

rods & mortar

INSTALLATION SYSTEM



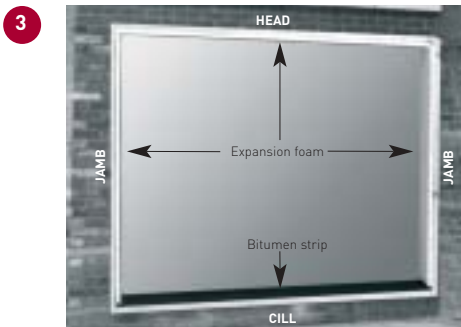
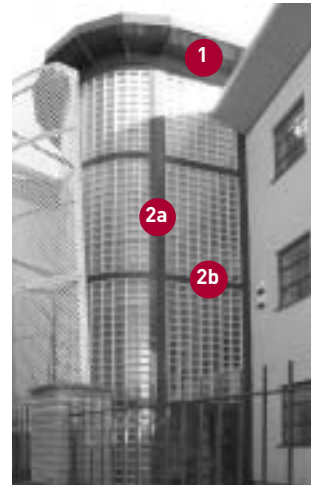
RODS AND MORTAR

REASONS TO USE RODS & MORTAR

Internal and External Panels Straight or curved walls

GOLDEN RULES OF GLASS BLOCK INSTALLATION USING RODS & MORTAR

- 1 Glass block walls are self supporting, but not load bearing.**
This external stair tower was constructed using steel box sections. The whole structure was infilled with glass block panels that could expand and contract freely. The steel box section supports the roof independently and no downward pressure is placed on the glass blocks.
- 2 For best integral strength, glass blocks should be installed into a four sided pre-prepared opening. This opening can be timber, brick, steel, concrete or blockwork.**
 - 2a** The vertical box section creates the jambs of the opening.
 - 2b** The horizontal beams provide a head and a cill for the glass block panels to be anchored into.



- 3 Glass blocks expand and contract with temperature change.**
Glass blocks should not be installed when the surrounding temperature is 5°C and falling or 30°C and rising.
Expansion material must be incorporated to the perimeter opening.

- 4 Openings must be square and perpendicular and designed to suit glass block modules.**
Glass blocks cannot be cut like masonry bricks or tiles.
For information regarding the calculation of opening sizes see page 3.
- 5 Maximum panel size without intermediate slip joint is 25m² with no single dimension exceeding 6m in any direction.**

- 6 Accessories for Rods and Mortar construction :**
 - 10mm plastic spacer pegs
 - bitumen and foam expansion material
 - Colmef Vetromix mortar
 - ø5.5mm stainless steel rods
 - Spacer pegs

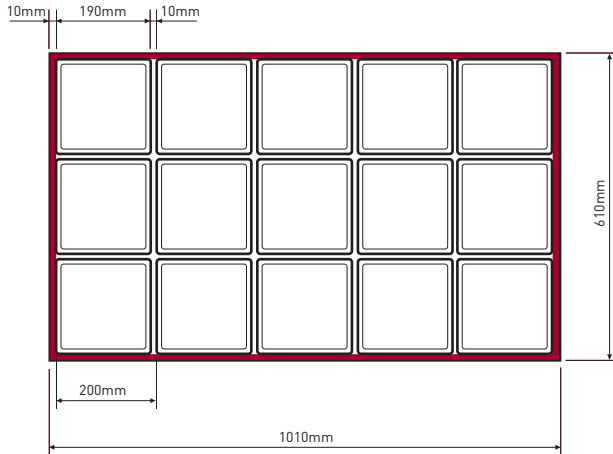
A full explanation of how to use each accessory is detailed in the relevant section of this booklet.



RODS AND MORTAR

CALCULATING OPENING SIZES

When detailing opening sizes, the minimum opening can be calculated using this simple formula :
 The dimension of the block + the width of the joint X the number of glass blocks + one more joint = minimum opening size.



EXAMPLE : Using 10mm joints

190mm glass block :	190
10mm joint :	+ 10
	<hr style="width: 50px; margin-left: auto;"/>
Number of blocks :	200
	x 5
	<hr style="width: 50px; margin-left: auto;"/>
	1000
Add sixth joint of 10mm:	10
	<hr style="width: 50px; margin-left: auto;"/>
Minimum opening size :	1010mm*

*The expansion material is incorporated into this measurement.

— Denotes expansion material

These working formulae will vary if you are using U channels, different size blocks or different size joints or the panel is curved. For assistance contact Glass Block Technology.

JOINT SIZES

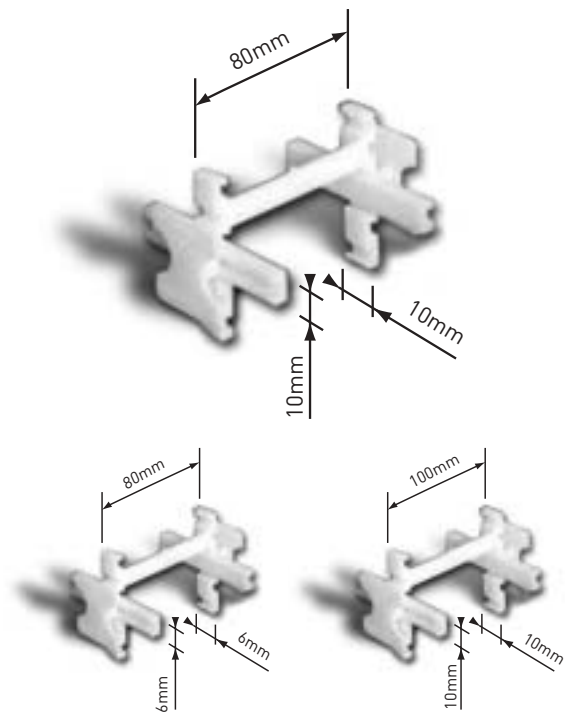
When constructing glass block walls using 190x190x80 or larger dimension glass blocks, Glass Block Technology recommend the use of 10mm horizontal and vertical joints.

SPACER PEGS

10mm spacer pegs are available to assist with accuracy of construction and prevent mortar squeeze.

Glass Block Technology also has a 6mm horizontal and vertical spacer peg in the product range, this can be used only in conjunction with 80mm thick glass blocks. It is primarily used in conjunction with smaller glass blocks for example - 115x115x80, 190x90x80 or for curved glass block screens where it is subject to a tighter than recommended radius.

When the spacer peg is fitted and the wall is finished, the tabs at the end twist off and this is then grouted over.



Spacer peg variants



RODS AND MORTAR ACCESSORIES

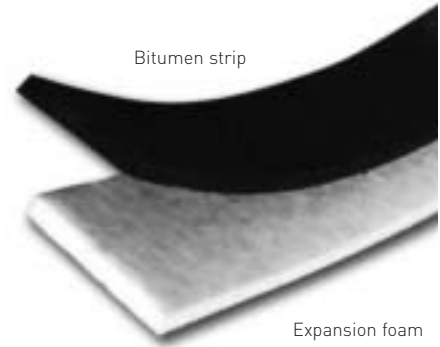
PERIMETER EXPANSION JOINTS



Diagram 1

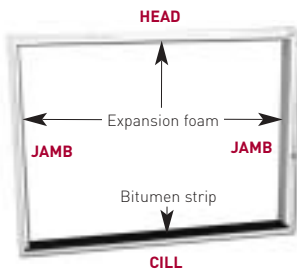
Expansion and contraction is one of the most critical aspects of any glass block construction. Expansion joints must be incorporated to the perimeter of all glass block panels (as detailed on GBT data sheets). For the head and jambs of any specification a 10mm thick foam should be used. It is extremely important not to bridge this expansion joint in mortar, it should be caulked over using silicone.

If the joint is bridged, it may cause blocks to crack (see Diagram 1).



Bitumen strip

Expansion foam



Cills should be prepared by using either a bitumen strip or two coats of bitumen emulsion, to allow for compression caused by the weight of the panel yet ensuring that the base course of glass block mortar does not adhere to the substrate.

When the height or width of the panel exceeds 6m, either a vertical or horizontal support should be incorporated, or a horizontal or vertical slip joint. (See data sheets GBT 0009 and GBT/0010).

For curved glass block walls, expansion joints must be inserted around the perimeter and where the curve changes plane. (See datasheets GBT 0017).

REINFORCEMENT



Reinforcement rods

Stainless steel ribbed reinforcement rods are used to anchor glass block panels in place and increase integral strength. The rods should be at least 5.5mm diameter and a minimum of one stainless steel rod should be used within each horizontal and vertical course.

Where reinforcement rods are joined, allow a minimum overlap of 150mm and loosely tie using tie wire.

Reinforcement rods should be anchored into all substrates to a minimum depth of 25mm. An oversized hole should be drilled, then filled with silicon to allow the reinforcement bars to move with expansion and contraction. For reinforcement with U channels refer to data sheet GBT-0003.

Reinforcement rods should never rest on or be in direct contact with any of the glass blocks. Spacer pegs have a cross section where the rods can be positioned onto.



Reinforcement rods in construction



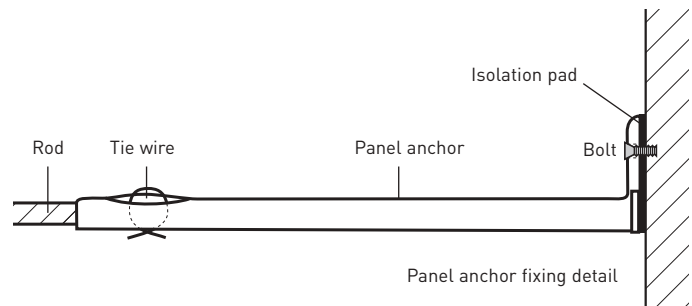
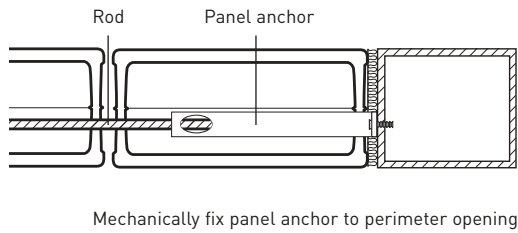
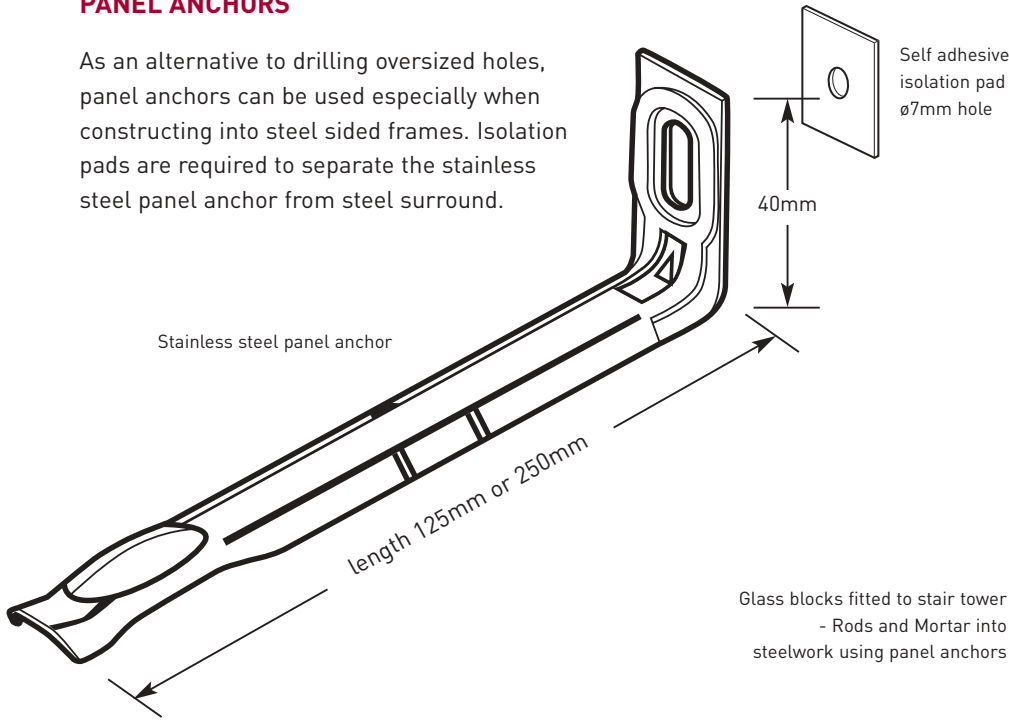
Spacer pegs and reinforcement rods

NOTE : For fire rated walls, special conditions may apply, regarding reinforcements. See Fireblocks section.

RODS AND MORTAR ACCESSORIES

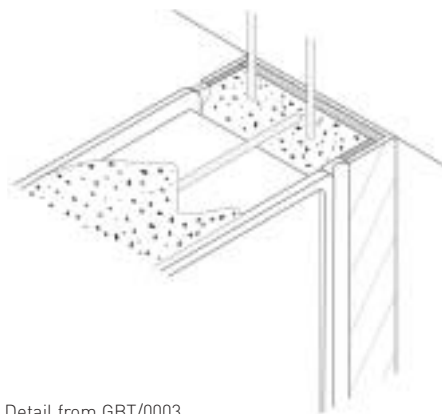
PANEL ANCHORS

As an alternative to drilling oversized holes, panel anchors can be used especially when constructing into steel sided frames. Isolation pads are required to separate the stainless steel panel anchor from steel surround.

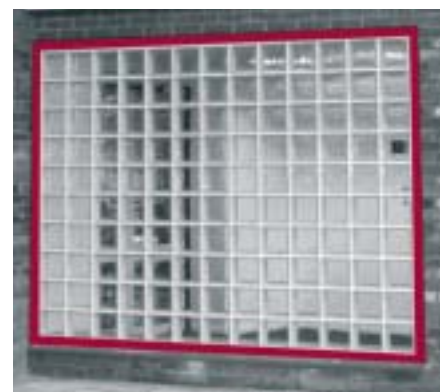


USING U CHANNELS

U channels are often used to assist in applications where an opening has to meet a specific dimension.



It can also be considered if an opening has been prepared incorrectly and the dimension is too large. The figure can be reduced by incorporating an individually fabricated U channel.



Refer to data sheet GBT/0003 when detailing.

It is crucial that the U channel is lined correctly with expansion fibre and when the channel is filled with glass block mortar at least two number stainless steel ribbed bars are inserted.

Ensure the glass block does not fit within the U channel.

RODS AND MORTAR ACCESSORIES

GLASS BLOCK MORTAR

Glass Block Technology recommend the use of Colmef Vetromix glass block mortar when constructing brick by brick. Colmef Vetromix is used as a bedding mortar and then by slightly diluting the mix it can be used as a grout for finishing.



Colmef Mortar approximate number of blocks per 10kg bag calculation

Block	Blocks per m ²	Blocks per bag 10mm joint	Blocks per bag 10mm joint curved	Blocks per bag 6mm joint
115x115x80	64	19	16	32
146x146x80	44	16	13	27
146x146x98	44	13	11	22
190x90x80	50	16	13	22.5
190x190x80	25	12	10	20
190x190x100	25	10	8	16
240x115x80	32	13	11	21
240x240x80	16	9.5	8	16
300x300x100	10	6	5	10

SUITABILITY

Colmef Vetromix can be used internally or externally for straight and curved glass block panels

Mixing instructions for Colmef Vetromix can be found on the reverse of each bag. Colmef Vetromix requires mixing with clean water only to make it workable, the powder already contains hydraulic binders, inert and synthetic resins.

Colmef Vetromix is a very pure shade of white.

Colmef Vetromix can be coloured by mixing it with special colouring compounds.

When Colmef Vetromix is completely cured it becomes totally water repellent.

When constructing glass block walls with Colmef Vetromix always ensure that the surrounding temperature is not 5°C and falling or 30°C and rising.

No joint width should exceed 22mm.

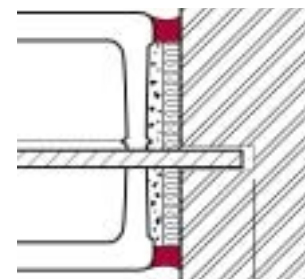


NOTE : Never grout over perimeter expansion joint, always silicone.

TECHNICAL CHARACTERISTICS OF COLMEF VETROMIX GLASS BLOCK MORTAR

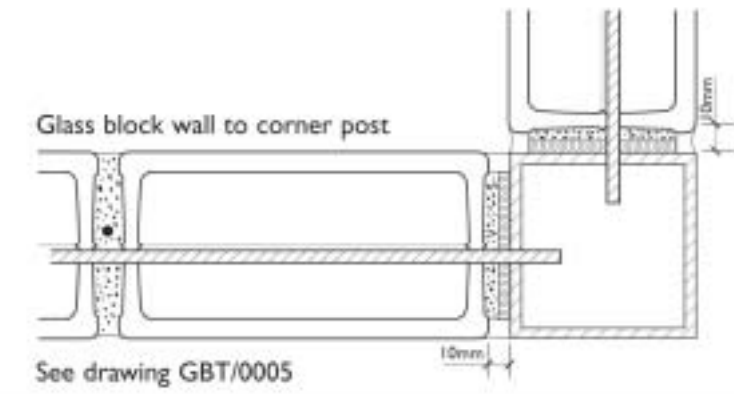
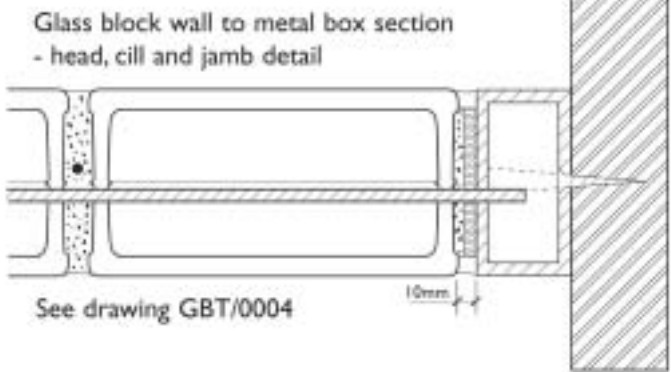
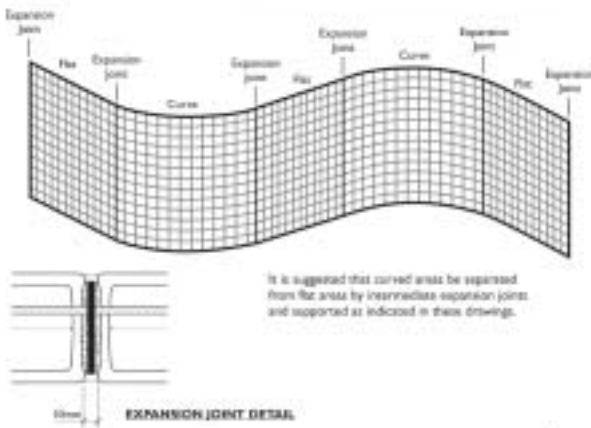
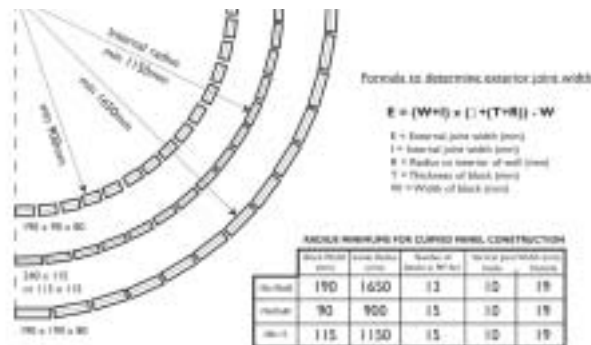
Figures stated were taken at 23°C at 50% RH and in lack of ventilation

- PH of mixture : 12.8
- Minimum joint size for a curved panel : 4mm
- Maximum joint size relating to the external joint for a curved panel : 22mm
- Compressive resistance after 28 days : 19.5N/mm²
- Flexible resistance after 28 days : 7.5N/mm²
- COSHH Data sheets are available for Colmef Vetromix on request from Glass Block Technology.
- Colmef Vetromix retains the glass block panel at a U value of 2.9W/m²°C.
Wet sand and cement mix increase panel to 3.2W/m²°C.



GUIDE TO INSTALLING GLASS BLOCKS USING RODS & MORTAR SYSTEM (1)

DATASHEET GBT/0001



- ### Guide to Installation - Golden Rules
1. Glass block walls are self supporting, but not load bearing.
 2. For best integral strength, glass blocks should be installed into a four sided pre-prepared opening. This opening can be timber, brick, steel, concrete or blockwork.
 3. Glass blocks expand and contract with temperature change. Expansion material must be incorporated to all four sides of the perimeter opening. 10mm expansion joints are recommended.
 4. Glass blocks should not be installed when the surrounding temperature is 5°C and falling or 30°C and rising.
 5. Openings must be square and perpendicular and made to suit glass block modules. Glass blocks cannot be cut like masonry bricks or tiles.
 6. To calculate the minimum opening size based on using 190x190x80mm blocks with 10mm joints, multiply the number of blocks by 200mm (190 block + 10mm joint) then add 10mm for the other mortar joint. This is the minimum opening requirement. 10mm mortar joints are recommended.
 7. All panels must be sealed with silicon mastic around the perimeter expansion joint to prevent moisture ingress and allow for expansion and contraction. Note: Do not bridge expansion material by pointing/grouting over using mortar.
 8. Do not use metal tools against glass blocks, only wooden or rubber.
 9. Maximum panel size without intermediate slip joint is 25m² with no single dimension exceeding 6m in any direction.

- ### Accessories
1. 10mm plastic spacer pegs.
 2. Ø 5.5mm stainless steel re-inforcement rods in 0.6 & 1.2m lengths.
 3. Expansion material for head & jambs.
 4. Expansion material for cill.
 5. Spacer pegs.

Mortar

ColmeF Vetromix glass block mortar is recommended as a bedding and finishing mortar, and can be diluted to use as a grout.

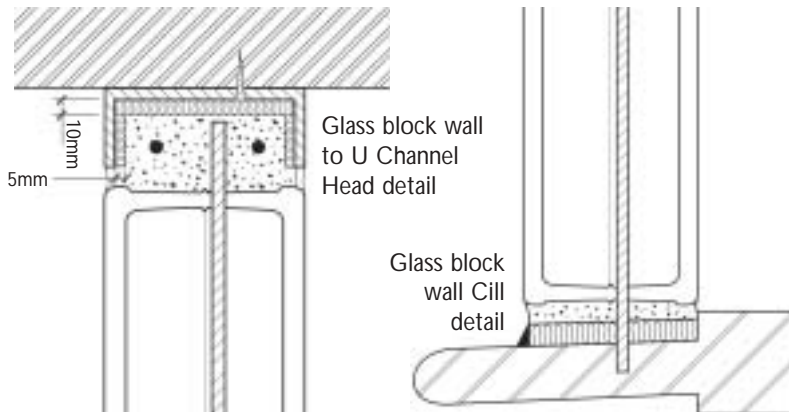
Re-inforcement

GBT recommend a minimum of 1 No. Ø 5.5mm rod every row horizontally and vertically.

Note : If 'U' channels are incorporated, they should be lined with expansion fibre and should have double rods positioned in the mortar. Channels should be fixed at 600mm centres.

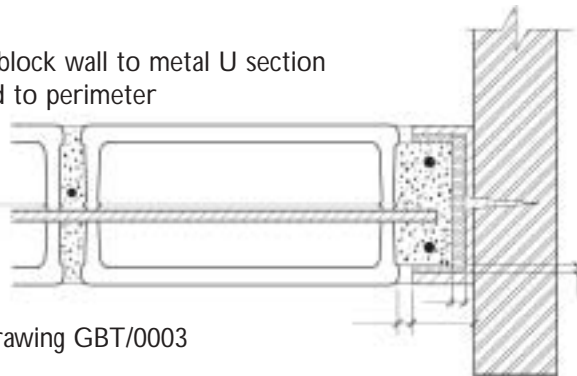
GUIDE TO INSTALLING GLASS BLOCKS USING RODS & MORTAR SYSTEM (2)

DATASHEET GBT/0002



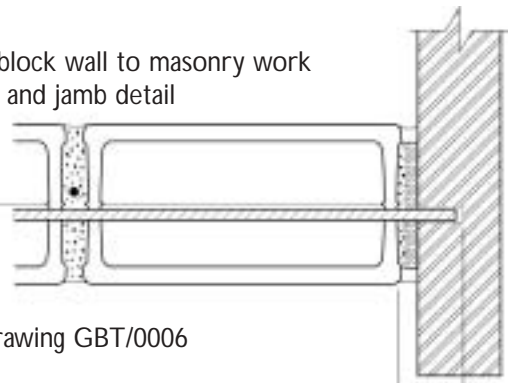
See drawing GBT/0008

Glass block wall to metal U section - Fixed to perimeter



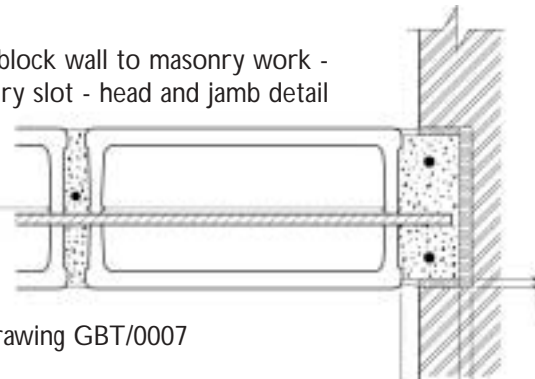
See drawing GBT/0003

Glass block wall to masonry work - head and jamb detail



See drawing GBT/0006

Glass block wall to masonry work - masonry slot - head and jamb detail



See drawing GBT/0007

Guide to Installation

1. Place bitumen expansion / slip joint on sill or paint 2 coats of bitumen emulsion
2. Position expansion fibre to jambs and head.
3. Position plastic spacer pegs (if used).
4. Lay sufficient mortar, place glass blocks in position and tap with mallet until mortar has compressed to give a 10mm joint.
5. Insert re-reinforcement rods as work progresses by drilling over sized holes, fill with mastic and insert rod. If overlapping rods, overlap by 150mm and tie with stainless steel tie wire. Panel anchors can be used as an alternative.
6. Fill joints with mortar between glass blocks and compress with suitable tool.
7. Ensure first row is level and perpendicular before proceeding. Back shuttering can be used to maintain a plumb line.
8. Insert spacer pegs whilst building progresses. Maximum of 3 rows can be built in one day without spacer pegs to avoid mortar squeeze. 6-8 rows can be built using spacer pegs.
9. Smooth joints whilst mortar is still workable. Alternatively rake back and use Colmef Vetromix as a grout to give a perfect finish. When cured, the mortar is water repellent.
10. Rake clear all perimeters and fill expansion joint with silicon sealant.

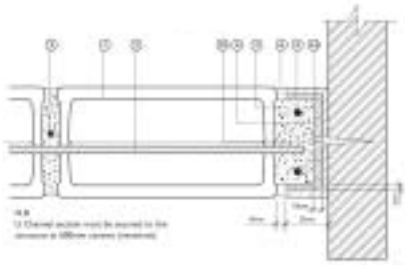
Note : If aluminium/steel 'U' channels are used, secure to surround at 600mm centres. Place expansion material inside 'U' channel and fill with mortar. Double rodding is required in all channels.

Cleaning

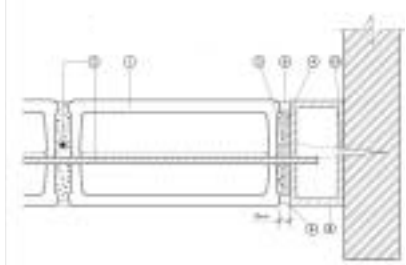
Remove surplus mortar from glass as work proceeds with a wet sponge. Do not use abrasive cleaners or hydrofluoric acids.

For final clean after installation : start at the top of the wall with clean water and wash down. Avoid any particles of mortar. Dry off with a soft cloth.

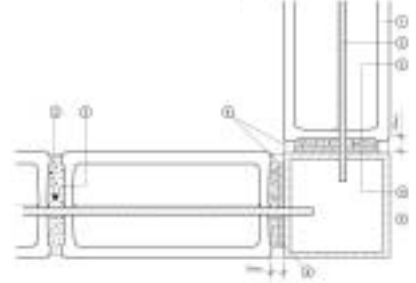
Glass Block Technology data sheets can be downloaded as pdf files from www.glassblocks.co.uk/datasheets
 If you require either faxed or posted versions, contact Glass Block Technology Sales.



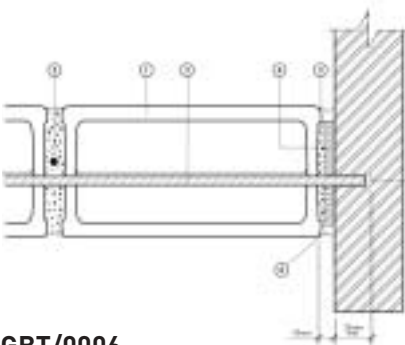
GBT/0003
 MORTAR SYSTEM FIXING DETAIL -
 GLASS BLOCK TO METAL U CHANNEL



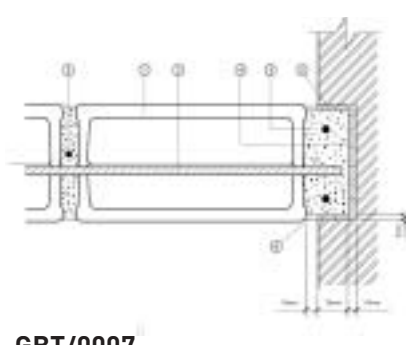
GBT/0004
 MORTAR SYSTEM FIXING DETAIL -
 GLASS BLOCK TO METAL BOX SECTION



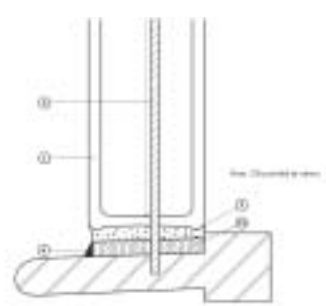
GBT/0005
 MORTAR SYSTEM FIXING DETAIL -
 GLASS BLOCK TO CORNER POST



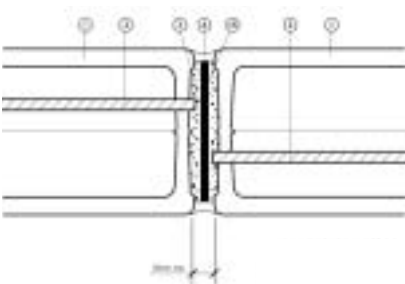
GBT/0006
 MORTAR SYSTEM FIXING DETAIL - GLASS
 BLOCK TO MASONRY WORK



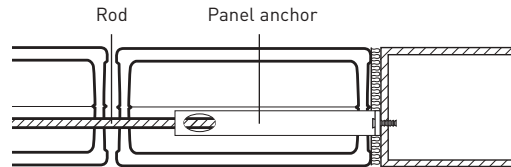
GBT/0007
 MORTAR SYSTEM FIXING DETAIL - GLASS
 BLOCK TO MASONRY WORK



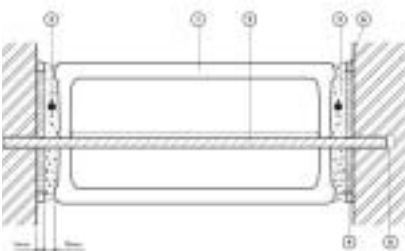
GBT/0008
 MORTAR SYSTEM FIXING DETAIL -
 GLASS BLOCK WALL CILL DETAIL



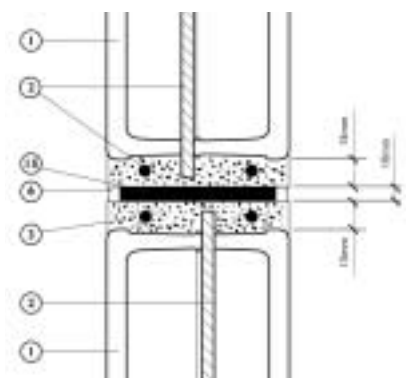
GBT/0009
 MORTAR SYSTEM FIXING DETAIL -
 INTERMEDIATE VERTICAL EXPANSION JOINT



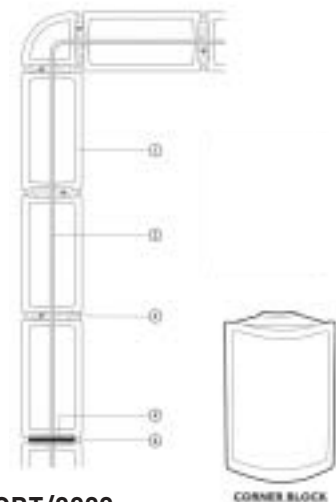
GBT/0027
 PANEL ANCHOR DETAIL



GBT/0022
 MORTAR SYSTEM FIXING DETAIL - SINGLE
 GLASS BLOCK TO MASONRY WALL



GBT/0010
 MORTAR SYSTEM FIXING DETAIL -
 INTERMEDIATE HORIZONTAL EXPANSION JOINT



GBT/0023
 MORTAR SYSTEM FIXING DETAIL -
 GLASS BLOCK WALL USING CORNER BLOCKS

GUIDE TO INSTALLING RODS & MORTAR SYSTEM

TOOLS REQUIRED

Trowel, spirit level, rubber mallet, wooden spatula, hack saw, pointing tool, silicon and caulking gun, drill & mixing bucket.

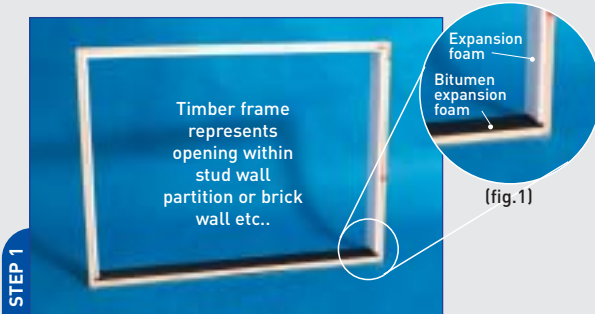


ACCESSORIES REQUIRED

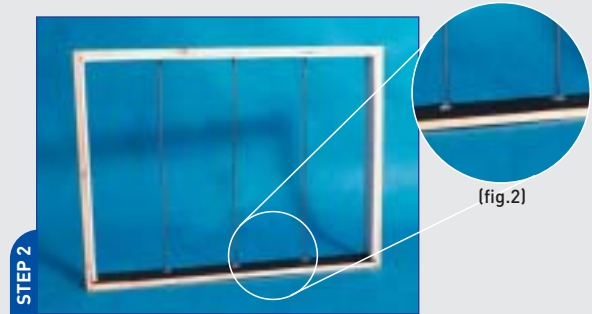
Blocks, bitumen and foam expansion joints, colmef mortar, stainless steel rods, plastic spacer pegs.



PREPARATION OF OPENING



Calculate the correct opening size. Make sure the opening is square and perpendicular. Lay bitumen expansion material along base of opening. Secure expansion foam to jambs and head. All four sides of the opening should now be covered in expansion material (See fig.1). Bitumen is necessary on the base to take the weight of the glass block wall.



Set out dry the first row of glass blocks to ensure opening size is correct. Mark accurately and drill oversized holes in between the blocks, vertically and horizontally where rods will be positioned. Fill holes with silicon and fit vertical bars in place (fig.2).

LAYING FIRST COURSE



Mix Colmef Vetromix glass block mortar following instructions on reverse of bag (fig.3). The mix should be a semi dry consistency (Slump 1 or less). Lay down a bed of mortar.

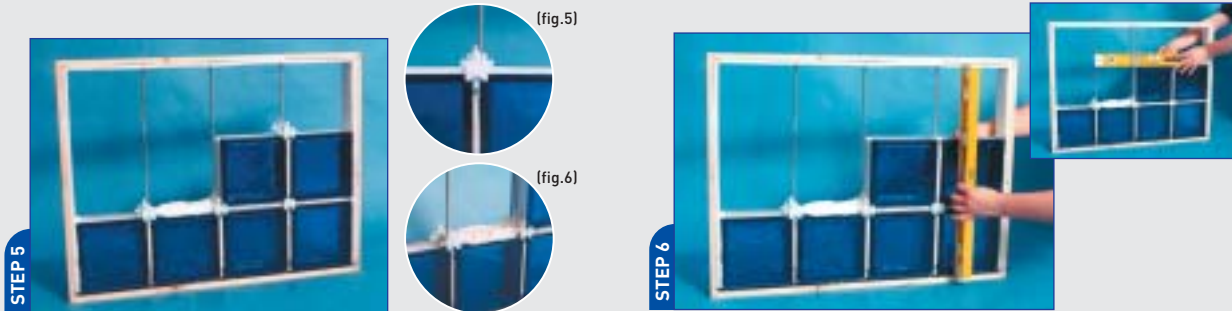


Fit first block and tamp down gently, fit second block and repeat. Ensure there is enough mortar between the blocks and the base to create sufficient adhesion, compact the vertical mortar joint using a wooden instrument. (fig.4)

Note : Spacer pegs are not required between base and first row of blocks.

GUIDE TO INSTALLING RODS & MORTAR SYSTEM

BUILDING THE PANEL



Repeat Step 4 until you have completed the first row. Insert spacer pegs in between blocks, this prevents steel rods from touching glass (fig.5). Lay half the quantity of mortar and fix the horizontal rod in position, not forgetting to put silicon in the holes, then cover over the rod with remainder of mortar (fig.6). Rods have to be positioned every row vertically and horizontally. If using a 'U' channel, two stainless steel reinforcement rods are required within the perimeter.

Fit next row, remembering to check vertical and horizontal alignment.

FINISHING THE GLASS BLOCK PANEL



When the wall has set, snap off spacer tabs and grout all joints with diluted Colmef mortar.

SEALING AND WEATHERPROOFING THE GLASS BLOCK PANEL



Mastic around perimeter of expansion foam to create a weather proof seal.

INITIAL CLEAN AND AFTER CARE MAINTENANCE

Do not clean with any acidic products, the best product for cleaning is water. Polish each block with a soft cloth using good old elbow grease .

Note : Clean face of block as work proceeds.

The glass block installer should have left the glass block wall in a clean, unblemished condition. Requiring only periodical cleaning to maintain an excellent appearance.

However, there may be a residue of cement on the glass surface left from mortar/tiling grout identified by whiteish bloom when dry. This may be removed by use of proprietary cement stain remover.

HYDROFLUORIC ACID OR DERIVATIVES MUST NOT BE USED.

Paint or cement may be removed by a blade taking care not to scratch the surface of the glass.

Periodic cleaning is required using clean water and buffing up with a chamois leather or in clean water use a proprietary glass cleaner and clean off with a lint free cloth.



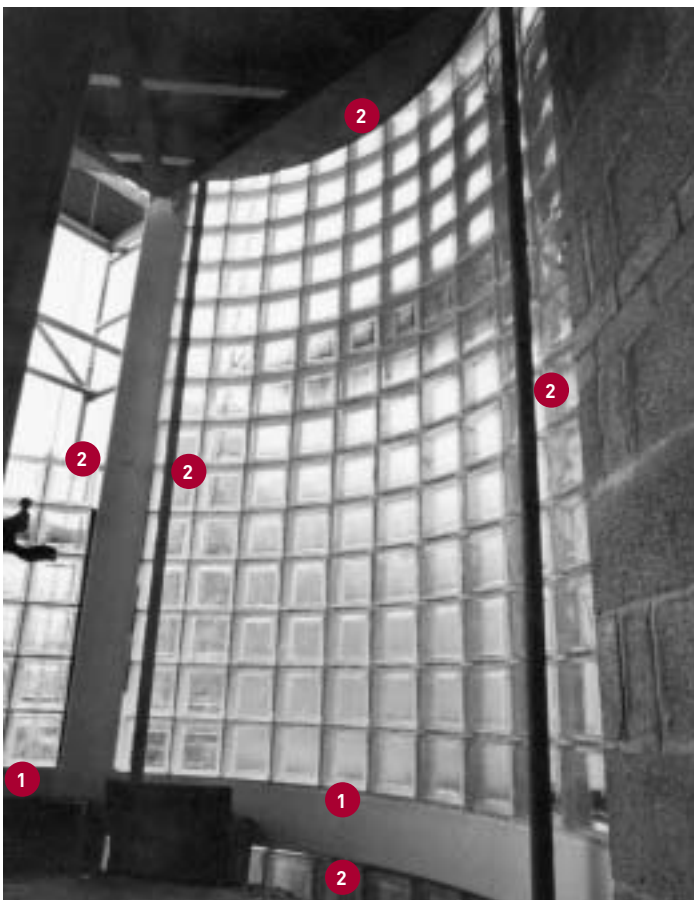
RODS & MORTAR - CURVED GLASS BLOCK WALLS

Curved glass block walls can only be constructed using Rods & Mortar installation system.

The principle of a curved panel follows the same guidelines as straight glass block walls, except the front vertical joint is opened to form a curve.

EXPANSION JOINTS

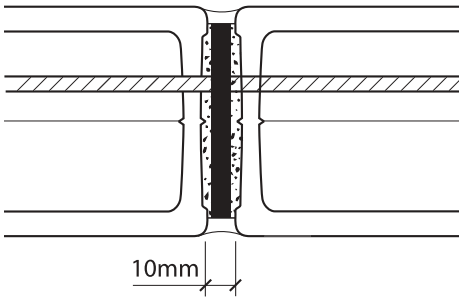
Perimeter expansion should be allowed for around all four sides of the panel, ensure this joint is weatherproofed by caulking with silicon and not grouted over with mortar.



- 1 Denotes the positioning of the bitumen expansion fibre at the base of the panels.
- 2 Denotes the positioning of the expansion fibre at the head and jambs of the glass block curved panel.

RODS & MORTAR - CURVED GLASS BLOCK WALLS

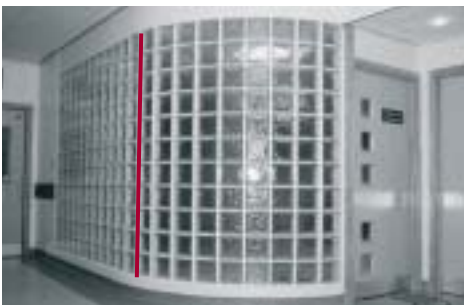
SLIP JOINT



Where a curve changes plane, a vertical slip joint must be inserted.

The mortar joint is replaced by the same bitumen expansion foam that is used at the cill of a panel. The reinforcement rods can be carried through the expansion foam by piercing a hole in the foam and the joint should be caulked with a white silicone, this will visually look similar a standard mortar joint.

Note : Ensure the slip joint is not grouted over in glass block mortar, as by bridging the expansion joint will not allow the panel to expand or contract effectively and may cause blocks to crack.



Expansion joint location on curved to straight wall



Cracking due to incorrect expansion joint

OPENINGS

Curved panels should ideally be fixed into four sides : floor/cill, ceiling/head, vertical walls/jambes or an end post.

If the curved wall is secured at the base and only one jamb, an end post should be used as a vertical restraint. (Diagram 1). If the panel can also be fixed at the top, secured into the ceiling, this will offer greater support.

If end glass blocks are used at one end of a curved panel, the reinforcement rods within the panel should be drilled into the top, base and one jamb. (Diagram 2). Introducing double rods will increase the integral strength.



End Glass Block

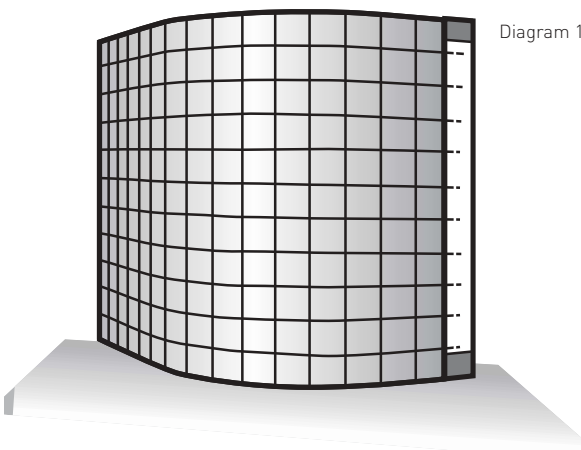


Diagram 1

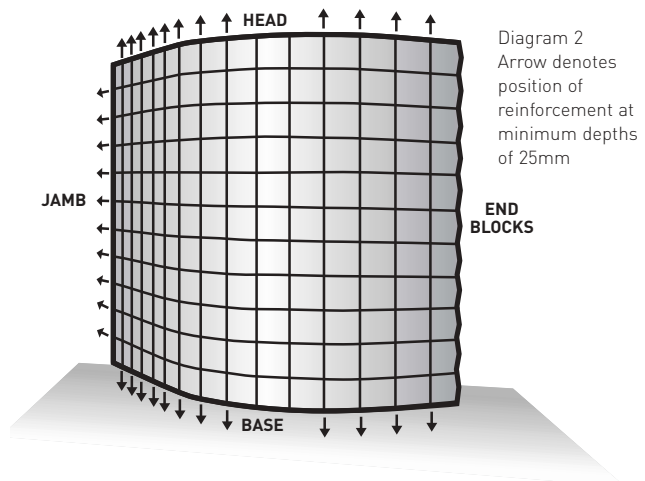
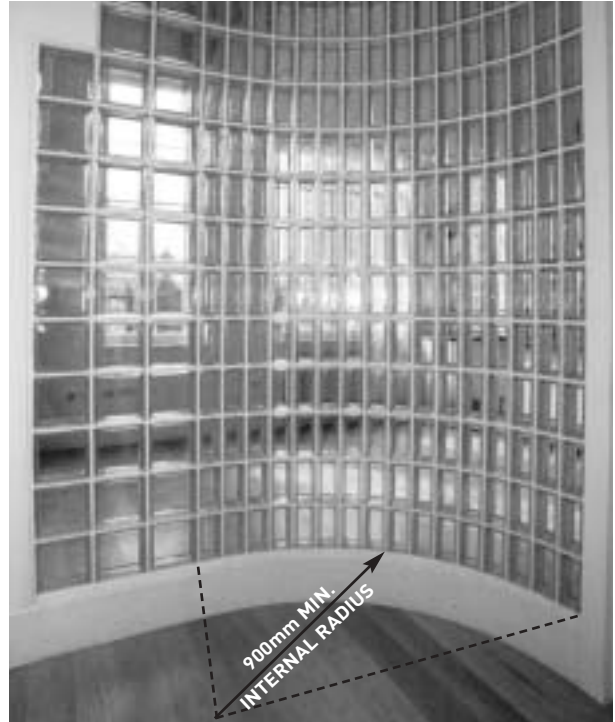
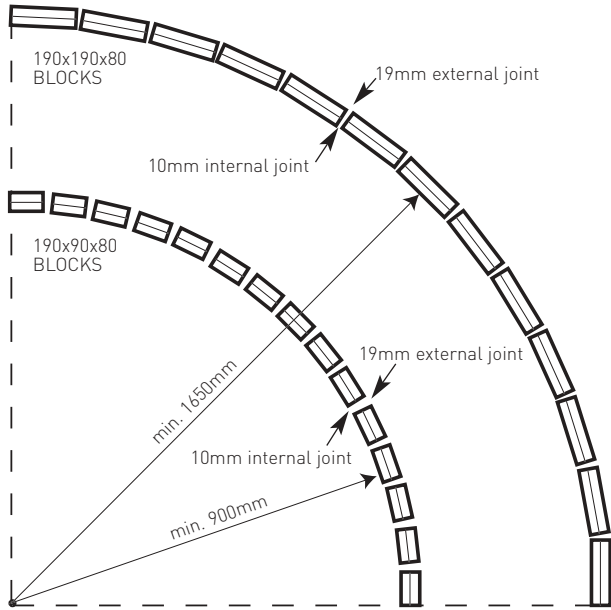


Diagram 2
Arrow denotes position of reinforcement at minimum depths of 25mm

RODS & MORTAR - CURVED GLASS BLOCK WALLS

JOINT SIZES AND MINIMUM RADII

When constructing curved glass block panels, Glass Block Technology recommend the use of a 10mm internal vertical joint. Using 190x190x80mm glass blocks, the minimum internal radius of 1650mm will result in the external vertical joint being 18-19mm. For other block sizes see GBT-0017 data sheet.



An example of curved screen in Weck 190x90 half blocks:
 Radius = 900mm
 Internal vertical joint = 10mm
 External vertical joint = 18-19mm
 Horizontal joint = 10mm

TYPICAL EXAMPLE OF CURVED GLASS BLOCK WALL - REINFORCEMENT

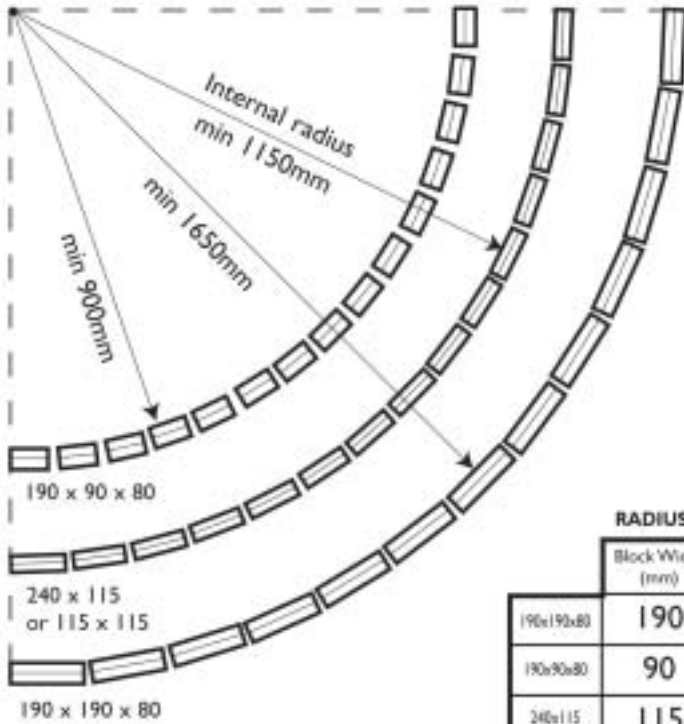
Two pictures below illustrate a curved glass block wall used in a restaurant to divide the main kitchen area from the seating area. The panel was open at the top and not tied into the ceiling. Each horizontal course was double rodDED to assist with strengthening the restraint of the panel and each vertical course was tied into the base.

- 1 Denotes position of where double rods are drilled into the side jambs at depths of 25mm minimum.
- 2 Denotes position of where vertical reinforcement rods are tied into the base at depths of 25mm minimum.

Note : Alternative to drilling holes - use panel anchors.



RADIUS WALL CONSTRUCTION



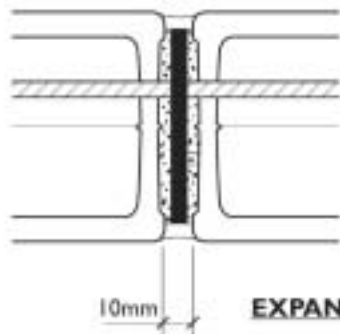
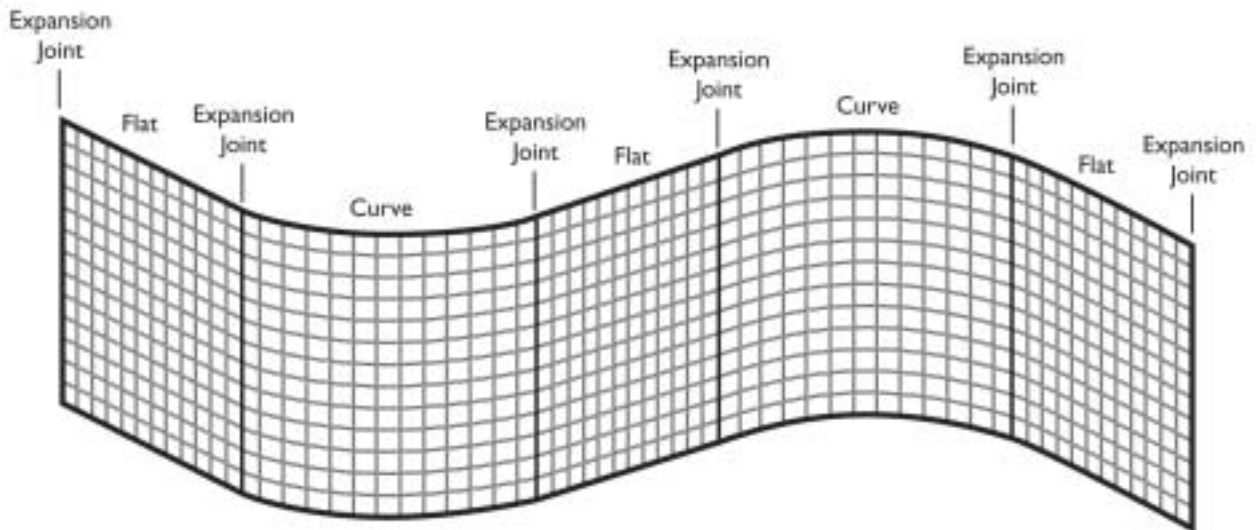
Formula to determine exterior joint width

$$E = (W+I) \times (1+(T+R)) - W$$

- E = External joint width (mm)
- I = Internal joint width (mm)
- R = Radius to interior of wall (mm)
- T = Thickness of block (mm)
- W = Width of block (mm)

RADIUS MINIMUMS FOR CURVED PANEL CONSTRUCTION

	Block Width (mm)	Inside Radius (mm)	Number of blocks in 90° Arc	Vertical Joint Width (mm)	
				Inside	Outside
190x190x80	190	1650	13	10	19
190x90x80	90	900	15	10	19
240x115	115	1150	15	10	19



It is suggested that curved areas be separated from flat areas by intermediate expansion joints and supported as indicated in these drawings.

All information is accurate to the best of our knowledge at time of going to press, however, colour images may vary slightly due to the photography, reproduction and printing process. Glass Block Technology Ltd cannot be held liable in any way regarding the usage of glass blocks and the manner in which they are installed.

Glass Block Technology reserve the right to amend or correct changes at any time.
