>1.0 / 1.1 WSC Top Fixing Bracket System</p> <ol style="list-style-type: none"> 1 WBRB Resin Anchor with mesh sleeve (where applicable) 2 Stainless Steel Top Fixing Cleat 3 WBSS Stainless Steel Setscrew 4 WBAW Wincro Adjustment Washer <p>Example specification: WSC/100/6.5/R/TF System to suit 100mm cavity and 6.5m of masonry, fixing to concrete by Top Fixing Cleat with Resin Anchor Bolt</p>
		<p>2.0 / 2.1 WSC System fixed to precast plank using:</p> <ol style="list-style-type: none"> 1 WBRB Resin Anchor with mesh sleeve (where applicable) 2 WBAW Wincro Adjustment Washer <p>Example specification: WSC/90/3.1/R/P75 System to suit 90mm cavity and 3.1m of masonry, fixing to concrete with Resin Anchor Bolts. Bracket projecting 75mm below structure (plank)</p>
<p>WSQD QUICKDECK EDGE SUPPORT SYSTEM: Used with metal deck shuttering, Wincro Quickdeck is a metal edge trim with integral stainless steel channel, which accepts the Wincro WBT38 T Head bolt. Please consult our Technical Design Team for further information.</p>		
		<p>1.0 / 1.1 WSQD Quickdeck Edge Support System</p> <ol style="list-style-type: none"> 1 WSQD Wincro Quickdeck Support System, with integral WC38 Channel (stainless steel) 2 WBT38 T Head Bolt 3 WBAW Wincro Adjustment Washer <p>Example specification: WSQD/130/G System to suit 130mm edge trim height. Manufactured from galvanised mild steel with stainless steel channel. Replace G with S for complete stainless steel edge trim system</p>

WSCFA COLD FORMED ANGLE/GUSSETED ANGLE SYSTEM

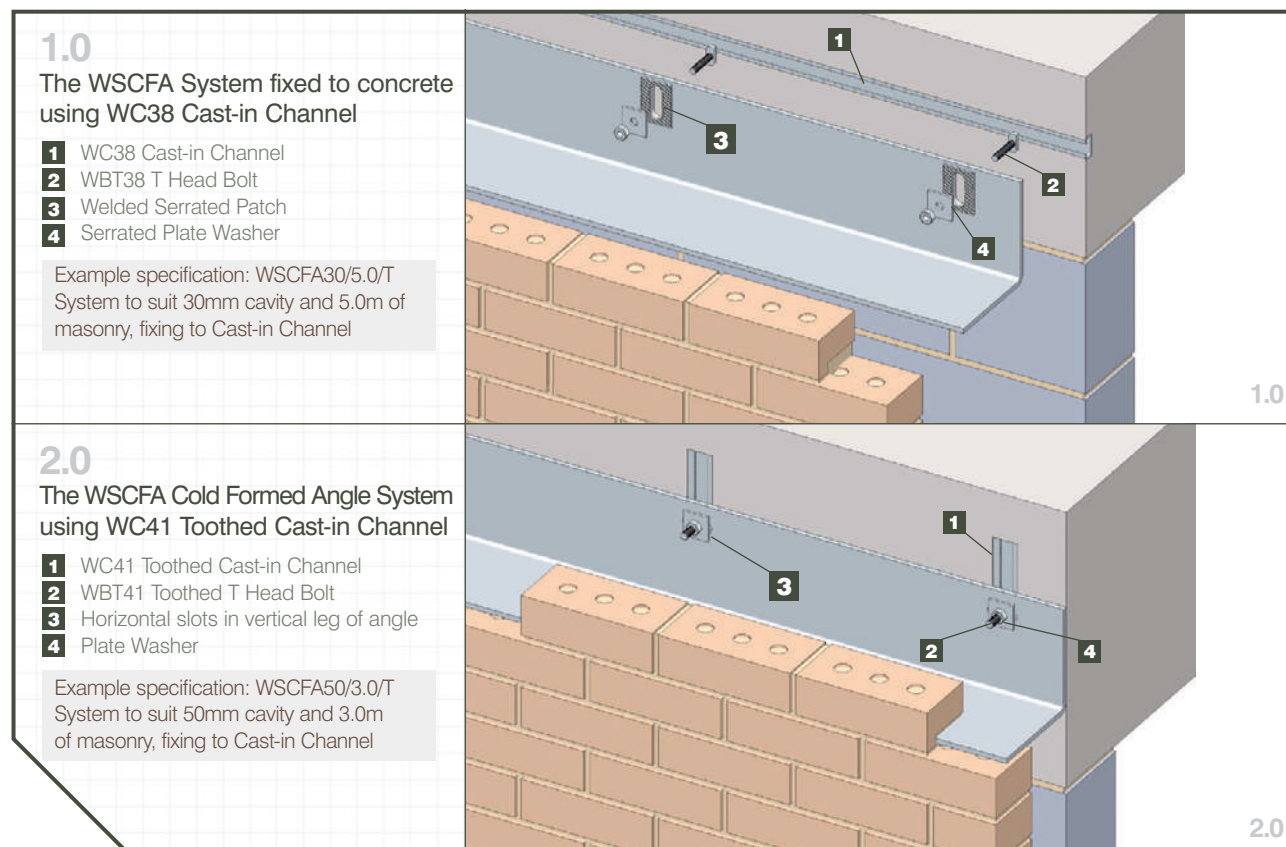
Wincro WSCFA Cold Formed Angle Support Systems are generally used where there is a reduced cavity situation or a need for the cavity to be closed at the support location.

Comprising of a traditional support angle, WSCFA systems are capable of supporting masonry over 9m in height and can be designed to incorporate all the fixing methods employed for other masonry support systems shown in this section.

Where larger cavities are encountered, WSC Bracket Support Systems tend to be more cost-effective – please refer to pages 6-7.

WSCFA Angles are normally supplied in lengths up to 3 metres and can be supplied with either serrated vertical slots or welded serrated patches where vertical adjustment needs to be designed into the system. Where vertical adjustment has been accommodated in the structure, for example using WC41 Toothed Channel, the WSCFA system can be supplied with horizontally slotted holes.

The WSCFA Angle System can also be supplied Inverted to accommodate situations where the coursing level/horizontal movement joint is above the fixing position.



WSCFA System Specification Guide:

WSCFA cavity/masonry height/fixing type/other.

Example: WSCFA25/3.25/E

WSCFA = Wincro System Cold Formed Angle

25 = Cavity width in mm

3.25 = Masonry height in metres

Fixing Type

E = Expansion Bolt to concrete

T = T Head Bolt to Cast-in Channel

R = Resin Anchor Bolt to concrete

Other

P# = Angle projecting below structure

RD # = Rendered masonry of # thickness

ST# = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC# = Stonework of # thickness with angle inclined at 15° to provide restraint

IA = Inverted Angle

<p>3.0</p>	<p>3.1</p>	<h3>3.0 / 3.1</h3> <h4>WSCFA Inverted Cold Formed Angle System</h4> <ul style="list-style-type: none"> 1 WC38 Cast-in Channel 2 WBT38 T Head Bolt 3 Welded Serrated Patch 4 Serrated Plate Washer <p>Example specification: WSCFA30/5.0/T/IA System to suit 30mm cavity and 5.0m of masonry, fixing to Cast-in Channel. Angle Inverted</p>
<p>4.0</p>	<p>4.1</p>	<h3>4.0 / 4.1</h3> <h4>WSCFA Cold Formed Angle System</h4> <ul style="list-style-type: none"> 1 WBEB Expansion Bolt 2 WBAW Wincro Adjustment Washer <p>Example specification: WSCFA25/2.2/E System to suit 25mm cavity and 2.2m of masonry, fixing to concrete with Expansion Bolts</p>
<p>5.0</p>	<p>5.1</p>	<h3>5.0 / 5.1</h3> <h4>WSCFAG Gusseted Cold Formed Angle system</h4> <ul style="list-style-type: none"> 1 WC38 Cast-in Channel 2 WBT38 T Head Bolt 3 Welded Serrated Patch 4 Serrated Plate Washer 5 Welded Gussets at design centres <p>Example specification: WSCFAG90/3.0/T System to suit 90mm cavity and 3.0m of masonry, fixing to Cast-in Channel</p>

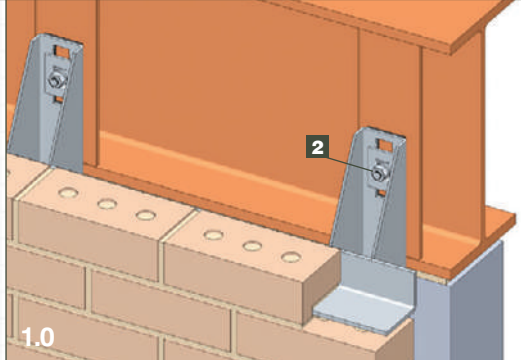
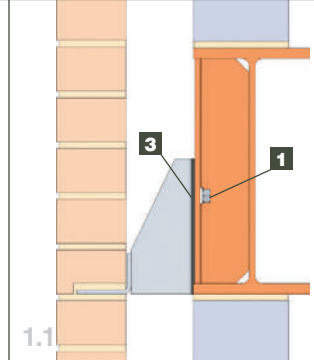
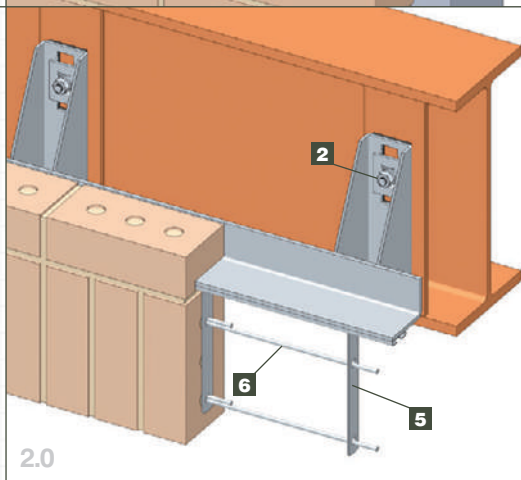
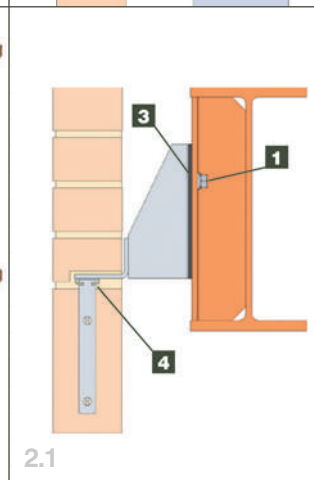
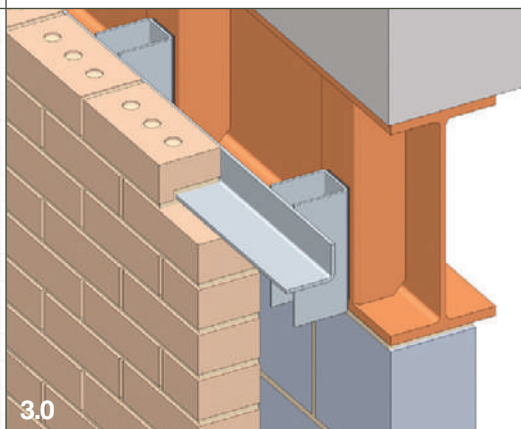
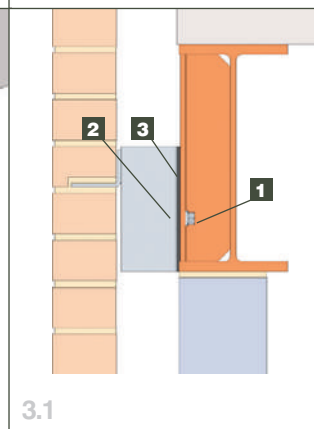
WINCRO SOLUTIONS FOR FIXING TO STEEL FRAME STRUCTURES

WSC BRACKET SYSTEM

Wincro WSC Bracket System comprises of a continuous thin angle support complete with welded brackets incorporating a serrated slot and adjustment washer, which provide vertical adjustment of $\pm 26\text{mm}$. Capable of supporting masonry over 9m in height and designed to suit cavities greater than 40mm, Wincro WSC systems are ideal for fixing straight on to steel framed structures. Various solutions are available including the use of Xylan Coated Setscrews or Wincro Grip bolts. To ensure ease of installation, horizontal slotted holes must **always** be incorporated into the steelwork gussets/fixing plates to allow horizontal tolerance.

Careful consideration should also be taken to avoid the effects of bi-metallic corrosion where the two dissimilar metals meet. Wincro recommend the use of Isolation Patches or the painting of the contact area between the metals to prevent such an occurrence.

Again, flexibility is a key feature of the Wincro WSC Bracket System. Systems are designed to suit the masonry height to be supported, the cavity width and structural fixing position. Bracket sizes and spacings, together with the section of the supporting angle are all designed to suit specific applications.

<p>1.0 / 1.1 WSC Bracket System</p> <ul style="list-style-type: none"> 1 WBXS Xylan Coated Hex-Head Setscrew 2 WBAW Wincro Adjustment Washer 3 WIP Isolation Patch <p>Example specification: WSC100/3.0/S System to suit 100mm cavity and 3.0m of masonry, fixing to steelwork</p>	 <p>1.0</p>	 <p>1.1</p>
<p>2.0 / 2.1 WSC Bracket System with WC36 Channel Hanger System to carry soldier course of brickwork</p> <ul style="list-style-type: none"> 1 WBXS Xylan Coated Hex-Head Setscrew 2 WBAW Wincro Adjustment Washer 3 WIP Isolation Patch 4 WC36 Channel 5 WTC36 Channel Tie @ 225 centres 6 6mm Stitching Rods <p>Example specification: WSC110/6.0/S/36 System to suit 110mm cavity and 6.0m of masonry, fixing to steelwork gussets at design centres. System complete with WC36 Channel Hanger System to carry soldier course of brickwork</p>	 <p>2.0</p>	 <p>2.1</p>
<p>3.0 / 3.1 WSC Inverted Bracket System</p> <ul style="list-style-type: none"> 1 WBXS Xylan Coated Hex-Head Setscrew 2 WBAW Wincro Adjustment Washer 3 WIP Isolation Patch <p>Example specification: WSC100/3.0/S/I System to suit 100mm cavity and 3.0m of masonry, fixing to steelwork gussets at design centres. Inverted brackets welded to angle</p>	 <p>3.0</p>	 <p>3.1</p>

Additionally, WSC Bracket Systems can be adapted to suit special masonry details including the support of soffit brickwork or atypical coursing positions.

WSC System Specification Guide:

WSC cavity/masonry height/fixing type/other.

Example: WSC100/6.0/S

WSC = Wincro System Continuous

100 = Cavity width in mm

6 = Masonry height in metres

Fixing Type

S = Setscrew (Xylan Coated) to steelwork

GB = Grip Bolt to RHS steelwork

Other

P # = Bracket projecting below structure

D # = Angle projecting below brackets

RD# = Rendered masonry of # thickness

TF = Top Fixing Cleat utilised

ST# = Stonework of # thickness

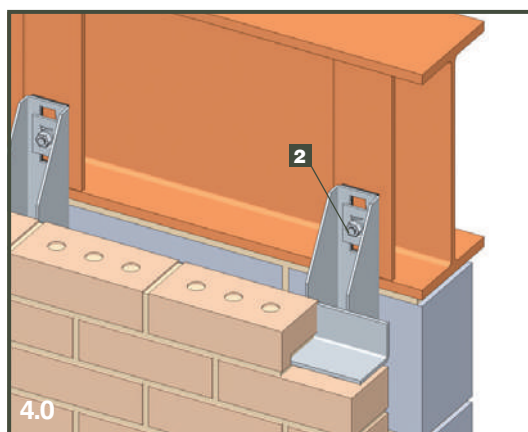
STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC# = Stonework of # thickness with angle inclined at 15° to provide restraint

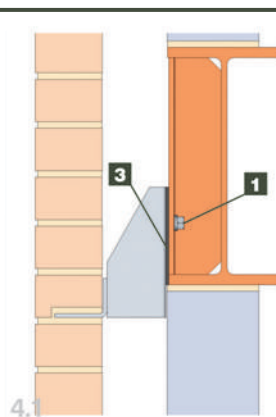
I = Inverted brackets welded to angle

IA = Inverted Angle welded to brackets

IIA = Fully inverted system



4.0



4.1

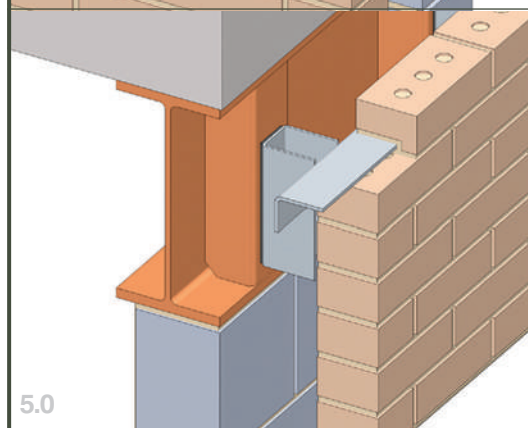
4.0 / 4.1

WSC Bracket System

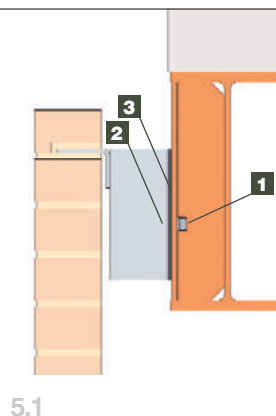
- 1** WBXS Xylan Coated Hex-Head Setscrew
- 2** WBAW Wincro Adjustment Washer
- 3** WIP Isolation Patch

This system offers you the flexibility of positioning the angle below the structure when required.

Example specification: WSC100/3.0/S/P50 System to suit 100mm cavity and 3.0m of masonry, fixing to steelwork gussets at design centres. Bracket projecting 50mm below structure



5.0



5.1

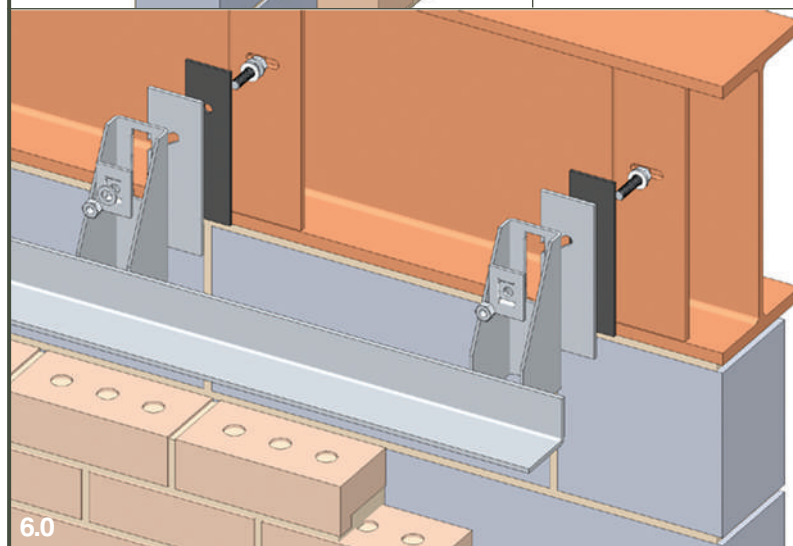
5.0 / 5.1

WSC Inverted Angle Bracket System

- 1** WBXS Xylan Coated Hex-Head Setscrew
- 2** WBAW Wincro Adjustment Washer
- 3** WIP Isolation Patch

This system offers you the additional option of positioning the angle above the bracket fixing position to suit coursing if required.

Example specification: WSC100/3.0/S/IA System to suit 100mm cavity and 3.0m of masonry, fixing to steelwork gussets at design centres. Inverted angle welded to bracket



6.0

6.0

Adjustment and Corrosion Protection

The WSC Bracket System allows for adjustment in all three planes. Horizontally slotted holes in the frame allow for horizontal adjustment. The Wincro Serrated Slot and Washer allows for vertical adjustment of +/- 26mm and lateral adjustment is provided by the use of stainless steel packing shims between the system and structure. Typically, the maximum thickness of shims should not exceed the diameter of the fixing bolt or 16mm, whichever is the less. For non-standard situations, please contact our Technical Design Team for further advice.

Isolation Patches should also be accommodated between the system and structure together with the use of suitably coated bolts.

WSP System Specification Guide:

WSP cavity/masonry height/fixing type/other.

Example: WSP100/2.5/S

WSP = Wincro System Individual Brackets

100 = Cavity width in mm

2.5 = Masonry height in metres

Fixing Type

S = Setscrew (Xylan Coated) to steelwork

GB = Grip Bolt to RHS steelwork

Other

P # = Bracket projecting below structure

D # = Angle projecting below bracket

RD # = Rendered masonry of # thickness

ST # = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

STC # = Stonework of # thickness with angle inclined at 15° to provide restraint

I = Inverted bracket welded to angle

IA = Inverted Angle welded to bracket

IIA = Fully inverted system

WSP INDIVIDUAL BRACKET SYSTEM

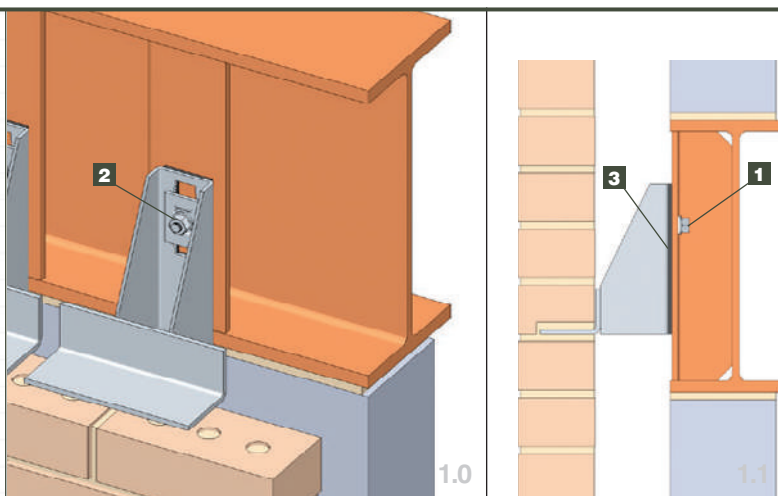
Wincro WSP Individual Bracket Systems provide greater design options for supporting brickwork or stonework, particularly curved on plan masonry or special corbelled brickwork. The system utilises a thin support angle complete with welded bracket incorporating the Wincro serrated slot and adjustment washer. Various solutions are available for fixing to steel framed structures including the use of Xylan Coated Setscrews or Wincro Grip bolts. Brackets are usually designed at 225mm centres for supporting brickwork and 450mm centres for blockwork. Systems to suit stone cladding are generally at the vertical joint between adjoining stones and should be in accordance with BS8298:1994 Code of practice for the design and installation of natural stone cladding and lining. Please consult our Technical Design Team for further information.

1.0 / 1.1

The WSP Individual Bracket System fixed to a pre-slotted gusset on a steel beam

- 1 WBXS Xylan Coated Hex-Head Setscrew
- 2 WBAW Wincro Adjustment Washer
- 3 WIP Isolation Patch

Example specification: WSP100/1.85/S
System to suit 100mm cavity and 1.85m of masonry, fixing to steelwork gussets at design centres

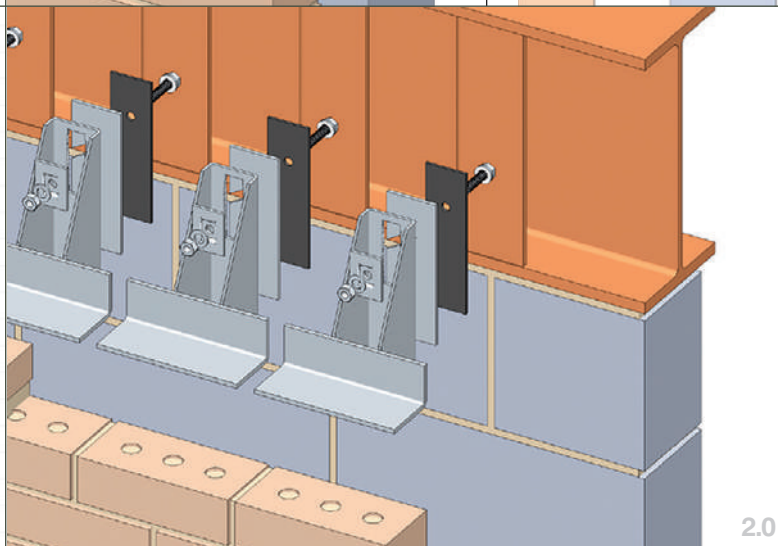


2.0

Lateral Adjustment and Corrosion Protection

The WSC Bracket System allows for adjustment in all three planes. Horizontally slotted holes in the frame allow for horizontal adjustment. The Wincro Serrated Slot and Washer allows for vertical adjustment of +/- 26mm and lateral adjustment is provided by the use of stainless steel packing shims between the system and structure. Typically, the maximum thickness of shims should not exceed the diameter of the fixing bolt or 16mm, whichever is the less. Isolation Patches should also be accommodated between the system and structure, together with the use of suitably coated bolts.

For non-standard situations, please contact our Technical Design Team for further advice.



WSCFA System Specification Guide:

WSCFA cavity/masonry height/fixing type/other.

Example: WSCFA35/4.8/S

WSCFA = Wincro System Cold Formed Angle

35 = Cavity width in mm

4.8 = Masonry height in metres

Fixing Type

S = Setscrew (Xylan Coated) to steelwork

GB = Grip Bolt to RHS steelwork

Other

P# = Angle projecting below structure

RD# = Rendered masonry of # thickness

ST # = Stonework of # thickness

STD# = Stonework of # thickness with welded dowels in angle to restrain stone

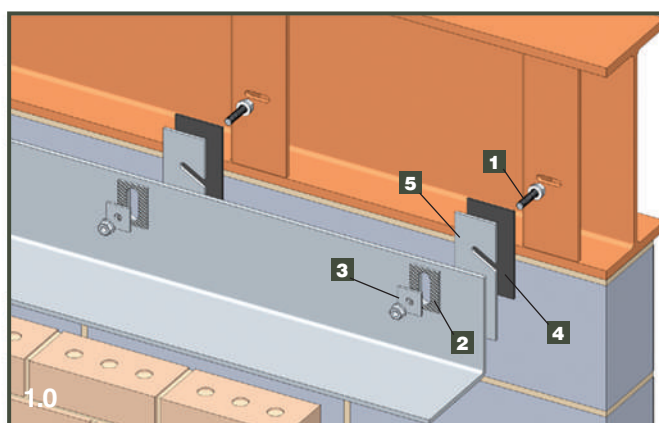
STC# = Stonework of # thickness with angle inclined at 15° to provide restraint

IA = Inverted Angle

COLD FORMED ANGLE/GUSSETED ANGLE SYSTEM

Comprising of a traditional support angle, WSCFA systems are capable of supporting masonry over 9m in height and are generally used in reduced cavity situations or where there is a need for the cavity to be closed at the support location.

WSCFA Angles are normally supplied in lengths up to 3 metres and can be supplied with either serrated vertical slots or welded serrated patches to allow up to +/- 26mm vertical adjustment.

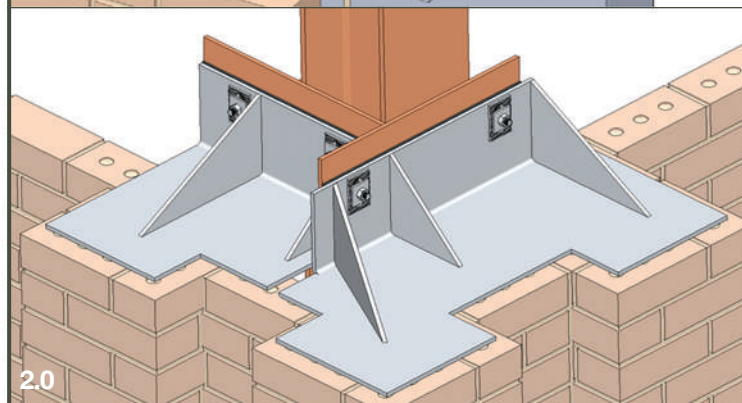


1.0

WSCFA Cold Formed Angle System

- 1** WBXS Xylan Coated Hex-Head Setscrew
- 2** Welded Serrated Patch
- 3** Serrated Plate Washer
- 4** WIP Isolation Patch
- 5** Slotted Shim

Example specification: WSCFA/65/4.85/S
System to suit 65mm cavity and 4.85m of masonry, fixing to steelwork gussets at design centres



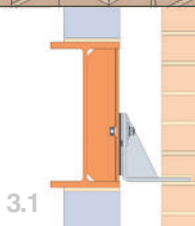
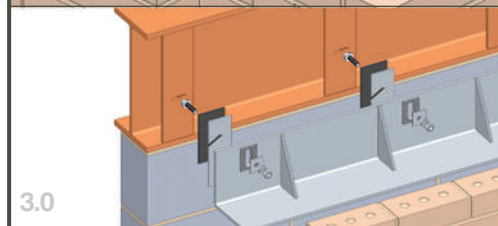
2.0

Fabricated Angles

Special masonry features, for example brickwork piers, require specific design solutions. Many of these are answered by the use of Wincro WSCFAG Support Systems.

This diagram illustrates our WSCFAG Gusseted Angle Support System fixed to a structural steel corner column to support castellated brickwork.

The use of gussets with the angle stiffens and strengthens the support. Gusset sizes and centres are determined by our Technical Design Team to take account of the higher load value and the eccentricity of the brickwork.



3.0 / 3.1

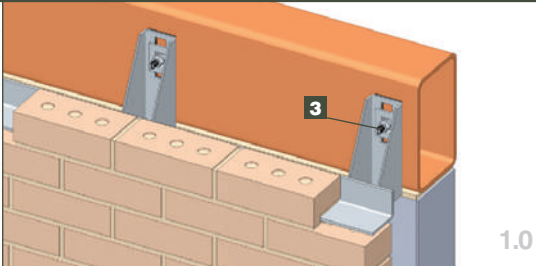
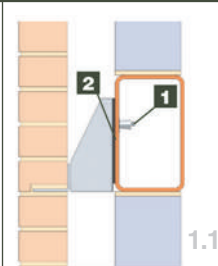
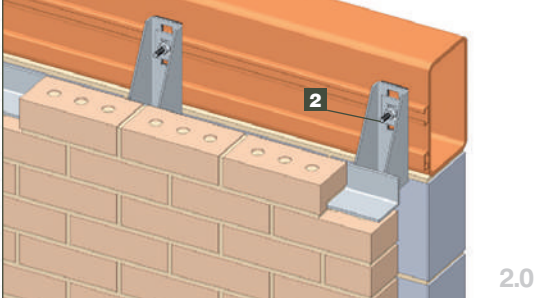
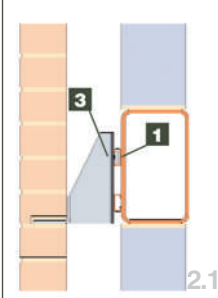
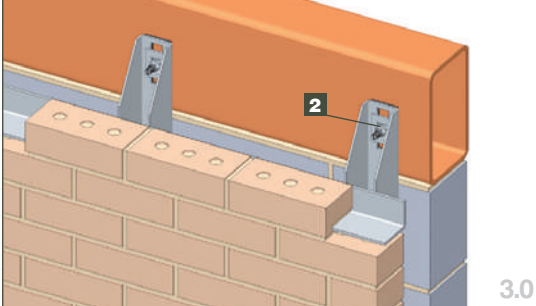
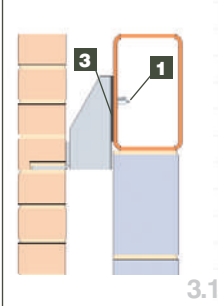
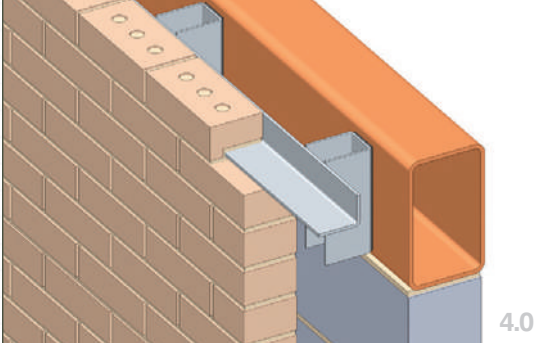
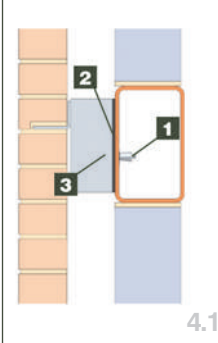
This diagram illustrates our Cold Formed Gusseted Angle support system fixed to a mild steel beam, using shims for lateral adjustment and Isolation Patch to prevent bi-metallic corrosion.

WINCRO SOLUTIONS FOR FIXING TO STEEL RHS FRAME STRUCTURES

WSC BRACKET SYSTEM

The support systems featured in this section can be fixed directly onto RHS frame structures by the use of the Wincro Grip bolts, or suitably coated T Head bolts into channels pre-welded to the RHS frame. Precautions should be taken to avoid bi-metallic corrosion (see page 13 – part 6.0).

All systems utilise an angle support and come complete with vertical adjustment of up to $\pm 26\text{mm}$. Welded channels onto the RHS frame provide virtually unlimited horizontal adjustment. Wincro recommend RHS sections are site drilled when using the WBGB Grip bolt to facilitate any horizontal adjustment that may be necessary.

<p>1.0 / 1.1 WSC Bracket System</p> <p>1 WBGB Grip Bolt 2 WIP Isolation Patch 3 WBAW Wincro Adjustment Washer</p> <p>Example specification: WSC95/3.2/GB System to suit 95mm cavity and 3.2m of masonry, fixing to RHS steelwork</p>	 <p>1.0</p>	 <p>1.1</p>
<p>2.0 / 2.1 WSC Bracket System</p> <p>1 WBXT38 Xylan Coated T Head Bolt 2 WBAW Wincro Adjustment Washer 3 WIP Isolation Patch</p> <p>Example specification: WSC80/3.2/XT/P30 System to suit 80mm cavity and 3.2m of masonry, fixing to channel on RHS steelwork. Bracket projecting 30mm below structure</p>	 <p>2.0</p>	 <p>2.1</p>
<p>3.0 / 3.1 WSC Bracket System</p> <p>1 WBGB Grip Bolt 2 WBAW Wincro Adjustment Washer 3 WIP Isolation Patch</p> <p>Example specification: WSC95/3.2/GB/P50 System to suit 95mm cavity and 3.2m of masonry, fixing to RHS steelwork. Bracket projecting 50mm below structure</p>	 <p>3.0</p>	 <p>3.1</p>
<p>4.0 / 4.1 WSC Inverted Bracket System</p> <p>1 WBGB Grip Bolt 2 WIP Isolation Patch 3 WBAW Wincro Adjustment Washer</p> <p>Example specification: WSC100/3.0/GB/I System to suit 100mm cavity and 3.0m masonry, fixing to RHS steelwork. Inverted brackets welded to angle</p>	 <p>4.0</p>	 <p>4.1</p>

WSP / WSP / WSCFA System Specification Guide:

WSC cavity/masonry
height/fixing type/other.

Example: WSC85/5.5/GB

WSP cavity/masonry
height/fixing type/other.

Example: WSP50/3.75/GB

WSCFA cavity/masonry
height/fixing type/other

Example: WSCFA10/3.1/GB

WSC = Wincro System
Continuous

WSP = Wincro System Individual
Brackets

WSCFA = Wincro System Cold
Formed Angle

Using example: WSC85/5.5/GB

85 = Cavity width in mm

5.5 = Masonry height in metres

Fixing Type

GB = Grip Bolt to RHS steelwork

T = T Head Bolt to Channel
(XT Xylan Coated to mild
steel Channel)

Other

P# = Bracket projecting
below structure

D# = Angle projecting below
brackets

RD# = Rendered masonry
of # thickness

TF = Top Fixing Cleat utilised

ST# = Stonework of # thickness

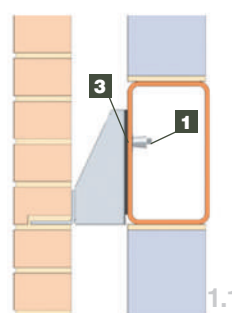
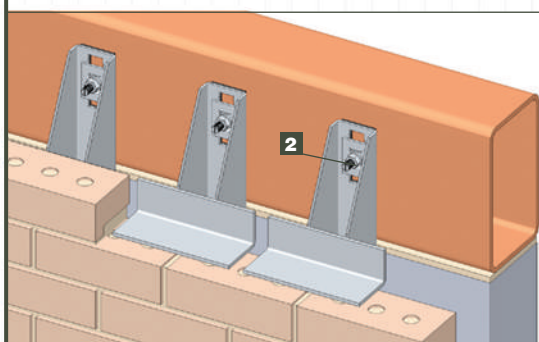
STD# = Stonework of #
thickness with welded dowels
in angle to restrain stone

STC# = Stonework of #
thickness with angle inclined
at 15° to provide restraint

I = Inverted brackets welded
to angle (WSC/WSP)

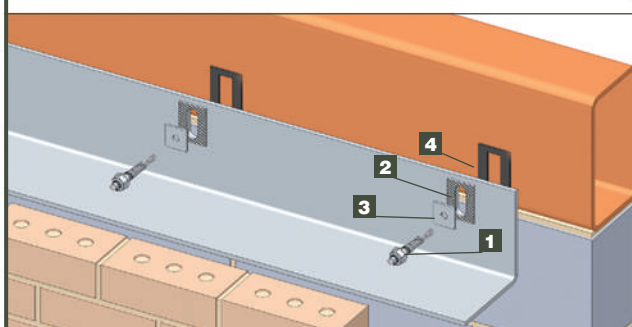
IA = Inverted Angle (WSCFA)
welded to brackets (WSC/WSP)

IIA = Fully inverted system
(WSC/WSP)

WSP INDIVIDUAL BRACKET SYSTEM**1.0 / 1.1****The WSP Individual
Bracket System**

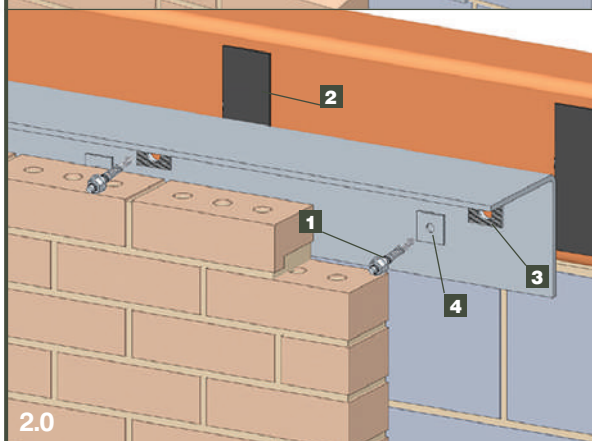
- 1** WBGB Grip Bolt
- 2** WBAW Wincro Adjustment Washer
- 3** WIP Isolation Patch

Example specification: WSP100/2.3/GB
System to suit 100mm cavity and 2.3m
of masonry, fixing to RHS steelwork

COLD FORMED ANGLE/GUSSETED ANGLE SYSTEM**1.0****WSCFA Cold Formed Angle System**

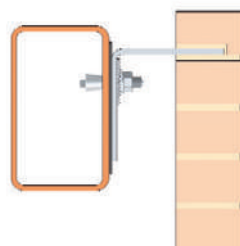
- 1** WBGB Grip Bolt
- 2** Welded Serrated Patch
- 3** Serrated Plate Washer
- 4** WIP Isolation Patch

Example specification: WSCFA65/4.85/GB
System to suit 65mm cavity and 4.85m
of masonry, fixing to RHS steelwork

**2.0 / 2.1****WSCFA Inverted Cold Formed
Angle System**

- 1** WBGB Grip Bolt **2** WIP Isolation Patch
- 3** Welded Serrated Patch
- 4** Serrated Plate Washer

Example specification: WSCFA100/5.5/GB/IA
System to suit 100mm cavity and 5.5m of
masonry, fixing to RHS steelwork.
Angle inverted



FIXINGS FOR WINCRO MASONRY SUPPORT SYSTEMS

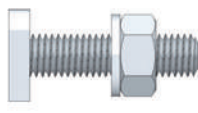
Wincro supply a wide range of fixings for securing our Masonry Support Systems. The standard sizes for each product range are shown in the appropriate table. Non-standard sizes are available on request.

Wincro T Head bolts can be inserted anywhere along the length of the channel and locked into place by rotating the head through 90°. The Wincro range of T Head bolts are manufactured from Grade A2 (304) stainless steel. Grade A4 (316) are available on request.

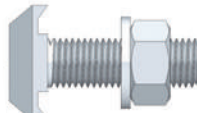
1.0 WINCRO CHANNELS USED IN CONJUNCTION WITH WINCRO MASONRY SUPPORT SYSTEM									
Wincro channel	Pull out (kN)	Shear (kN)	Longitude(kN)	T Head Bolt size	Bolt length (mm)	Torque (Nm)	Minimum edge distant (mm)	Minimum bolt spacing (mm)	Standard length (mm)
WC28	3.75	4.25	1.00	M10	40, 50	15	50	200	100, 150, 200, 3000
WC38	6.00	7.50	2.00	M12 M16	40, 50, 60 50	25 60	75 75	200 200	100, 150 200, 3000
WC40	8.00	10.00	2.50	M12	40, 50, 60	60	100	200	3000
WC49	12.50	15.00	2.75	M12 M16 M20	40 50 50	25 60 120	150 150 150	200 200 200	3000 3000 3000
WC41*	10.5 10.5	4.0 5.75	10.5 10.5	M12 M16	50 50	25 70	100 100	200 200	100 100

*Shear loads for the Wincro WC41 are taken in the direction of the channel. All other shear loads are right angle to the channel.

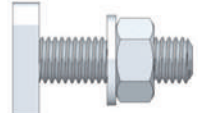
2.0 WBT28 T HEAD BOLT FOR USE WITH WINCRO WC28 CHANNEL	
Standard bolt size (mm)	
M10	40
M10	50



5.0 WBT49 T HEAD BOLT FOR USE WITH WINCRO WC49 CHANNEL	
Standard bolt size (mm)	
M12	40
M16	50
M20	50



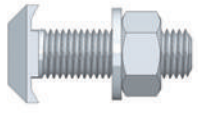
3.0 WBT38 T HEAD BOLT FOR USE WITH WINCRO WC38 CHANNEL	
Standard bolt size (mm)	
M12	40
M12	50
M12	60
M16	50



6.0 WBT41 T HEAD BOLT FOR USE WITH WINCRO WC41 TOOTHED CHANNEL	
Standard bolt size (mm)	
M12	35 50
M16	40 50 60



4.0 WBT40 T HEAD BOLT FOR USE WITH WINCRO WC40 CHANNEL	
Standard bolt size (mm)	
M16	40
M16	50
M16	60



FOR FURTHER TECHNICAL DETAIL – SEE CHANNEL AND BOLT FIXINGS SECTION


For full specification details on the Wincro range of bolts for use with our Masonry Support Systems, please see our Channel and Bolt Fixings section.

Our Technical Design Team is always available to assist you and recommend the correct fixing type, size and length for any situation.

7.0 WBGB GRIP BOLT

Bolt Size	Steel grade	Hole dia. mm	Fixing thickness (mm)		Safe working load (kN)	
			min	max	Tensile	Shear
M12 x 60	8.8	12	7	41	9.8	9.8

Wincro WBGB Grip bolts should not be re-used on safety critical locations, unless a guarantee of their previous loading can be obtained.



8.0 WBXS/WBSS HEXAGON HEAD SETSCREWS

Nominal size (mm)	Pitch (mm)	Tensile mm ² stress area	Class	Tightening torque (Nm)	Yield load kN	Safe working load (kN)		Min dist. between centres (mm)
						Tension	Shear	
M8	1.25	36.60	70	17.00	16.40	10.90	7.52	20
M10	1.50	58.00	70	33.00	26.10	17.40	12.00	25
M12	1.75	84.30	70	57.00	37.90	25.30	17.45	30
M16	2.00	157.00	70	140.00	70.60	47.00	32.43	40



9.0 WBSS THREAD DATA DIMENSIONS IN MM

Major dia.	Core dia.	Pitch	Effective dia.	Tapping drill	Clearance drill
8.00	6.4664	1.25	7.188	6.80	8.20
10.00	8.1596	1.50	9.026	8.50	10.20
12.00	9.8530	1.75	10.863	10.20	12.20
16.00	13.5462	2.00	14.701	14.00	16.25

10.0 WEBB WINCRO EXPANSION BOLT

Product code	Bolt size /hole in (concrete)	Bolt length	Washer dia. steel (SS)	Thread length	Hole dia. in fixture	Standard	Embedment	Reduced	Embedment	Rcomm. torque	
						Depth	Max fixture thickness	Depth	Max fixture thickness		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	
M1080	10	80	21	30	11	60	7	50	16	25	
M10115	10	115	21	30	11	60	42	50	52	25	
M10130	10	130	21	30	11	60	57	50	67	25	
M12100	12	100	24	40	13	80	12	60	24	45	
M12135	12	135	24	40	13	80	39	60	58	45	
M12150	12	150	24	40	13	80	54	60	73	45	
M16105	16	105	30	47	18	100	-	80	5	110	
M16140	16	140	30	60	18	100	20	80	40	110	
M16180	16	180	30	60	18	100	60	80	80	110	
M16220	16	220	30	60	18	100	100	80	120	110	

11.0 WEBB PERFORMANCE DATA

In concrete 30N/mm ²											
Standard embedment depth					Reduced embedment depth						
Safe working load (kN)		Failure load (kN)		Safe working load (kN)		Failure load (kN)		Normal edge distance (mm)		Normal spacing (mm)	
Size	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension & Shear
M10	5.8	6.6	19.5	22.8	3.1	4.5	14.0	20.1	100	100	120
M12	9.0	10.5	30.5	32.2	5.2	6.5	19.6	29.2	120	120	150
M16	14.2	16.3	47.6	61.4	7.1	12.8	30.0	57.8	160	160	180

12.0 WEBB BOLT SPACING (CONCRETE)

Spacing mm	Tensile & Shear reduction factors		
	M10	M12	M16
60	0.65		
80	0.77	0.65	
100	0.88	0.77	0.65
120	1.0	0.88	0.77
150		1.0	0.88
180			1.0

13.0 WEBB EDGE DISTANCE (CONCRETE)

Spacing mm	Tensile: Edge reduction factors			Shear: Edge reduction factors		
	M10	M12	M16	M10	M12	M16
60	0.65			0.60		
80	0.83	0.65		0.80	0.67	
100	1.0	0.83	0.65	1.0	0.84	0.62
120		1.0	0.77		1.0	0.74
140			0.88			0.87
160			1.0			1.0

SELECTION DATA

The Wincro Expansion Bolt requires a hole the same diameter as the bolt.

The hole can, therefore, be drilled through the pre-positioned fixture, eliminating the need for marking out and allowing fast and accurate installation.

Available in a wide range of sizes the Wincro Expansion Bolt is a versatile, cost-effective anchor combining good load carrying characteristics with ease of fitting.

The WEBB Expansion bolt is for use in concrete with minimum strength of 20N/mm².

FOR FURTHER TECHNICAL DETAIL – SEE CHANNEL AND BOLT FIXINGS SECTION

DESIGN DATA

Concrete

Loads shown are for 30N/mm². For other grades of concrete please contact our Technical Design Team.

Edge Distance and Spacing

The loads shown are applicable to normal edge and spacing distances. For closure spacing and edge distances, reduction factors must be calculated from the appropriate tables.

Combined Load

When selecting an anchor which will carry a combined load, ensure that the bolt size selected satisfies the following equation.

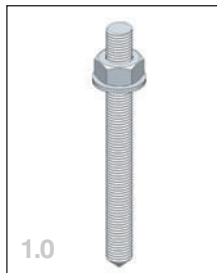
$$\frac{\text{Applied tensile load}}{\text{Safe static tensile load}} + \frac{\text{Applied shear load}}{\text{Safe static shear load}} \leq 1.2$$

14.0 PERFORMANCE DATA WBRB RESIN ANCHOR BOLT USING WBRB INJECTION RESIN

Size	In concrete 30N/mm ²						Brickwork 20.5N/mm ²	Blockwork 7N/mm ²	Blockwork 3.5N/mm ²	Blockwork 2.8N/mm ²	Recommended torque (Nm)		
	Safe working load (kN)		Failure load (kN)		Normal edge distance (mm)		Normal spacing (mm) tension & shear	Safe working load (kN) tension & shear				Concrete 30 N/mm ²	Brickwork 20.5 N/mm ²
	Tension	Shear	Tension	Shear	Tension	Shear							
M10	4.2	4.6	20.8	13.9	70	90	90	2.9	1.3	0.9	0.7	9	6
M12	6.6	6.7	33.0	20.2	80	110	110	4.0	2.0	1.1	0.9	17	11
M16	11.2	12.6	56.0	37.7	90	130	130	5.0	3.0	Sizes above M12 are not recommended		36	24

15.0 CURING TIME

Temp. (0c)	Gel time	Cure time
30	4 mins	30 mins
25	7 mins	60 mins
15	15 mins	120 mins
5	30 mins	180 mins



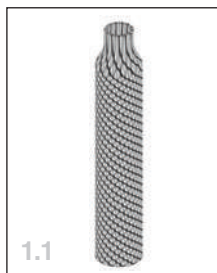
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17.0 EDGE DISTANCE (CONCRETE)

Spacing mm	Tensile: Edge reduction factors			Shear: Edge reduction factors		
	M10	M12	M16	M10	M12	M16
50	0.83			0.56		
60	0.91	0.85		0.66	0.54	
70	1.0	0.92		0.78	0.64	
80		1.0	0.93	0.89	0.72	0.62
90			1.0	1.0	0.82	0.69
100					0.91	0.77
110					1.0	0.84
130						1.0

16.0 MESH SLEEVE

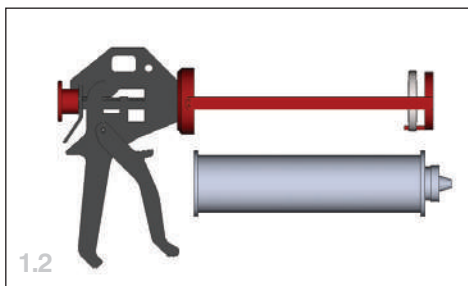
For Stud size (mm)	Hole diameter in structure (mm)	Sleeve diameter & length	Pack quantity
M10	16	15x95, 15x130, 15x200	10
M12	18	17x95, 17x200	10
M16	22	21x200	10



1.1

18.0 SPACING (CONCRETE)

Spacing mm	Tensile & shear reduction factors		
	M10	M12	M16
50	0.82		
60	0.87	0.82	
70	0.91	0.85	
80	0.95	0.89	0.85
90	1.0	0.93	0.88
100		0.96	0.91
110		1.0	0.94
130			1.0



1.2

- 1.0 WBRB Resin
Anchor Bolt
- 1.1 Wincro Mesh
Sleeve
- 1.2 WBRB Injection
Resin and
Resin Gun

The Wincro WBRB is a polyester mix in the nozzle resin anchor system providing a stress free fixing method. Ideal where edge distance or spacing is limited or substrate quality is poor.

The WBRB is suitable for solid or hollow substrates. Used in conjunction with mesh or plastic sleeves. Suitable for overhead applications. Effective in damp conditions. The Wincro WBRB 150ml fits a standard mastic gun. Relative short cure times.

TYPICAL APPLICATIONS

- Two part mix in the nozzle polyester resin anchor systems for use in concrete, brickwork and blockwork.
- Ideal for applications where conventional expansion fixings present problems.
- Typical applications include installation of mechanical and electrical services, facade retention, structural steel cladding restraint, curtain walling, Masonry support systems and remedial repairs.

19.0 NUMBER OF FIXINGS PER CARTRIDGE (SOLID)

Stud size	Hole diameter (mm)	Hole depth & length (mm)	No. of holes per 150ml cartridge	No. of holes per 380ml cartridge	No. of holes using mesh sleeve	
					150	380
M10	12	90	15	61	5	20
M12	14	110	10	42	3	14
M16	18	125	5	28	2	9

20.0

PERFORMANCE DATA
WBRCHD HEAVY DUTY INJECTION RESIN RECOMMENDED LOADS IN kN

Size	Tensile				Oblique30°				Oblique45°				Oblique60°				Shear
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25
M10	11.0	11.0	11.0	11.0	9.2	9.2	9.2	9.2	8.0	8.0	8.0	8.0	7.2	7.2	7.2	7.2	6.6
M12	16.0	16.0	16.0	16.0	13.3	13.3	13.3	13.3	11.7	11.7	11.7	11.7	10.5	10.5	10.5	10.5	9.6
M16	20.1	24.1	30.3	30.3	16.9	18.8	25.2	25.2	15.9	17.1	22.0	22.0	15.6	16.2	19.8	19.8	18.2

21.0

TECHNICAL DATA
WBRB RESIN ANCHOR BOLT USING WBRCHD HEAVY DUTY INJECTION RESIN

Size	Anchor depth	Max thickness of part to be fixed	Thread dia.	Min thickness of base material	Drill bit dia.	Drilling depth	Min dia. clearance	Total anchor length	Max tightening torque
mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm
M10	90	20	M10	130	12	90	12	130	20
M12	110	27	M12	160	14	110	14	160	30
M16	125	35	M16	175	18	125	18	190	60

22.0

TECHNICAL DATA FOR INSTALLING OVERHEAD
WBRB RESIN ANCHOR BOLT USING WBRCHD HEAVY DUTY INJECTION RESIN

Size	Anchor depth	Max thickness of part to be fixed	Thread dia.	Min thickness of base material	Drill bit dia.	Drilling depth	Sleeve inside dia.	Sleeve length
M10	90	26	M10	130	15	90	12.5	85
M12	110	34	M12	160	18	110	15.0	105
M16	125	43	M16	175	22	125	20.5	120

23.0

MECHANICAL PROPERTIES
WBRB RESIN ANCHOR BOLT USING WBRCHD HEAVY DUTY INJECTION RESIN

Size	Min tensile strength	Yield strength	Stressed cross section	Elastic Section modules characteristic bending movement	Characteristic bending movement	Recommended bending movement
M10	700	350	52.8	54.1	45.5	18.7
M12	700	350	77.0	95.3	80.0	32.8
M16	700	350	145.3	247.0	207.4	83.3

CHEMICAL ANCHOR DETAILS FOR HEAVY LOADS

Installation for Resin and Chemical Anchors:

1. Drill hole of correct depth and diameter.
2. Remove the dust thoroughly (also possible with water under pressure).
3. Start injection from the bottom of the hole until it is half full.
4. Insert the selected stud with a twisting motion (rod must be grease free) and check that resin has completely filled the hole (no air pockets), an excess of material should appear on the surface.
5. Apply load and tighten torque as shown in the table below.

FOR FURTHER TECHNICAL DETAIL – SEE
CHANNEL AND BOLT FIXINGS SECTION

DESIGN DATA

Concrete

Loads shown are for 30N/mm². For other grades of concrete please contact our Technical Design Team.

Edge Distance and Spacing

The loads shown are applicable to normal edge and spacing distances. For closure spacing and edge distances, reduction factors must be calculated from the appropriate tables.

Combined Load

When selecting an anchor which will carry a combined load, ensure that the bolt size selected satisfies the following equation.

$$\frac{\text{Applied tensile load}}{\text{Safe static tensile load}} + \frac{\text{Applied shear load}}{\text{Safe static shear load}} \leq 1.2$$

24.0 CHARACTERISTIC LOADS (FAILURE) IN kN WBRCHD HEAVY DUTY INJECTION RESIN

	Tensile				Oblique30°				Oblique45°				Oblique60°				Shear
Size	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25
M10	37.0	37.0	37.0	37.0	25.6	25.6	25.6	25.6	22.4	22.4	22.4	22.4	20.2	20.2	20.2	20.2	18.5
M12	53.9	53.9	53.9	53.9	37.4	37.4	37.4	37.4	32.7	32.7	32.7	32.7	29.4	29.4	29.4	29.4	26.9
M16	60.4	72.5	101.7	101.7	50.9	56.7	70.5	70.5	48.0	51.5	61.7	61.7	46.9	48.8	55.5	55.5	50.8

25.0 SPACING (CONCRETE)

Size	Spacings (mm)						
M10	45	60	74	90	104	117	135
M12	55	73	91	110	127	143	165
M16	63	83	103	125	145	162	187
Reduction Factor							
	0.7	0.75	0.8	0.85	0.9	0.95	1.0

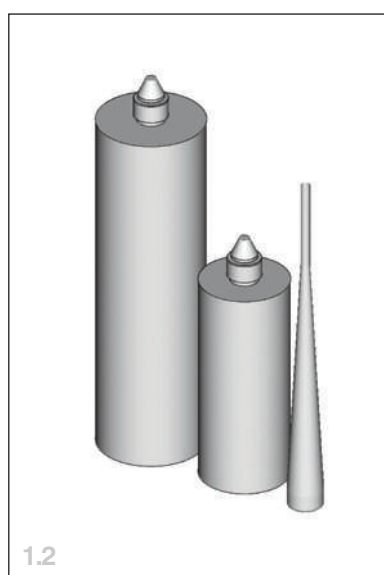
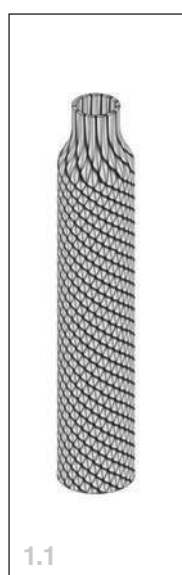
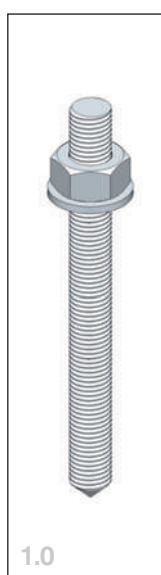
26.0 EDGE DISTANCE (CONCRETE)

Size	Edge Distance (mm)						
M10	45	57	69	81	93	105	117
M12	55	70	84	99	114	128	143
M16	63	80	96	113	129	146	162
Reduction Factor							
	0.4	0.5	0.6	0.7	0.8	0.9	1.0

27.0 TEMPERATURE LIMITS FOR INSTALLATION: 4° TO 52°C

Ambient temperatures (°C)	Max. time for installation (min)	*Waiting time before applying user loads (hr)	Waiting time before torque application (hr)	Total hardening time (hr)
4	45	3.0	5.0	48
10	20	2.0	4.0	36
16	10	1.5	3.5	24
21	7	1.0	3.0	24
32	5	1.0	3.0	24

*Hardening time depends on ambient temperature.



1.0 WBRB Resin Anchor Bolt

1.1 Wincro Mesh Sleeve

1.2 WBRCHD Heavy Duty Injection Resin

SAFE WORKING LOADS

The recommended safe working loads published in this guide are for static application, static applications include dead loads, sustained loads and variable loads where the peak load is lower than the safe working load. Dynamic applications are generally not covered by this guide due to the range and complexity of the application.

For guidance on dynamic applications contact our Technical Design Team.

To establish safe working loads the following criteria are to be met:

SAFETY MARGIN

$$\text{Safe working load} = \frac{x - KS}{\gamma}$$

Where: x = The main ultimate load at failure

K = statistical confidence factor relating to sample size tested

S = Standard deviation of test results found by statistical analysis

γ = Factor safety of 3 for torque controlled expansion anchors

For Bonded Anchors Wincro suggest a safety margin of greater than 4 to take account of variations to site conditions and operator technique.

FIXTURES WILL NOT MOVE

Safe Working Load < mean load at 0.1mm axial movement of anchor due to tensile loading

OR

Average Loading at 1.0mm movement perpendicular to the axis of the bolt due to shear loading, whichever is lower

ANCHOR MATERIAL WILL NOT BE OVERSTRESSED

Safe Working Load < the specified maximum working tensile and shear stress for the particular bolt material in question, all in accordance with the relevant material standard.

Note 1: The lowest value produced by these three methods is used as the safe working load

Note 2: Other manufacturers and distributors may not apply the same stringent criteria to establishment of safe working loads as Wincro

Care should be exercised when comparing Wincro Anchor performance to that of other companies.

CONCRETE STRENGTH

The safe static load (SSL) and failure loads shown in the product specific tables are for 30N/mm² concrete unless otherwise stated. For other strength concrete (between 20 and 50N/mm²) the equivalent tensile load can be calculated using the following empirical formula:

$$\frac{\text{Tensile SSL} = \text{Tensile}}{\text{SSL in 30N/mm}^2 \text{ concrete}} \times \sqrt{\frac{\text{Substrate strength}}{30}}$$

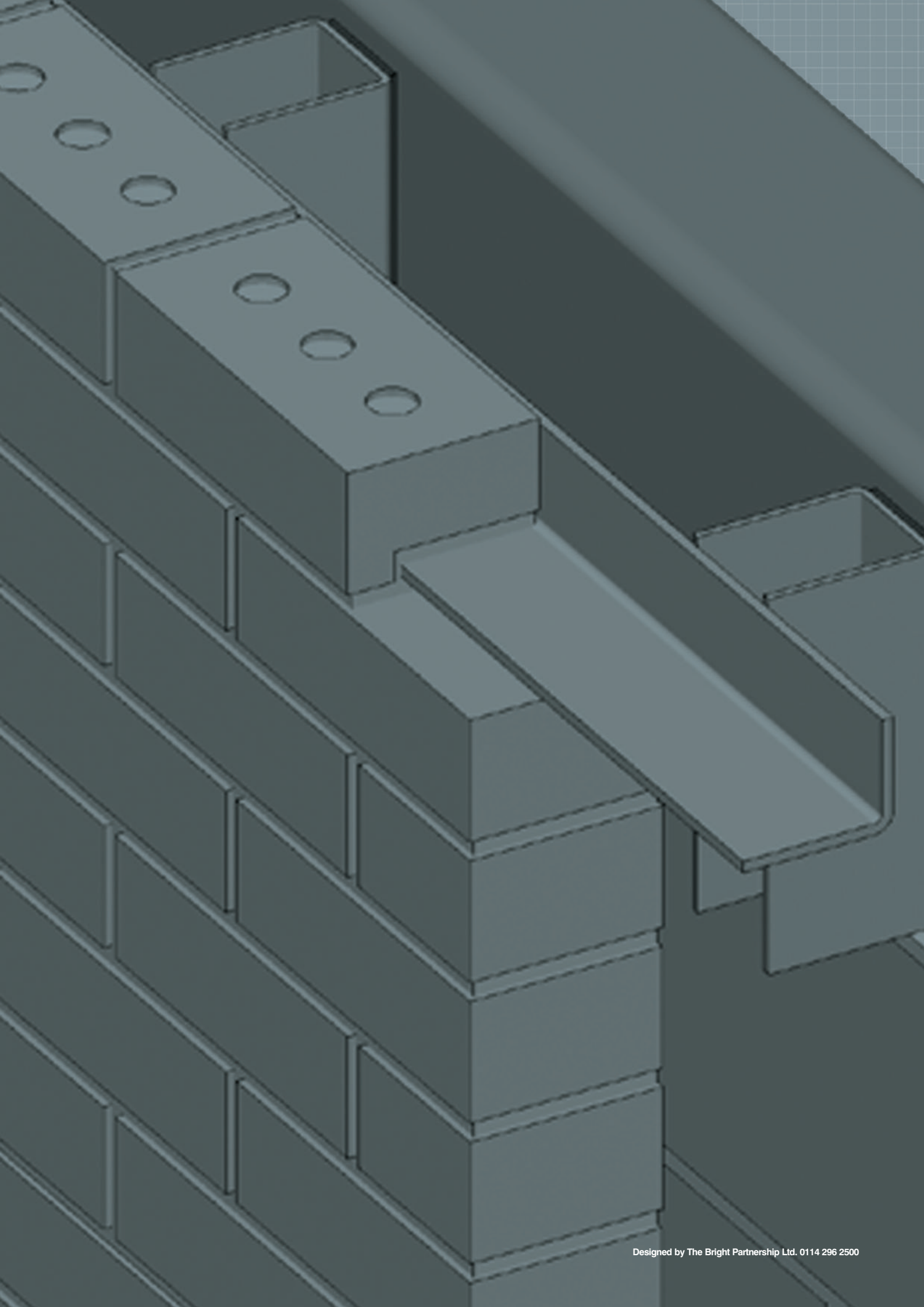
For example:

$$\begin{aligned} \text{Tensile SSL in 50N/mm}^2 \text{ concrete} &= \text{Tensile SSL in 30N/mm}^2 \text{ concrete} \times \sqrt{\frac{50}{30}} \\ &= \text{Tensile SSL in 30N/mm}^2 \text{ concrete} \times 1.29 \end{aligned}$$

Hence the tensile safe working load in 50N/mm² concrete will be 29% greater than the figure shown in the table for 30N/mm² concrete.

This calculation is only valid to tensile loads and cannot be applied to shear loads or failure loads. The formula is empirical, based on test results, in accordance with M.O.A.T. 49, and is intended for guidance only. A site test is recommended to validate these tests.

For further guidance contact our Technical Design Team.



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