July 2017 v10

GEBRIK
INSTALLATION INSTRUCTIONS

GE BRIK BY ISOSYSTEMS

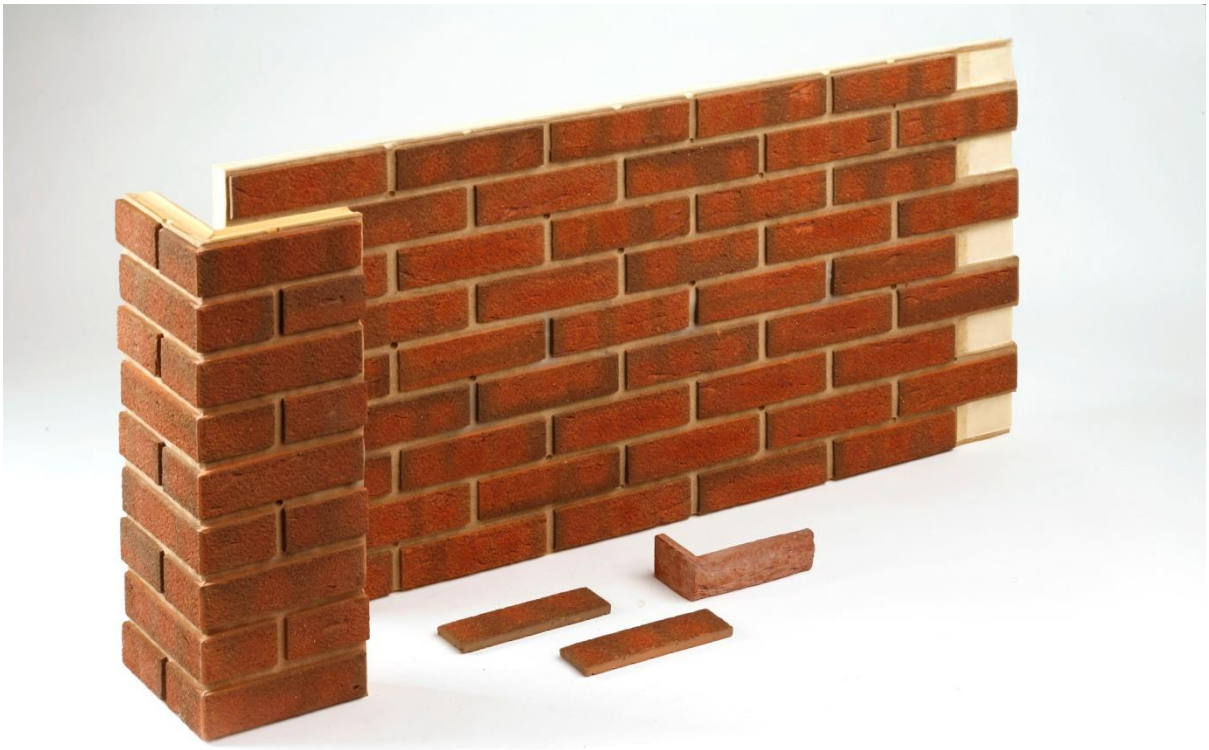
AQUARIAN CLADDING SYSTEMS

CONTENTS

Introduction

WHAT IS GEBRIK?

Gebrik is an insulating brick cladding system and has been produced in Belgium since 1982. During its history it has been used throughout Europe to clad over 30,000 different buildings. It has been used in the UK since 2002, where to date approx 80,000m^2 has been successfully supplied and installed on over 100 different buildings.



The system consists of the following:

- Brick panels (Type P, SP, SP1, SP1.5, RP, RP+, & FP)
- Factory-produced cut & bonded or extruded brick slip external corners (HE)
- Site-produced external corners (PUE & ER)
- Factory-produced cut & bonded or extruded brick slips window jamb & head corners (FE, ST & RE)
- Site-produced window jamb & head corners (PUE & ER)
- Factory-produced cut & bonded column U-elements (U)
- Factory-produced cut & bonded semi-circular and Bullseye window arches
- Additional insulation layers
- Aluminium starter rail
- Plugs and screws
- Single component PU foam
- Cement-based glue
- Specific tools and accessories eg foam gun, V-shaped PU cutting knife, PU cleaner, PU foam plug

Introduction

Gebrik is designed to provide a watertight natural brick finish with improved insulation and is impervious to water, yet will still allow the wall to breathe. It can be mechanically fixed to most walls and is suitable for new build or refurbishment.

Being mechanically fixed, it is less weather dependent and as all panels are frost resistant no climate can be excluded for its use.

Panels are supplied in stretcher bond or stack bond and in the following formats,

	Gebrik UK	**Gebrik 61**	**Gebrik 6**
Panel dimensions:	1350 x 675mm	1375 x 688mm	1391 x 714mm
Brick slip dimensions:	215 x 65mm	240 x 65/66mm	240 x 65/66mm
Mortar joint:	10mm	10mm	13mm

	Gebrik R6	**Gebrik WF**	**Gebrik 5**
Panel dimensions:	1350 x 675mm	1350 x 675mm	1350 x 675mm
Brick slip dimensions:	440 x 65mm	215 x 50mm	440 x 50mm
Mortar joint:	10mm	10mm	10mm

The insulating material is polyurethane (PU), produced from Pentane, which does not release CFC or HCFC agents during manufacture. Our PU also has the advantage of not spreading fire, and has a Class 'O' rating for the risk of fire spread as determined by English Building Regulations and classified as B,s1,d0 in accordance with EN13501-1:2007+A1:2009.

The system has BBA certification, number 07/4403, and has also achieved agrément certification in Belgium, Germany, France, Holland, Poland and Czech Republic. Gebrik has also been successfully tested in accordance with the CWCT Standard Test Methods for building envelopes, 2005 for weather tightness to simulate application to a framed substrate when used on a multi-storey building.

In accordance with the BBA certificate, all system components must be supplied by Isosystems and the application of Gebrik can only be carried out by approved installers, ie firms who either

1. Employ operatives who have been trained by the Certificate holder, ie Aquarian Cladding Systems, to install the system and who have been issued with appropriate training cards by the Certificate holder.
2. Has undertaken to comply with the Certificate holder's application procedure, which contains the requirement for each application team to include at least one member with a training card

(NB We actually issue certificates rather than cards)

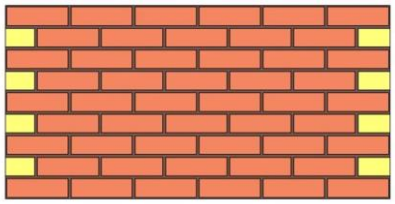
Failure to comply with these instructions may result in the BBA certificate being invalid and consequently invalidating the systems product insurance.

Introduction

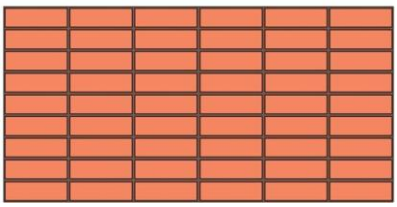
COMPONENTS

1. Panels

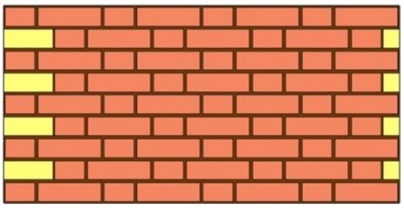
Panels are supplied in stretcher bond (type P, SP, SP1, SP1.5 & KP), stack bond (type RP and RP+) and Flemish bond (FP) using a section of brick slip sizes, ie 215x65mm, 240x65/66mm, 215x50mm, 440x65mm and 440x50mm. NB Not all brick finishes are available in all sizes. Stretcher bond panels can be produced entirely with slips (type P) or headers (type HR) or with slips removed (SP, SP1 and SP1.5). Type SP, SP1 & SP1.5 panels can be used where panels are to be cut on site, hence reducing the site labour of removing slips from cut panels when maintaining stretcher bonding between panels.



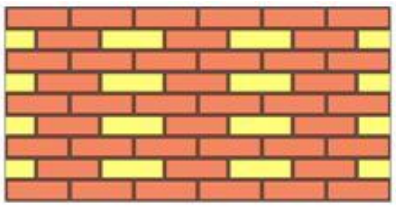
Type P



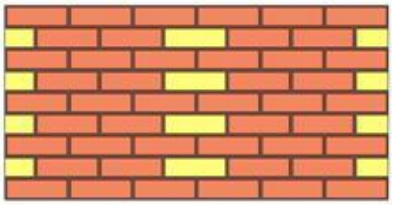
Type RP



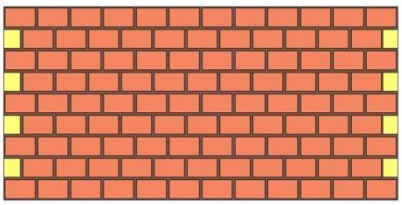
Type FP



Type SP1



Type SP1.5



Type KP

Panels consist of the following:

i. Insulation

The insulation consists of polyurethane foam, which is bi-component and formed from Polyol and MDI (Isocyanurate), with Pentane gas used as the blowing agent. It is this gas that causes the expansion and gives the foam its insulating characteristics. The Lambda (λ) value of the total system can be taken as 0.029W/mK.

There are many advantages to polyurethane foam, which are:

- It maintains its insulating properties for a long time
- It is impermeable to water but permeable to vapour
- It does not spread fire and melts at a higher temperature than most other insulating materials
- It is rot proof
- It is inert and does not release toxic gases upon ageing

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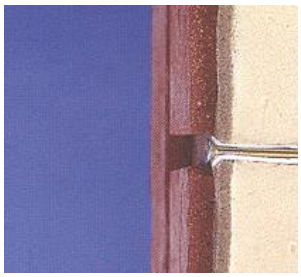
ii. Fixing support



Panels & corners are secured to the substrate by mechanical fixings which are tightened to the panel through the joints between brick slips. The jointing between the brick slips is a mixture of dry sand and high-density PU foam created by the pressure inside the mould during expansion of the foam. This jointing gives rigidity to the panel and provides a counter sunk fixing location to ensure the screw heads do not damage the foam. The density of this joint makes it impermeable to water and vapour.

iii. Brick Slips

All brick slips are manufactured from frost resistant clay and are typically through-coloured. They have an extremely good tolerance for size and shape and sufficient water absorption to ensure a good adhesion to the PU foam.

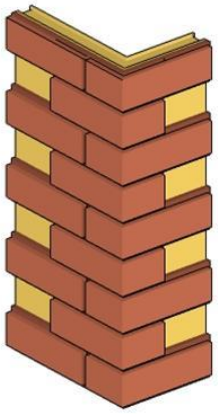
2. Corners

There are 3 options to achieving corners:

1) Factory-produced by cutting and bonding flat panels which are bonded with PU glue, coloured to tone with the brick face. Excess glue is removed mechanically at the factory. The length of either side is a multiple of full and half bricks up to a maximum of 2 ½ bricks.

2) Factory-produced by applying brick slips and brick slip 'pistol' returns to L-shaped PU foam.

The different corners are as follows:



i. External corner (HE)
Example reference HE 1/1.5 (1 brick/1½ brick), HE 1.5/1.5 (1½ brick/1½ brick) etc. Each side is finished with alternating half bricks spaces and full bricks, i.e. 'open'.

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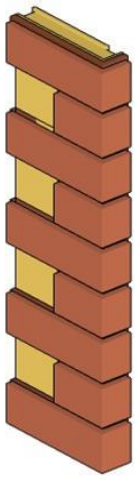
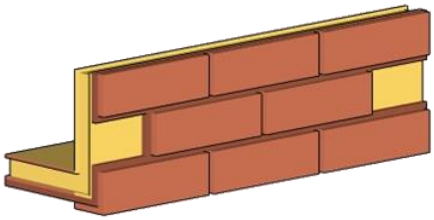
ii. Window Corner (FE)
Example FE 1/06 (1 brick/60mm to close off the panel). These are supplied with one end "open" i.e. alternating courses with a half brick space and the other side is "closed" i.e. will return to the window or door opening.

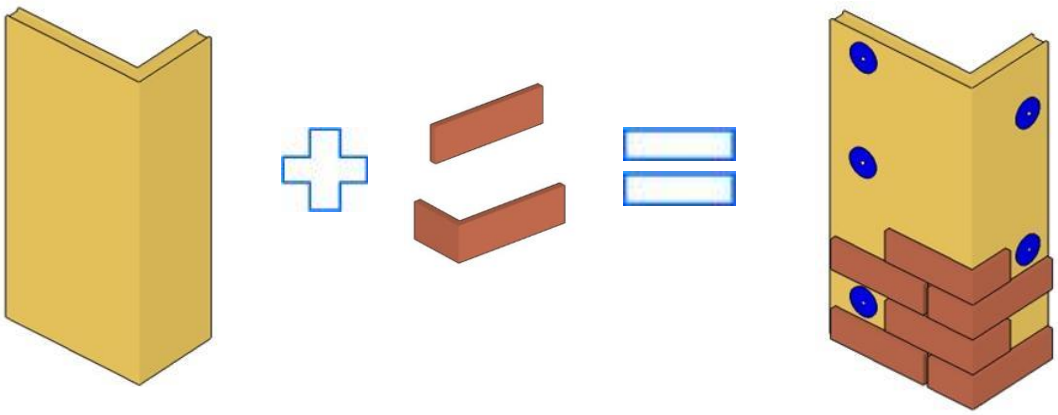




iii. Lintel Corner (ST)
Both sides are "closed" so that a solider course can sit above the window and under the soffit half bricks can abut the frame.

iv. U Elements
These are used either at corners to finish off the system to an abutment, or as piers or at columns and are manufactured to suit up to 2½ bricks wide by 2 bricks deep. They should be ordered open (0) to stitch to a Gebrik component or closed (c) if meeting an abutment, eg U (o)2/2.5/1(c)

3) Site applied corners are used where the cut & bonded finish is not acceptable to the architect or client due to aesthetics. PU corners (PUE) are secured to the substrate using appropriate fixings and large diameter PU washers. Extruded pistol returns (ER) and slips (R) are glued to the substrate on site using Gebrik adhesive.



Introduction

3. Fixings

Plugs and screws have been specifically designed and are manufactured in Germany as part of the agreement. It is imperative that no other fixings are used without the consent of the manufacturer.

There are different types of fixings and plugs for different substrates, ie clay & concrete, aircrete, exterior grade sheathing board and metal. Here are some examples of the fixings and plugs available:

i. *Green Plugs* – suitable for clay and dense concrete masonry where the substrate will allow an expanding plug. They are 8mm diameter and supplied in lengths from 120 – 220mm and must be anchored at least 70mm into the substrate (render is not considered a substrate)

ii. *Blue Plugs* – suitable for aerated concrete where we do not want expansion. The plug is anchored by "wings". They are 8mm diameter and supplied in lengths from 160 – 220mm and must be anchored at least 110mm into the substrate (render is not considered a substrate).

iii. *Spax screws with white collar* – suitable for fixing to minimum 15mm thick exterior grade sheathing boards. They are 6mm diameter and supplied in lengths from 90mm. The screws have a cutting thread similar to a wood screw and the collar is used to spread the fixing through the pre-located hole.

Screws

- The screws are typically supplied as zinc-coated steel unless otherwise requested (stainless steel available)
- Screws are supplied with TX30 or TX25 screw heads
- Masonry screws do not have a cutting thread, which enables greater expansion of the plug
- There are two levels of thread in the screw – one to support the panel weight and the other to work with the torque action of the drill.

Plugs

- The plugs are made of nylon
- The plugs have a diameter of 8mm
- The plug is designed to limit over-tightening of the fixing screw

18no fixing positions are cast within each panel during manufacture and are evenly distributed, located in joints between brick slips. The appropriate type and number of fixings used should be subject to the building exposure and condition and type of substrate.

Approx Fixing Guide

The number of fixings for standard panels depends on the height of the building (h) and the wind pressure (W) on the finished assembly as calculated by a professional Engineer. For guidance purposes,

- If $h \leq 10$ metres and $W < 2.3$ KNm^2 use 9no fixings (3 rows of 3)
- If $h > 10$ & < 18 metres and $W < 2.565$ KNm^2 use 12no fixings (4 rows of 3 or 3 rows of 4)

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- If h > 18 & < 50 metres and W < 2.831 KNm² use 16no fixings (4 rows of 4)

Gebrik can also be supplied to include **Iso-Fixings**, with 9no typically cast in panels and a pro rata number in corners during manufacture. This is an optional extra and only available upon request (at an additional cost), so should be discussed during design with an Aquarian representative and included at the time of order.
Their dual purpose is to improve the pull-through resistance of fixings and minimise thermal bridging by isolating the fixing head from the mortar with an insulating plug, which is inserted after the fixing is applied during installation.

4. PU Foam

PU foam is used to ensure the system remains watertight and thermally efficient. It also minimises the risk of cracking in the mortar as a result of differential movement between panels and corners. It is supplied in 750ml canisters and applied with a special PU pistol around the perimeter of every component to fully seal the system.

5. Adhesive

Slips and external pistol returns are applied on site with cement-based adhesive, which is supplied dry in 25kg bags for water to be added on site.

Approx 15-20no slips can be applied with 1kg of adhesive and mixing instructions must be followed to ensure correct consistency. **NB though its application is not entirely dependent on dry conditions, care should still be taken to ensure the adhesive is not too wet and it can only be applied in temperatures of 5^0 and rising to avoid frost failure.**

6. Accessories and Tools

Generally specialist tools are not required to enable the installation of Gebrik and the following list of tools and equipment has proven to be sufficient in most cases:

Tools provided by the installer

- Tools for levelling and ensuring surfaces are flat (eg straight edge of 2m, spirit-level, transparent tube filled with water,...)
- Bricklayer's weighted plumb line
- Measuring tape
- Hammer drill/ drill (P=620 W; Ødrill= from 4-24mm)
- Power screwdriver with a torque limiter (P= 4 Ah; 12 V)
- Drill bits to suit TX25 & TX30 fixing heads
- Work station (2 feeds with a panel 1.4 x 0.70 m)
- Grinder with Ø230mm cutting disc (P=2100 W; U=6000tr/min)
- Angle grinder with Ø125mm cutting disc (P=1020 W; U=11000 tr/min)
- Drill with high torque and low speed to mix the glue (P=500W; U=2400tr/min)
- Mixer, Ø50mm
- Plasterer's knife 6.5cm wide
- Mason's trowel, 5-6cm wide
- Hammer
- Knife
- Shims or packers up to 10mm
- Timber hand saw (to cut the PU-foam)

Introduction

- Hammer-plugs Ø8mm-L=50mm for fixing the starter-rail
- Small nails (to position site applied brick slips during the hardening of the glue)
- Fine gloves (for protecting hands from PU adhesive)
-

Tools to be purchased with the GEBRIK-system

- PU-Pistol for injecting PU foam into the chamber
- PU-Cutter to re-cut the injection chamber in site cut panels
- PU-Plug to close the PU-injection hole after foaming
- PU-Cleaner to remove PU from face of brickwork

PREPARATION

1. The Substrate

i. Fixings

Identify the type of substrate to ensure the correct fixing type and length will be used, ensuring there is sufficient carrying capacity for the proposed wall plugs.

ii. Condition of Substrate

Assess and prepare the condition of the substrate if necessary. Any unevenness under 10mm over a 2m straight edge and the surface area of which is less than 1/3 of the surface area of the Gebrik element need not be filled or removed. (In such instances wooden or plastic packers between 2mm and 10mm should be used to ensure flush panel abutment).

Any unevenness between 10mm and 40mm are treated by either of the following methods:

- Render
- Lathe and plywood or cement particle board
- Injection of mono component PU foam
- Use of PU or PE panels with a density greater than 40kg per metre^3
- Remove projections with appropriate tools

a) *For concrete/clay masonry:*

1) Masonry or concrete to which the cladding is fixed must be structurally sound and constructed in accordance with one or more of: the designers instructions, BS/EN codes of practice (and their respective UK National Annexes) and the Building Regulations
2) If the masonry/render finish is crumbling or the joints are porous then a bonding test should be undertaken should there be any doubt.
3) Remove any loose or flaked masonry/render.
4) Extreme rough cast render may need to be smoothed with appropriate mechanical equipment to ensure a large contact area.

b) *For galvanized steel framework:*

1) The substrate should be installed by others and must be structurally sound. It should be designed and constructed in accordance with BS EN 1993-1-3 : 2006 and its UK National Annex
2) A minimum 12mm waterproof sheathing i.e. wood/cement particle board with sufficient fixing and load resistance to carry the Gebrik system (35-40kg/m^2 subject to brick finish) should be installed at centres in accordance with the engineers design.

Installation

c) *For timber stud framework:*
   1) The substrate should be installed by others and must be structurally sound. It should be designed and constructed in accordance with BS EN 1995-1-1:2004, the UK National Annex and preservative treated in accordance with BS EN 351-1 : 2007
   2) A minimum 12mm waterproof sheathing i.e. wood/cement particle board with sufficient fixing and load resistance to carry the Gebrik system (35-40kg/m^2 subject to brick finish) should be installed at centres in accordance with the engineers design

2. Projections

Ensure that any vertical and horizontal flashings, masonry cills, copings, etc project 40mm from the face of the system ensuring that the drip projects a minimum of 20mm from the face.

3. External fittings and fixtures

1) For overcladding existing buildings, all fixtures fastened to the façade i.e. rainwater pipes, aerials, vent systems, etc must be removed prior to installation of the system.

2) When fastening any external fitting or fixture ensure that they are anchored to a sufficient depth in the substrate. If in doubt guidance must be sought.

4. Additional Insulation

The total thickness of a Gebrik panel is 60mm, in which the insulation thickness is >=40 mm and the brick slips are a max 20mm (this will vary between brick slip suppliers).

To achieve a particular U Value it is sometimes necessary to apply an additional rigid layer of insulation, which can either be applied to Gebrik panels & corners at the factory or to the substrate prior to securing the Gebrik system. The total thickness of insulation can be increased from the initial Gebrik insulation thickness of 40mm to 240mm however we recommend no more than 100mm of additional insulation is factory-applied.

Where the total insulation thickness is >80mm, we recommend working with 2no layers, ie a first layer of rigid insulation board and then to over-clad with Gebrik. When working with two layers, it is good practice to use the Gebrik PUR foam (PUB cans) to bond the back of the Gebrik panel to the installed insulation layer during application as follows*:

- Additional insulation thickness <60mm: No additional bonding required.
- Additional insulation thickness ≥60mm: Additional PUR bonding is recommended.
- Additional insulation thickness ≥100mm: Additional PUR bonding is required.

Furthermore, we suggest that the first insulation layer is bonded to the substrate with either adhesive mortar or PUR foam as follows:

- Additional insulation thickness <80mm: No additional bonding required.
- Additional insulation thickness ≥80mm: min 40% of the surface must be glued.
- Additional insulation thickness ≥140mm: min 60% of the surface should be glued.

Installation

It is recommended that a minimum of 2no fixings/m² should be used to mechanically attach the first layer of insulation layer.

*note that this advice has been updated since successful dead load testing on purely mechanical attachment in Dec 2016. The advice is good practice not an essential instruction.

INSTALLATION

1. Determine Starting Level

Before starting any fixing determine the start position around the whole building. This can be achieved as follows:

1) Typically gauge down from the head of the ground floor window, door or in accordance with pre-determined datums as the project drawings
2) Ensure the datum level is at least 200mm lower than the finished floor surface to prevent cold bridging between the rail and floor
3) Set the level at each corner of the building and mark with a chalk line two levels 60mm apart in anticipation of fixing the aluminium rail between the lines.

N.B.

- When applied adjacent to a terrace ensure a distance of 20-35mm between the two interfaces to allow for movement. The gap should be filled with a suitable sealant.
- When applied adjacent to bituminous ceilings i.e. for flat roofs, the rail must be fixed above the waterproofing (concave moulding) so that the latter is not damaged.

2. Starter Rail

Preparation

1) Where the cladding starts below ground it is not necessary to use a starter rail.
2) The system can be "buried" by up to 215mm (i.e. three brick courses)
3) The substrate should be protected from damp ingress below ground prior to application of Gebrik (below ground, Gebrik is not a damp proof barrier).
4) Care must be taken not to pierce any damp proofing by drilling. It is recommended that no wall plugs are inserted in the part of the panel, which covers the damp proof membrane.

Installation

The rail is not a load bearing support for the system. It is used to act as a starting level so great care must be taken when fixing the rail, as all future levels will be determined from it. It also acts to protect the system from damage by either direct or indirect UV rays and rodent attack.

Installation

1) Having determined levels, fix rail at 600mm centres using 6mm diameter screws (and plugs if fixing to masonry).
2) Mitre the rail on site for corners as necessary.
3) If the rail is used below ground do not use any form of flexible seal as this will break down in time, allowing water to climb up between Gebrik and the substrate.

3. External Corners

The first component to be fixed is usually an external corner. This will set a vertical measurement so that combined with the horizontal starter rail a right angle is created, ready for the first full panel.

1) Mark the height of the first row with a chalk line.

2) At the bottom of the element remove sufficient PU foam so that it fits flush over the starter rail.

3) Before applying the first element, ensure the rail is free of dust, oil and other pollutants and then run a bead of PU foam along the top of the rail and along the projecting angle of the rail. This prevents water being drawn up and behind the system.

Corners are either supplied factory-produced or site-produced from PU corners, pistol slips and glue. The principles are essentially the same however please note the following:

For factory-produced corners

1) Remove the 5mm overhang of sand/pu so the base of the element starts with brick slips

2) Sit the element on the rail and against the corner of the building and using a spirit level and packers (where appropriate) ensure the face is flat. To position the element correctly:

    i. When applying to masonry, drill through the element and into the substrate. (For aerated concrete, do not use a percussion drill). The drilled hole must be at least 15mm deeper than the plug because the screw is longer than the plug. The deeper hole also compensates for any dust being pushed into and filling the drill hole. (To keep the hole as free of dust as possible push and pull the drill during drilling – but remember to keep the drill at right angles to the element!)

    ii. When applying to sheathing board, ensure the collar is applied to the appropriate fixing then tap it into position in the Gebrik element before

Installation

securing. The screw has a cutting thread so position the element then drill the fixing into the sheathing, pulling the element into position.

iii. When using Iso-fixings, there will be 9no per panel, equally spread across the panel. They are located visually and the fixing is applied in the usual way but the head will sit deeper in the panel by approx. 20mm. Cylindrical EPS plugs are supplied as part of the system and one per fixing is placed into the 'throat' of the Iso-Fixing once the fixing is tightly secured (care must be taken to ensure the fixing and Iso-fixing abut tightly and there is sufficient clearance for pointing). NB Panels can also be secured using standard cast fixing positions but it is imperative to use the Iso-Fixings to achieve the thermal and resistance benefits, which are likely to be included as part of the design.

3) Secure the element to the wall through the brick joints, taking care to neither over-tighten, as this may damage the sand/PU joint between the bricks, or under-tighten as this may lead to subsequent vibration and breakdown of the joint at the fixing position, rendering the fixing useless.

4) If the corners are produced using extruded corner slips there is no PU/sand composite so the corners are secured with fixings and Ø50mm washers. These are located in the spaces created at the edges for slip application, ensuring they are sufficiently embedded in the foam so as not to obstruct the flat application of the slip when 'stitching' to an adjacent panel.

5) Ensure the corner element is correctly in position using a spirit level then unscrew and rescrew the fixings as appropriate to keep the element in its desired position, using packers if necessary.

6) Repeat by inverting the next component to castellate the corners by half a brick. This will maintain correct stretcher bond with perpendicular joints aligning on alternate horizontal courses.
(NB The photo is for illustration only. Typically Gebrik is built up in horizontal rows, similar in principle to brickwork)

Installation

For site-produced corners

i. Typically 85 x 200mm PU corners (PUE 85/200) are used at external returns when using Gebrik UK however if additional insulation is used behind the system 200x310mm (PUE200/310) may be more appropriate to ensure adequate lengths for fixing to the substrate. Typically 85 x 85mm (PUE 85/85), is used with Gebrik 61(as photo).

ii. As with factory-produced corners, sit the PU corner on the rail and against the corner of the building. Using a spirit level to position the element correctly, drill through the element and into the substrate. Use the fixings provided for the panels but also use a PU collar to spread the fixing head across a larger surface area of the foam (without the PU collar the fixing head will penetrate the foam and will have no integrity).

iii. Once the PU corner is in place panels are aligned and then pistols are applied using cement based glue once the corner has been foamed at the interface with the adjacent panels or abutments.

4. Installing the first panel

1. There is sometimes a small (<20mm diagonally across the panel) curve on panels as a result of the PU curing process continuing within the panels whilst shrink-wrapped. This is a rare occurrence and can be remedied by scoring the back of the panel with a series of cuts from a sharp knife in a perpendicular direction to the curve. This is a simple process and should be done prior to application of the panel. Provided the cuts are not deeper than 30mm, this process does not affect the integrity of the panel.

2. Repeat steps 1, 2 and 3 as fitting a factory-produced corner.

Installation

3. Position the panel so that it abuts the corner and sits on the starter rail. Use a spirit level and packers (where appropriate) to ensure the face is flat and there is a good abutment and alignment between the two elements to ensure the vertical and horizontal joints are maintained.

4. Drill through the panel into the substrate using the pre-located fixing positions. Apply an appropriate number of fixings subject to specification, fixing the panel from the centre to the corners across the whole surface, taking care not to over- or under-tighten the fixings against the pre-located countersunk fixing positions. If the installer considers that, in spite of the number of wall plugs stated in the specification, the panel is not firmly fixed then additional wall plugs must be used.

5. Use packers as appropriate to ensure that the panel is correctly positioned and tighten fixings so that the fixing head is tightly positioned in the countersunk pre-located fixing position. If necessary, a maximum of 30mm of foam can be removed from the panel thickness to assist with uneven substrates. However to avoid weakening the structural integrity of the component, this must not be exceeded.

6. When applying the next row of panels ensure the foaming chamber is free of dust and debris.

6. Repeat the above steps to apply further panels and increase coverage one row after the other. This can be done either in stretcher or stack bond. (See notes regarding Bonding Principles).

5. Openings

As with external returns, jambs and soffits can be supplied either factory-produced or supplied for site-application using PU corners, pistol external returns and slips to suit the depth of the reveal.

Installation

Installation of the window reveals

1. Ensure that before the Gebrik component is installed, the frame is sealed to avoid water ingress between the frame and opening.

2. Leave a gap of 10mm between the Gebrik component and the frame so that a compressible sealing strip can be applied to ensure no water can penetrate at the interface.

3. Where applicable, ensure any outward opening windows are not obscured by the component. If so, remove the appropriate thickness of foam up to a 30mm maximum reduction.

4. Start at the cill and work up by first fixing the corner elements in place with at least 2 fixings on either 'leg' (3no on legs >215mm) , ensuring that the whole surface area is in contact with the substrate. If a soffit reveal is required, make sure that it is in place before applying the last corner element.

5. Fix the soffit reveal in place using the same method as fixing jambs. Be aware when drilling of any reinforcements in the existing lintel.

6. If necessary, cut the height of the soffit reveal to ensure that the top brick edge lines up with the horizontal edge of the bricks in the adjacent stretcher bond panels (unless it's part of a continuous string course)

7. Fix the remaining corner and soffit reveals.

8. Apply the compressible (compriband) seal then the silicone sealant between the element and frame.

9. Site-applied reveals are applied in the same way as external corners and note that pistols and slips (if required) must be cut to length on site. When applying soffit reveals on site the pistol returns should be supported with a former during curing to ensure sufficient pressure and adhesion.

6. Movement Joints

Gebrik will have negligible movement however movement joints should be used to follow the substrate, which will ensure the facade and substrate/structure move together.

Vertical expansion joints should be provided at intervals not exceeding 15 m. Horizontal expansion joints should be provided at intervals not exceeding 7 m.

Where movement joints are required a 10mm gap is left between components which is subsequently filled with a compriband strip and then covered with a suitable mastic sealant, coloured to match the mortar.

7. Maintaining Brick Bond

Bonding of panels varies according to their format, eg Gebrik UK, Gebrik 61, etc so ensure you are familiar with the difference between panels. Note that within each format each panel is the same, though the type of 'stitching' will vary between formats. For example Gebrik UK panels must be staggered vertically by half a brick, to maintain a stretcher bond where perpendicular joints align every other horizontal course.

Installation

However in the Gebrik61 format, either end is different i.e. the first brick on the top row is a full brick with that row finishing with a space for a half brick. The next course will start with the half brick space and end with a full brick and so on. To maintain stretcher bond always make sure the panel is aligned so that when two elements abut either two half bricks or two whole bricks should meet.

As with traditional brickwork, it is required aesthetically to line up perpendicular joints wherever possible. Generally however buildings do not co-ordinate with brick dimensions therefore cutting of panels to maintain a bond pattern will be necessary. Essentially this is done to the client's/architect's approval but the best way of reducing the overall effect of non-co-ordinating brickwork is by inserting a closing bond typical of traditional brickwork.

Note that it is easier to reduce the length of the corner element and work with full bricks on a panel, ensuring that the length of the element is never less than 180mm.

Cutting Elements

To maintain the appropriate bond, cutting of elements will be necessary.

Tools required:

- Disc cutter with Ø230mm diameter diamond-tipped blade suitable for clay bricks for cutting panels
- Disc cutter with Ø125mm diameter diamond-tipped blade suitable for clay bricks for removing bond between slip & PU/sand
- 65mm wide trowel or steel spatula for removing brick slips
- V-shaped PU cutter for creating foam chamber

Cutting the element

1) Measure the element and mark a line in preparation for cutting. Ensure there will be no gap between cut and uncut elements.

2) Make the cut with the Ø230mm disc cutter ensuring that the blade is at right angles to the element's surface.

3) Using the V-shaped tool form a channel by removing the foam along the perimeter of the element to create a foaming chamber.

4) Either fix the element to the substrate or place it securely on the work station.

Installation

5) Once the panel is firmly restrained, using the disc cutter remove the sand/PU surrounding the half brick with the Ø125mm disc-cutter. Ensure care is taken not to remove PU foam by cutting too deep.

6) Once the bond between the brick slip and sand/PU is broken, slide the trowel/spatula immediately under the slip to break the bond with the foam. Prise away the slip carefully (in pieces) to leave as much foam as possible on the panel.

7) If the slips are removed from the cut piece prior to securing to the wall the piece should be secured and sealed in the usual way with fixings and foam

8) Slips should be cut to the required length with the disc-cutter and then glued in position in the usual way with the appropriate adhesive

8. Foaming

This procedure is one of the unique features of Gebrik. The system is typically sold as an insulating and impervious cladding solution so it is imperative to apply foam correctly, which will avoid water penetration or warm air leakage.

The Foam

The single component polyurethane foam has been designed specifically for the Gebrik system and it will expand to twice its volume. The first increase in volume is due to a CFC-free gas and as soon as the foam leaves the gun it starts creaming. The second volume change is a longer one and is created by a chemical reaction between the Isocyanurate part of the foam and humidity of the air. Because of this delayed reaction, particular care should be taken when injecting the foam into the chamber to avoid overfilling.

The Injection Chamber

The chamber is designed to prevent foam leakage at the front but allow foam to escape to the back of the system so as to minimise any potential bulging of the face where panels abut. This will also act as a supplementary binder and packer. Any elements cut on site will require a channel formed on site to create the chamber. A special PU cutter tool is available for this process.

To avoid unsightly bulging at panel and corner abutments, checks should be made for flatness of the facade prior to full curing of the applied foam. Where necessary, fixings should be re-tightened and use of 'chocks' under the fixing head and across the brick face may be required to pull the panel tight to the substrate to avoid the head pulling through the countersunk fixing position.

Installation

Option 1

Foam is injected into the chamber through pre-fabricated 6mmØ apertures along horizontal abutments and through the soft foam area of panels where slips are applied at vertical abutments (if stack bond panels are used, the vertical apertures need to be site-formed by drilling with a 6-8mmØ masonry drill bit). This a preferred solution if the substrate behind the system is uneven, eg concrete or refurbishment.
The *benefits* of this option are that panels can be re-positioned if necessary, prior to foam application and the chamber is formed prior to filling.
The main *disadvantage* is that it is difficult to control the foam expansion and it may expand out of the chamber onto the face of the brickwork.

Option 2

Foam is applied along the channel of a fixed component immediately prior to positioning, and then securing, an adjacent component. Care should be taken to ensure that there is a continuous bead of foam along the channel and the next component is applied as quickly as possible to ensure the foam expands into the chamber which is created as the components abut. This solution is applicable when applying to a flat substrate, eg sheathing board.
The *benefit* of this option is that the installer can see that the channel has a continuous bead of foam however it is imperative that the next component is applied quickly. If not, the foam should be removed before curing, the chamber cleaned and the process started again.
The main *disadvantage* is that the foam will 'glue' the panel to the substrate so once the foam has cured it is difficult to be re-positioned without destruction.

The PU Injection Tool/Pistol

The foam pistol gun is a robust tool with an 8mmØ nozzle tapering down to 4mm and is equipped with a continuous adjustable flow system. The 'gun' is therefore forced into the aperture and may require site drilling on site to increase the diameter of the injection aperture.

Always keep a filled canister on the gun. Do not dismantle the gun and ensure the nozzle is kept from blockage by cleaning the nozzle of the gun daily, using recommended cleaning products.

PU Plugs

To ensure that foam doesn't leak from injected holes, hard plastic Gebrik PU plugs are available to close the hole. These can be cleaned and reused.

Application

It is recommended that foaming is carried out at the end of every day, after panels and corners have been firmly secured (the expansion of the foam will push panels apart or away from the substrate!). This will ensure that the system is watertight immediately and will avoid later confusion over areas that may (or may not!) have been foamed.

1) Use foam at a temperature between 5°C and 35°C.

2) Shake canister from side to side (at least 20 times) before use and repeat regularly.

Installation

3) Position the canister on the gun and test to ensure the appropriate control, adjusting the nozzle as required. Experience shows that better control is attained by reducing the opening of the gun to a minimum and increasing the injection time.

4) To access the horizontal chamber penetrate the pre-located holes at horizontal panel abutments with the pistol nozzle. Apply the foam left and right within the hole, taking care to fully fill the chamber but minimising excess foam expanding out of the joint. The chamber is full when the foam comes out of the adjacent holes.

5) To access the vertical chamber, force the gun nozzle between panels at the point where slips will be applied.

5) Plug the hole where injection has taken place with PU plugs to ensure the foam expands within the chamber. **Do not force** the plug into the chamber as this may leave an area without foam.

7) Leave the plugs in position for a minimum of 4 hours.

8) After foaming, check for flatness of the facade and, where appropriate, re-tighten the fixings

9) Cut and remove any excess foam with a sharp knife. Remove any dried PU from the face of the bricks using PU cleaner as soon as possible to minimise difficulty in cleaning the brick face at a later date.

Installation

10) Typical consumption is approx 8m² per 750ml canister for masonry and 12m² for sheathing boards i.e. 45-50 litre free foaming. Injection time can be affected by atmospheric temperature and humidity but is generally approximately 4 seconds.

11) Store bottles upright at approximately 20°C.

9. Gluing of Brick Slips

When stretcher or Flemish bond is required, the system has been designed to "stitch" panels together by gluing a brick slip on alternate courses where panels abut, using cement-based glue.

Insufficient control of on-site adhesion will potentially lead to delamination of slips so care must be taken to ensure the following instructions are strictly adhered to.

Cement-Glue

Cement based glue is supplied in dry powder form in 25kg bags and is mixed on site with water in accordance with the instructions on the bag.

Preparing Cement-Glue

The Gebrik panels, slips and mixing equipment must be sound, level, clean, dry, free of paints, oil and other bond-inhibiting residues prior to application of cement-based adhesive.

1) Use the adhesive at atmospheric temperatures between 5°C and 25°C.

2) Add approx 6-6.5l of water to 25kg of adhesive powder (or to a similar ratio if less adhesive is required) in a clean mixing container, add powder while mixing with a paddle attached to an electric drill until all lumps have disappeared. Leave to stand for a few minutes and re-mix.

3) Once water has been added and the adhesive prepared, care must be taken to ensure no further water is added as this will dilute the adhesive quality of the glue.

4) Typical coverage is ≤20no slips per kg with a work time of approx 3 hours at 20°C. The slips will be set from approx 12 hours and sound within 3 days, at 23°C and 50% RH (higher temperatures reduce and lower temperatures increase these times)

Application of brick slips and pistols

1) Before applying the glue to the brick slip ensure that it is the correct size and cut to length or trim any edges as necessary.

Installation

2) Wearing fine gloves to protect your hands, first apply a thin layer of glue to the substrate with a smooth trowel. Then a layer of glue should be applied to the rear of the brick slips with the trowel. Ensure there is sufficient glue to cover the full surface at the appropriate depth.

3) Press the glued slip against the PU foam and move it around to ensure there is total surface contact.

4) Make sure that the brick slips are correctly aligned and flat by using a straight edge that spans the applied slip and adjacent slips. Ensure a constant stretcher course is maintained and if necessary hold the brick slips in place whilst the glue sets by tapping nails into the foam and ensuring that you do not push them through the glue. These can be removed after 12 hours.

5) Never change the ratio of pre-batched PU glue nor add fresh water to the cement based glue.

6) Remove residue from the face of the slips with water immediately.

7) Clean tools with water.

10. Pointing

Pointing is carried out not less than 7-10 days following foaming using either cement or lime based mortar, and a water repellent. The mix should be no stronger than 3:1 (sand:cement) or weaker than 6:1 (sand:cement) and will vary from brick to brick, depending on water absorption. Advice should be sought from the mortar supplier or specialist applicator if in any doubt. Bucket handle or flush joints are typically used and recessed joints are achievable up to 3mm.

We strongly recommend mortar is applied with mechanical (eg Gunpoint) or hand held (eg Easipoint) guns to minimise batch variation. Care should be taken to avoid pointing in inclement weather (to minimise efflorescence) and to ensure the whole joint is filled (to avoid free-lime staining). Immediately following pointing, ensure the facade is protected from direct sunlight (to avoid drying out too quickly), from rain (to avoid being washed off/out), from frost (to avoid cracking due to frost expansion).

Manual

Manual Pump

Mechanical