GLASS BLOCK TECHNOLOGY

PREFABRICATED WALL PANELS

AND FIXING SYSTEMS

GLASSBLOCK TECHNOLOGY

INTRODUCTION

Glass Block Technology's range of Precast systems are designed to offer solutions to the UK construction industry, with unique exclusive standard and connecting panels, restraint and fixing systems.

Precast can be considered for most glass block applications, for internal, external, fire rated and flooring specifications. Most projects can be undertaken using standard size or connecting precast panels that are manufactured under factory controlled conditions, ensuring regularity of joints whilst guaranteeing a first class, premium finish.

Glass Block Technology specialise in supplying, researching and are constantly developing solutions to complete all manner of projects. Weather conditions are not an issue that affect the installation of external glass block precast units unlike insitu construction.

They can be used to allow natural daylight to flow from room to room, side of doorways, shower screens, and breakfast bars, to increase security or purely for aesthetical appeal.

PRECAST PANELS MAKE A DIFFERENCE

Precast wall panels offer many benefits :

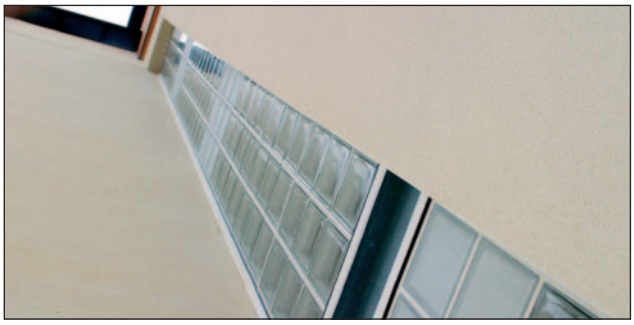
- **Uniformity of joints**
- **Ease and speed of installation**
- **The advantages of quality control**
- **Modular dry fix panels**
- **Made to measure/Standard size panels**

Car Park, France

Football training ground, Stuttgart

In France, approximately 70-75% of glass block projects undertaken are installed using precast as opposed to loose build insitu construction. (La Rochere, a French glass block manufacturer, has produced precast since the 1970's, they offer 3 or 4 fixing systems.)

Glass Block Technology have invented solutions more suitable to the UK market.



St Andrews

Gibson Terrace

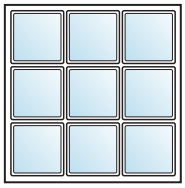
PRECAST PANEL SPECIFICATION

When specifying Precast Wall panels, important criteria should be considered:

- **Type of precast (concrete, Easifix or fire rated)**
- **Restraint/clamping panels in place**
- **How panels connect together.**
- **Calculating of opening sizes**
- **Fire ratings**

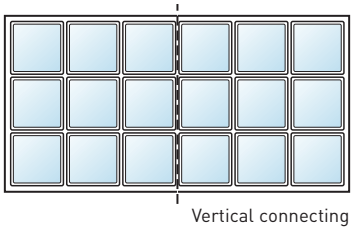
TYPES OF PANEL PRODUCED

STANDARD

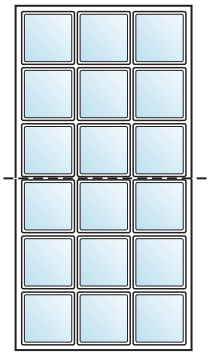


One piece

CONNECTING



Vertical connecting



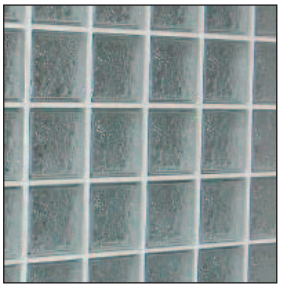
Horizontal connecting

Panels can be produced incorporating all types of glass block dimensions, the most common being 190x190x80mm, **see La Rochere range, visit www.glassblocks.co.uk /range**, 190x190x100mm, 190x90x80mm (½ blocks), 240x240mm and fire blocks.

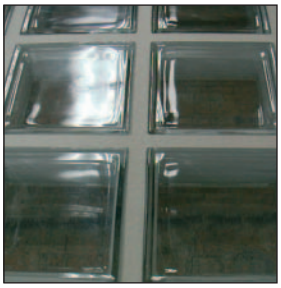
Wall panels cannot be used for horizontal applications like roof lights.
For roof lights/floor pavers, visit **www.glassblocks.co.uk/floorpanels**

JOINTS

Concrete wall panels are generally manufactured with 10mm joints, however this can be decreased to as little as 6mm or increased to around 20mm.



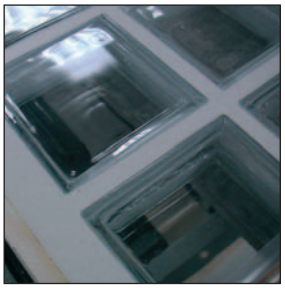
10mm joints



20mm joints

BORDERS

Concrete wall panels have to be produced with a border to the perimeter edge of the panel. These are vital for the purpose of restraint aswell as production and handling. They are also a condition of some fire rated panels (in accordance with manufacturers test data). Generally border widths for precast panels are 35mm. The maximum width is dependent on the panel (wall, floor or fire rated) or block type. Please contact GBT for further assistance regarding maximum border widths. F30 and F60 fire rated panels are manufactured with 50mm borders.



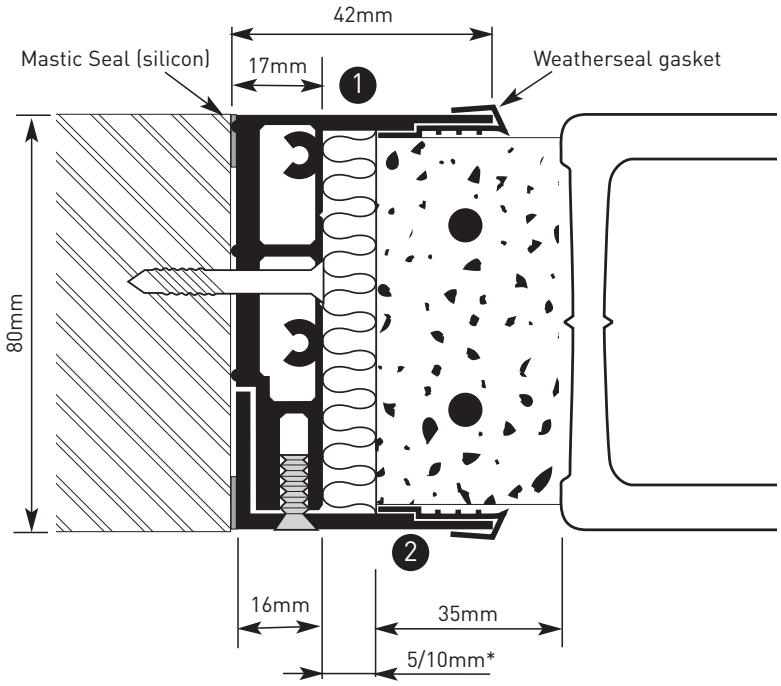
35mm border width

GOLDEN RULES OF GLASS BLOCK SPECIFICATION TO CONSIDER

- Glass block walls are self supporting, but **not load bearing**. Therefore similar to doors & windows, support above should be provided in the form of a lintel.
- For best integral strength, glass blocks should ideally be installed into a four sided pre-prepared opening. This opening can be timber, brick, steel, concrete or block work.
- **Glass blocks expand and contract** with temperature change. **Expansion material must be incorporated to the perimeter opening** and intermittently between vertical of horizontal joints if a panel exceeds 6m in any direction. Perimeter expansion should be weatherproofed.
- Openings must be square and perpendicular and made to suit glass block panels.
- The maximum panel size does vary for precast installation based upon design (consult GBT).
- The specification of precast panels may be limited by handling, site access and lifting.

SYSTEM 1 - TWO PART U CHANNEL CLAMP

To fit panels in position quickly and neatly, the two part U channel clamp was designed. The system can be used in conjunction with precast concrete wall panels for fixing precast panels internally and externally. The U channel clamp can also be used with Precast Easifix.



i) Section 1 should be fitted to the outside of the building.

ii) Section 2 restrains panel in place and should always be fitted from inside the building.

iii) The weather seal gasket offers a barrier against water penetration.

iv) A mastic seal weatherproofs between perimeter opening substrate and U channel clamp.

*5mm expansion foam is used as a minimum. Consult Glass Block Technology regarding panel sizes and uses where 10mm is applicable.

CHANNEL FINISHES

CHANNEL

The channel is available in white as standard. Other RAL colours can be powdercoated dependent upon quantity and lead time.

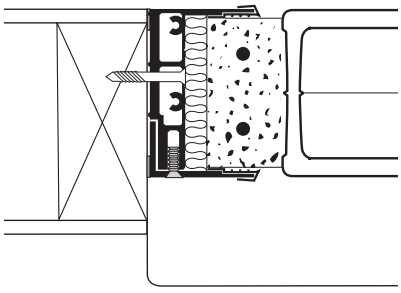
INTERNAL USE

A plasterboard cover trim is available.

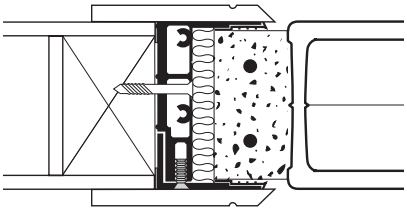
Plasterboard cover trim slots into the channel

OTHER INTERNAL FINISHES

Cill/WIndow board

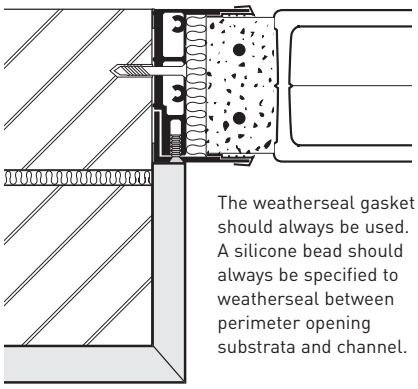


Architrave - U channel



EXTERNAL FINISH

Jamb

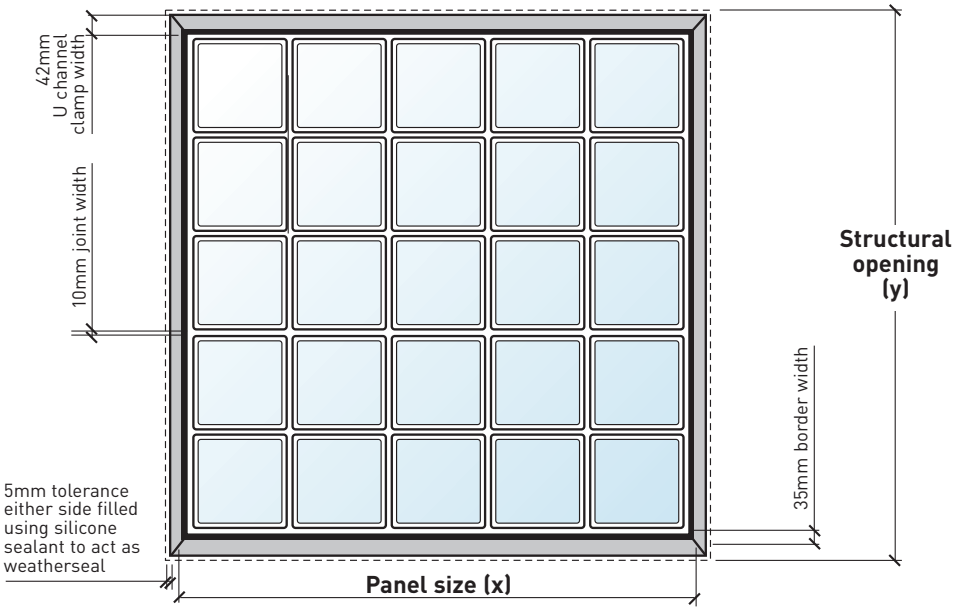


The weatherseal gasket should always be used. A silicone bead should always be specified to weatherseal between perimeter opening substrata and channel.

SYSTEM 1 - TWO PART U CHANNEL CLAMP

CALCULATING OPENING SIZE FOR PRECAST WALL PANEL & TWO PART U CHANNEL CLAMP

Example based on a panel of 5 blocks wide x 5 blocks high using 190x190x80mm blocks with 10mm joints, 35mm borders, 5mm expansion fibre and two-part U channel clamps.



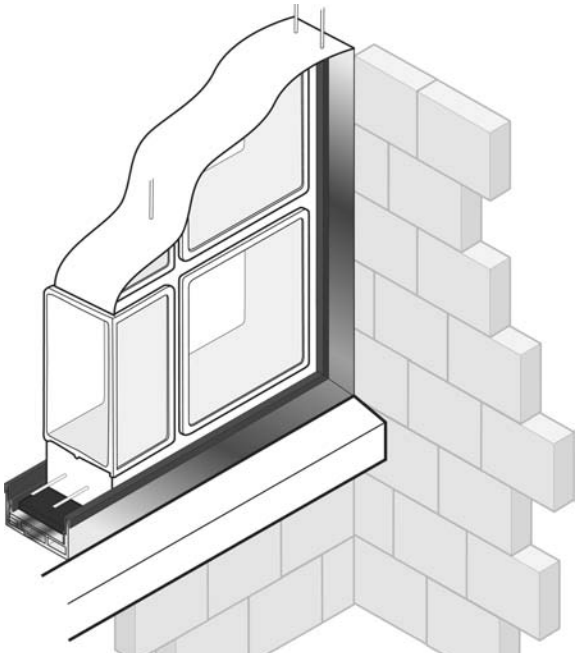
PANEL SIZE (x)

5 no. blocks x 190mm =	950mm
4 no. joints x 10mm =	40mm
2 no. borders x 35mm =	70mm
Panel size (x) dimension	**1060mm**

OPENING SIZE (y)

Panel width/height =	1060mm
2 no. vertical/horizontal expansion joints x 5mm =	10mm
2 no. two-part U channel clamp base x 17mm =	34mm
2 no. tolerance allowance x 5mm	10mm
Opening size (x) and (y) dimension	**1114mm**

SPECIFYING TWO PART U CHANNEL CLAMP



PANEL SIZE

- Only 80mm thick glass blocks can be used with System 1 (Two Part U Channel Clamp).
- 35mm borders offer the best fit and are aesthetically more pleasing.
- Panels exceeding 6m in any direction should be split using intermediate support/slip joints.

Expansion material should always be incorporated inside the channel, expansion fibre across the head, down both jambs and bitumen at the base to support the weight of the panel. 8mm bitumen and 5mm expansion foam. If the panel exceeds 4m in width or height 10mm expansion foam may need to be used, consult GBT. Golden rules of glass block specification should be considered.

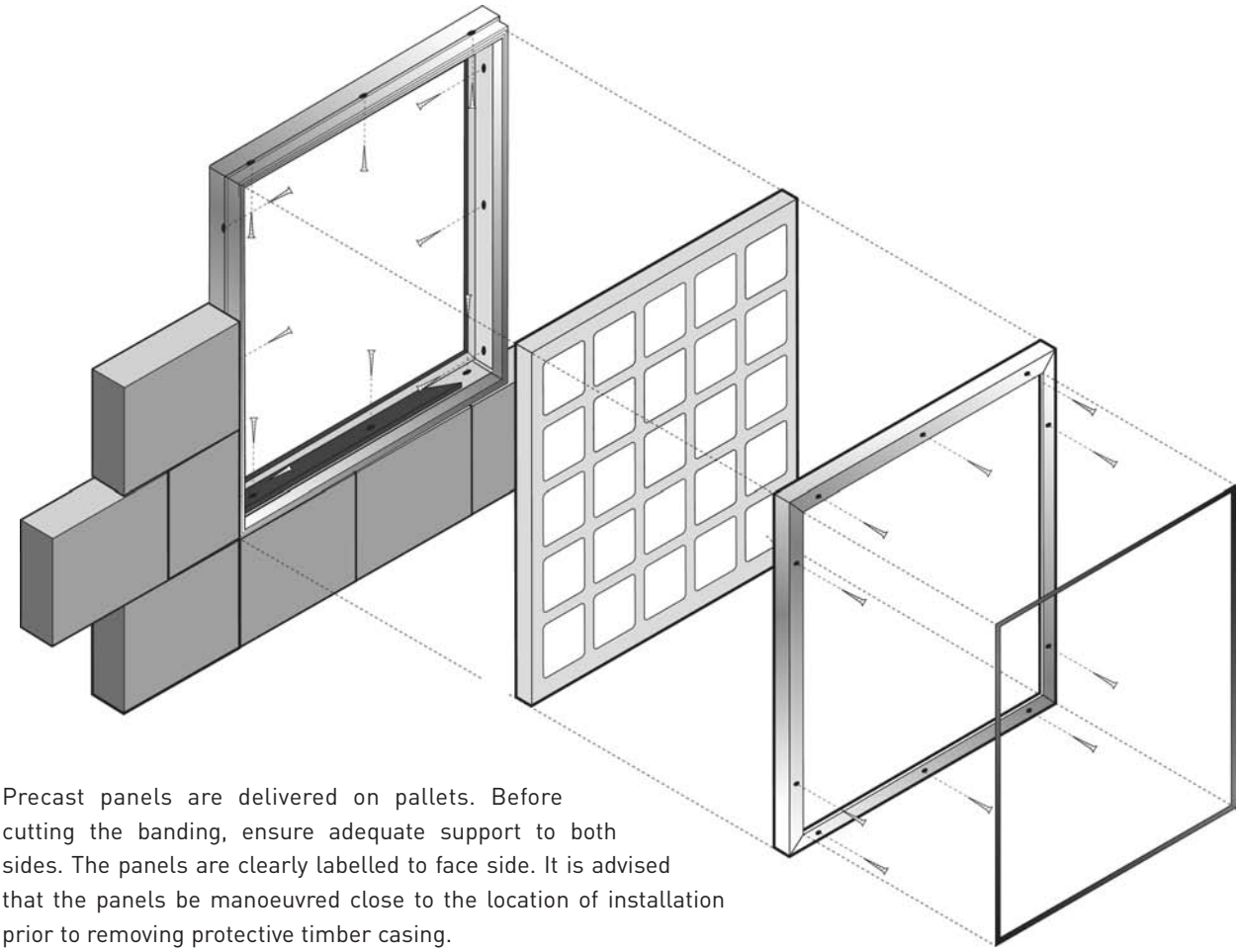
When calculating opening sizes for precast wall panels it is critical that the correct dimensions are specified/detailed. GBT can offer full assistance with this.

The six key areas to consider are:

- **Block size**
- **Expansion fibre width**
- **Joint width**
- **Restraint/clamp system width**
- **Border width**
- **Tolerance**

SYSTEM 1 - TWO PART U CHANNEL CLAMP

PREPARATION OF THE OPENING

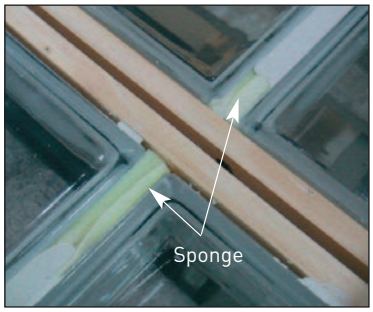


Precast panels are delivered on pallets. Before cutting the banding, ensure adequate support to both sides. The panels are clearly labelled to face side. It is advised that the panels be manoeuvred close to the location of installation prior to removing protective timber casing.

INTERCONNECTING PRECAST WALL PANELS

Each installation of Precast wall panel varies, depending on type, access, internal or external, fire or non-fire rated and which installation/restraint system is being used.

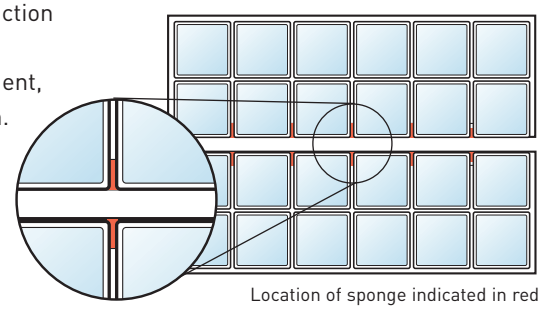
The following section is divided into two categories:
1. How horizontal/vertical connecting panels are manufactured.
2. How horizontal connecting panels are positioned, fitted in place and finished.



Sponge

Horizontal and vertical precast concrete panels are produced with a section of the connecting joint missing for practical, safe connection.
The location of connecting joints is decided by GBT Precast Department, based on the nature of project in respect of panel size, panel location. lifting and fitting (either mechanical or manual) and panel weights (based upon block specification).

See step by step instructions for information regarding how connecting panels are constructed and finished.



Location of sponge indicated in red

SYSTEM 1 - TWO PART U CHANNEL CLAMP

INSTALLATION OF PRECAST WALL PANELS

FIXING GUIDE FOR SINGLE PANELS USING TWO PART U CHANNEL CLAMP

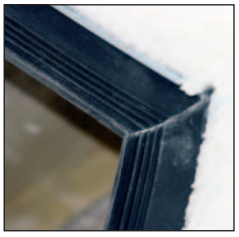
Take the sections of the base channel and screw fix to form the main body of the frame. Place frame into pre-prepared opening.

Ensure that the base is level and plumb. Fix channel to jambs and head (using packers if necessary) and plumb the face and side directions.

NB:It is essential that the channel frame is not distorted or pulled out of square.

If fitting externally, mitre cut the weatherseal gasket and fix to channel. Always place panel within the channel frame from inside the building. Fix bitumen expansion joint on base and expansion fibre to head & jambs of channel (if not pre done).

Screw fix to opening on markation lines at 600mm centres. Use packers to avoid distortion. Unpack the first panel adjacent to the opening. Do not walk the panels using the mortar border. Lift base section of panel in place. Screw fix the cover plate loosely in position using clamps provided, screw fix them to temporarily support the two sides.

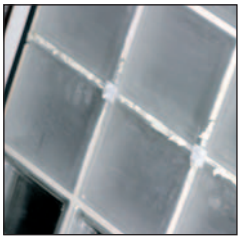


FIXING GUIDE FOR INTERCONNECTING PANELS

Remove foam packing from between the joints and same with bottom of connecting panel. Put spacer pegs (10mm) between the joints of the panel. Lay a layer of matching mortar, deep enough to allow for compression.

Place 1 number horizontal reinforcement bar (supplied). (If panels are F30, or higher fire rating, check with supplier reference number of re-bars used), lay additional bed of mortar and place the next panel on top.

Place connecting panel on top and support as previously. When the mortar is dry snap off the front butterfly of the spacer and grout over the interconnecting joints. Using matching mortar fill all gaps in vertical joints, then dilute a little as a finishing grout. Please be careful not to bridge the expansion material. As building commences it is important that retaining clamps are used to restrain the panel(s). Wipe clean faces of glass blocks ensuring not to use abrasive materials or acidic solutions.



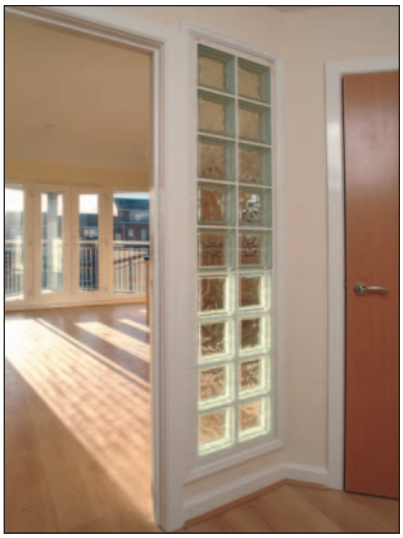
FINISHING & CLAMPING THE PANELS

Fit cover plates to top and base, remove clamps from one side of panel and fit cover plate. Remove remaining clamps from the opposite side and fit last cover plate.

NB: When fixing remaining cover plates loosely, then fix weatherseal gasket, if installing externally. Gasket should be used on both sides of the panel (it is important when using a cordless drill to use a maximum torque setting of 2 on a standard drill).

Fix cover plate screw caps to conceal the screw heads.
NB.Both sections of channel should be weathersealed between the channel and surround with sealant to both elevations, internally and externally.
NB. Each installation of Precast wall panel will vary, depending on type, access, internal or external, fire or non-fire rated and which installation/restraint system is being used.

SYSTEM 2 - FIRE RATED PRECAST CONCRETE WALL PANELS



Precast concrete wall panels can be manufactured to suit various fire ratings: G60/FI5, G60/F30 and G60/F60. (G60/F90 upon application).

Fire rated glass blocks are used in various areas and in all market sectors, usually in compartmentalised areas, fire escape routes, third storey loft conversions and external boundary walls in close proximity to other buildings or public highways.

Fire rated panels are usually specified via an architect or a condition instructed by building control under building regulations.

Fire rated panels are available in Precast format, ensuring correct installation requirements in line with test data, also ensuring regularity of joints and a premium quality factory controlled finish.

Various restraint/installation solutions are available dependent on application and required finish.

FIRE RATINGS EXPLAINED

Unlike fire doors, fire ratings for glass blocks are concerned with two criteria: fire integrity and thermal isolation. To successfully pass testing, panels are tested to four standards (explained in more detail in Glass Block Fire Rated literature); a brief definition of fire integrity is how long a wall will remain stable for in the case of a fire. Thermal isolation relates to the period of time it takes for the heat to transfer from the side of the fire through to the other face of the glass blocks.

Fire rating tests are measured in 15 minute increments and three types of fire blocks are available: 60 minute integrity & 15 minute thermal isolation, 60 / 30 & 60 / 60.

When a fire rated panel is built, it is not just the block that is important, ensuring the correct installation system and accessories are used is vitally crucial. All fire panels tested are constructed on the basis of Rods & Mortar. For specific fitting guides and test certification, contact Glass Block Technology.

Fire resistance is concerned with four criteria :

(a) Mechanical Resistance - the glass block wall must stay upright without too much damage following testing
(b) Thermal isolation
(c) Imperviousness against blaze
(d) No flammable emission during testing.

These tests are recorded in 15 minute increments.

DEFINITION :

FIRE INTEGRITY (G-CATEGORY GLAZING)
The glass block wall must pass Test (a), (c) and (d) above.

THERMAL ISOLATION (F-CATEGORY GLAZING)
The glass block wall must pass all four of the criteria above.

U Value : TF30 & TF60 blocks both offer U value <2.0 W/m^{2}^{0}C. For more information see...

G60/F15 60 minutes integrity and 15 minutes thermal isolation.

190x190x80mm

See La Rochere glass block range for all available patterns.

SPECIFICATION FOR F15 GLASS BLOCK

MINIMUM JOINT WIDTH	10mm
PERIMETER BORDERS:	35mm
PERIMETER REINFORCEMENT:	Two number ø6mm stainless steel rods.
JOINT REINFORCEMENT:	One number ø6mm stainless steel rods both horizontally & vertically.
RESTRAINT/CLAMPING:	Use either two part U channel clamp or use steel plate/box profile. (See alternative restraint/clamp details).

SYSTEM 2 - FIRE RATED PRECAST CONCRETE WALL PANELS

G60/F30 60 minutes integrity and 30 minutes thermal isolation.

190x190x100mm

SPECIFICATION FOR TF30 GLASS BLOCK

MAXIMUM PANEL SIZE: 9m² with width or height either direction not exceeding 6m. The panel was tested 14 blocks wide x 14 blocks high.

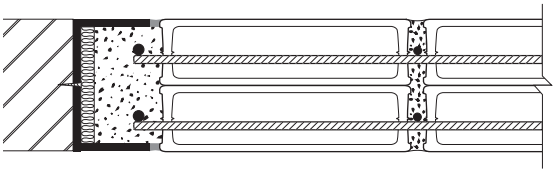
PERIMETER BORDERS: 50mm width constructed of glass block mortar.

PERIMETER REINFORCEMENT: Two number ø8mm stainless steel reinforcement rods.

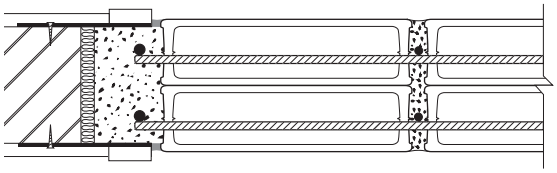
JOINT REINFORCEMENT: Two number ø6mm stainless steel reinforcement rods both horizontally and vertically.

EXPANSION MATERIAL: 10mm width. Bitumen fibre to base for assistance with weight compression and expansion foam to head & jambs, caulked over with fire stop silicone (dependant on finishing detail, either encased in steel U profile or protected behind plasterboard).

PLAN TF30 - TYPICAL LOOSE BUILD CONSTRUCTION

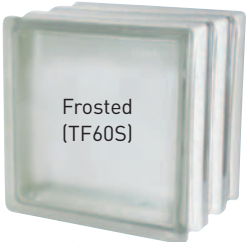


PLAN TF30 - TYPICAL PRECAST CONSTRUCTION



G60/F60 60 minutes integrity and 60 minutes thermal isolation.

190x190x150mm



SPECIFICATION FOR TF60 GLASS BLOCK

MAXIMUM PANEL SIZE: 9m² with width or height either direction not exceeding 6m. The panel was tested 14 blocks wide x 14 blocks high.

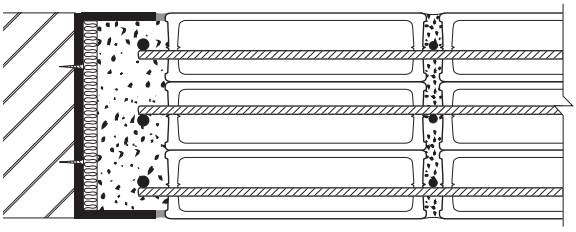
PERIMETER BORDERS: 50mm width constructed of glass block mortar.

PERIMETER REINFORCEMENT: Three number ø8mm stainless steel reinforcement rods.

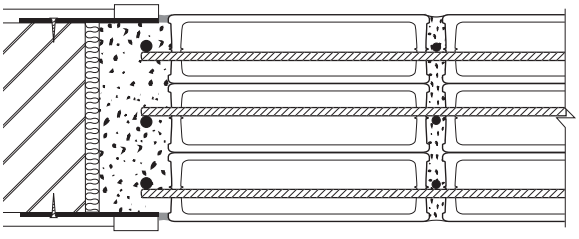
JOINT REINFORCEMENT: Three number ø6mm stainless steel reinforcement rods both horizontally and vertically.

EXPANSION MATERIAL: 10mm width. Bitumen fibre to base for assistance with weight compression and expansion foam to head & jambs, caulked over with fire stop silicone (dependant on finishing detail, either encased in steel U profile or protected behind plasterboard).

PLAN TF60 - TYPICAL LOOSE BUILD CONSTRUCTION

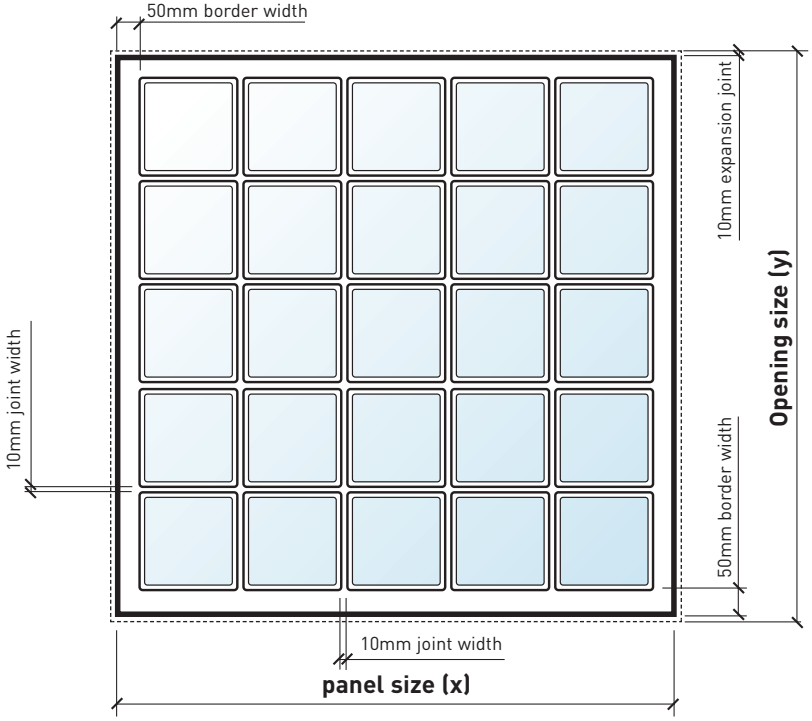


PLAN TF60 - TYPICAL PRECAST CONSTRUCTION



SYSTEM 2 - FIRE RATED PRECAST CONCRETE WALL PANELS

CALCULATING OPENING SIZES G60/F30 (Example based on 5 x 5 block panel)



PANEL SIZE (x)

5 no. blocks x 190mm =	950mm
4 no. joints x 10mm =	40mm
2 no. borders x 50mm =	100mm
Panel size (x) dimension	**1090mm**

MINIMUM OPENING SIZE (y)

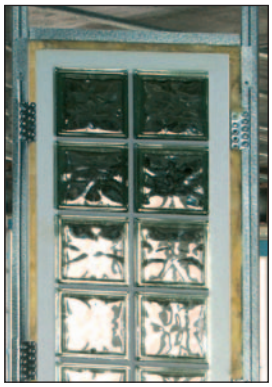
5 no. blocks x 190mm =	950mm
4 no. joints x 10mm =	40mm
2 no. borders x 50mm =	100mm
2 no. expansion joints x 10mm =	20mm
Opening size (y) dimension	**1110mm**

BORDERS

Precast Concrete Fire Rated panels are always manufactured with perimeter borders as a requirement under fire certification and also designed to assist with clamping panels in place as shown.

EXPANSION MATERIAL

Expansion material is crucial for fire rated panels. This example depicts a 60/30 panel which requires a minimum 10mm perimeter expansion joint. Mineral fibre can be used or lengths of GBT 10mm expansion foam (head and jambs). Bitumen strips to the base also siliconed over in a fire stop silicon.



FINISHING

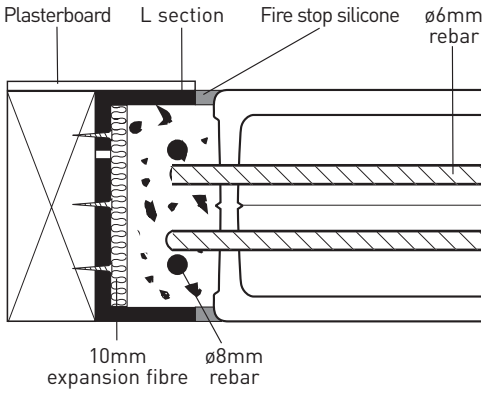
Where the precast panel meets the perimeter opening, the join has been decoratively finished by an architrave moulding.

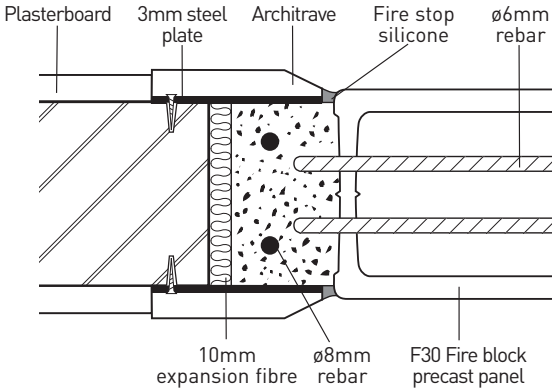
For specific data sheets with reference to joint and border widths, steel reinforcement bar specification, and restraint/clamp detail, please contact GBT or visit www.glassblocks.co.uk/datasheets or /firerating

SYSTEM 2 - FIRE RATED PRECAST CONCRETE WALL PANELS

RESTRAINT CLAMPING SYSTEMS

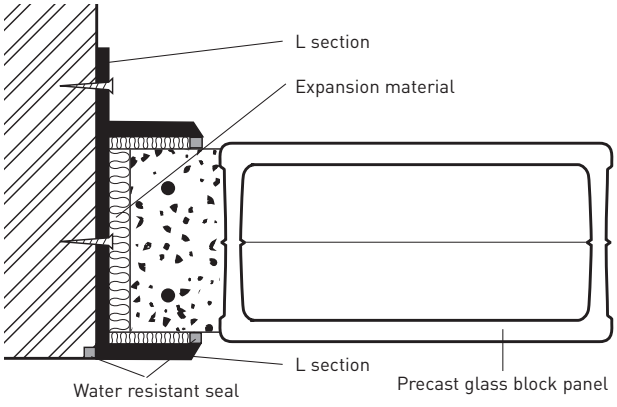
Precast concrete panels can also be secured in place using an L section or steel plate, often the choice for fire rated panels or 100mm thick block panels.



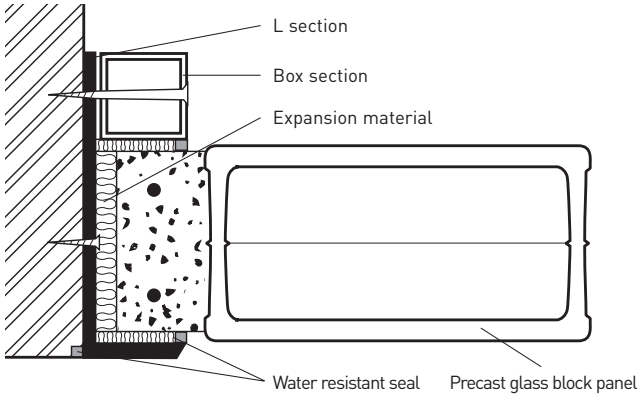


Installation generally used when installing Precast F30 Panels.

TWO L SECTIONS DETAIL



L SECTION & BOX SECTION DETAIL



Dimensions detailed are all theoretical, shown as examples. Specific sizes and gauges should be designed in conjunction with panel sizes and fire rating requirements (if applicable).

HOW TO ATTAIN CERTIFICATION

For a fire glass block wall to be warranted and receive a fire certificate it must be installed in strict accordance with the original test conditions. Once the panel has been installed, the person or contractor responsible must contact Glass Block Technology and complete an application form, which will be lodged in the project file at the head offices. Glass Block Technology will then issue the F15, F30 and F60 certification which must be kept safe at all times.

INTRODUCTION TO PRECAST EASIFIX

Precast Easifix is an ideal product for bar fronts, counters, dividing walls, virtually any straight non-fire glass block panel.

Two types of panel are available: Standard or interconnecting.

Precast Easifix panels should ideally be installed into a four sided opening.

Precast Easifix is lighter in weight compared to Rods & Mortar construction.

USING PRECAST EASIFIX:

Precast Easifix is only recommended for internal use.

Precast Easifix is not fire rated.

Precast Easifix can only be used for straight applications.

Precast Easifix can only be manufactured using 80mm glass blocks.

Precast Easifix aluminium channel can be left exposed or the panel can be framed by using a clip on plasterboard cover strip that creates a clean line between plasterboard & glass blocks. Alternatively a decorative moulding.

INTRODUCTION TO PRECAST FLOORING

Precast Floor Panels are produced with a minimum 30mm joint and 70mm border.

Glass Block Technology Ltd recommend that floor panels are installed into a pre-prepared four sided opening with minimum bearings of 40mm and our Projects Department can offer advice regarding loading requirements and fire ratings although all calculations have to be qualified by a structural engineer*.

*Structural engineer qualification not supplied by GBT Ltd.

Single units and connecting panels can be manufactured. Loading information is available on request.

Their use doesn't need to be restricted to just allowing natural light into basements. They can be incorporated into balconies, walkways, mezzanine floors, bed decks, terraces and roof gardens. Combined with use of lighting, stunning aesthetical and practical architectural features can be created.

GLASSBLOCK TECHNOLOGY

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