SEVES GLASS BLOCK

Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

SEVES GLASS BLOCK

www.sevesglassblock.com

Seves Glass Block is the world's leading manufacturer of glass blocks for architecture and interior design

Seves Glass Block unites the **tradition and profound experience of Vetroarredo, Vitrablok and Solaris**: industrial groups that have made glass block history, synonymous respectively with the highest quality design, the decorative art of glass and cutting-edge technology for high performance solutions. All of this today combined in the Seves Glass Block s.r.o. factory in Bohemia, a historical region of the Czech Republic, where glass manufacturing has ancient origins.

With this incredible know-how and thanks to the careful selection of raw materials, the introduction of state-of-the-art machinery and the monitoring of every single stage of production, from design to packaging, Seves Glass Block has succeeded in transforming glass block from a simple building material into an architectural and artistic element, inspired by the principles of **creativity**, **style**, **functionality** and **innovation**.

The first company to introduce colour into the glass block and to produce the largest format ever, Seves Glass Block has always paid special attention to research, proposing **original and avant-garde** solutions. Its wide range of products is now designed to offer innovative solutions for interior design, architecture and construction**, with 'smart' proposals that enhance the purity, brilliance and transparency of glass blocks**.

In particular, the 'Smart Home' solutions of the **Design Line** - with which it is possible to create all-glass walls thanks to exclusive 'invisible' joints - have been formed over time thanks to the contributions of the great protagonists of contemporary architecture and design.

The **Technology Line**, heir to the Solaris tradition, offers 'Smart Architecture' solutions that respond to different design needs and specific technical requirements: light control, fire and blast resistance, thermal and acoustic insulation, and horizontal panels solutions.

With **a unique production process**, Seves Glass Block is also able to offer complete customisation of the glass block with the **Tailor Made service**.

Seves Glass Block, consistent with its origins and know-how, continues to expand the great potential of glass blocks with the aim of anticipating market trends, optimising product performance, reducing maintenance time and costs and offering increasingly 'green' solutions

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RANGE

VERTICAL STRUCTURES

DESIGN PEGASUS

Clear and soft colours

- Q19
- R09
- LINEAR TERMINAL
- CURVED TERMINAL
- ANGULAR
- CORNER 90°

Clear

- Q19 DORIC

Intense colours

- MENDINI

DESIGN

- VETROPIENO
- VISTABRIK 883, 683, 483
- Q33
- Q30 Doric
- Q30 Trapezoidal
- OPAL 1919/8

BASIC

Clear and soft colours

- 1919/8
- LINEAR END
- DOUBLE END

Clear

- 1909/8
- CORNER ALLBEND
- CORNER 19/8
- CORNER 90°

Intense colours

- BRILLY
- MATTY
- MYMINIGLASS

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- ES 1919/16 HTI
- ES 1919/13 0.9

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- 1919/10

HORIZONTAL STRUCTURES

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- BG R19/10 - Orbis
- BG 1414/11
- BG 1919/8
- BG 1919/8 4Kg
- BG 1919/10

Half shell glass

- BG R19/5 - Orbis
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- B 1414/5
- B 1919/7

Glass tiles

- B 1616/3
- B 2020/2

Fire-resistant Glass blocks for horizontal structures - REI

- BG 1919/8 30F
- BG 1919/16 60F
- BG 1919/16 90 F

Roof tiles

- MARSIGLESE TILE

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REFERENCE STANDARDS

Glass blocks are used in the construction of vertical and horizontal structures.

Tests on the glass blocks are performed and certified by an accredited laboratory according to regulations;

- **EN 1051-1:2003** (Glass in building. Glass blocks and glass sheets. Definitions and descriptions),
- **EN 1051-2:2007** (Glass in building. Glass blocks and glass sheets. Conformity assessment/product standard)
- other special rules

PERFORMANCE AND GUARANTEE

	Performance	Reference standard
Vertical Structures The most frequently used tests	Reaction to fire	EN 13501-1
	Fire resistance	EN 13501-2
		EN 1364-1
	Bulletproof	EN 1063
	Explosion resistance	EN 13541
	Resistance to temperature changes	EN 1051-2
	Sound insulation	EN 10140-3
		EN 717-1
	Thermal insulation	EN 673
	Solar and light transmission	EN 410
	Compressive strength	EN 1051-1
	Intrusion resistance	EN 356

VISUAL REQUIREMENTS ACCORDING TO EN 1051-1

This standard considers a quality level for glass wall and floor diffusers. This is determined by assessing visual defects, e.g. stains, opaque inclusions and linear/extended defects.

Method of observation and measurement
The wall and floor glass diffuser to be inspected is illuminated under light conditions approximately similar to daylight. The specimen is illuminated from below and inspected at a distance of approximately 3 metres at right angles to the visible face of the wall or floor glass diffuser.

Level of acceptance
The visual defects must be admitted as long as they are not visible when inspected in accordance with the previous point.

	Performance	Reference standard
Horizontal structures The most frequently used tests	Reaction to fire	EN 13501-1
	Fire resistance	EN 13501-2
		EN 1365-2
	Bulletproof	EN 1063
	Explosion resistance	EN 13541
	Resistance to temperature changes	EN 1051-2
	Sound insulation	EN 10140-3
		EN 717-1
	Thermal insulation	EN 673
	Solar and light transmission	EN 410
	Compressive strength	EN 1051-1
	Intrusion resistance	EN 356

CE MARKING AND WARRANTY:

The CE marking attests that the product complies with the requirements of the relevant harmonised standard (hEN) and fulfils the essential requirements:

- Mechanical resistance and stability
- Safety in case of fire
- Hygiene, health and environment
- Safety in use
- Protection against noise
- Energy saving and heat retention

Seves Glass Block s.r.o. ensures that the technical, dimensional and aesthetic parameters of its products comply with the relevant standards for each characteristic (EN 1051-1, EN 1051-2).
However, since Seves glass Block s.r.o has no control over the installation conditions, the manner of execution, the use of skilled labour in the installation and the correct use of accessory materials, no guarantee can be extended to the material after its installation.

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DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

This part of the guide is designed for those who design or build structures with Seves Glass Block.

By following the instructions and steps in the assembly phase, it will be quick and easy to create glass block walls, setting up works of all sizes.

The installation system may involve on-site installation or prefabrication in the workshop.

CLASSIC FORMATS

Introduction to design

When designing with glass blocks, one must always keep in mind the characteristics of the *three materials that compose it: steel, concrete and glass, in* order to avoid the problems that can arise from an incorrect use of the various elements.

It is well known that glass, by its nature, goes from the elastic phase to fracture *without having the intermediate plastic phase* typical of other construction materials. Thus, glass lacks that plastic adaptation that in steel and reinforced concrete structures allows stresses to be distributed and discharged onto less fatigued elements, allowing the entire structure to cooperate as a wHOLE.

It is important to avoid external load and constraint conditions that induce stress concentrations in the structure realised using SGB, thus designing isostatic panels.

A design with glass blocks involving a hyperstatic connection with other more rigid and massive structures would subject the structure to critical stresses. In addition, if the expansion resulting from an increase in temperature is prevented, tension is generated which can lead to glass breakage.

The experience of specialised builders recommends *works that are free to deform* and expand, so that the expansion and deformation of the different parts (glass blocks and bearing structures) *are independent of each other*.

When designing, it must be ensured that the glass blocks must never come into direct contact with the metal profiles or reinforcement bars required for their assembly.

Tipping of the wall can always be avoided by means of two types of anchorage chosen by the designer: by points or continuous, which will always guarantee the isostaticity of the panels.

Basic elements for calculating and verifying glass blocks structures

Physical/mechanical properties of glass

Modulus of elasticity: ≅ 760,000 kg/cm^2
Poisson's coefficient: ≅ 0.20
Density/specific weight: ≅ 2.5 g/cm3 (2500 kg/m3)
Hardness (Mohs scale): ≅ 6.0
Linear expansion (between -20 and +50°C): ≅ 0.000007 cm/cm°C

Source: Enrico Brusa, Progettazione del Vetrocemento. Fidenza S.A. Vetraria Editrice, Milan, 1967. Average values referred to diffuser glass produced with reverberatory furnaces. ***SGB*** bricks, made from Clear or paste-coloured calcium sodium glass, are annealed and contain no harmful substances.

In both interiors and exteriors there are two main fields of design application:

- Vertical linear walls
- Vertical curved walls

NB: These structures are considered self-supporting and therefore do not play any structural role, since they are only capable to support their own weight, the horizontal load generated by the wind and any impacts perpendicular to the visible surfaces.

NB: **The design must not attribute load-bearing functions to the SGB structures, which must only have plugging and dividing functions**.

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DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

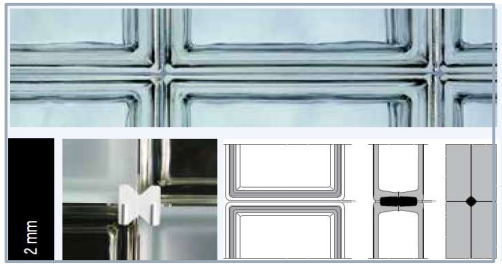
The glass block wall surface, which includes pattern, mass and three-dimensionality, defines the overall look and style of a project. It is possible to transform static walls into dynamic, fluid surfaces with a variety of joint thicknesses;

Two different joint thicknesses to create walls with invisible or almost invisible joints.

CLASSIC FORMATS

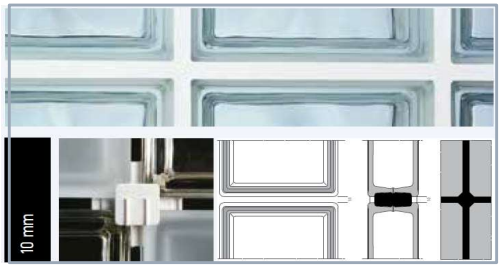
Glass profile differences between product lines

PEGASUS LINE has a profile with 6 mm edges, called wings, which reduce the joints to just 2 mm, effectively eliminating their visual perception. The result is an 'all-glass' wall that enhances brilliance and light, creating an effect of continuity between rooms.



DESIGN	Dimensions (mm)	Glass weight (Kg)	Compressive strength (Mpa)	Thermal transmittance U (W/m² K)	Light transmission (%)	G factor (g)	Sound insulation (dB)	Fire resistance
Q19	190x190x80	2,3	> 9	2.6	80	78	39	E60
R09	190x94x80	1,3	> 9	3.2	80	80	41	E60
Q19 TER LINEAR	190x190x80	2,2	> 7	NPD	80	80	NPD	NPD
Q19 TER CURVED	190x190x80	1,8	NPD	NPD	80	80	NPD	NPD
Q19 ANGULAR	110x190x80	1,7	> 7	NPD	80	81	NPD	NPD
Q19 CORNER 90°	132x190x80	1,7	-	-	-	-	-	-

BASIC LINE, form and function combine in this classic Glass block. An effective choice for applications where the main purpose is the passage of light and/or the creation of a luminous effect. Use the 10 mm joint to deliberately accentuate the joints and for a modular look.



BASIC	Dimensions (mm)	Glass weight (Kg)	Compressive strength (Mpa)	Thermal transmittance U (W/m² K)	Light transmission (%)	G factor (g)	Sound insulation (dB)	Fire resistance
1919/8	190x190x80	2,3	> 9	3.0	80	79	37	E60
1909/8	190x90x80	1,4	> 13	3.2	79	77	41	E60
1919/8 LINEAR END	190x190x80	2,4	> 8	NPD	80	78	NPD	NPD
1919/8 DOUBLE END	190x190x80	2,4	NPD	NPD	79	78	NPD	NPD
19/8 CORNER	101x190x80	1,6	> 9	3.0	77	78	NPD	NPD
1919/8 CORNER 90°	132x190x80	1,7	-	-	-	-	-	-
19/8 ALLBEND	105x190x80	1,4	> 15	3.1	78	78	NPD	NPD

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VERTICAL STRUCTURES

If glass block of different sizes are to be used during the design phase, we recommend compositions that allow for the reinforcement of vertical and/or horizontal bars.

The end blocks models allow for the construction of full-glazed flagged walls. Linear end blocks can be used in both horizontal and vertical rows. Curved end blocks, on the other hand, allow for the finishing of the connection between the horizontal and vertical terminal.

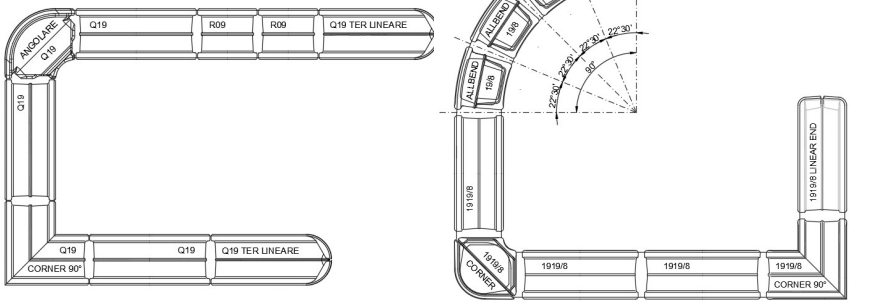
CLASSIC FORMATS

Combinations of different sizes

EXAMPLES OF COMPATIBILITY BETWEEN FORMATS

(some combinations of articles may vary as the joints vary):

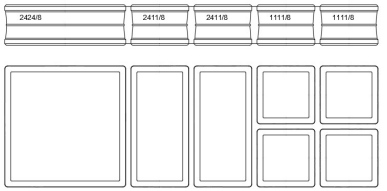
- Design PEGASUS Q19, R09, TER. LIN, TER CURVE, ANGULAR and CORNER 90° (2mm joint. 5mm, 1cm)
- Basic 1919/8, 1909/8, LINEAR END, DOUBLE END, CORNER, CORNER 90° and ALLBEND (1 cm joint)
- Technology 2424/8, 2411/8 and 1111/8 (1 cm joint)
- Technology 3030/10, 1919/10 (1 cm joint)



Example with DESIGN PEGASUS Q19 with: R09, Ter. Linear, Ter. Curved, Angular and Corner 90°

Example with BASIC 1919/8 with: 1909/8 Linear End, Double End, Corner 90°, Allbend

Example of compatibility between DESIGN Line formats



Example with TECHNOLOGY: 2424/8, 2411/8 e 1111/8

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DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

In the case of **large walls,** it is suggested to subdivide the panels according to the following maximum dimensions:

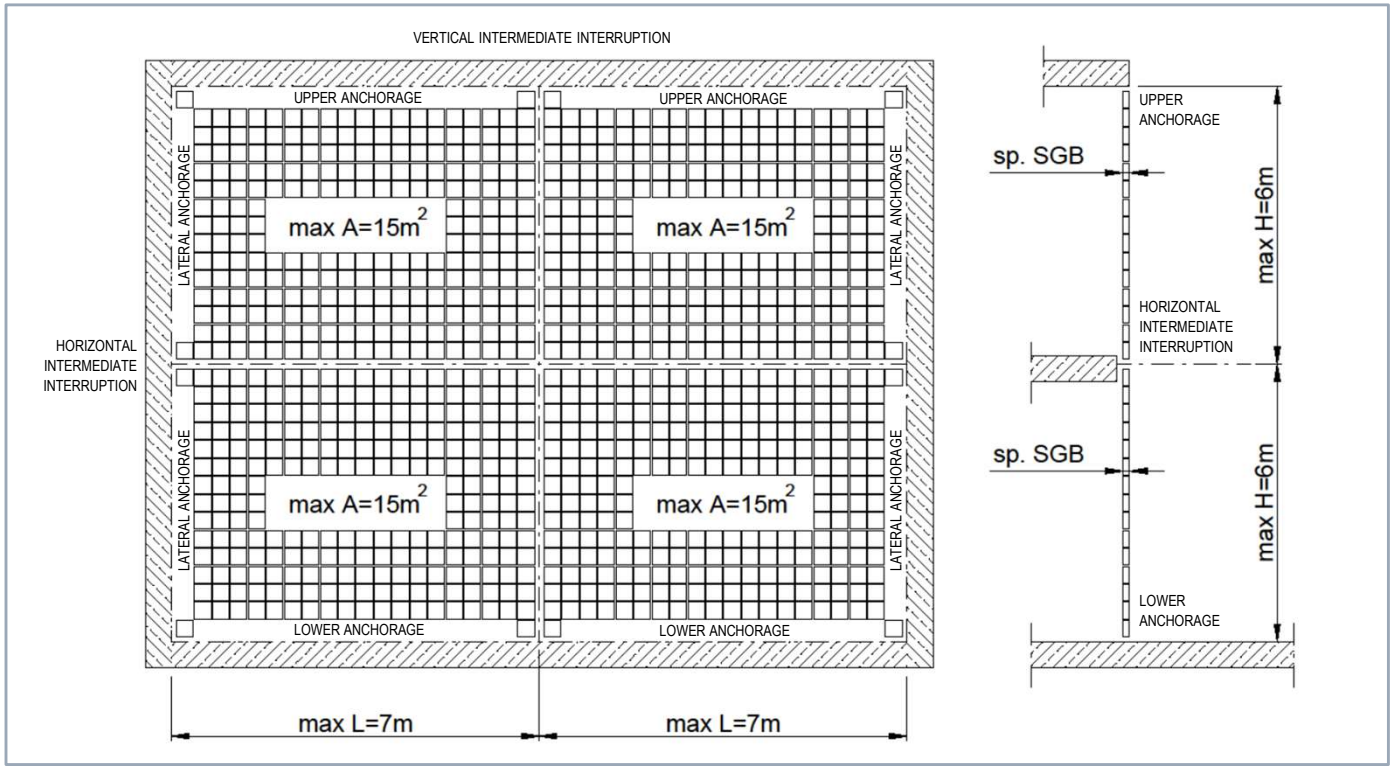
Max. SURFACE = L x H < 15 m ^{2}

L = WIDTH max. 7m

H = HEIGHT max. 6 m

CLASSIC FORMATS

Linear wall dimensional limits



For larger surfaces, specific structural calculations are required. It will be the designer's task to provide for the subdivision of surfaces by means of expansion and absorption joints *made of suitable materials.* (see vertical and/or horizontal intermediate breaks)

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DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Seves glassblock is designed for vertical structures in a variety of formats. This allows designers to increase flexibility and versatility with original compositions.

The formula on this page allows you to calculate the size and number of glass blocks.

CLASSIC FORMATS

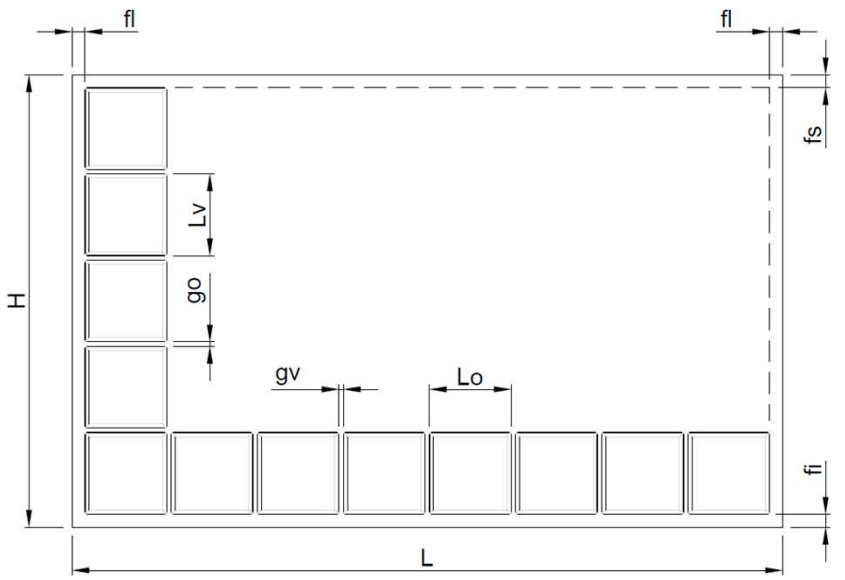
Calculating the size and number of glass blocks

LINEAR WALLS

L = (n x Lo) + [gv x (n-1)] + 2fl
H = (m x Lv)+ [go x (m-1)] + (fs+fi)
n = (gv + L - 2fi) / (Lo + gv)
m = (go + H - 2fi) / (Lv + go)

Where:
n = no. of horizontal glass blocks
m = no. of vertical glass blocks
Lo = length (cm) of the glass blocks
Lv = height (cm) of the glass blocks
fl = size of the lateral band (cm) - min. value 2 cm
fi = size of the lower band (cm) - min. value 2 cm
fs = size of the upper band (cm) - min. value 2 cm
go = horizontal internal joint (cm)
gv = vertical internal joint (cm)

In the formula, fl and fi are equal to 2 cm
As concerns the result of the formula, it is necessary to take into consideration only the entire number.
The exceeding fraction will be counted as an integrating part of the bands.



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VERTICAL STRUCTURES

If glass blocks of different thicknesses and/or formats are to be used during the design phase, it is recommended that they be designed with joints to allow for the reinforcement of vertical and/or horizontal bars.

CLASSIC FORMATS

Calculating the weight of glass block panels

WEIGHT CALCULATION

Weight = (PV + PC + PA) / (L x H) x 10000

PV = RV x n x m

PC = RC x s x [L x H - (m x Lo x n x Lv)].

PA = RA x [(m + 1) x L + (n + 1) x H]

Where:

PV = weight of glass element (kg)

PC = weight of cement mortar (kg)

PA = weight of steel reinforcing bars (kg)

RV = average unit weight of glass elements (kg)

RC = specific weight of mortar (kg/cm)

RA = linear density of the steel (kg/cm)

s = side thickness of glass elements (cm)

n = number of horizontal glass blocks

m = number of vertical glass blocks

ARTICLE	DIMENSIONS (cm)	UNIT WEIGHT (Kg)	INDICATIVE STRUCTURE WEIGHT PER m^2				NUMBER OF PIECES PER m^2 OF WALL			
			2 mm joints	5mm joints	1 cm joints	1.6cm joints	2 mm joints	5mm joints	1 cm joints	1.6cm joints
Q19 PEGASUS	19x19x8	2,30	83	86	89	94 (*)	27	26	25	24
R09 PEGASUS	19x9.4x8	1,30	102	107	112	-	54	52	50	-
1919/8	19x19x8	2,30	-	-	83	87 (*)	-	-	25	24
1909/8	19x9x8	1,40	-	-	108	-	-	-	50	-
1919/5	19x19x5	1,70	-	-	59	-	-	-	25	-
1919/10	19x19x10	2,70	-	-	99	-	-	-	25	-
2424/8	24x24x8	4,00	-	-	82	90 (*)	-	-	16	16
2411/8	24x11.5x8	2,20	-	-	98	-	-	-	32	-
1111/8	11.5x11.5x8	1,08	-	-	105	-	-	-	64	-
3030/10	29.8x29.8x9.8	7,50	-	-	98	-	-	-	10,5	-
VETROPIENO	24x11.7x5.4	3,60	-	-	264	-	-	-	62	-

(°) Walls with openable frames

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VERTICAL STRUCTURES

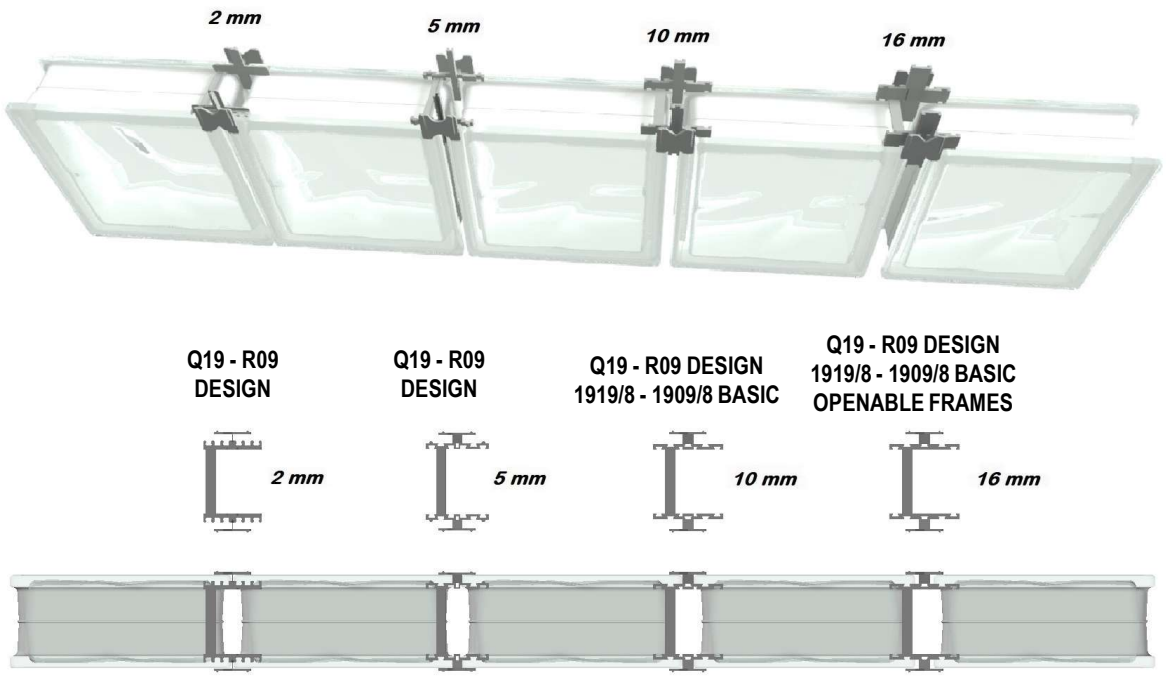
Seves Glass Block provides plastic spacers that facilitate installation and allow for glass block and its joints between 2* mm, 5* mm, 10 mm and 16 mm; the latter size is suitable for the installation of openable frames.

(* only with Q19 and R09 Pegasus)

CLASSIC FORMATS

Spacers for glass blocks

SPACERS FOR 2MM, 5MM, 1CM AND 1.6CM JOINTS FOR OPENABLE FRAME



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DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The adjacent formula allows the dimensions of the outer joint to be calculated in relation to the radius of curvature and the model of Seves Glass Block used, and the number of glass blocks to be used as a base in relation to the development of the circumference.

CLASSIC FORMATS

Radius, curvature and dimensional limits curved walls

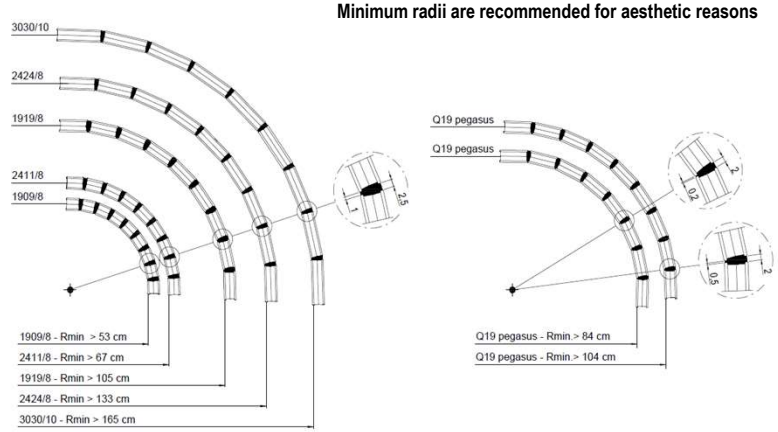
CALCULATION OF EXTERNAL JOINT

$$E = [(Lo + gv) \times (1+s/r)] - Lo$$
$$Np = r \times \pi \times a/[180/(Lo + go)].$$

E = size of the external vertical joint (cm) - Np = number of SGB pieces - Lo = length of the glass blocks (cm) - gv = size of the internal vertical joint (cm) - r = internal curvature radius (cm) - s = lateral thickness of glass blocks (cm) - a = angle between the development radius of the curve π = 3.14 - go = horizontal internal joint (cm)

gv – size of vertical and horizontal internal joints and horizontal external joints (cm)	E – size of vertical external joint (cm)	s – lateral thickness of glass blocks (cm)					
		8					
		Lo – length of glass element (cm)					
		9,4	11,5	19	24	30	19
		R - internal radius of curvature (cm)					
0.2 only with PEGASUS version	15			118			
	2			85			
0.5 only with PEGASUS version	1,5			156			
	2			104			
1	1,5	160	200	320	400	496	200
	2	80	100	160	200	248	100
	2,5	53	67	105	133	165	67
1,6	1,5	212	262	412	512	632	257,5
	2	94	116,5	183,5	227,5	281	114,5
	2,5	60,5	75	117,5	146	180,5	73,5

Minimum radii are recommended for aesthetic reasons



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VERTICAL STRUCTURES

For **curved** walls, the dimensional limits seen for vertical walls with linear development are recommended.

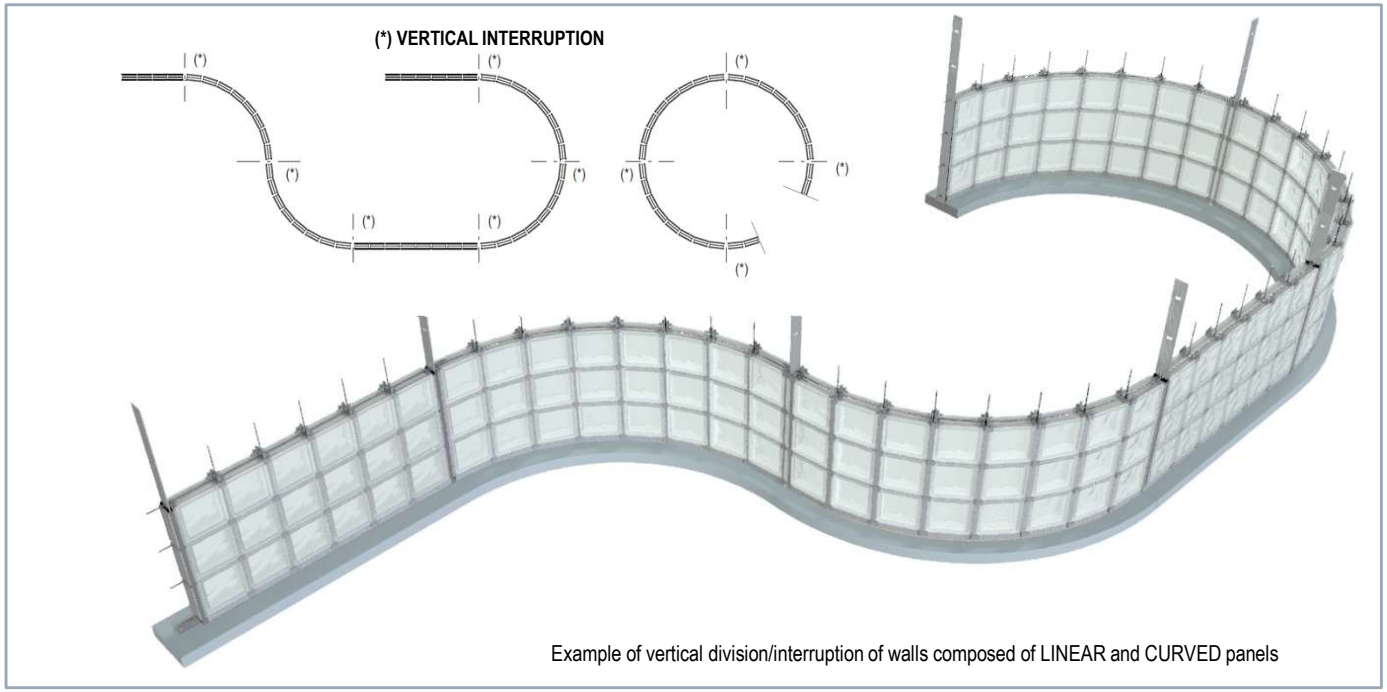
The geometry of these walls provides, in any case, greater stability against horizontal loads.

CLASSIC FORMATS

Radius, curvature and dimensional limits curved walls

Please note that in curved surfaces the inner vertical joint differs from the external vertical joint. In every change of radius of curvature, it is advisable to insert an expansion joint regardless of the panel surface.

NB: In the case of closed circular walls, we recommend inserting expansion joints every 90°.



Example of vertical division/interruption of walls composed of LINEAR and CURVED panels

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VERTICAL STRUCTURES

When designing *SGB* walls, it is important to provide appropriate perimeter restraints to give the wall stability. It is essential to allow for the necessary settlement and expansion by providing:

- laterally and at the top an **expansion joint** approximately 5 mm thick made with a special **SGB** accessory
- a **sliding joint** of non-compressible insulating material at the base

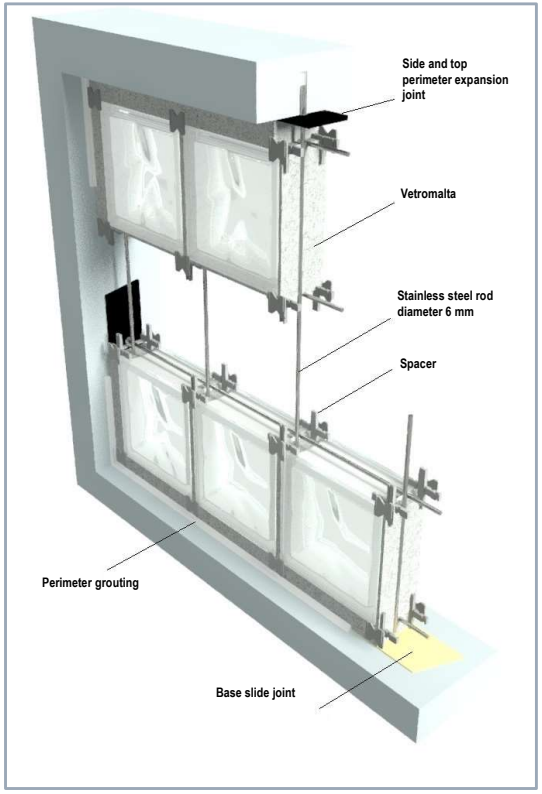
Perimeter anchorage section

The vertical and horizontal load-bearing structures, on which the SGB walls will rest, must be appropriately dimensioned. As illustrated in the examples on the following pages, there are two types of fixing:

- Concrete point fixing in the structure is achieved by inserting the SGB reinforcement bars, which are present in all horizontal and vertical joints, into pre-drilled HOLEs in the lateral and upper load-bearing structures placed in adhesion, avoiding the base. The HOLEs in the structures must be slightly larger in diameter and depth than the diameter of the reinforcement bars used, avoiding filling with adhesives and mortars in order to avoid blocking.
- Continuous fixing with metal "U" profiles along the entire perimeter edge of the structure, obtained by using metal profiles or housings with a "U" section, taking care to seal the base side where water could most easily stagnate, increasing the possibility of deterioration of the materials. The internal dimension between the wings of the profiles or housings must be not only constant, but also greater than the thickness of the SGB bricks in order to facilitate any sliding, to avoid friction with the support surface and regular expansion on the remaining sides, and the insertion of sliding and expansion joints is obligatory.

In cases where structural requirements or exceeded size limits require the panel to be divided into several parts, an expansion/slip joint should be inserted between one panel and another where the structural continuity of the panel is interrupted:

- Vertical intermediate break with the insertion of metal blade profiles or 'U' profiles anchored to the structures, which allows the vertical wall break to be carried out with optimal expansion and sliding tolerance.
- Horizontal intermediate break with the insertion of metal profiles anchored to the structure, which allows the horizontal wall break to be carried out ensuring optimal expansion and sliding tolerance, as well as supporting the weight of the glass block panel.



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Concrete point fixing in the structure is achieved by inserting the SGB reinforcement bars, which are present in all horizontal and vertical joints, into pre-drilled HOLEs in the lateral and upper load-bearing structures placed in adhesion, avoiding the base. The HOLEs in the structures must be slightly larger in diameter and depth than the diameter of the reinforcement bars used, avoiding filling with adhesives and mortars in order to avoid blocking.

CLASSIC FORMATS

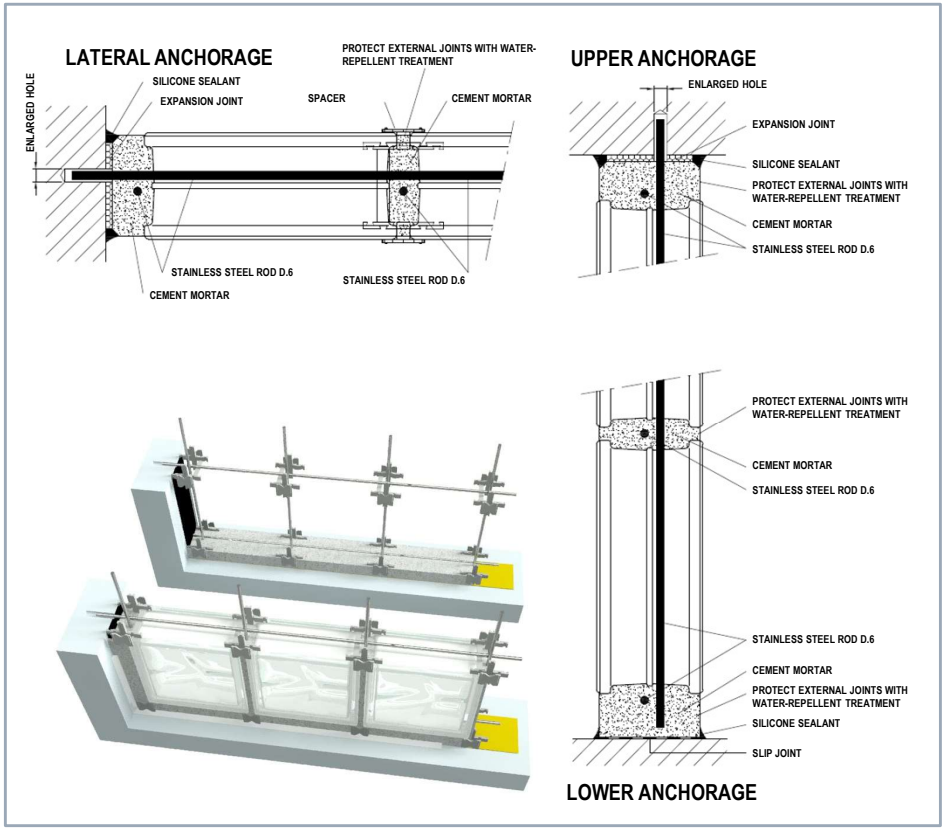
Fixing for concrete points in the structure

INSTALLATION ACCESSORIES
(*) glass block 19x19x8 cm

- SGB spacers = **(*)** approx. 36 pcs/m^2
- Minimum panel perimeter 2/3cm
- SGB mortar installation and finishing = **(*)** approx. 25 kg/ m^2
- Expansion joint SGB = side and top perimeters
- Slip joint in the lower base of non-compressible insulation material (e.g. paper or vinyl tape)
- Horizontal/vertical joint reinforcement with Ø. 6 mm stainless steel SGB rod = **(*)** approx. 12 m/ m^2
- Point anchorage by inserting the rods laterally and at the top about 4/5 cm into an oversized HOLE in the supporting structure

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent

max. area = L x H < 15 m^2
max. width = L. 7m - max. height = H. 6 m
In the case of **large walls,** it is suggested to subdivide the surface



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

- Continuous fixing with metal "U" profiles along the entire perimeter edge of the structure, obtained by using metal profiles or housings with a "U" section, taking care to seal the base side where water could more easily stagnate, increasing the possibility of deterioration of the materials. The internal dimension between the wings of the profiles or housings must be not only constant, but also greater than the thickness of the SGB bricks in order to facilitate any sliding, to avoid friction with the supporting surface and regular expansion on the remaining sides, and the insertion of sliding and expansion joints is obligatory.

CLASSIC FORMATS

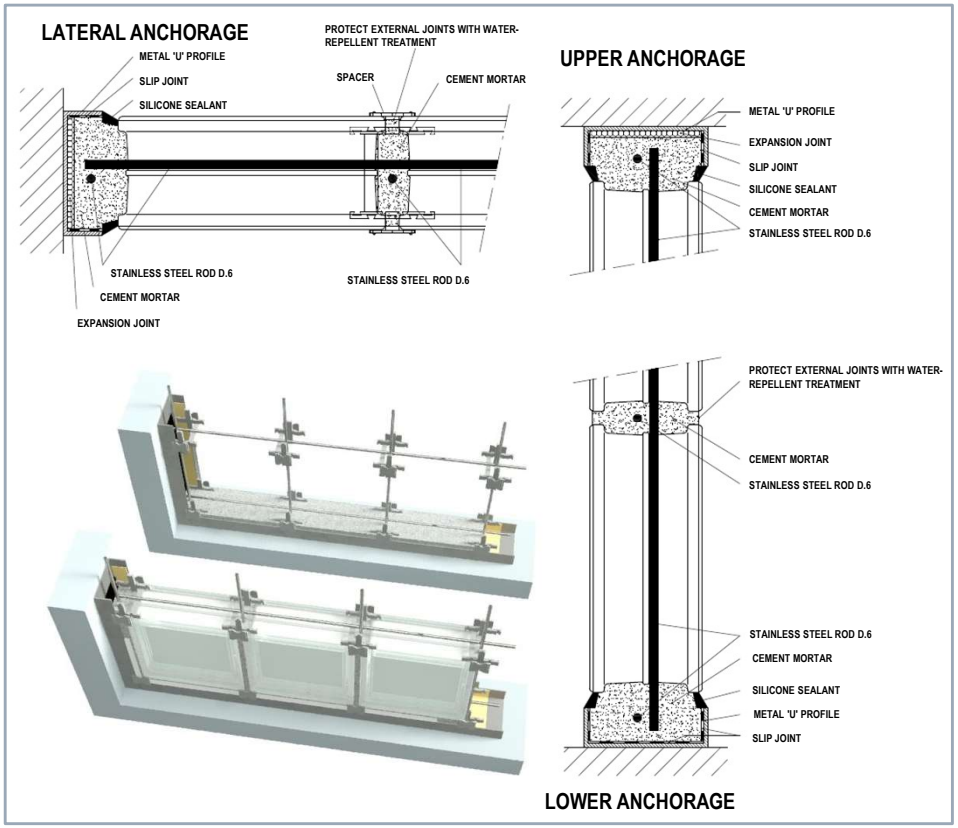
Continuous fastening with metal U-profiles

INSTALLATION ACCESSORIES
(*) glass block 19x19x8 cm

- U' metal profiles with constant internal wing dimensions and greater than the thickness of the glass-brick
- SGB spacers = (*) approx. 36 pcs/ m^2
- SGB mortar installation and finishing = (*) approx. 25 kg/ m^2
- Expansion joint SGB = side and top perimeters
- Slip joint in the lower base of non-compressible insulation material (e.g. paper or vinyl tape)
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = (*) approx. 12 m/ m^2

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent

max. area = L x H < 15 m ²
max. width = L. 7m - max. height = H. 6 m
In the case of **large walls,** it is suggested to subdivide the surface



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

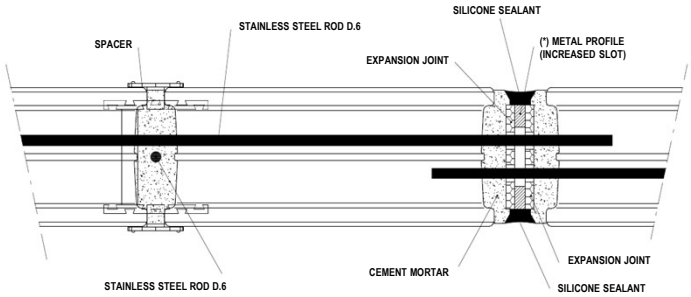
VERTICAL STRUCTURES

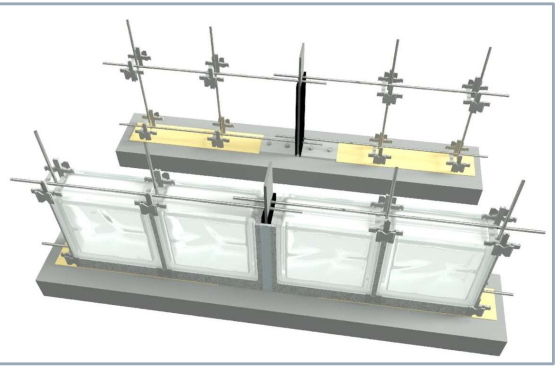
Vertical intermediate interruption with the insertion of metal blade profiles or 'U' profiles anchored to the structures, which allows the vertical wall interruption to be carried out with optimal expansion and sliding tolerance.

CLASSIC FORMATS

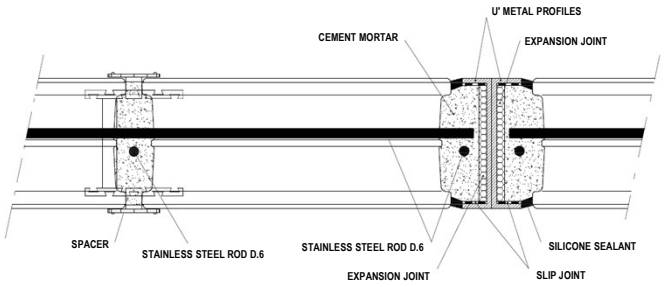
Expansion / settlement joint (vertical interruption)

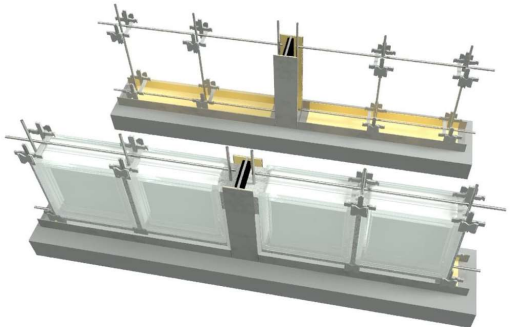
INTERMEDIATE VERTICAL WALL INTERRUPTION





INTERMEDIATE VERTICAL WALL INTERRUPTION, WITH METAL 'U' PROFILES





SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

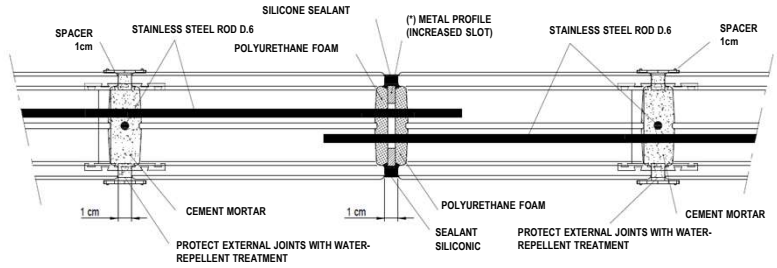
VERTICAL STRUCTURES

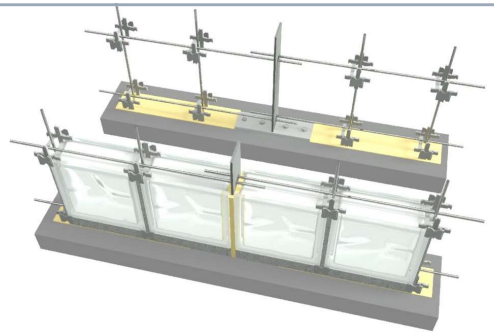
In cases where structural requirements or exceeded dimensional limits require the panel to be divided into several parts, an expansion/slip joint should be inserted between one panel and the next, with metal blade profiles anchored to the structure, where the structural continuity of the panel is interrupted by polyurethane foam (mock joint or constant joint)

CLASSIC FORMATS

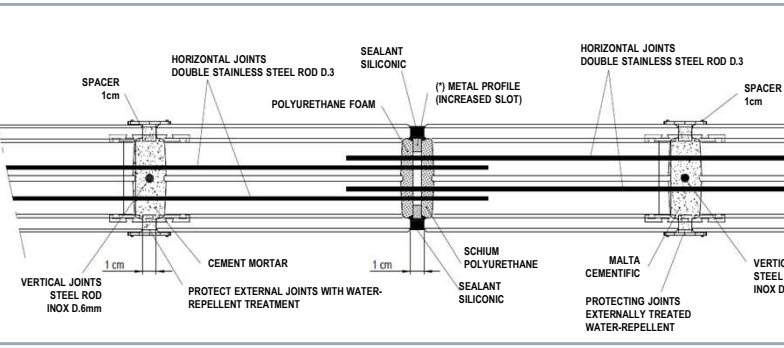
Expansion joint / Settlement (vertical interruption)

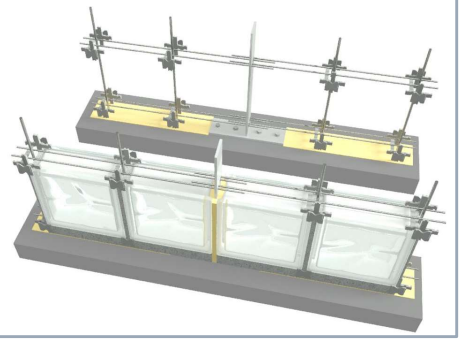
1 cm CONSTANT JOINT: INTERMEDIATE WALL INTERRUPTION WITH POLYURETHANE FOAM AND HORIZONTAL/VERTICAL REINFORCEMENT WITH 6 mm STAINLESS STEEL RODS





1 cm CONSTANT JOINT: VERTICAL WALL INTERMEDIATE INTERRUPTION WITH POLYURETHANE FOAM AND HORIZONTAL REINFORCEMENT WITH DOUBLE 3 mm STAINLESS STEEL RODS AND VERTICAL WITH 6 mm STAINLESS STEEL RODS





DESIGN AND INSTALLATION TECHNIQUES

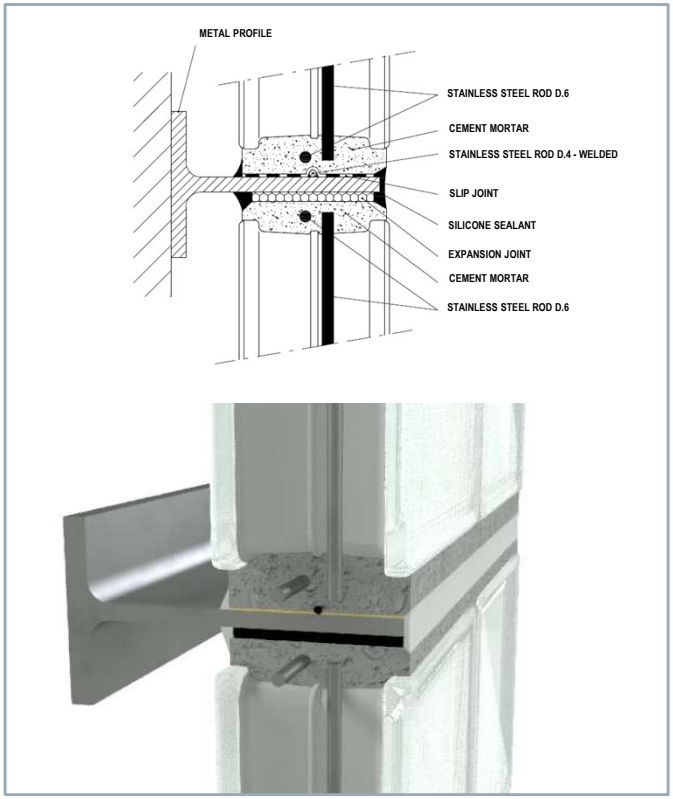
VERTICAL STRUCTURES

Horizontal intermediate break with the insertion of metal profiles anchored to the structure, which allows the horizontal wall break to be carried out ensuring optimal expansion and sliding tolerance, as well as supporting the weight of the glass block panel

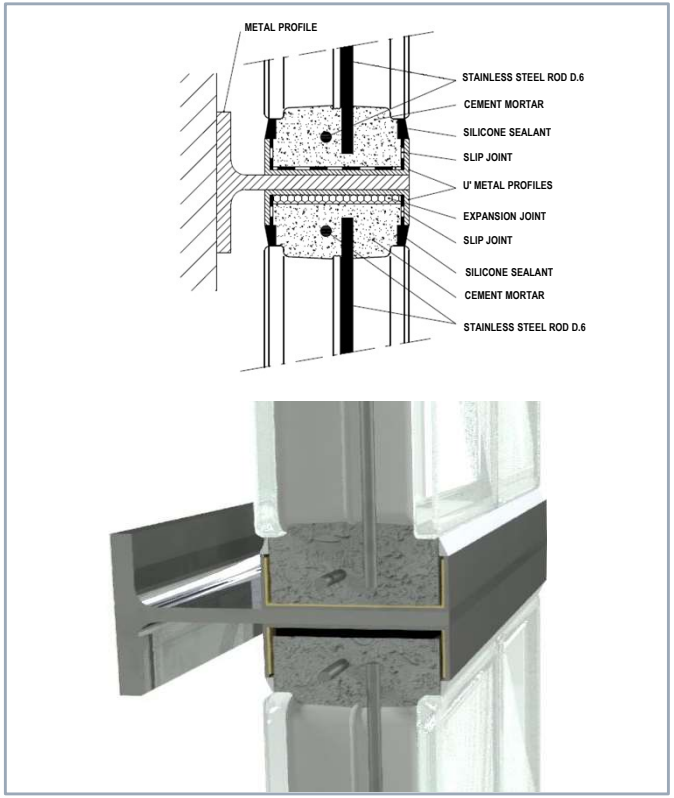
CLASSIC FORMATS

Expansion / settlement joint (horizontal interruption)

HORIZONTAL INTERMEDIATE INTERRUPTION



HORIZONTAL INTERMEDIATE INTERRUPTION, WITH METAL 'U' PROFILES



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

It is possible to create symmetrical, original, geometric compositions by combining and matching square and rectangular glass blocks.

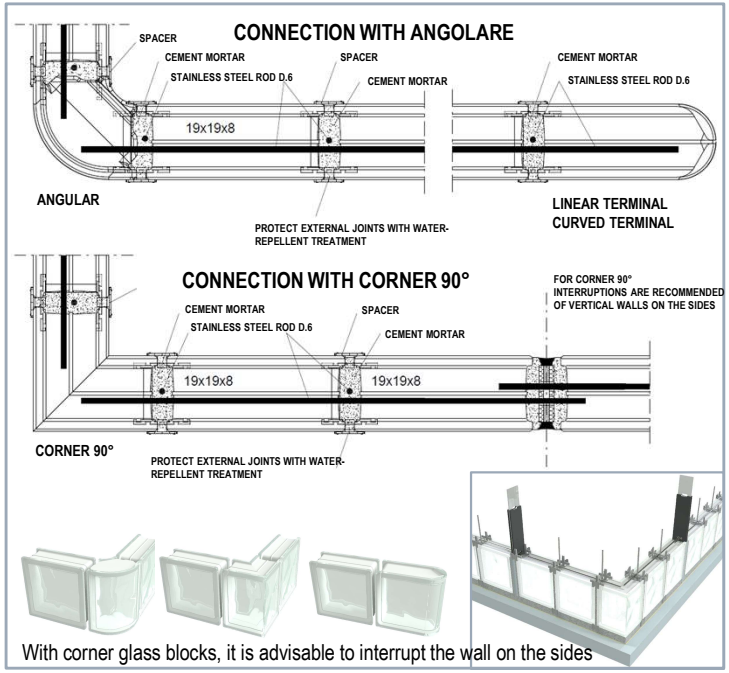
Walls with elegant, angular finishes or linear and curved ends can be realised to suit customised projects.

CLASSIC FORMATS

Angles and intersections between flag walls

90° ANGLES AND FLAG WALLS WITH SPECIAL GLASS BLOCKS

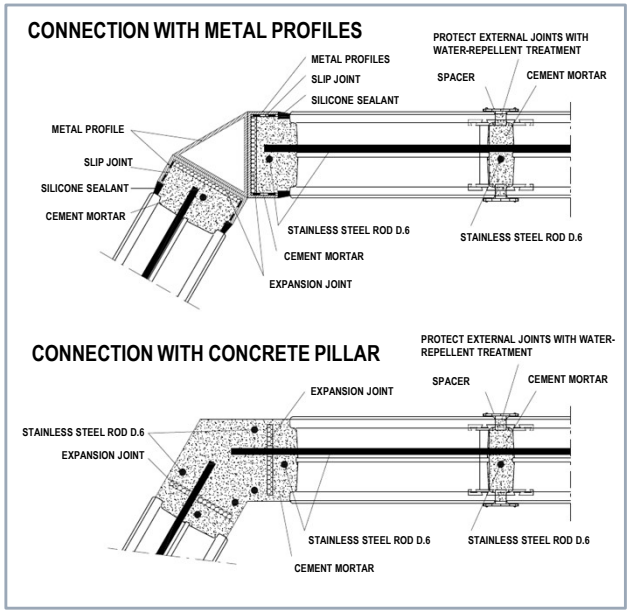
SGB angolare or corner 90° type can be used to create all-glass 90° corners. With the SGB linear and curved wall end block, it is possible to realise flagged walls with a end glass block.



With corner glass blocks, it is advisable to interrupt the wall on the sides

ANGLES OTHER THAN 90° IN CONCRETE OR WITH PROFILES

If angles other than 90° are to be created, the SGB walls can be joined using appropriate metal profiles, or by creating shaped concrete or brick pillars on which to anchor the Glass block walls



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

It is possible to insert a window (light door or window) inside a Glass block wall with specially designed fittings.

CLASSIC FORMATS

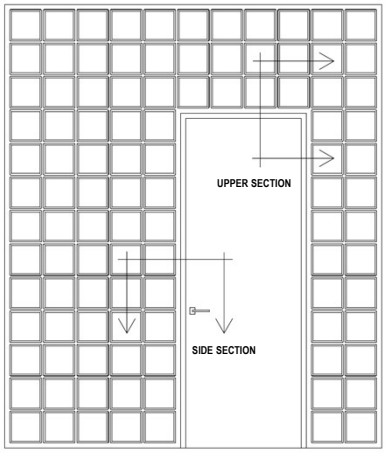
Fitting doors and windows

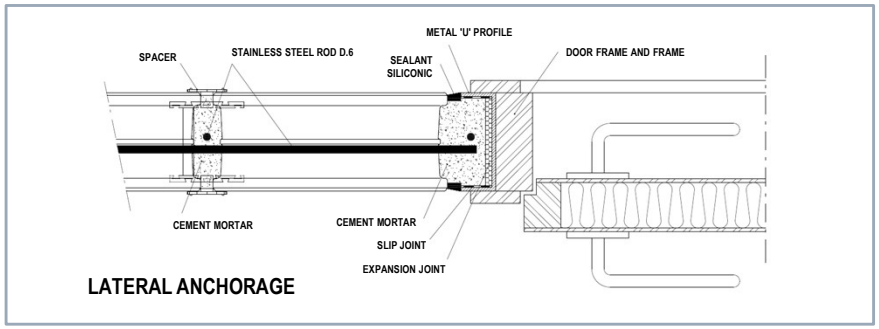
To fit doors and windows into a glass block wall you must create an opening with a frame made of metal U-sections. You must position the frame, using temporary supports, before the SGB structure.

Install the glass blocks sure to leave a *minimum distance of 1 cm space* between the frame and the blocks positioned along its perimeter.

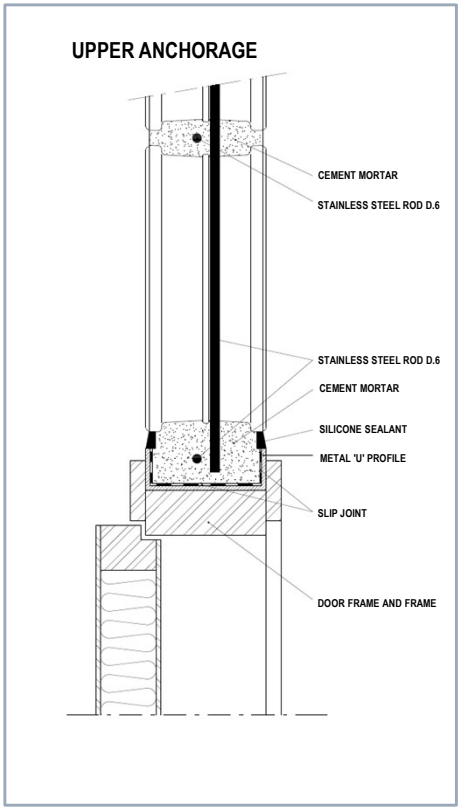
In order to prevent damage to the glass blocks that may be caused by slamming the door or window, make sure to cover the inside of the metal sections with rubber or similar material.

The metal sections can serve as supports for the fixed door or window frame or for subframe.





LATERAL ANCHORAGE



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

SGB opening frames, designed for room ventilation, can accommodate one, two or four glass blocks in 19x19x8 cm or 24x24x8 cm format.

The opening system is horizontally pivoted.

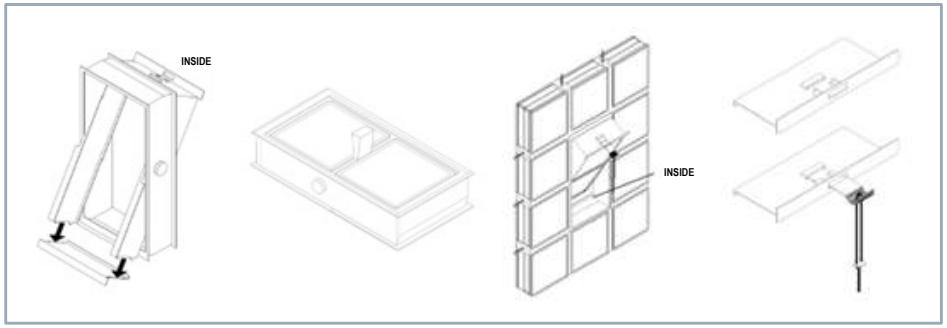
In the case of SGB openable frames, glass blocks can be installed with ***16 mm*** joints***,*** using the appropriate spacers***.***

CLASSIC FORMATS

Fitting openable frames

ASSEMBLY OF OPENABLE FRAMES

- Place the glass blocks inside the frame by removing the bottom rail of the opening part (only for one- and two-seater bricks).
- Place the frame on a smooth surface and fill the joints obtained by spacing the glass blocks with cement mortar using wooden wedges.
- Attach the opening handle by lifting the metal tabs on the side of the opening frame part.
- Insert the handle before the frame is set in place to prevent it from moving out of the correct position and opening unintentionally.
- When the mortar has hardened, install the frames as the wall is laid.
- Insert the opening frame with the tilting opening axis horizontal and the opening handle positioned at the top, in order to facilitate gravity closing and prevent water infiltration.



OPENABLE FRAME 1 place

OPENABLE FRAME 2 places

OPENABLE FRAME 4 places

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

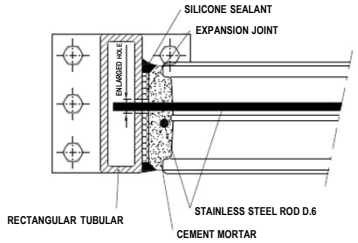
In the absence of a stable anchoring support, tubular profiles can be used as a fixing point.

It is essential to support and anchor the walls to suitably sized solid supporting structures, perimetering them with suitable rot-proof materials of such thickness, density and hardness as to absorb expansion and any structural sliding or settling

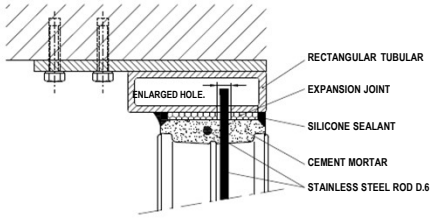
CLASSIC FORMATS

Lateral anchoring with tubular profiles

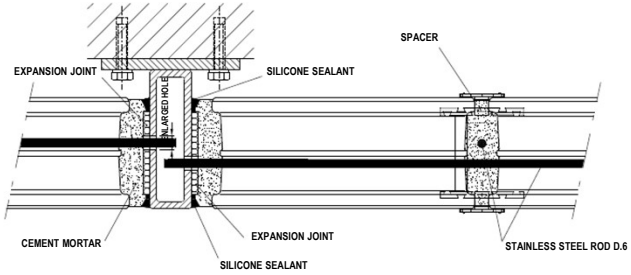
LATERAL ANCHORAGE



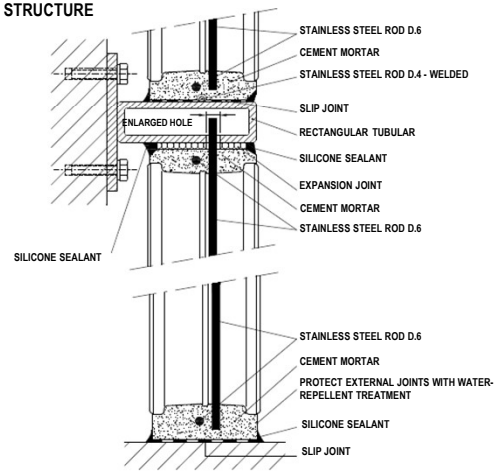
UPPER ANCHORAGE



INTERMEDIATE INTERRUPTION OF VERTICAL WALL WITH INSERTION OF RECTANGULAR METAL TUBE ANCHORED TO THE STRUCTURE



INTERMEDIATE HORIZONTAL WALL INTERRUPTION WITH INSERTION OF RECTANGULAR METAL TUBE ANCHORED TO THE STRUCTURE



LOWER ANCHORAGE

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The following materials and accessories are required for installation,

- Cement mortar
- Steel reinforcements
- Joints finishes
- Protective treatments and sealants
- Slip and expansion/settling joints
- Spacers

Installation materials and accessories

CEMENT MORTAR - For the construction of vertical walls, the use of Vetromalta SGB is recommended, a pre-mixed white or grey coloured binder with a yield per m^2 of approximately 25 kg (including finishing). This product is suitable for both laying and finishing structures
As an alternative to Vetromalta SGB, we recommend the use of traditional cement mortar with a *Portland* cement mix, or similar, of class 32.5. The use of adhesives generally used to glue wall and floor tiles is absolutely not recommended. Furthermore, the use of epoxy-based mortars is not recommended as they cause difficulties in removing residues during cleaning.
The mortar can alternatively be obtained by dosing:

- 1 part binder (cement type 32.5)
- 1 part fine aggregate (sand of mineral origin, washed, with assorted grain size and maximum size of 3 mm)
- 1 part clean water until a slurry of plastic consistency is achieved

All in such proportions as to ensure workability in the wet state and mechanical strength in the dry state after setting and hardening.
The mortar must offer good mechanical strength and, at the same time, good workability for complete and correct filling of all spaces between glass and glass. It must also possess waterproof and low shrinkage characteristics during curing. High shrinkage induces harmful stresses on the SGB bricks and can cause cracks in the mortar itself to the detriment of waterproofing.
The white paint covering the side of the bricks allows them to be installed with mortar of any colour, without changing the brightness of the glass. This paint, which is also linked to the shape of the SGB glass sidewall, also improves the adhesion of the mortar to the sidewall of the brick itself.

STEEL REINFORCEMENT - The use of stainless steel bars is recommended (available SGB smooth round, Ø 6mm, 3m length) in order to prevent and limit the oxidation of the bars themselves, increasing the life of the panel. The size of the rod may however vary depending on the calculations made by the designer and the need to give the structure adequate structural strength, but must be such as to avoid contact with the glass.

JOINT FINISHING - The most common grouting systems include:

- SGB glass mortar in white and grey with the possibility of being coloured with commercially available oxides;
- cement mortars with fine sieved sand, for grey coloured joints;
- mortars of white cement and marble powder, for white coloured joints;
- cement mortars with fine sand and oxides, for coloured joints.

The finishing mortars used must not contain aggregates that risk scratching the glass elements.
If pre-mixed mortars or specific grouts are used, it is essential to ensure that they do not contain any special additives or epoxy, which can make it difficult to clean SGB bricks, especially if they are sand blasted.

For filling the joints, it is generally recommended to use mortar with a compressive strength not exceeding that of the mortar used for laying.

PROTECTIVES AND SEALANTS - It is possible to intervene with protective treatments on the joints in order to prevent water infiltration by applying one or more layers of protective waterproofing, usually transparent.
When the wall is dry, apply a sealant on the perimeter of the work, inside/outside, in order to fill any cracks along the contact points with the surrounding structures. This operation protects against infiltration.
These treatments are indispensable for structures with SGB exposed to moisture (outdoor, driving rain, shower stalls) and structures with special SGB items such as ES (energy saving) and EI (fire resistant).

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The following materials and accessories are required for installation,

- Cement mortar
- Steel reinforcements
- Joints finishes
- Protective treatments and sealants
- Slip and expansion/settling joints
- Spacers

CLASSIC FORMATS

Installation materials and accessories

SLIP AND EXPANSION/SETTLING JOINTS

Appropriate materials must be placed on the sides and top to absorb any settling of the structure, such as the SGB expansion joint, which is adhesive on one side so that it can be better positioned on the adhering structures, with a thickness of 5 mm. At the base, a suitable expansion joint of non-compressible insulating material (e.g. paper or vinyl tape) must be placed in order not to create cohesion with the building.

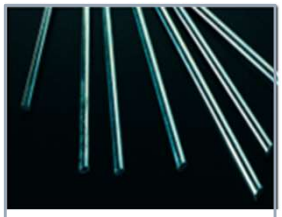
Expansion/settlement joints

SPACERS

To make installation easier and faster, SGB offers a range of plastic spacers for linear and curved vertical walls. This accessory facilitates the creation of joints of constant thickness and reduces the risk of contact between the reinforcement bars and the side of the SGB bricks.

The spacers differ according to the size of the joints, the thickness of the glass blocks and the type of wall (linear or curved). The range of spacers is composed as follows:

- for 2 mm joints (Q19 Pegasus version only) and for 8 cm thick glass blocks for 5 mm joints (Q19 Pegasus version only) and for 8 cm thick glass blocks
- for 10 mm joints and 8 cm glass blocks
- for 10 mm joints and 3030/10 cm glass blocks
- for 10 mm joints and 5 cm glass blocks
- for 16 mm joints for 8 cm thick glass blocks and for inserting opening frames
- for curved walls and 8 cm thick glass blocks



Stainless steel rod

VETROMALTA

Quick method for calculating the number of spacers

Use the following formula to calculate the number of spacers needed for your specific installation:

D = (n + 1) x (m + 1)

Where:

D = No. of spacers

n = no. of horizontal glass elements

m = No. of vertical glass elements

Spacers

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The installation consists of three stages:

preliminary, installation and finishing.

It is indispensable to support and anchor the walls to suitably sized solid supporting structures, perimetering them with suitable rot-proof materials of such thickness, density and hardness as to absorb expansion and possible sliding or structural settlement.

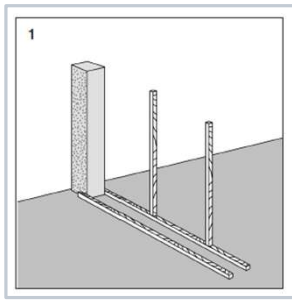
Installation

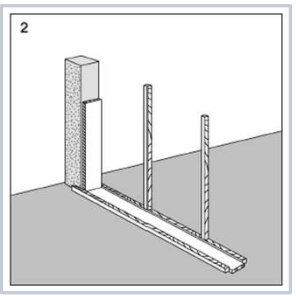
PRELIMINARY PHASE

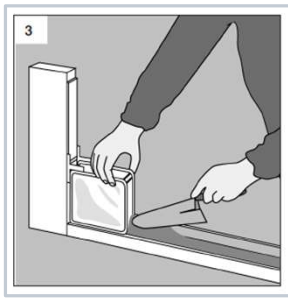
Fig. 1
Check the horizontality and verticality of the structures to which the work will be supported.
Lay two wooden battens horizontally on the elevation plane of the wall to be executed. The battens must follow the track of the wall and will be spaced by the same measure as the thickness used.
Place the vertical rails plumb, spaced so as to ensure verticality of the wall. It is important that the wall is perfectly vertical in order to avoid eccentric loads.
Fig. 2
Insert a sliding joint inside the horizontal strips to prevent adhesion to the supporting surface.
Provide expansion/levelling joints on the sides and at the panel support points.

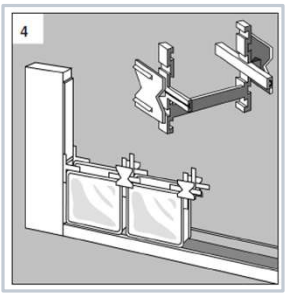
INSTALLATION PHASE

Fig. 3
Use a trowel of a suitable size to work easily between the vertical reinforcement bars.
Place cement mortar between the base strips in order to create a support of no less than 3 cm. This dimension may vary depending on the height of the wall, as specified by the designer.
Place the first row of SGB bricks.
Fig. 4
Run the first course perfectly level.
Spacing the elements, using spacers to achieve even joints.
Place cement mortar in the vertical space between the Glass blocks of the course already laid, temporarily removing the spacer to allow for this.









SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The installation consists of three stages:

preliminary, installation and finishing.

It is indispensable to support and anchor the walls to suitably sized solid supporting structures, perimetering them with suitable rot-proof materials of such thickness, density and hardness as to absorb expansion and possible sliding or structural settlement.

Installation

FIG. 5

Place the reinforcing bar on the centre flap of the spacer so that it does not come into contact with the side of the brick. Lay the mortar, leaving the spacer sides free. Ensure that the glass blocks are surrounded on all sides by well-compacted and distributed mortar and avoid direct contact with the supporting structures.

Insert smooth stainless steel bars into each joint, vertical and horizontal.

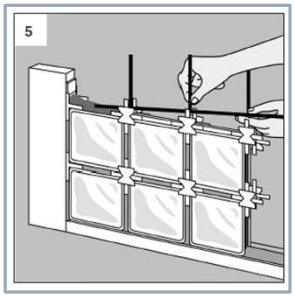
Using a piece of wood, remove excess material on the joints before it hardens, thus preparing them for finishing.

Wipe the surface of the glass panes with a dampened sponge to remove residues of laying mortar. If the wall reaches the ceiling, position the expansion/levelling joint in the same way as on the sides.

In order to provide small and medium-sized walls with the necessary stability, they should be fastened to the adjacent load-bearing structures by inserting horizontal rods into the structures. These bars should enter HOLEs slightly larger in diameter than the rebar for a sufficient length to prevent tilting, thus passing through the expansion/settlement joint.

In the case of large walls, the use of U-shaped metal profiles with parallel internal wings, with an internal width greater than the thickness of the glazing, dowelled or welded to adjacent load-bearing structures, is more appropriate.

To prevent the metal from touching the SGB bricks, place the first vertical row of Glass blocks at a distance of at least 10 mm from the profile wings. With this solution, the expansion/ settlement joint must be placed inside the profile.



FINISHING PHASE

FIG. 7

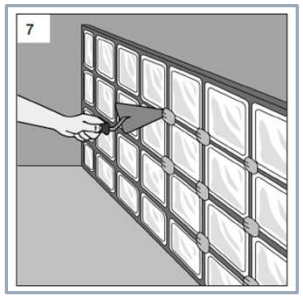
Only proceed with joint finishing when the laying mortar has hardened.

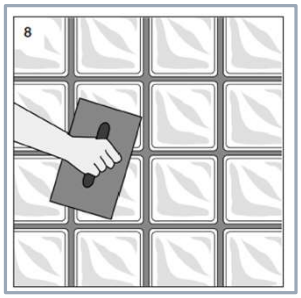
Remove the outer plates of the plastic spacers with a tool that does not scratch the glass surface.

FIG. 8

Spread the finish, filling the joints and perimeter well with soft spatulas and trowels. After the finish has dried, seal the perimeter with an elastic sealant to prevent any cracking along the expansion/ settlement joints.

In the case of exterior walls or walls exposed to water, paint the exposed joints with transparent protective products in order to increase impermeability and seal the perimeters with suitable sealants.





SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The executive characteristics of prefabrication, being similar in many respects to those for horizontal constructions, are dealt with in the chapter "Horizontal Structures".

Proper cleaning of glass blocks must be done carefully to avoid damaging the product.

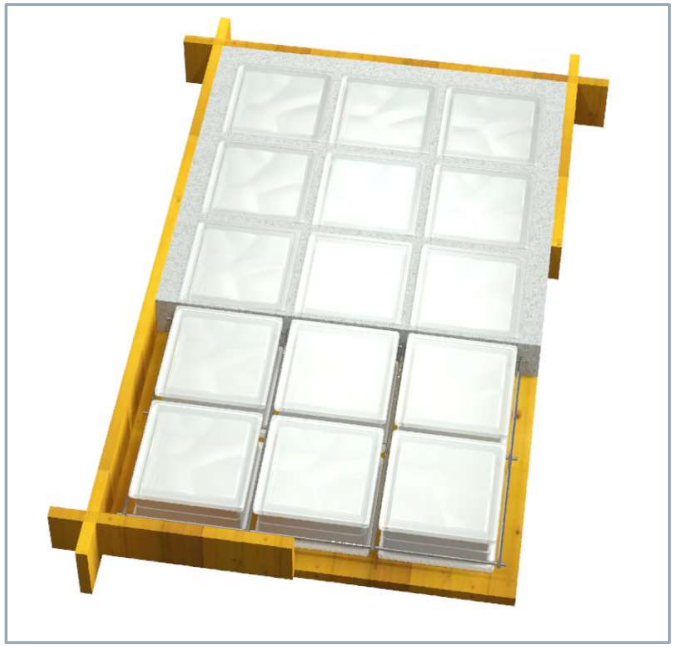
CLASSIC FORMATS

Prefabricated panels and Glass block cleaning

PREFABRICATION OF VERTICAL PANELS

In order to position the panels vertically, the panel must be cured for a suitable time and equipped with suitable accessories (such as fasteners embedded in the SGB panel) to facilitate installation.

It is important that any coupling system allows not only the necessary stability, but also possible expansion and settlement.



CLEANING THE GLASS BLOCK

At the end of laying operations, the following steps must be taken to clean the product properly:

- Clean the wall from the finishing mortar while it is still wet, using wet sponges or soft white rags, taking care to rinse them frequently in clean water.

- Remove mortar residue from the SGB bricks when it has dried but not yet hardened. Proceed by individual faces so as not to go over the finish of the joints, ruining the finish that has just been applied.

To remove any haloes and hardened cement stains on glass blocks, one can proceed with hydrochloric acid solution or alternatives (e.g. muriatic acid, anti-limescale products or similar) or acetic acid (e.g. white wine vinegar), taking care not to go over the joints and adopting the necessary personal protection precautions.

Do not use oily solvents, hydrofluoric acid or strongly alkaline solutions (e.g. soda ash or similar substances) for cleaning

If additive mortars are used for finishing, first carry out some face-cleaning tests on some Glass blocks of the same type as the one to be installed, observing the cleaning methods indicated by the mortar manufacturer.

Particular care must be taken when installing bricks with a sandblasted finish. The film that protects them should only be removed when grouting the joints, and any glue residue left by the film should be removed with warm, slightly soapy water or, if more persistent, with acetone, trichloroethylene or specific glue-removing products using a non-abrasive sponge.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Glass blocks designed for vertical structures in different formats and thicknesses to increase flexibility and versatility with wall compositions.
For high-end sophistication, Glass block in large formats (33×33 cm, 30×30 cm and 24×24 cm) is the first choice of architects.
Ideal for exteriors with large facades, and as an elegant solution for interiors, the surface effects are incredibly bright, fluid and dynamic. Available in a variety of glass designs.

OTHER FORMATS

Models and technical characteristics

	1919/8 BSH 20	Q 19 Doric	2424/8	3030/10	Q30 Doric	Q33
Dimension (mm)	190x190x80	190x190x80	240x240x80	298x298x98	300x300x80/100	330x330x120
Glass weight (kg)	4	3	4	7,5	7,5	9,2
Compressive strength (MPa)	> 21	> 10,5	> 9	> 10	> 8	> 14
Thermal transmittance U (Wm^2 K)	2.8	3,0	3.0	3,0	2.9	2.9
Light transmission (%)	71	77	78	77	79	77
G factor (%)	69	76	77	75	75	75
Sound insulation (dB)	42	42	36	35	40	37
Fire resistance	E90 (**)	NPD	NPD	NPD	NPD	NPD
Security - Shatterproof	BR2/NS - FB3 S (*) - RC3 / P2A	NPD	NPD	NPD	NPD	NPD

(°) see design and installation instructions BSH20 Bulletproof - (**) see design and installation instructions BSH20 Fire Resistant

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

These bricks are often used in 'high-risk' areas such as ATMs in banks or prisons, and wherever the strength of the Glass block needs to be certified. Available in the Orsa glass design with transparent finish only or smooth and corrugated in different finishes.

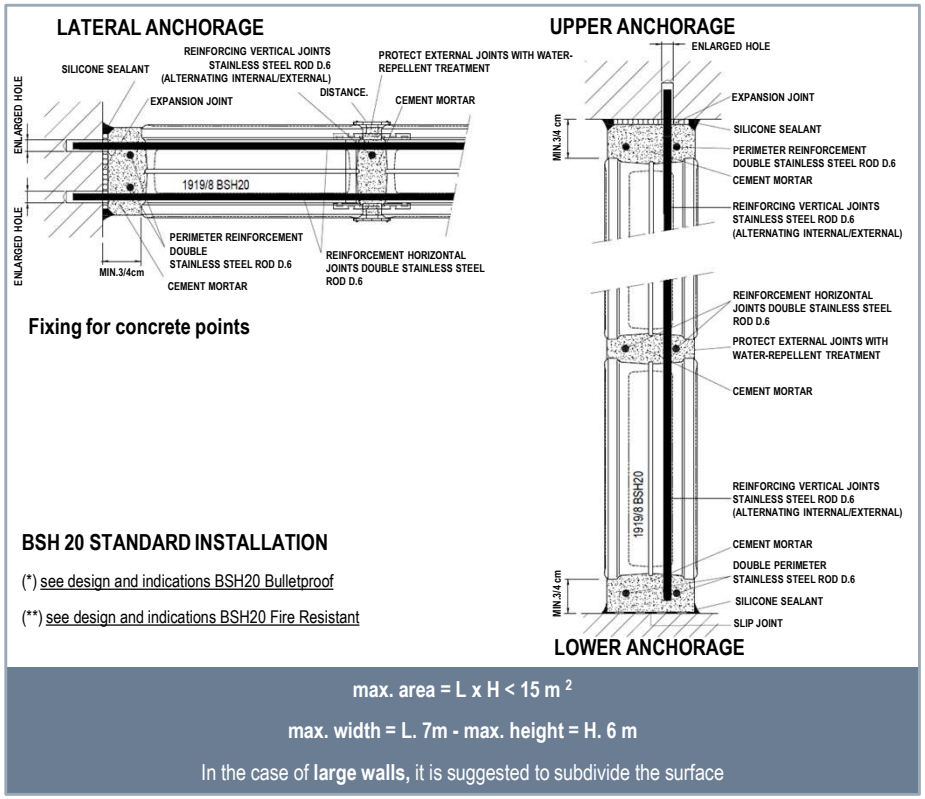
OTHER FORMATS

1919/8 BSH 20 Standard (19x19x8 cm)

INSTALLATION ACCESSORIES

- 1.6cm SGB spacers= approx. 36pcs/ m^2 3/4cm panel perimeter
- SGB mortar for installation and finishing/grouting= approx. 20kg/ m^2
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Joint reinforcement with Ø 6 mm stainless steel SGB rod, double horizontally and single vertically alternating internal/external
- Perimeter reinforcement with double SGB stainless steel rod Ø 6 mm approx. 18m/m^2
- Point anchorage by inserting the horizontal/vertical rods for approx. 4/5 cm into an oversized HOLE in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints exposed to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 15 m ²

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Glass block with high mechanical strength, capable of resisting even bullets in accordance with European standard EN 1522 (resistance class FB3).

Belonging to one of these classes is the only criterion that determines the actual level of safety and quality of the glass block.

OTHER FORMATS

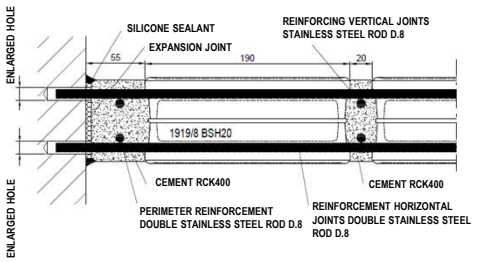
1919/8 BSH 20 bulletproof (19x19x8 cm)

INSTALLATION ACCESSORIES

- Vertical/horizontal leaks 20mm
- Spacers to be used wooden battens to be removed after the cement has dried
- 5 cm panel perimeter
- Cement type RCK 400
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Reinforcement of vertical and horizontal joints with double Ø 8 mm stainless steel SGB rod
- Perimeter reinforcement with double SGB stainless steel rod Ø 8 mm
- Point anchorage by inserting the horizontal/vertical rods for approx. 4/5 cm into an oversized HOLE in the supporting structure on the sides and top only

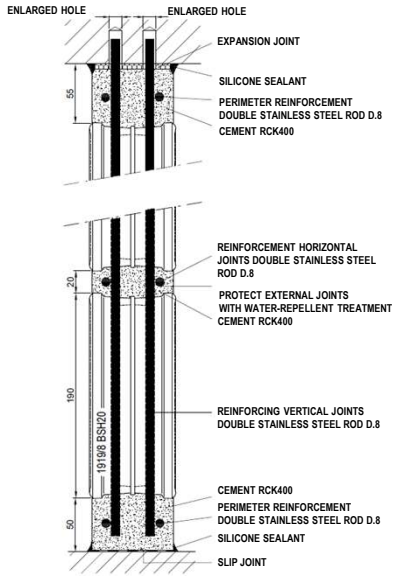
NB: Care must be taken to connect the Glass block walls with the surrounding structures with a specific masonry sealant.
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent

LATERAL ANCHORAGE



Fixing for concrete points

UPPER ANCHORAGE



BSH 20 BULLETPROOF INSTALLATION BR2/NS FB3 S

(*) see design and indications BSH20 Standard

(**) see design and indications BSH20 Fire Resistant

LOWER ANCHORAGE

max. area = L x H < 15 m ^{2}

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Inspired by ancient Greek columns of the same name, Doric is the world's first Glass block with a three-dimensional face. The perfect combination of classical and modern styles with parallel grooves projecting 15mm outwards on one face .

Doric is suitable for use in residential buildings and all spaces, offering designers the opportunity to create bold visual designs and special effects.

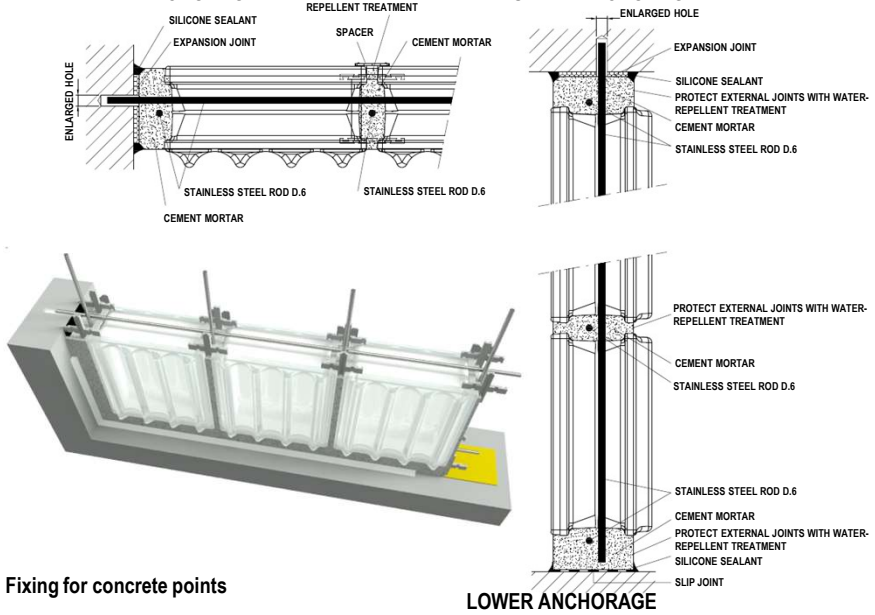
OTHER FORMATS

Q 19 Doric (19x19x8 cm)

INSTALLATION ACCESSORIES

- 1 cm spacers SGB = approx. 36 pcs/m^2 (to facilitate installation, cut off the front centring tab on the side of the 3d glass)
- 3/4cm panel perimeter
- SGB mortar for installation = approx. 30 kg/m^2
- SGB mortar for finishing / grouting or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 12 m/m^2
- Point anchorage by inserting horizontal/vertical rods approximately 4/5 cm into oversized holes in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The 24x24 cm format facilitates the passage of light. Available in three glass designs (smooth, wavy and cross small) and two finishes (clear and sandblasted).

The smooth glass design creates transparency and gives an effect as if inside and outside become one.

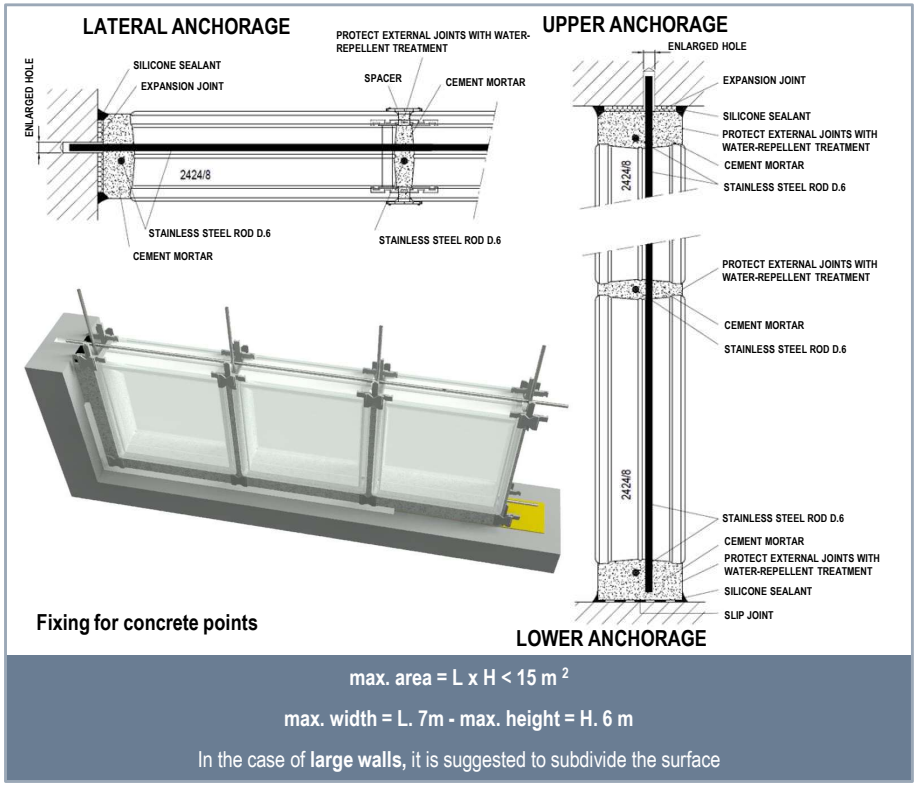
OTHER FORMATS

2424/8 (24x24x8 cm)

INSTALLATION ACCESSORIES

- 1 cm spacers SGB = approx. 25 pcs/m^2
- 3/4cm panel perimeter
- SGB mortar for installation =approx. 25 kg/ m^2
- SGB mortar for finishing / grouting or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 10m/ m^2 (diameter to be verified by designer)
- Point anchorage by inserting the horizontal/vertical rods for approx. 4/5 cm into oversized holes in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Ideal for large area walls and curtain walls, these 30x30 cm glass blocks are available in smooth or wavy glass designs. Both can be sandblasted for added privacy. The glass design, IceScapes offers the highest level of privacy as well as maximum light transmission. The 9.8 cm thickness provides maximum stability and durability. The CrossLarge brick has lines that run horizontally on one face and vertically on the other, resulting in the largest square pattern in existence.

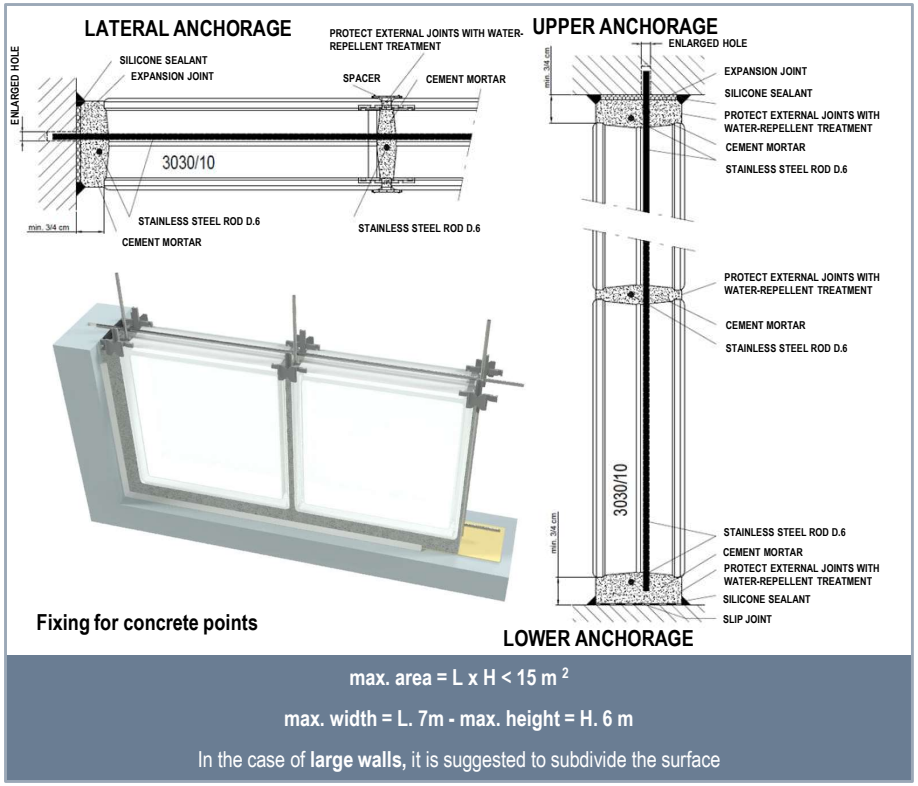
OTHER FORMATS

3030/10 (29.8x29.8x9.8 cm)

INSTALLATION ACCESSORIES

- SGB 1cm spacers, 10cm thick = approx. 16 pcs/m^2
- 3/4cm panel perimeter
- SGB mortar for installation = approx. 25 kg/m^2
- SGB mortar for finishing/grouting or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 8 m/m^2 (diameter to be verified by designer)
- Point anchorage by inserting horizontal/vertical rods approximately 4/5 cm into oversized HOLEs in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Doric is a large-format Glass block, 30x30cm, which takes its origin from Pegasus, as shown by the presence of the 10mm wings along the entire development of the brick, which allow the load-bearing elements to be housed invisibly in the gaps between the bricks. For the first time a three-dimensional undecorating is applied to a Glass block on the outer surface, which is no longer smooth to the touch but sinuous and in relief, realised with parallel grooves projecting 20mm outwards on one face and towards the inside of the brick on the other.

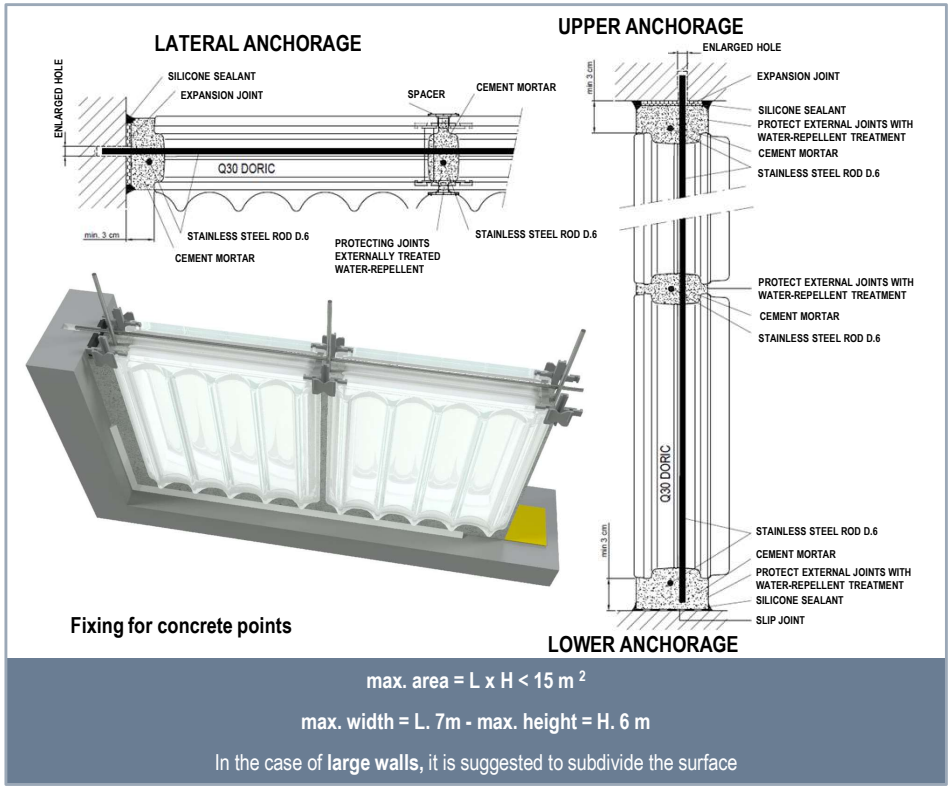
OTHER FORMATS

Q 30 Doric (30x30x8/10 cm)

INSTALLATION ACCESSORIES

- 1cm SGB spacers = approx. 16 pcs/m^2 (to facilitate installation, cut off the front centring tab on the side of the 3d glass)
- 3/4cm panel perimeter
- SGB mortar for installation = approx. 25 kg/m^2
- SGB mortar for finishing / grouting or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 8 m/m^2 (diameter to be verified by designer)
- Point anchorage by inserting horizontal/vertical rods approximately 4/5 cm into oversized HOLEs in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Transparency, invisible joints, the illusion of continuity between exterior and interior: these are just some of the reasons to design with large glass blocks measuring 33x33 cm. Due to its unique sophistication, the large Glass block is a favourite among architects. Ideal for large exterior façades, and as an elegant interior solution, the surface effects are incredibly bright, fluid and dynamic.

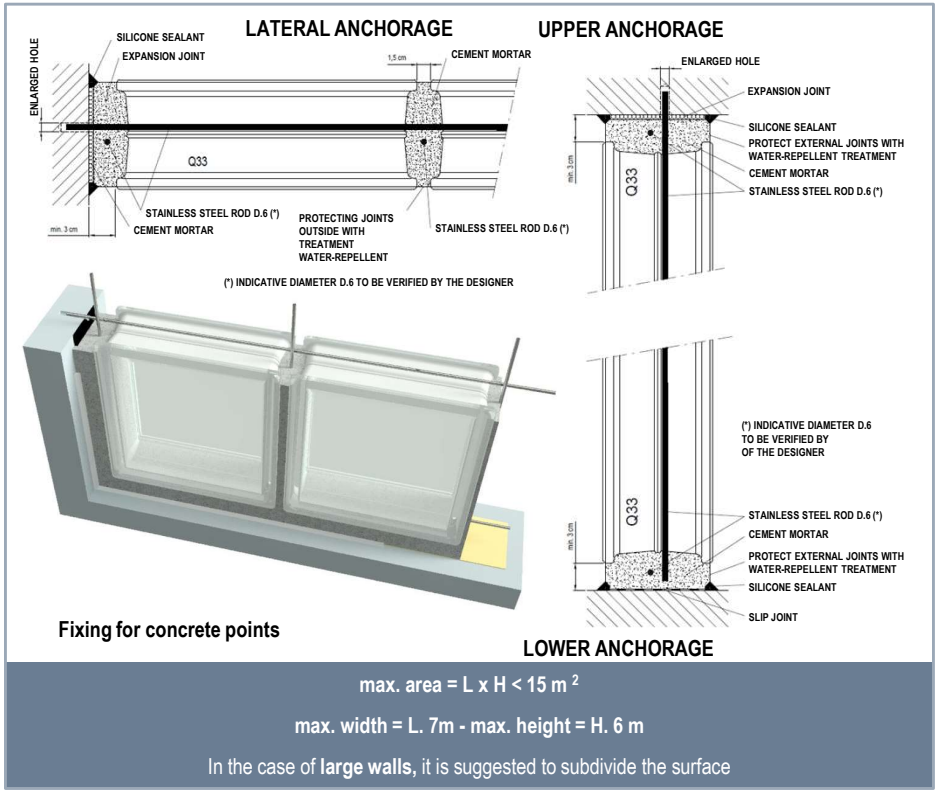
OTHER FORMATS

Q 33 (33x33x12 cm)

INSTALLATION ACCESSORIES

- 1.5 cm horizontal and vertical leaks
- 3/4cm panel perimeter
- Spacers to be used wooden battens to be removed after the mortar has dried
- SGB mortar for installation = approx. 40 kg/m^2
- SGB mortar for finishing/grouting or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Slip joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 8 m/m^2 (diameter to be verified by designer)
- Point anchorage by inserting horizontal/vertical rods approximately 4/5 cm into oversized HOLEs in the supporting structure on the sides and top only

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution: for finishing/grouting joints subjected to moisture (driving rain etc.) use suitable waterproofing material or surface treated with a specific waterproofing agent.



max. area = L x H < 15 m ^{2}

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Energy Saving technology consists of the insertion of one or more low-emissivity panes of glass in the centre of the block, thus forming a two-chamber system. The strength of Energy Saving lies in the insertion of the very low emissivity coating that is applied to the inserted glass pane. In addition, both air chambers are filled with argon gas. This noble gas is used for its thermal conductivity value, which is approximately half that of air. The result is that the total thermal transmission of the glass block is lowered by more than 50 per cent.

ENERGY SAVING

Models and technical characteristics

The best thermal insulation (i.e. the lowest 'U') is achieved with the larger formats and in the case of using lightweight laying mortars. In both cases, there is a reduction in the 'thermal bridges' formed by the existing joints between the SGB glass blocks.

*** ENERGY SAVING - THE EVOLUTION OF GLASS BLOCK**

Innovative **'ES'** production technologies enable the glass block to achieve thermal transmission values of up to 0.9 W/m^2 K. With these important innovations, it is possible to design buildings made entirely of glass blocks.

The classic glass block consists of two glass half-shells with moisture-free air inside. This system is comparable to a system consisting of two laminated float glass panes with a 'chamber' in between, also containing moisture-free air.

The new '**ES**' brick system develops the 'chambers' principle. The system places one or more sheets of float glass with low emissivity characteristics between the two semi-shells of the glass block. Two 'chambers' are thus created and the space enclosed within them no longer consists of air but of Argon gas. The glass surfaces are thus increased from two to three, and the combined effect of the 'low emissivity' pane, Argon and the three glass surfaces can thus significantly reduce the thermal transmittance value in the glass-brick (see values in the table).

	Q19 ES 1.5 (OPTION)	Q19 ES 1.2 (OPTION)	1919/8 ES 1.4 (OPTION)	1919/8 ES 1.1 (OPTION)	1919/16 HTI	1919/13 NUBIO ES 0.9	2424/8 ES 1.1 (OPTION)
Format size (mm)	190x190x80	190x190x80	190x190x80	190x190x80	190x190x160	190x190x134.5	240x240x80
Glass weight (kg)	2,5	2,6	2,5	2,5	4,5	4,2	5,0
Thermal transmittance (W/m^2 K)	**1.5**	**1.2**	**1.4**	**1.1**	**1.8**	**0.9**	**1.1**
Light transmission (%)	69	59	69	60	65	56	55
G factor (%)	56/52	45	56/52	42	68	47	44

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Seves Glass Block has patented 'Energy Saving' technology that introduces low-E glass panes and argon gas with controlled pressure: and created solutions to reduce thermal transmittance down to U=0.9 W/m2 K, saving energy and protecting the environment. SGB glasses with ENERGY SAVING 1.5 and 1.4 options are marked with a small coloured sticker indicating the orientation of the installation. Basically, the side with the adhesive marking must be placed on the inside of the construction with SGB and can be removed easily after installation.

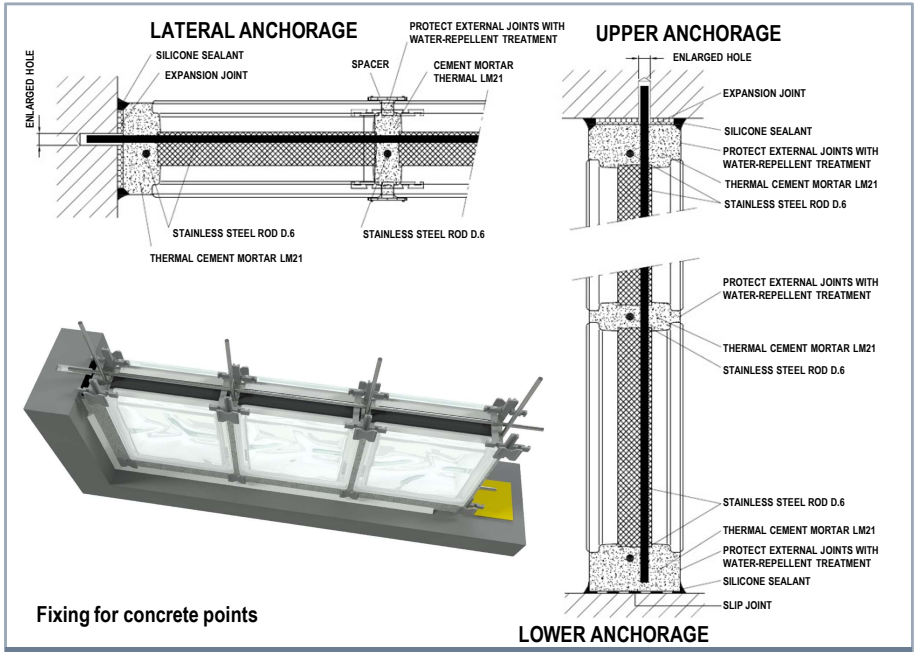
ENERGY SAVING

Q19 and 1919/8 ES (anchorages and installation technique)

INSTALLATION ACCESSORIES

- SGB spacers = approx. 36 pcs/m^2
- Minimum panel perimeter 2/3cm
- Thermal insulation mortar for installation LM36 class M5 EN 998-2 (0.27 W/m^2 K) or LM21 class M5 EN 998-2 (0.21 W/m^2 K) = approx. 25 Kg/ m^2
- Finishing/grouting with suitable waterproof material
- Expansion joint SGB = side and top perimeters
- Slip joint in the lower base of non-compressible insulation material (e.g. aluminium tape)
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod = approx. 12m/m^2
- Point anchorage by inserting the rods laterally and at the top about 4/5 cm into an oversized hole in the supporting structure

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Designed for high energy-saving performance, HTI has a U-value of 1.8 W/(m2 x K), and its thermal insulation characteristics reduce heat loss through glass block walls.

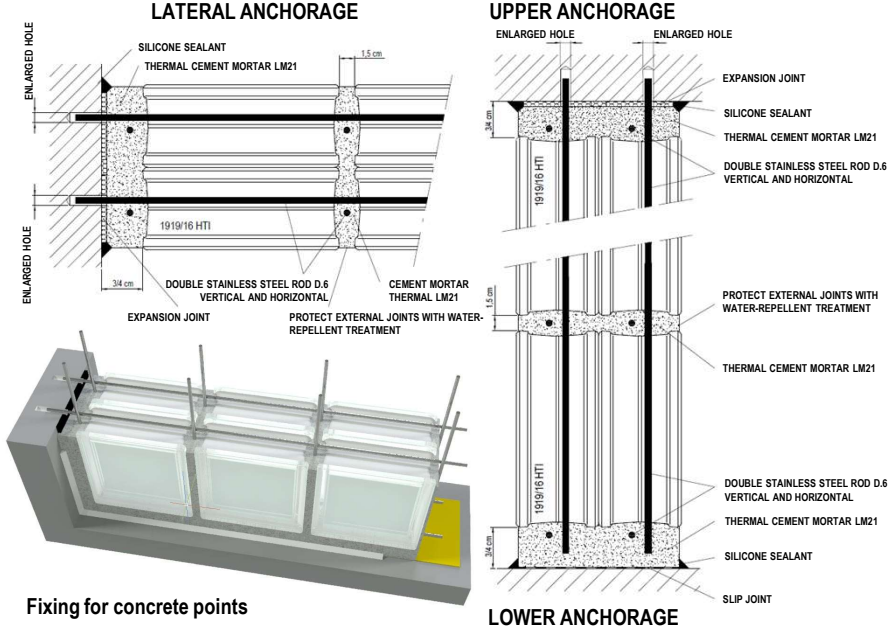
ENERGY SAVING

1919/16 HTI ES (anchorages and installation technique)

INSTALLATION ACCESSORIES

- Spacers to be used wooden battens to be removed after the mortar has dried
- Vertical and horizontal leaks 1.5 cm
- Panel perimeter 3/4 cm
- Thermal insulation mortar for installation LM36 class M5 EN 998-2 (0.27 W/m^2 K) or LM21 class M5 EN 998-2 (0.21 W/m^2 K) = approx. 25 Kg/ m^2
- SBG expansion joint in side and top perimeters (double for increased glass thickness)
- Sliding joint in the lower base of non-compressible insulation material (e.g. aluminium tape)
- Horizontal/vertical joint reinforcement with double stainless steel SBG rod Ø 6 mm = approx. 24 m/m^2
- Point anchorage by inserting the rods laterally and at the top about 4/5 cm into an oversized HOLE in the supporting structure

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

It is now possible to construct architectural façades entirely of thermally insulated, high-performance glass blocks designed to conserve energy and protect the environment. The 1919/13 ES 0.9 Glass block reduces heat loss and transmission by up to U=0.9 W/m2 K.

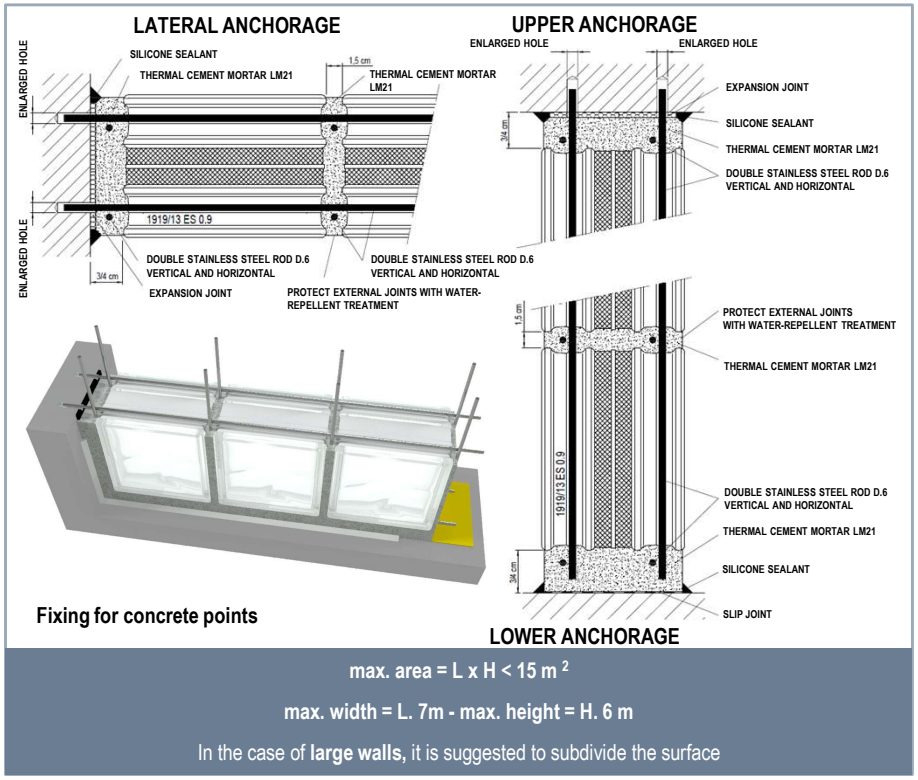
ENERGY SAVING

1919/13 ES 0.9 (anchorages and installation technique)

INSTALLATION ACCESSORIES

- Spacers to be used wooden battens to be removed after the mortar has dried
- Vertical and horizontal leaks 1.5 cm
- Panel perimeter 3/4 cm
- Thermal insulation mortar for installation LM36 class M5 EN 998-2 (0.27 W/m^2 K) or LM21 class M5 EN 998-2 (0.21 W/m^2 K) = approx. 50/55 Kg/m^2
- SBG expansion joint in side and top perimeters (double for increased glass thickness)
- Slip joint in the lower base of non-compressible insulation material (e.g. aluminium tape)
- Horizontal/vertical joint reinforcement with double SBG stainless steel rod Ø 6 mm = approx. 24 m/m^2
- Point anchorage by inserting the rods laterally and at the top about 4/5 cm into an oversized hole in the supporting structure

NB: Care must be taken to connect Glass block walls with surrounding structures with a specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 15 m^2

max. width = L. 7m - max. height = H. 6 m

In the case of **large walls,** it is suggested to subdivide the surface

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The Glass block with fire resistance for 30, 60, 90 and 120 minutes provides stability and structural strength while protecting objects and people from the passage of smoke, gases and flames. Fully insulated to limit heat transmission, and capable of resisting heat transmission under load, the brick is available with a wavy or smooth surface and three finishes for privacy and light control: transparent, sandblasted on one side, and sandblasted on both sides.

FIRE-RESISTANT

Models and technical characteristics

	1919/8 BSH 20	1919/10 30F	1919/8 30F	1919/16 60F	1919/16 90F	1919/13 120F
Format size (mm)	190x190x80	190x190x100	190x190x80	190x190x160	190x190x160	190x190x130
Glass weight (kg)	4	5	4,15	8	8,3	5
Compressive strength (MPa)	> 21	> 10	> 21	> 26	> 36	> 8
Thermal transmittance W/m K^2	2.8	2.9	2.2	1.8	1.4	1.6
Light transmission (%)	71	67	61	50	38	69
G factor (%)	69	64	50/47	50	31	64
Sound insulation (dB)	42	45	47	49	51	43
Fire resistance	**E90**	**EI30 / E60**	**EI30 / EW30**	**EI60 / EW60**	**EI90 / EW90**	**EI120 / EW120**
Security - Shatterproof	BR2/NS - FB3 S	-	FB3 S	FB6 S	FB7 S	-
	RC3 / P2A	RC3	RC3 / P2A	RC3 / P2A	RC3 / P2A	-

max. area = L x H < 9 m^2

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface. It will be the designer's task to provide for the subdivision of surfaces by means of appropriate expansion and absorption joints (vertical and/or horizontal) made of suitable materials.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

1919/8 BSH 20 E 90 is the Glass block from the Technology line that offers a high mechanical resistance of the structure, under the action of flame, to the propagation of fire, smoke and heat for 90 minutes (E 90 value according to European standard EN 1364-1). This resistance class ensures that the structure is stable and sealed for 90 minutes, making it the ideal Glass blocks for applications requiring high characteristics to meet safety requirements.

FIRE-RESISTANT

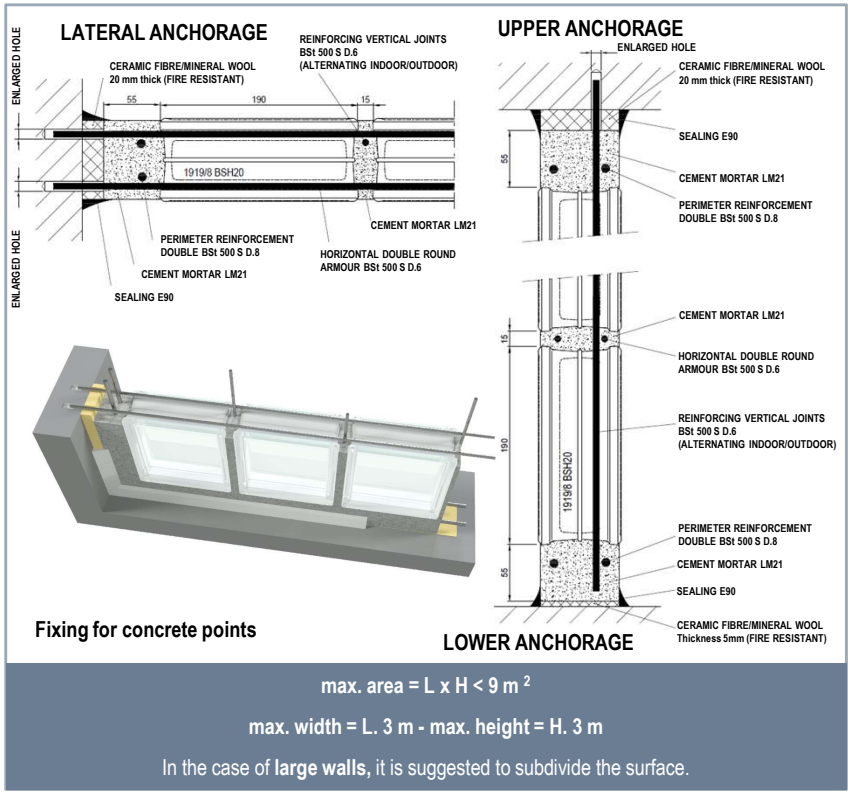
1919/8 BSH 20 E 90 (anchorages and installation technique)

INSTALLATION IN ACCORDANCE WITH CERTIFICATION

Certification test panel size max. 3x3 (14x14 glass)

- 15 mm horizontal and vertical joints/leaks - 55 mm panel perimeter joint
- THERMAL INSULATING MALTA LM21 class M5 EN 998-2 (thermal conductivity 0.21 W/m^2 K)
- Expansion joint in side and top perimeter: example ceramic fibre/mineral wool thickness 20 mm (trade classification A1)
- Slip joint in the lower base of ceramic fibre/mineral wool 5 mm thick, alternatively non-compressible/flammable insulation material (commercial)
- Spacers to be used wooden battens to be removed after the mortar has dried
- It is advisable to protect the joints with suitable grout and seal the perimeter to prevent infiltration
- Panel perimeter is reinforced with Ø8 mm 2 bars (type BSt 500 S)
- Horizontal joints are reinforced with Ø6 mm bars 2 (type BSt 500 S)
- Vertical joints are reinforced with Ø6 mm bars 1 (type BSt 500 S) (alternating internal/external)
- Reinforcing bars are not tied together at the joints

NB: The certification refers to a prefabricated panel, in the case of installation with laying on site it is recommended to carry out point anchorages by inserting the rods laterally and at the top for about 4/5 cm in an increased hole on the supporting structure.
NB: Perimeter sealing with suitable material required by the performance characteristics of the wall (e.g. commercial fire resistant sealant E 90)
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 9 m^2

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Glass block 1919/8 30F offers a high mechanical resistance of the structure, under the action of flame, to the propagation of fire, smoke and heat for 30 minutes (value EI 30 according to European standard EN357 and F30 according to German standard DIN 4102-3). This class of resistance ensures that the structure is not only stable and watertight, but also has a low passage of thermal radiation, thus limiting the heating of objects placed in rooms protected by the glass block wall.

FIRE-RESISTANT

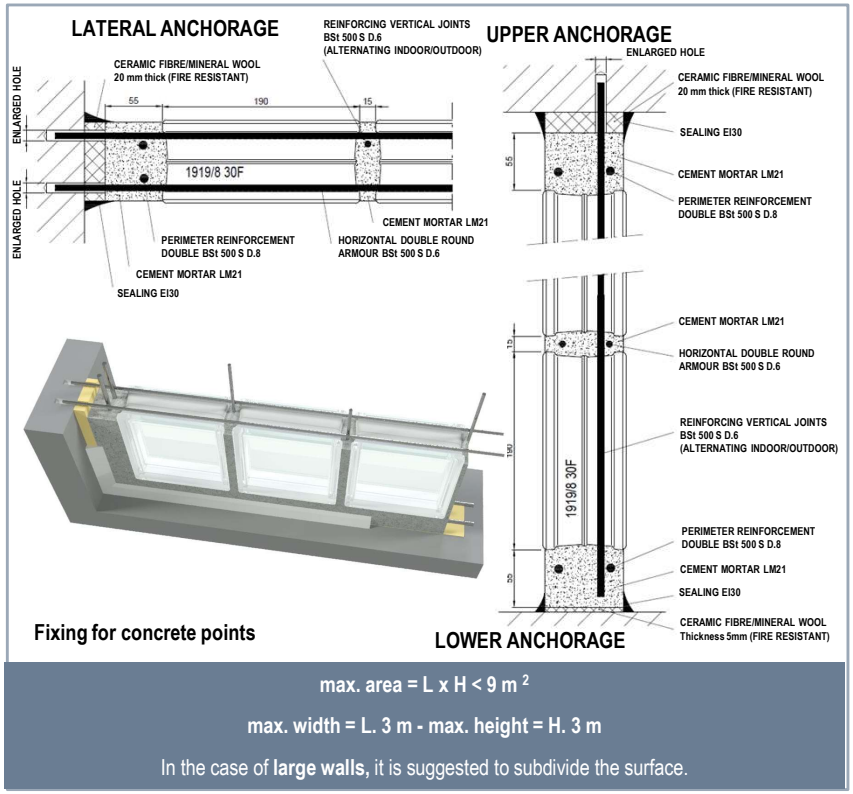
1919/8 30 F EI 30 (anchorages and installation technique)

INSTALLATION IN ACCORDANCE WITH CERTIFICATION

Certification test panel size max. 3m x 3m (14x14 glass)

- 15mm horizontal and vertical joints/leaks - 55mm panel perimeter joint
- THERMAL INSULATING MALTA LM21 class M5 EN 998-2 (thermal conductivity 0.21 W/m^2 K)
- Expansion joint in side and top perimeter: example ceramic fibre/mineral wool thickness 20 mm (trade classification A1)
- Slip joint in the lower base of ceramic fibre/mineral wool 5 mm thick, alternatively non-compressible/flammable insulation material (commercial)
- Spacers to be used wooden battens to be removed after the mortar has dried
- It is advisable to protect the joints with suitable grout and seal the perimeter to prevent infiltration
- Panel perimeter is reinforced with Ø8 mm 2 bars (type BSt 500 S)
- Horizontal joints are reinforced with Ø6 mm bars 2 (type BSt 500 S)
- Vertical joints are reinforced with Ø6 mm bars 1 (type BSt 500 S) (alternating internal/external)
- Reinforcing bars are not tied together at the joints

NB: The certification refers to a prefabricated panel, in the case of installation with laying on site it is recommended to carry out point anchorages by inserting the rods laterally and at the top for about 4/5 cm in an increased hole on the supporting structure.
NB: Perimeter sealing with suitable material required by the performance characteristics of the wall (e.g. commercial fire resistant sealant EI 30)
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with a specific waterproofing agent



max. area = L x H < 9 m ^{2}

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The 1919/8 30 F glass block is available in the smooth glass design and in three finishes (transparent, 1-sided or 2-sided sandblasted) combining safety requirements and aesthetic aspects. Due to their specific performance, 1919/8 30F glass blocks are used in buildings intended for public use (hotels, schools, nursing homes, restaurants, cinemas, etc.) and in buildings where flammable or ignitable materials are stored and/or handled.

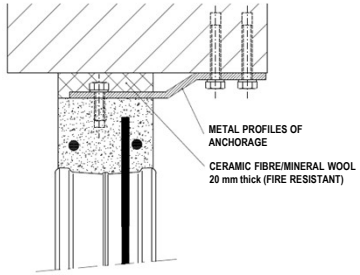
FIRE-RESISTANT

1919/8 30 F EI 30 (anchorages and installation technique)

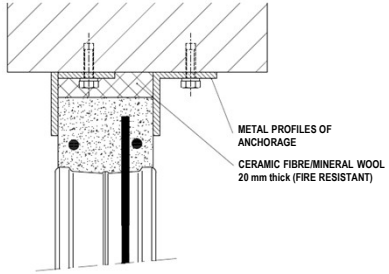
INSTALLATION - see pages 62 and 63

Anchoring of EI 30 prefabricated panels

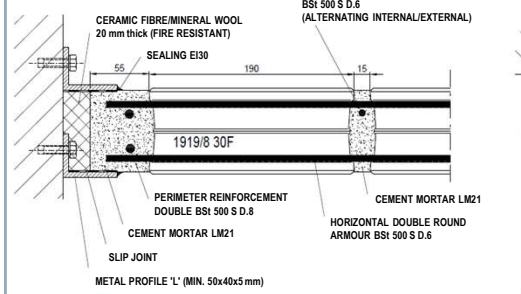
EI30 - POINT ANCHORAGE

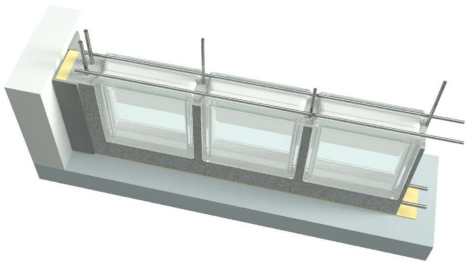


EI30 - CONTINUOUS



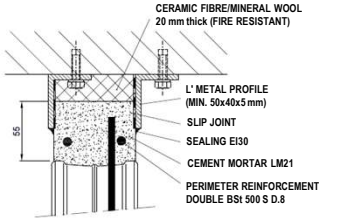
LATERAL ANCHORAGE

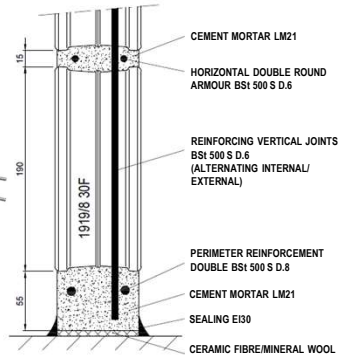




Continuous fastening with metal L-profiles

UPPER ANCHORAGE





LOWER ANCHORAGE

max. area = L x H < 9 m ^{2}

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The 1919/16 60F and 1919/16 90F glass blocks offer high mechanical resistance of the structure under the action of flame to the propagation of fire, smoke and heat for 60 and 90 minutes (F60 and F90 value according to German DIN 4102-3).

This strength class ensures not only stability and tightness of the structure but also a low passage of thermal radiation, thus also limiting the heating of objects placed in rooms protected by the glass block wall.

FIRE-RESISTANT

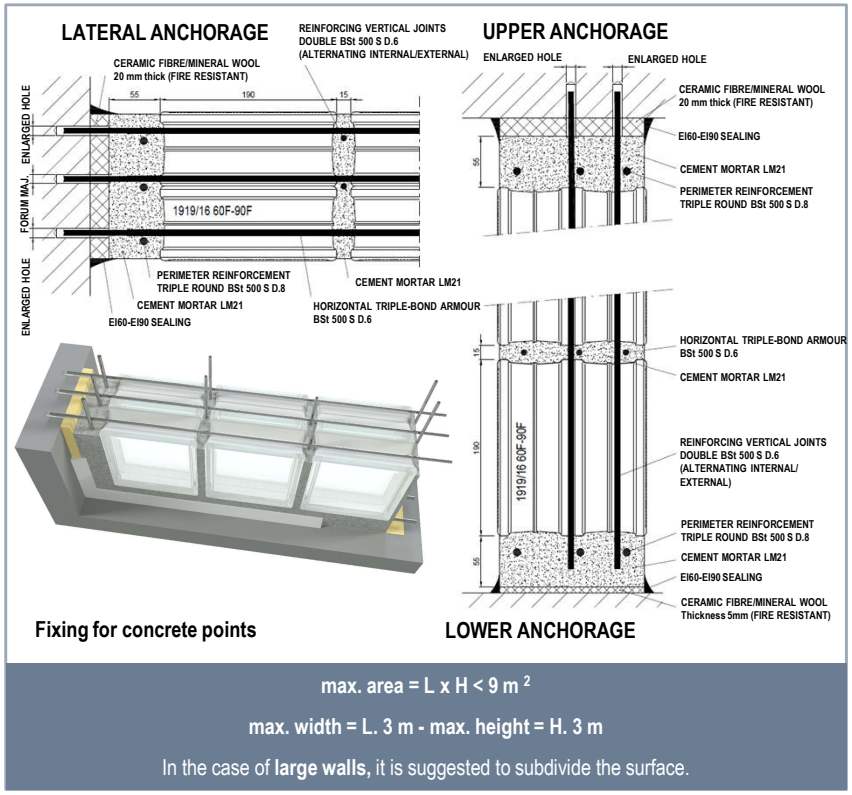
1919/16 60 F EI 60/90 (anchorages and installation technique)

INSTALLATION IN ACCORDANCE WITH CERTIFICATION

Test/certification panel size max. 3m x 3m (14x14 glass)

- 15 mm horizontal and vertical joints/leaks - 55 mm panel perimeter joint
- THERMAL INSULATING MALTA LM21 class M5 EN 998-2 (thermal conductivity 0.21 W/m^2 K)
- Expansion joint in side and top perimeter: example ceramic fibre/mineral wool thickness 20 mm (trade classification A1)
- Slip joint in the lower base of ceramic fibre/mineral wool 5 mm thick, alternatively non-compressible/flammable insulation material (commercial)
- Spacers to be used wooden battens to be removed after the mortar has dried
- It is advisable to protect the joints with suitable grout and seal the perimeter to prevent infiltration
- Panel perimeter is reinforced with Ø8 mm bars 3 (type BSt 500 S)
- Horizontal joints are reinforced with Ø6 mm bars 3 (type BSt 500 S)
- Vertical joints are reinforced with Ø6 mm 2 bars (type BSt 500 S) (alternating internal/external)
- The reinforcement rods are not tied together at the joints.

NB: The certification refers to a prefabricated panel, in the case of installation with laying on site it is recommended to carry out point anchorages by inserting the rods laterally and at the top for about 4/5 cm in an increased hole on the supporting structure.
NB: Perimeter sealing with suitable material required by the performance characteristics of the wall (e.g. commercial fire resistant sealant EI 60-90)
NB: Caution for finishing/ grouting joints exposed to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 9 m^2

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Due to their specific performance, these glass blocks are used in buildings intended for public use (hotels, schools, nursing homes, restaurants, cinemas, etc.) and in buildings where flammable or ignitable materials are stored and/or handled. The vertical installation of the fire-resistant glass blocks must be carried out in accordance with the procedures indicated in the product certifications in order to ensure a rapid outflow of people in the event of a fire.

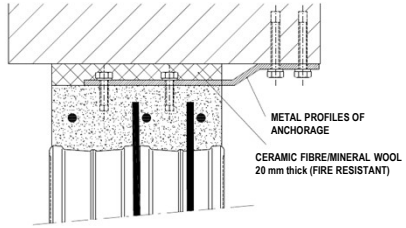
FIRE-RESISTANT

1919/16 60 F EI 60/90 (anchorages and installation technique)

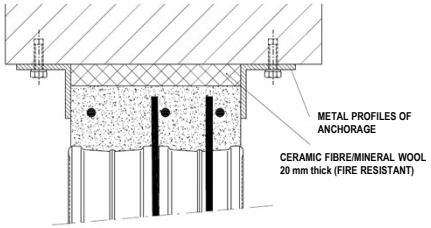
INSTALLATION - see pages 62 and 63

Anchoring of prefabricated panels EI 60 - EI 90

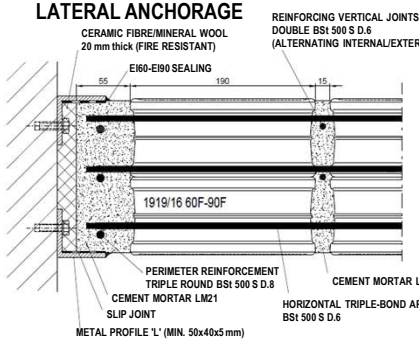
EI60 / EI90 - POINT ANCHORAGE



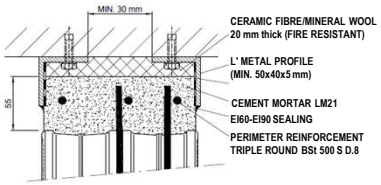
EI60 / EI90 - CONTINUOUS

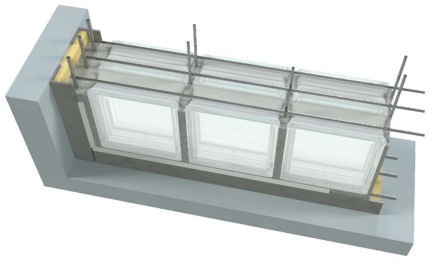


LATERAL ANCHORAGE



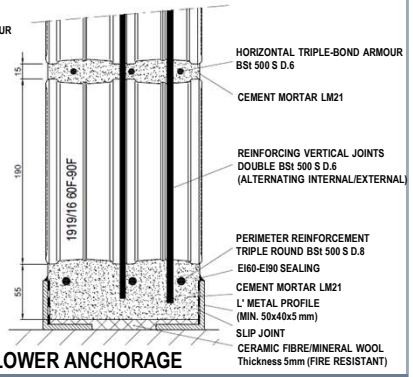
UPPER ANCHORAGE





Continuous fastening with metal L-profiles

LOWER ANCHORAGE



max. area = L x H < 9 m ^{2}

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

1919/10 30F is the Glass block from the Technology line that offers a high mechanical resistance of the structure, under the action of flame, to the propagation of fire, smoke and heat for 30 minutes (EI 30 value according to European standard EN 1364-1). This class of resistance ensures that the structure is not only stable and watertight, but also has a low passage of thermal radiation, thus limiting the heating of objects placed in rooms protected by the glass block wall.

FIRE-RESISTANT

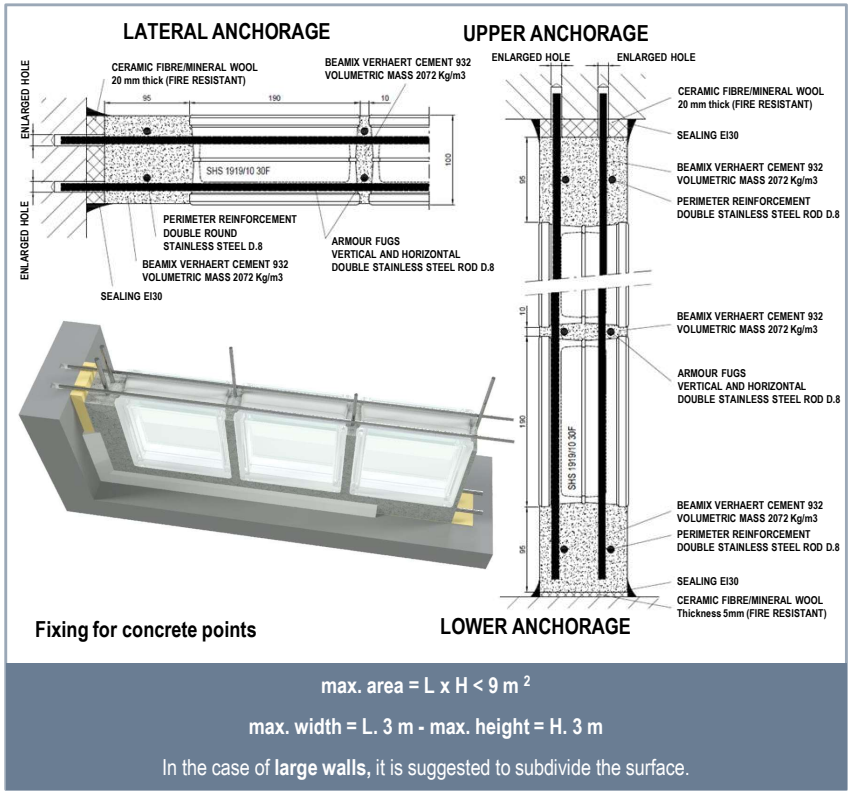
1919/10 30 F EI 30 (anchorages and installation technique)

INSTALLATION IN ACCORDANCE WITH CERTIFICATION

Test/certification panel size max. 3m x 3m (14x14 glass)

- 10 mm horizontal and vertical joints/leaks
- 95 mm panel perimeter joint
- BEAMIX VERHAERT CONCRETE 932 - volumetric mass 2072 kg/m^3 (MV)
- Expansion joint in side and top perimeter: example ceramic fibre/mineral wool thickness 20 mm (trade classification A1)
- Slip joint in the lower base of ceramic fibre/mineral wool 5 mm thick, alternatively non-compressible/flammable insulation material (commercial)
- Spacers to be used wooden battens to be removed after the mortar has dried
- It is advisable to protect the joints with suitable grout and seal the perimeter to prevent infiltration
- Panel perimeter is reinforced with 2 x Ø 8 mm stainless steel smooth bars
- Horizontal joints are reinforced with 2 x Ø 8 mm stainless steel plain bars
- Vertical joints are reinforced with 2 x Ø 8 mm stainless steel plain bars
- Reinforcing bars are not tied together at the joints

NB: The certification refers to a prefabricated panel, in the case of installation with laying on site it is recommended to carry out point anchorages by inserting the rods laterally and at the top for about 4/5 cm in an increased hole on the supporting structure.
NB: Perimeter sealing with suitable material required by the performance characteristics of the wall (e.g. commercial fire resistant sealant EI 30)
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 9 m^2

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND LAYING TECHNIQUES

VERTICAL STRUCTURES

EI 120 glass blocks offer a high mechanical resistance of the structure, under the action of flame, to the propagation of fire, smoke and heat for 120 minutes (value 120 according to European standards EN 13501-2 and EN 1364-1). Due to their specific performance, EI 120 glass blocks are used in buildings intended for public use and in buildings where flammable or ignitable materials are stored and/or handled. In all these cases, installation must be carried out in accordance with the procedures indicated in the product certifications.

FIRE-RESISTANT

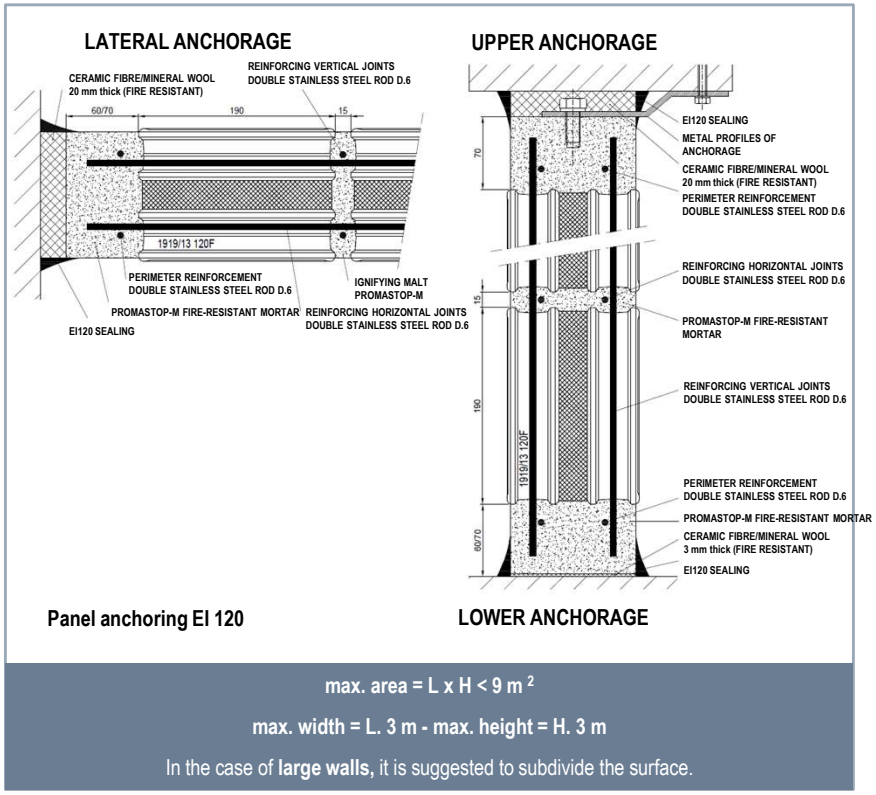
1919/13 120F EI 120 (anchorages and installation technique)

INSTALLATION IN ACCORDANCE WITH CERTIFICATION

Test/certification panel size max. 2995x3015x130 mm (14x14 panes)

- 15mm horizontal and vertical joints/leaks - 60/70mm panel perimeter joint
- Spacers to be used wooden battens to be removed after the mortar has dried
- PROMASTOP-M fire-retardant laying mortar
- Finishing/plastering with suitable waterproofing material or surface treatment with a specific waterproofing agent.
- Expansion joint in side and top perimeter: example ceramic fibre/mineral wool thickness 20 mm (trade classification A1)
- Slip joint in the lower base of ceramic fibre/mineral wool 5 mm thick, alternatively non-compressible/flammable insulation material (commercial)
- Horizontal/vertical reinforcement of all joints with double Ø 6 mm stainless steel SGB rod

NB: The certification refers to a prefabricated panel; in the case of installation with laying on site, it is recommended to carry out the anchorage by points by inserting the rods laterally and at the top for approximately 4/5 cm in an increased hole on the supporting structure. Furthermore, the spacers to be used may be wooden battens to be removed after the mortar has dried (do not use plastic spacers).
NB: Perimeter sealing with suitable material required by the performance characteristics of the wall (e.g. commercial fire resistant sealant EI 120)



Panel anchoring EI 120

LOWER ANCHORAGE

max. area = L x H < 9 m ²

max. width = L. 3 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

The pure and solid glass block offers design possibilities limited only by an architect's imagination and vision.
The Vistabrik glass block increases the amount of natural light while ensuring safety.
The Vetropieno Line offers colour possibilities to add atmosphere to interiors.

SOLID GLASS

Models and technical characteristics

	Rectangular Vetropieno	Square Vetropieno	883 Vistabrik	683 Vistabrik	483 Vistabrik
Format size (mm)	240x117x54	118x117x54	194x194x76	143x194x76	92x194x76
Glass weight (kg)	3,6	1,8	7	4,5	3,6
Compressive strength (MPa)	> 109	-	> 82	> 82	> 67
Thermal transmittance ($W/m^2 K$)	3.5	-	4.1	4.1	4.1
Light transmission (%)	44	-	60	60	60
G factor (%)	51	-	52	52	52
Sound insulation (dB)	-	-	43	43	47
Fire resistance	NPD	-	NPD	NPD	NPD
Security – Burglar resistance	NPD	-	NPD	NPD	NPD
	NPD	-	NPD	NPD	NPD

max. area = L x H < 9 m^2

max. width = L. 4 m - max. height = H. 3 m

For larger surfaces, specific structural calculations are required. The designer's task will be to provide for the subdivision of surfaces by means of appropriate expansion and absorption joints (vertical and/or horizontal) made of suitable materials.

NB: IN THE DESIGN, THE LOAD-BEARING CAPACITY OF THE FLOOR SLAB MUST BE VERIFIED FOR THE WEIGHT OF THE PANEL (glass, cement mortar, reinforcement etc.).

GLASS FULL = approx. 270 kg
VISTABRIK = approx. 190 / 210 kg

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

VetroPieno is the compact 100% glass block that combines the charm of traditional bricks with the transparency and luminosity of glass.

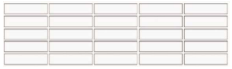
This original solution can be used in place of classic bricks to create high-impact interior walls and partitions that allow light to pass between rooms; or it can be introduced as a shading or furnishing detail to add a touch of style, individuality and colour.

SOLID GLASS

VETROPIENO (anchorages/interruptions and installation technique)

LAYING ACCESSORIES

Assembly type:



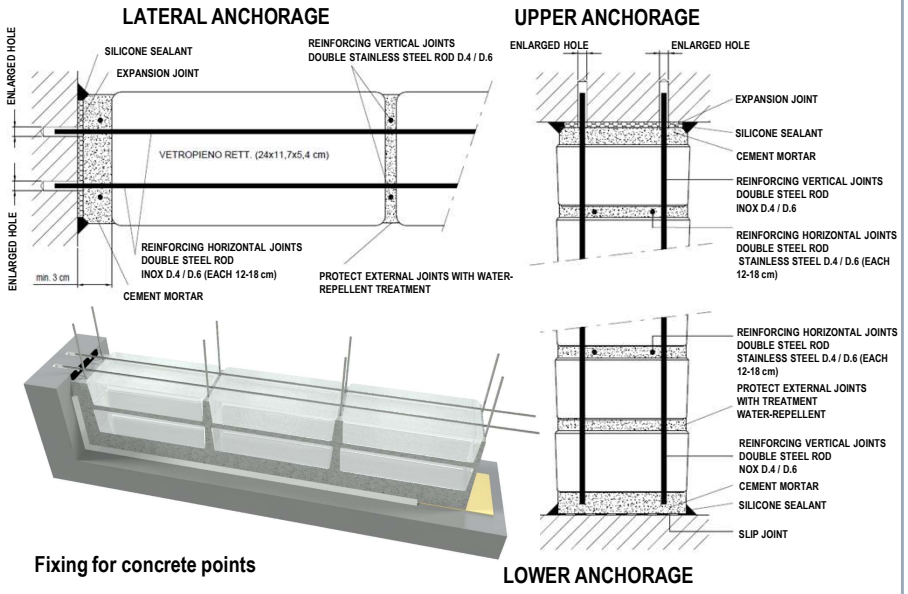
- 1cm joint
- Spacers not available to be used wooden laths to be removed after the cement mortar has dried.
- Slip joint in the lower base of non-compressible material
- Double SGB expansion joint for side and top insulation
- Reinforcement with Ø 4mm / 6mm stainless steel rods, two on all vertical joints and two horizontally every 2/3 rows of glass approximately 12/18cm, taking care that there is no contact between the rods and the glass.
- NIVOPLAN composition cement mortar (25 kg) + PLANICRETE additive (2.5 L) + Water (2.5 L)

Assembly type,
as above
with a difference:

- Reinforcement with Ø 4mm / 6mm stainless steel rod, two on the joints horizontally every 2/3 rows of glass approximately 12/18cm, taking care that there is no contact between the rods and the glass.
- The walls must be anchored at the top to prevent tilting by means of metal supports embedded in the mortar and fixed to the ceiling.

NB: The connection between the vetropieno walls and the surrounding structures must be made with a specific elastic masonry sealant.
NB: Caution: for finishing/grouting joints subjected to moisture (driving rain etc.) use suitable waterproofing material or surface treated with a specific waterproofing agent.

Point anchorage in the structure with Ø 4 mm or Ø 6 mm reinforcement



max. area = L x H < 9 m ^{2}

max. width = L. 4 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Thanks to its standard size and versatile shape, VetroPieno can be installed either horizontally or vertically to create the desired effect: flowing surfaces, traditional designs, delicate frames or colourful light reflections.

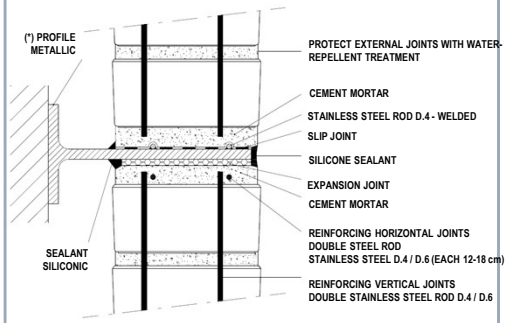
Compared to the standard glass block, VetroPieno is smaller in height and width and allows for thinner glass structures that optimise room space and add depth to interiors.

SOLID GLASS

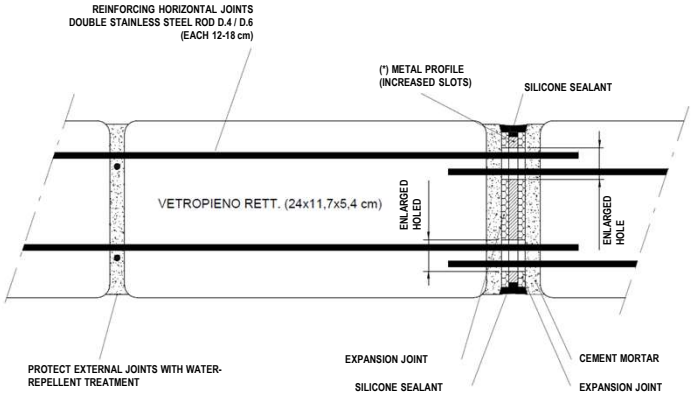
VETROPIENO (anchorages/interruptions and installation technique)

INSTALLATION - see pages 27 and 28

Intermediate wall interruption - horizontally (*) with insertion of metal profile anchored to the structure



Intermediate wall interruption - vertically (*) with insertion of metal profile anchored to the structure



Point anchorage in the structure with Ø 4 mm or Ø 6 mm reinforcement

max. area = L x H < 9 m ^{2}

max. width = L. 4 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

VERTICAL STRUCTURES

Vistabrik combines the best in security and aesthetics, which is why they are widely used in institutional and commercial environments, schools, transport terminals and numerous public spaces and buildings, including courthouses, embassies and police stations. Strength and security: Vistabrik offers low-distortion transparency that allows clear observation through robust 8 cm thick glass block partitions in areas where visual control is essential. Furthermore, Vistabrik requires minimal maintenance and replacement costs, is exceptionally durable and highly resistant to impact, bullets and fire.

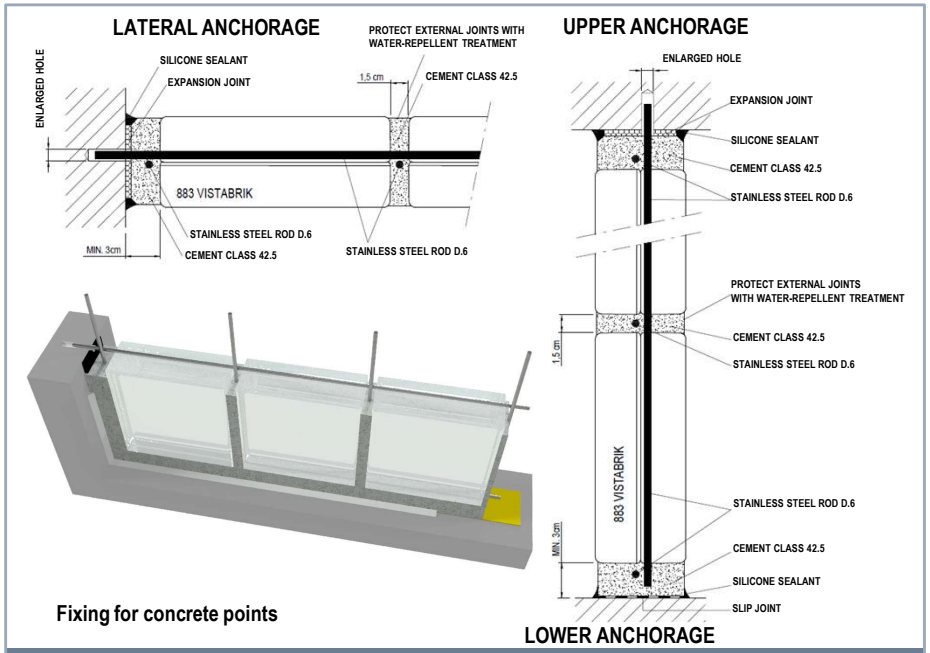
SOLID GLASS

VISTABRIK (anchorages / interruption and installation technique)

INSTALLATION ACCESSORIES

- 1.5 cm horizontal and vertical leaks
- 3/4cm panel perimeter
- Spacers not available to use wooden battens to be removed after drying of the cement mortar
- Portland cement class 42.5 for laying
- SGB mortar for finishing/grouting (*) or use suitable waterproof material
- SGB expansion joint in side and top perimeters
- Sliding joint in the lower base of non-compressible material
- Horizontal/vertical joint reinforcement with Ø 6 mm stainless steel SGB rod
- Point anchorage by inserting the horizontal/vertical rods for approx. 4/5 cm into oversized holes in the supporting structure on the sides and top only

NB: Care must be taken to connect Vistabrick walls with surrounding structures with specific masonry sealant
NB: Caution for finishing/ grouting joints subjected to moisture (driving rain etc.) use suitable waterproof material or surface treated with specific waterproofing agent



max. area = L x H < 9 m ^{2}

max. width = L. 4 m - max. height = H. 3 m

In the case of **large walls,** it is suggested to subdivide the surface.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

Horizontal structures are understood to be all works *with linear or curved development*, for interiors and exteriors generally used for duly calculated walkable functions.

CLASSIC FORMATS

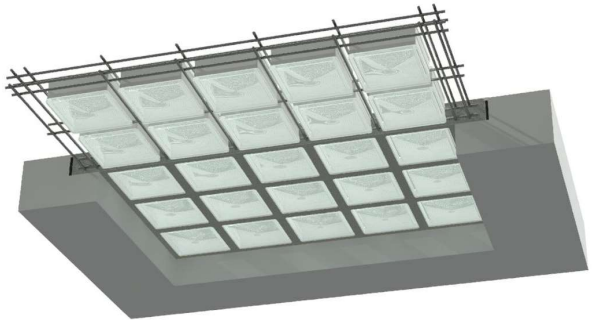
Introduction to design

These structures can be made either *in-situ* or *prefabricated*, taking the following parameters into account when choosing the type of installation:

- size of the surface to be realised;
- weight of structures in *SGB*;
- location of the work within the project;
- quantity and seriality of works in *SGB*;
- complexity of form and geometry.

Dimensions, designs, finishes, accessories: even for horizontal structures, *SGB* offers a wide range of solutions to create *walkable surfaces* without sacrificing the peculiarities of glass, safety, stability.
SGB Glass blocks, *which are* certified as walkable, can also be used for other uses such as panels sized for driveways. *SGB does not guarantee their integrity*, as glass, by its nature, goes from the elastic phase to breaking *without having the plastic phase* typical of other construction materials. Thus, glass lacks the possibility of indicating a safety coefficient before passing to the yield phase and then to breakage.
When designing a glass-concrete structure, it must be considered that the bricks must never come into direct contact with the metal profiles or reinforcement bars needed for their assembly. The characteristics of the *three materials that compose it: steel, concrete mix and glass,* must always be taken into account in order to avoid the problems that can arise from the incorrect use of the various elements.
The experience of specialised builders recommends *works that are free to deform* and expand, so that the expansion and deformation of the different parts (glass blocks and supporting structures) *are independent of each other*.

Top view of horizontal SGB panel (extrados)



Bottom view of horizontal SGB panel (soffit)

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

Glass blocks do not constitute structural elements as they only perform lightening functions, supporting their own weight and a payload perpendicular to the visible areas.

This load must be predominantly static, so the structures must be considered walkable.

CLASSIC FORMATS

Dimensional and load calculations

Using small glass pavers increases safety as the shoe, resting more on the gap between glass and glass, increases friction.

A minimum gap between glass pavers of at least 3 cm is recommended.

NB: When designing outward-facing skylights, a slope must be provided for rainwater runoff.

Table with the maximum dimensions ($m^{2)}$ of horizontal panels with 3 cm joints that can be realised depending on the overload, reinforcement and type of SGB.

The values were calculated for the following conditions:
- recessed joist panels resting on all four sides;
- uniformly distributed overload;
- permissible stresses: iron 1000 kg/cm^2 ; concrete 50 kg/cm ;[2]
- joint 3 cm.

MODEL	Size (mm)	Glass weight (Kg)	Number of pieces (m2)	Compressive strength (kN)	Non-walkable structures 200 kg/m^2			Walkable structures 400 kg/m^2		
					reinforcement Ø 6	reinforcement Ø 8	reinforcement Ø 10	reinforcement Ø 6	reinforcement Ø 8	reinforcement Ø 10
BG R 19/10 CLEARVIEW	Ø 190x100	2,9	21	> 40	NPD	NPD	NPD	NPD	NPD	NPD
B 19/5 CLEARVIEW	Ø 190x50	1,5	21	> 39	NPD	NPD	NPD	NPD	NPD	NPD
BG 1414/11 CIRCLES	145x145x110	2,7	33	> 12	6,7	11,5	13,5	4,4	7,5	9
BG 1919/8 CIRCLES	190x190x80	2,8	21	> 28	4,5	8	9,5	2,7	4,8	6
BG 1919/8 DOTS	190x190x80	2,7	21	> 12	4,5	8	9,5	2,7	4,8	6
BG 1919/8 CLEARVIEW	190x190x80	4	21	> 59,7	4,5	8	9,5	2,7	4,8	6
BG 1919/10 CLEARVIEW	190x190x100	3,5	21	> 45	4,5	8	9,5	2,7	4,8	6
B R11/6 CLEARVIEW	Ø 117x60	1	45	> 48	NPD	NPD	NPD	NPD	NPD	NPD
B 1111/6 CLEARVIEW	117x117x60	1,2	45	> 40	NPD	NPD	NPD	NPD	NPD	NPD
B 1414/5 CIRCLES	145x145x55	1,4	33	> 47	3,5	4,5	5,5	2,3	4	4,5
B 1919/7 CIRCLES	190x190x70	2,5	21	> 50	4	6,5	8	2,3	4	6
B 1616/3 PRISM	160x160x30	1,7	28	> 238	NPD	NPD	NPD	NPD	NPD	NPD
B 2020/2 PRISM	200x200x22	2	19	> 20	NPD	NPD	NPD	NPD	NPD	NPD
B 2020/2 CIRCLES	200x200x22	1,9	19	> 20	NPD	NPD	NPD	NPD	NPD	NPD

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

SGB bricks for horizontal structures are used for simply supported panels. The designer must therefore avoid works with SGBs that form a body with load-bearing parts or that are embedded.

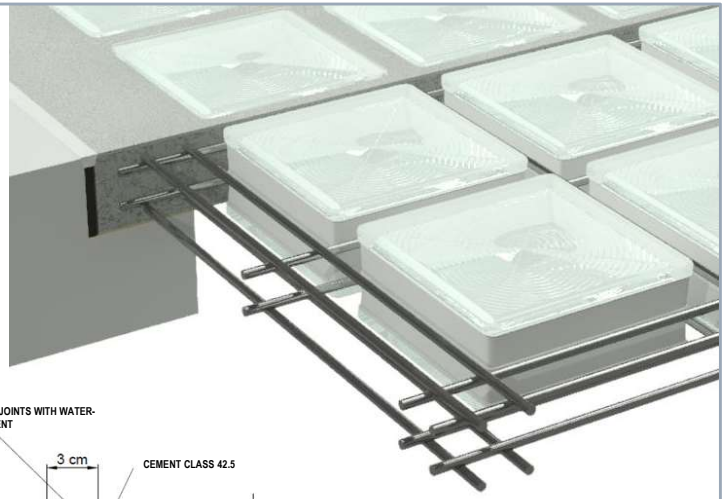
CLASSIC FORMATS

GLASS BLOCK FOR PEDESTRIAN HORIZONTAL STRUCTURES (Perimeter and intermediate supports)

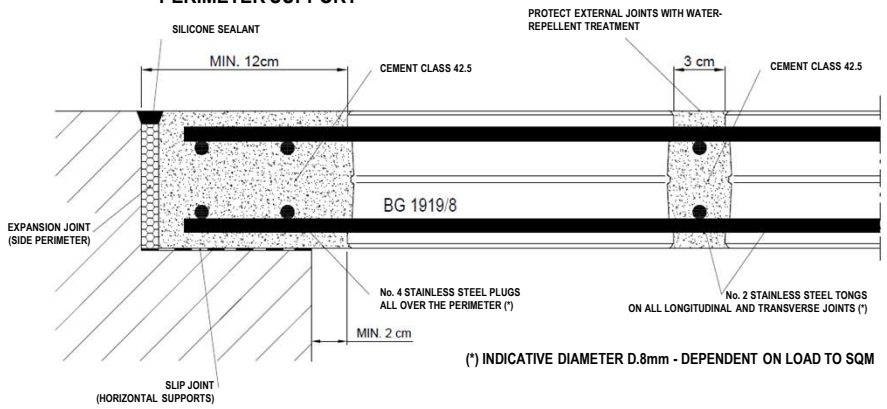
The designer must consider at least 2-3 cm distance between the supporting structure and the first row of glass blocks of the panel with ***SGB***, so that the row is not in direct contact with the support itself.

This support should preferably be along the entire perimeter of the panel through the interposition of a sliding joint. Both the panel and the supporting element must be suitably dimensioned.

If products with SGB are flush with the roof or floor, the designer must provide an elastic expansion joint sealed with cold-laid materials at the head of the panel.



PERIMETER SUPPORT



(*) INDICATIVE DIAMETER D.8mm - DEPENDENT ON LOAD TO SQM

DESIGN AND INSTALLATION TECHNIQUES

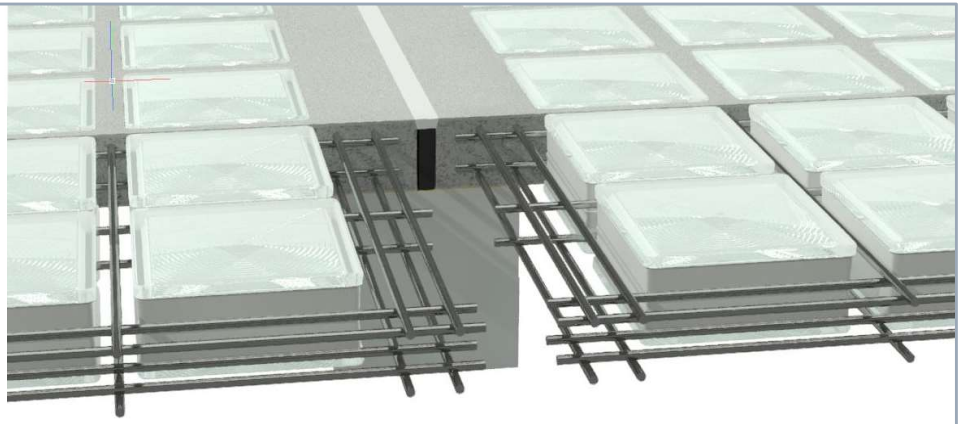
HORIZONTAL STRUCTURES

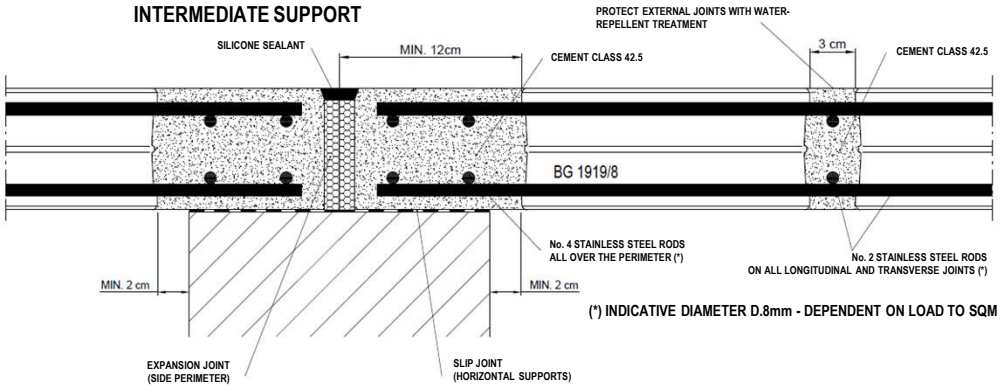
In the presence of intermediate supports, the designer must consider at least 2-3 cm distance between the supporting structure and the first row of glass blocks of the panel with ***SGB***, so that the row is not in direct contact with the support itself.

CLASSIC FORMATS

GLASS BLOCK FOR PEDESTRIAN HORIZONTAL STRUCTURES (perimeter and intermediate supports)

It is necessary to interrupt the reinforcement rods in order to avoid internal stresses in the structure itself.





SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

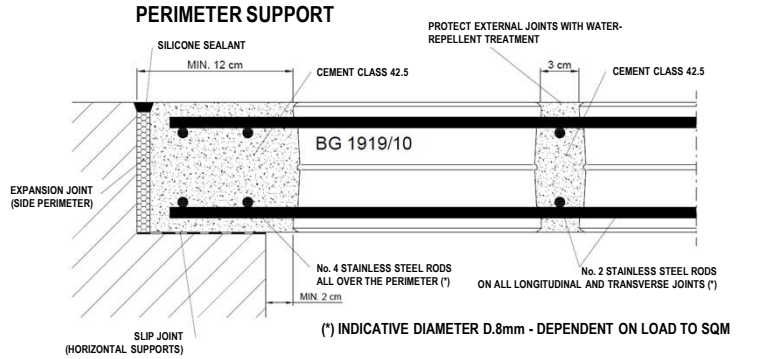
BG 1919/10 is a glass paver with high mechanical strength and good thermal insulation capacity.

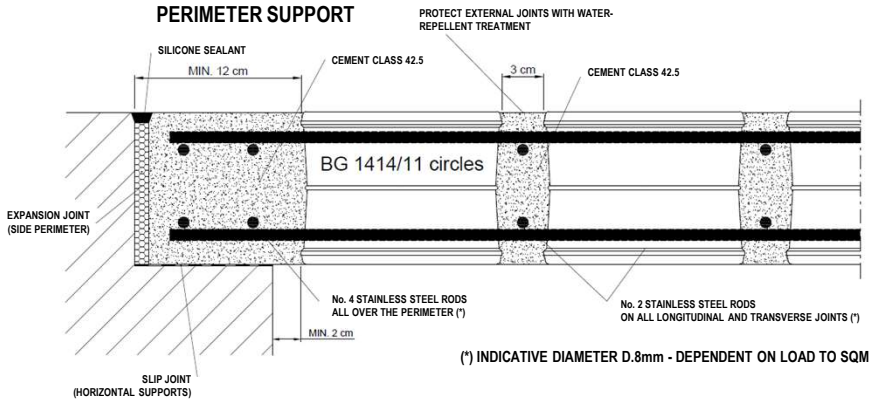
BG 1414/11 is the square chamber glass block characterised by high mechanical strength and good thermal insulation capabilities).Thanks to its 11 cm thickness, panels made of BG 1414/11 can withstand heavy structural loads.

A minimum gap between the glass blocks of at least 3 cm is recommended for installation.

CLASSIC FORMATS

BG 1919/10, BG R19/10 and BG 1414/11 (Perimeter supports)





SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

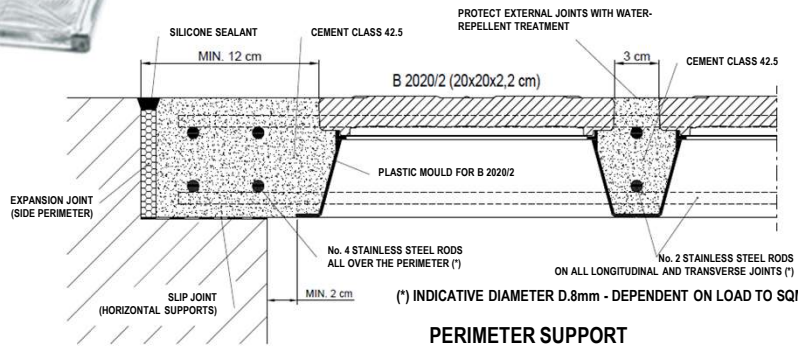
Monolithic glass element ideal for horizontal structures both indoors and outdoors where greater brightness is desired between separation levels. They are elegant and functional solutions compared to traditional materials, ideal for structures where greater luminosity is desired.

A minimum joint between the glass blocks of at least 3 cm is recommended for installation.

CLASSIC FORMATS

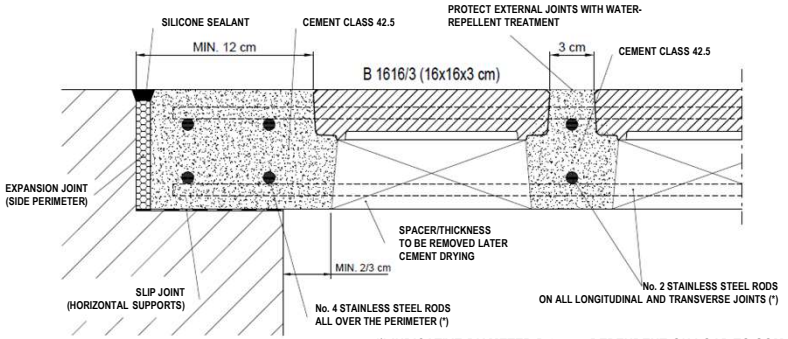
GLASS TILES FOR PEDESTRIAN HORIZONTAL STRUCTURES(perimeter supports)

PERIMETER SUPPORT



(*) INDICATIVE DIAMETER D.8mm - DEPENDENT ON LOAD TO SQM

PERIMETER SUPPORT



(*) INDICATIVE DIAMETER D.8mm - DEPENDENT ON LOAD TO SQM

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

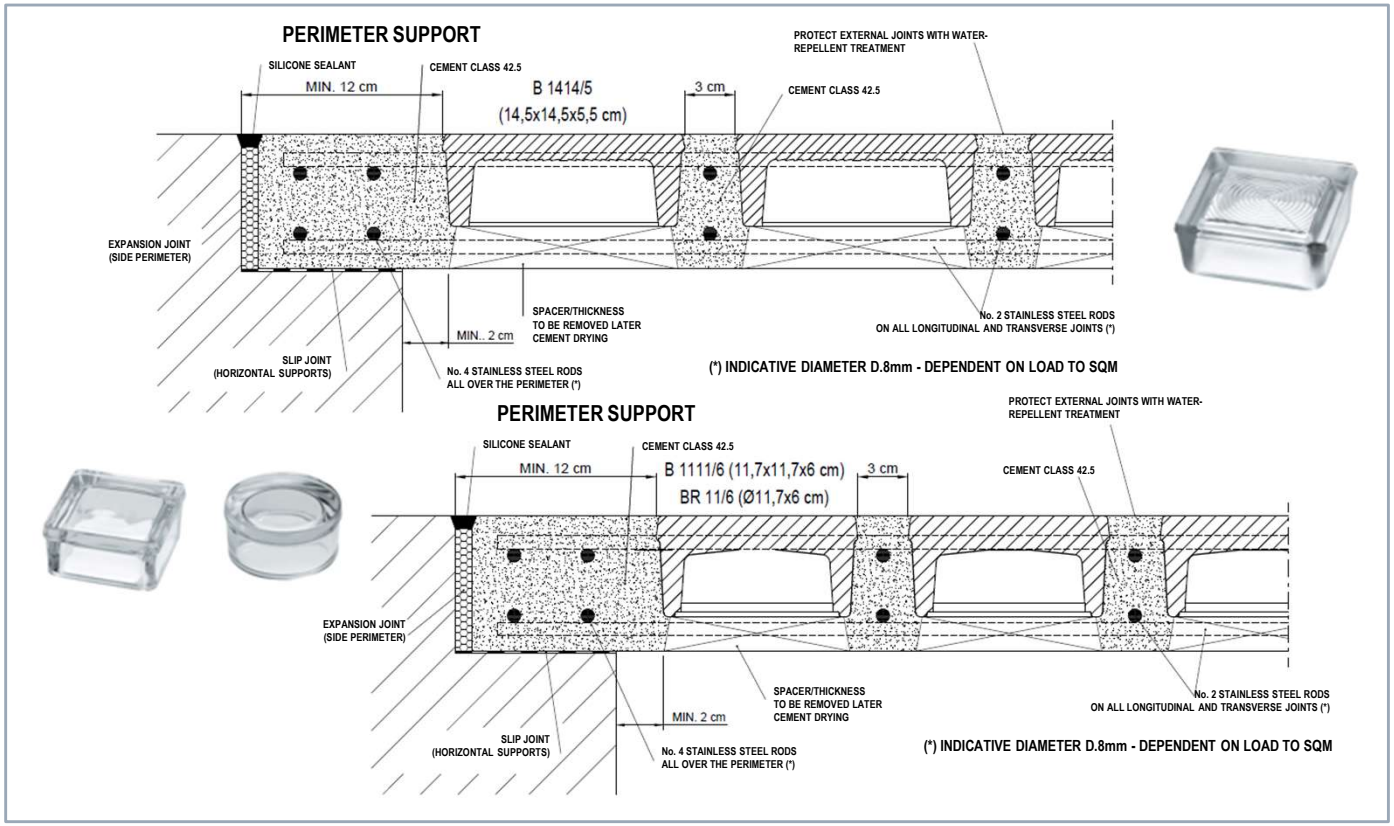
HORIZONTAL STRUCTURES

The small format offers a twofold advantage: on the one hand, the panels are safer to walk on, due to the larger joint surface created between glass pavers, which increases friction. On the other hand, the smaller format applied to the flooring makes the surfaces more decorative and more suitable for indoor and outdoor furniture.

A minimum gap between the glass pavers of at least 3 cm is recommended for installation.

CLASSIC FORMATS

HALF SHELL GLASS FOR PEDESTRIAN HORIZONTAL STRUCTURES (perimeter supports)



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

The following materials and accessories are required for installation,

- Concrete
- Disarming
- Steels reinforcements
- Joints finishes
- Protective treatments and sealants
- Expansion and slip joints
- Tiles and grids

CLASSIC FORMATS

Installation materials and accessories

CEMENT MORTAR - For the construction of horizontal structures, the use of traditional cement mortar with a mixture of Portland cement, or similar, of class 42.5 is recommended. The cement mix is obtained by mixing cement (class 42.5), aggregates (mineral sand, washed, with assorted grain size and maximum size of 3 mm), gravel, any additives and sufficient clean water for a dense mix. The quantities will depend on the mechanical resistance characteristics required for the individual panel. The cement mix must offer good mechanical resistance and good workability, for complete and correct filling of narrow sections. It must also possess waterproofing characteristics and low shrinkage during curing. High shrinkage in fact induces harmful stresses on the SGB glass blocks and can cause cracks in the mortar itself to the detriment of waterproofing.

Release agent **-** Use a suitable release agent to allow the panel to detach from the formwork or laying surface. To facilitate the release of the panel with SGB, it is advisable to use traditional cement grout with a Portland cement mix, or similar, of class 42.5. The grout/dismantling agent is obtained by dosing: 1 part cement, 1 part marble powder and enough clean water for a slightly dense mix.

SLIP AND EXPANSION/SETTLING JOINTS - An appropriate expansion joint must be placed along the entire perimeter to absorb any settling of the structure, such as the SGB expansion joint, of adequate thickness, adhesive on one side so that it can be better positioned to adhere to the structures. An appropriate expansion joint must be inserted in support so as not to create a single structure with the building.

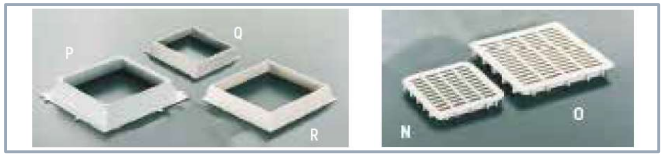
STEEL REINFORCING RODS - It is advisable to use smooth stainless steel or hot-dip galvanised iron bars or those treated with protective agents to prevent oxidation. The size of the rod varies according to the calculations made by the designer and the need to provide adequate structural resistance.

JOINT FINISHING - The most common grouting systems include:
- cement mortars with fine sieved sand, for grey coloured joints;
- mortars of white cement and marble powder, for white coloured joints;
- cement mortars with fine sand and oxides, for coloured joints.

The finishing mortars used must not contain aggregates that can scratch the glass elements. If pre-mixed mortars are used, it is imperative to ensure that they do not contain any additives that can make cleaning the glass blocks difficult, especially if they are sandblasted. For filling the joints, it is essential to use mortar with a compressive strength not exceeding that of the mortar used for laying.

PROTECTIVES AND SEALANTS - Once the work has been completed and the grouting is dry, it is possible to intervene with protective treatments on the joints in order to prevent water infiltration. This intervention is indispensable in the case of constructions subjected to heavy rain. The treatments consist of applying one or more layers of protective waterproofing, usually transparent. It is also advisable to apply sealant around the perimeter of the work.

PLASTIC VENTILATION GRIDS AND TILES - During the installation of horizontal panels, glass blocks can be interspersed with ventilation grilles inserted in tiles. Available in plastic, they must be installed with the corresponding Glass block:
(P) Plastic glazing moulds B 2020/2
(Q) Plastic tiles and (N) Plastic grids 137x137 for B 1414/5
(R) Plastic tiles and (O) 195x195 plastic grids for B 1919/7



SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

SGB bricks for horizontal structures are used for simply supported panels. The designer must therefore avoid works with SGBs that form a body with load-bearing parts or that are embedded.

One method of installation is to prefabricate the panel in the workshop or on site and then place it on the supporting structure.

Installation of prefabricated panels

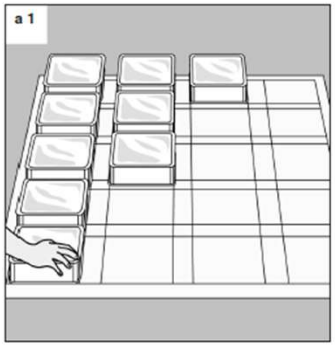
To create a panel that allows not only the passage of light but also ventilation, replace one or more glass pavers measuring 19x19x7 cm or 14.5x14.5x5.5 cm with corresponding plastic grids.

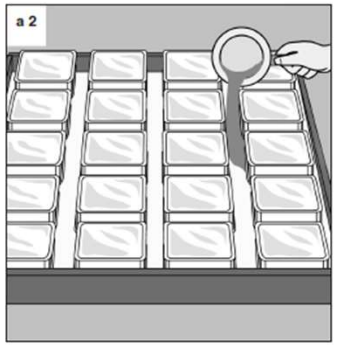
PRELIMINARY PHASE

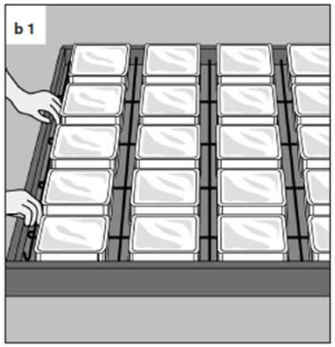
- Work on a smooth or ground flat surface.
- Draw the laying grid, considering that the measurements of the traces are derived from the side length of the *SGB* elements to be used and the size of the reinforced joints between glass and glass.
- Spread release agent on the ground surface.
- Place glass blocks on the traced grid
- Pour water and cement grout into the interspaces to a thickness of a few millimetres in order to prevent the elements from shifting during the subsequent pouring of mortar.

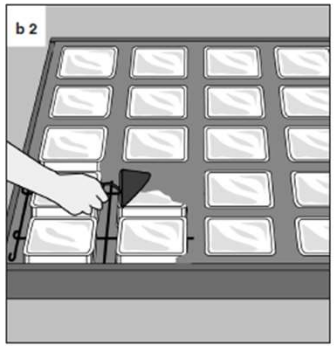
INSTALLATION PHASE

- Apply enough mortar to assure that the reinforcement bars you will be inserting will be at least 20 mm from the base.
- Reinforce the joints between the glass blocks of the structure with smooth stainless steel or hot-dip galvanised iron bars treated with anti-oxidant that are shorter than the length of the sides of the structure itself (so as to prevent them from leaking and oxidising), thus creating an orthogonal frame.
- If the panel is supported along two sides, first insert the irons perpendicular to the support and only then the others.
- Make sure that the bars are positioned in the centre of the interspace so that they do not come into contact with the glass.
- Complete the casting by compacting the mortar well, eliminating empty spaces to achieve waterproofing.









DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

The installation consists of three stages:

- **Preliminary phase**
- **Installation phase**
- **Finishing phase**

Generally, prefabricated panels made with ***SGB*** are used horizontally or inclined.

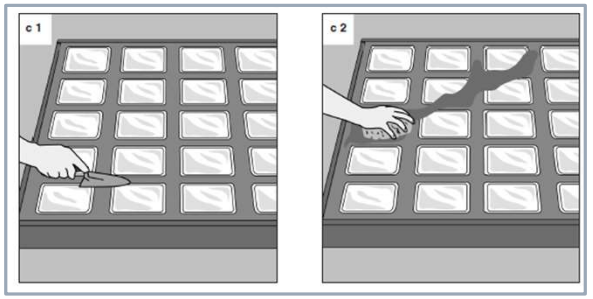
CLASSIC FORMATS

Installation of prefabricated panels

FINISHING PHASE

- Finish (smooth) the joints between glass and glass with the tip of the trowel and then, when the joints have semi-hardened, clean with rags until the joints are coplanar to the glass surface:
- Highlight the bottom and/or top side of the panel, allowing the materials (concrete and steel) to work properly.
- Cover the panel with a layer of wet sand to limit the shrinkage of the concrete mix.
- Consider environmental factors, such as humidity and wind exposure, before stripping the prefabricated panel (which in any case should not take place earlier than 5 days after casting).
- Lift the panel, taking care to clean the joints on the underside. Fill and finish any holes and micro-cracks that may have been created during casting. Clean the glass blocks.
- Only transport and install the panel when the concrete has completely hardened and in any case not earlier than 28 days after casting.
- Insert suitable accessories, such as hooks and clamps, into the concrete casting to facilitate the handling of large panels.
- Should the panel be exposed to rain, apply silicone water-repellent impregnants to the joints (between glass and glass).

For cleaning the *SGB* glass-brick (see page 29)



Installation

The construction methods described for prefabrication also apply to the construction of in-situ panels, with the difference that a formwork and a temporary bench supporting the panel must be carried out in advance, to be removed only when the concrete has reached the necessary strength.
The bottom of the formwork must be perfectly flat and at the same level as the perimeter support structure.
A horizontal sliding sheath and a vertical expansion/settlement joint must be placed on the latter.
If the structures are exposed to rain, expansion joints should be sealed, avoiding materials that are stretched or heat-fixed in order not to cause thermal shock and dangerous expansion of the glass elements.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

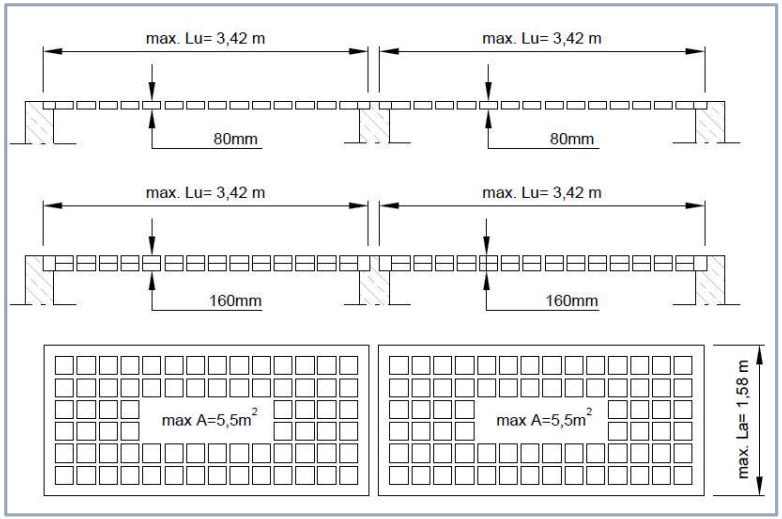
Seves Glass Block glass blocks for Class 30, 60, 90 fire-resistant horizontal structures to provide structural stability and strength while protecting objects and people from the passage of smoke, gases and flames.
Available in corrugated or smooth surface and three finishes for privacy and light control: clear, sandblasted on one side and sandblasted on both sides.

FIRE-RESISTANT

REI panel size limits

REI	Size (mm)	Glass weight (Kg)	Compressive strength (Mpa)	Thermal transmittance U (W/m² K)	Light transmission (%)	G factor (g)	Sound insulation (dB)	Fire resistance	Security-Security	
BG 1919/8 30F	190x190x80	4,15	> 54	2.2	61	50/47	47	REI45 / RE30	FB3 S	RC3 / P2A
BG 1919/16 60F	190x190x160	8	> 92	1.8	50	50	49	REI60 / RE60	FB6 S	RC3 / P2A
BG 1919/16 90F	190x190x160	8,3	> 57	1.4	38	31	51	REI90 / RE90	FB7 S	RC3 / P2A

DIMENSIONAL LIMITS OF GLASS BLOCK FLOOR PANELS REI



Max. surface = La x L < 5.5 m²
WIDTH max. La = 3,42 m
LENGTH max. Lu = 1.58 m

The designer's task will be to provide for the subdivision of surfaces by means of appropriate expansion and absorption joints (vertical and/or horizontal) made of suitable materials.

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

The glass block BG 1919/8 30F, installed horizontally (with an inclination of less than 15°), offers a high mechanical resistance of the structure, under the action of flame, to the propagation of fire, smoke and heat for 30 minutes (F30 value according to German standard DIN 4102-3). This resistance class ensures that the structure is not only stable and watertight, but also has low thermal radiation transmission. The horizontal installation of the fire-resistant glass blocks must be carried out in accordance with the product certifications.

FIRE-RESISTANT

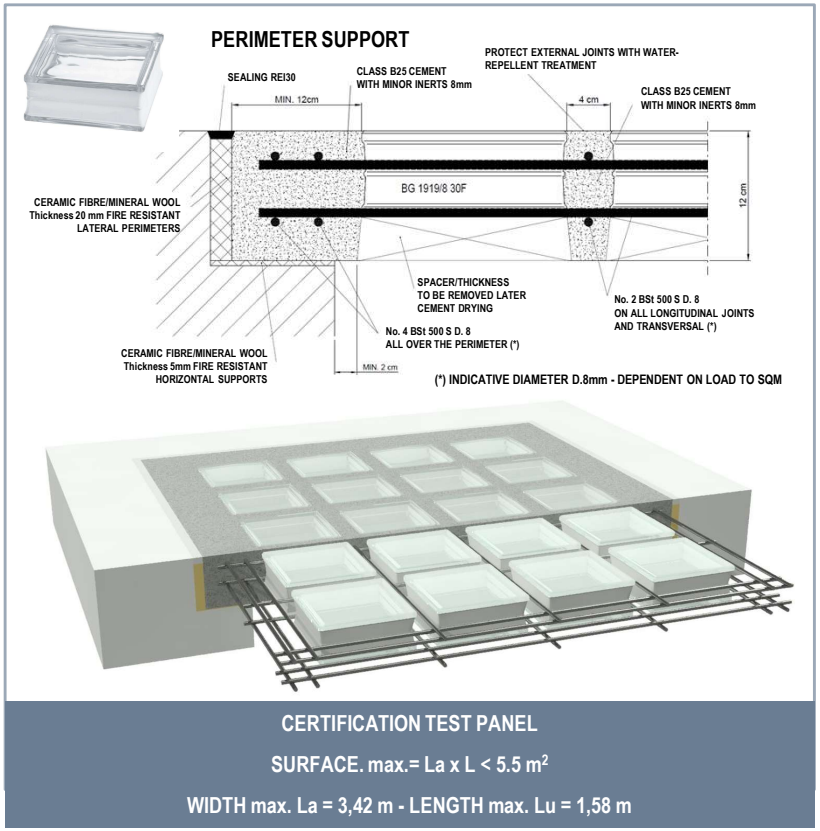
BG 1919/8 30F - REI 30 (Perimeter supports)

REI 30 INSTALLATION - 190x190x80 MM

(In accordance with certification)

- Test/certification panel size max. 3.42m x 1.58m (14x6 glass blocks)
- 40mm longitudinal and transverse joints - 120mm panel perimeter joint
- Cement class B25 with minor aggregates 8mm
- Expansion joint in side perimeters: example ceramic fibre
- Slip joint in the lower supports of non-compressible/flammable insulating material (commercial).
- It is advisable to protect the joints with suitable putty of insulating material and to seal the perimeter to prevent infiltration.
- Panel perimeter is reinforced with Ø 8 mm bars 4 of type BSt 500 S
- Longitudinal and transverse joints are reinforced with Ø 8 mm bars 2 of type BSt 500 S
- The reinforcement rods are not tied together at the joints.

NB: The certification refers to a prefabricated panel.
NB: Perimeter sealing with suitable material required by the performance characteristics of the roof (e.g. commercial fire-resistant sealant REI 30)



CERTIFICATION TEST PANEL

SURFACE. max.= La x L < 5.5 m²

WIDTH max. La = 3,42 m - LENGTH max. Lu = 1,58 m

SEVES GLASS BLOCK Technical Guide

DESIGN AND INSTALLATION TECHNIQUES

HORIZONTAL STRUCTURES

The glass block BG 1919/16 60F and BG 1919/16 90F, installed horizontally (with an inclination of less than 15°), offer a high mechanical resistance of the structure to the propagation of fire, smoke and heat for 60 and 90 minutes under the action of flame (F60 and F90 value according to German standard DIN 4102-3). This resistance class ensures not only stability and tightness of the structure, but also a low passage of thermal radiation, thus also limiting the heating of objects placed in protected rooms. The horizontal installation of fire-resistant glass blocks must be carried out in accordance with the product certifications.

FIRE-RESISTANT

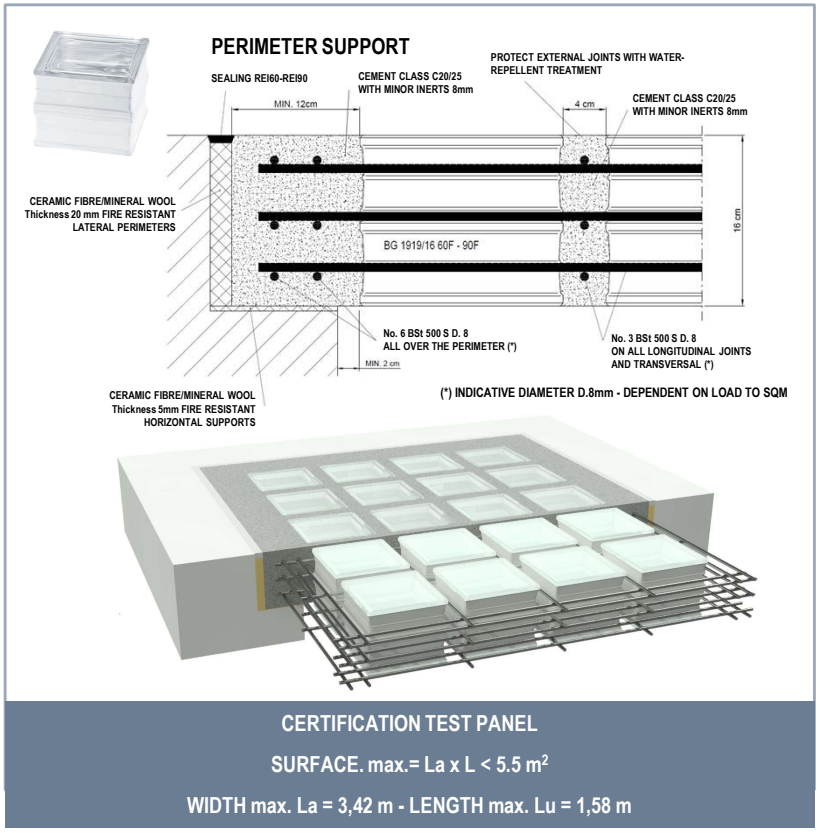
BG 1919/8 60/90F - REI 60/90 (Perimeter supports)

INSTALLATION REI 60/90 - 190x190x160 MM

(in accordance with certification)

- Test/certification panel size max. 3.4m x 1.58m (14x6 glass blocks)
- 40mm longitudinal and transverse joints/joints - 120mm panel perimeter joint
- Cement class C20/25 with minor aggregates 8mm
- Expansion joint in side perimeters: example ceramic fibre
- Slip joint in the lower supports of non-compressible/flammable insulating material (commercial).
- It is advisable to protect the joints with suitable putty of insulating material and to seal the perimeter to prevent infiltration.
- Panel perimeter is reinforced with Ø 8 mm BSt 500 S type 6 bars
- Longitudinal and transverse joints are reinforced with Ø 8 mm bars 3 of type BSt 500 S
- The reinforcement rods are not tied together at the joints.

NB: The certification refers to a prefabricated panel.
NB: Perimeter sealing with suitable material required by the performance characteristics of the roof (e.g. commercial fire-resistant sealant REI 60-90)



CERTIFICATION TEST PANEL

SURFACE. max.= La x L < 5.5 m²

WIDTH max. La = 3,42 m - LENGTH max. Lu = 1,58 m

SEVES GLASS BLOCK Technical Guide

SPECIFICATIONS

VERTICAL AND HORIZONTAL STRUCTURES

FORMAT 19x19x8 - (Generic vertical installation)

Supply and installation of vertical walls made of pressed 19x19x8 glass blocks, hot-assembled by welding the faces and annealed.
The dimensions are 19x19x8 cm, with the glass design, colours, finish and white or metallic paint of the lateral bands determined by the construction management.
The product must comply with EN 1051-1
The manufacturer must have a UNI - EN - ISO 9001 quality system
These Glass blocks are installed by inserting special plastic spacers type SGB with joints of a thickness determined by the Works Management, including positioning with mortar type SGB that is elastic, impermeable to water and humidity, with a white or grey colour suitable for both installation and grouting.
The walls must be suitably reinforced with plain-drawn stainless steel rods, Ø 6 mm, to be placed inside the joints both horizontally and vertically.
The structures must be insulated laterally and on the top with a special rot-proof expansion joint, adhesive on one side, type SGB made of veolene (closed-cell expanded polyethylene) measuring 65x5 mm, and on the bottom by a sliding joint of non-compressible insulating material.
The connection between the glass block walls and the surrounding structures must be made with a specific elastic masonry sealant.
The joints must be superficially treated with a specific waterproofing agent.

FORMAT BG 19x19x8 - (Generic horizontal installation)

Supply and installation of prefabricated horizontal panels made of pressed BG 1919/8 air chamber Glass blocks, hot-assembled by welding and annealed.
The dimensions are 19x19x8 cm, Clear colour and white side panels.
The product must comply with EN 1051-1 and EN 1051-2
The manufacturer must have a UNI - EN - ISO 9001 quality system
The prefabricated panels will be manufactured using cement mix based on Portland cement type 425, sand and gravel (max.3mm), for the finish composition based on Portland cement type class 42.5 and marble powder.
The internal joints will be a minimum of 3 cm must contain a double reinforcement, consisting of smooth-drawn stainless steel rods of a suitable thickness
The perimeter band shall be a minimum of 12 cm, used for supports, and shall contain a quadruple reinforcement consisting of smooth-drawn stainless steel rods of suitable thickness.
After packaging, these panels will be positioned in place by means of special support structures and insulated: horizontally with a sliding joint of non-compressible insulating material, perimeter with a rot-proof SGB-type expansion joint, adhesive on one side. in veolene (closed-cell expanded polyethylene) 65x5 mm in size.
The connection between the glass-brick panels and the slab must be made with a special elastic sealant.
The joints must be superficially treated with a specific waterproofing agent.

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