

**Loading data for concrete screw FBS II GVZ & A4 in solid masonry units for redundant multiple fixings of non-structural systems**

This document is valid for the concrete screw FBS II GVZ and A4.

Restriction: Size D6 only available in GVZ.

**Base material**

Solid clay brick according to EN771-1, min. compressive strength class 12 N/mm<sup>2</sup>.

Solid sand-lime brick according to EN771-2, min. compressive strength class 12 N/mm<sup>2</sup>.

Aerated concrete according to EN771-4, min. compressive strength class 6 N/mm<sup>2</sup>.

**Installation**

Drilling the hole by rotary drill mode or by hammering drill mode

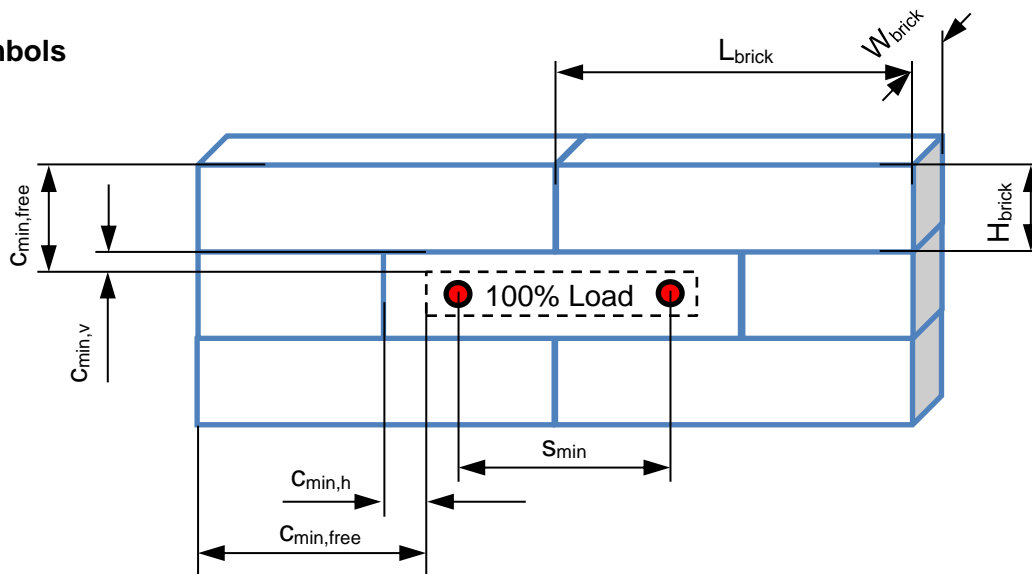
Screw installation such that:

- $h_{nom}$  of the screw in the brick is not smaller than the value given in this specification.
- Further turning of the screw head should not be possible.
- The head of the screw is fully supported on the fixture and is not damaged.

The following installation torques must be observed:

Base material	Compressive strength class [N/mm <sup>2</sup> ]	Type	FBS II			
		Size	[mm]	6	8	10
		$h_{nom}$	[mm]	55	65	85
Solid clay brick (EN771-1)	≥ 12	$T_{inst}$	[Nm]	<b>2</b>	<b>10</b>	<b>10</b>
Solid sand-lime brick (EN771-2)	≥ 12	$T_{inst}$	[Nm]	<b>5</b>	<b>15</b>	<b>15</b>
Aerated concrete (EN771-4)	≥ 6	$T_{inst}$	[Nm]	<b>1,5</b>	<b>5</b>	<b>5</b>

## Symbols



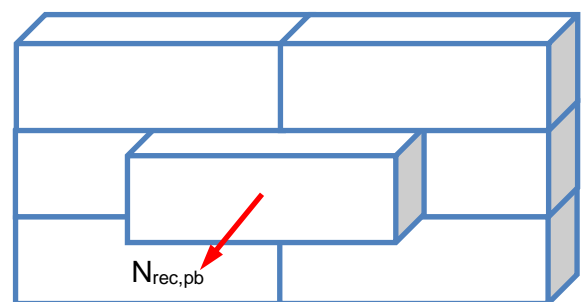
## Minimum edge distance and spacing for all brick types

$C_{min,v}$	[mm]	20
$C_{min,h}$	[mm]	40
$C_{min,free}$	[mm]	200
$S_{min}$	[mm]	80

The values  $C_{min,v}$  and  $C_{min,h}$  apply only if the joints of the masonry are filled with mortar. Joints which are not filled with mortar must be regarded as a free edge and  $C_{min,free}$  applies. Minimum mortar strength M 2.5.

## Pull out of one brick

		$N_{rec,pb}$ [kN] for clay bricks				
$W_{brick}$ [mm]	$L_{brick}$ [mm]	115	175	240	300	365
240	240	1,58	2,40	3,29	4,11	5,01
300	300	1,97	3,00	4,11	5,14	6,26
365	365	2,40	3,65	5,01	6,26	7,61
490	490	3,22	4,90	6,72	8,40	10,22
		$N_{rec,pb}$ [kN] for all other bricks				
$W_{brick}$ [mm]	$L_{brick}$ [mm]	115	175	240	300	365
240	240	1,18	1,80	2,47	3,09	3,75
300	300	1,48	2,25	3,09	3,86	4,69
365	365	1,80	2,74	3,75	4,69	5,71
490	490	2,42	3,68	5,04	6,30	7,67



$N_{rec,pb}$  for other brick formats:

For clay bricks:

$$N_{rec,pb}[\text{kN}] = L_{brick}[\text{mm}] \times W_{brick}[\text{mm}] / 17.500$$

For all other bricks:

$$N_{rec,pb}[\text{kN}] = L_{brick}[\text{mm}] \times W_{brick}[\text{mm}] / 23.333$$

**Recommended loads**

Base material	Compressive strength class [N/mm <sup>2</sup> ]	Type	FBS II			
		Size	[mm]	6	8	10
		h <sub>nom</sub>	[mm]	55	65	85
Solid clay brick (EN771-1)	≥ 12	F <sub>rec,12</sub>	[kN]	<b>0,25</b>	<b>1,1</b>	<b>1,4</b>
	≥ 20	F <sub>rec,20</sub>	[kN]	<b>0,4</b>	<b>1,6</b>	<b>2,0</b>
		H <sub>brick,min</sub>	[mm]	113		
		W <sub>brick,min</sub>	[mm]	115		
		L <sub>brick,min</sub>	[mm]	240		
Solid sand-lime brick (EN771-2)	≥ 12	F <sub>rec,12</sub>	[kN]	<b>0,9</b>	<b>1,3</b>	<b>1,4</b>
	≥ 20	F <sub>rec,20</sub>	[kN]	<b>1,4</b>	<b>1,7</b>	<b>2,1</b>
		H <sub>brick,min</sub>	[mm]	71		
		W <sub>brick,min</sub>	[mm]	115		
		L <sub>brick,min</sub>	[mm]	240		
Aerated concrete (EN771-4)	≥ 6	F <sub>rec,6</sub>	[kN]	<b>0,1</b>	<b>0,7</b>	<b>0,9</b>
		H <sub>brick,min</sub>	[mm]	100		
		W <sub>brick,min</sub>	[mm]	100		120
		L <sub>brick,min</sub>	[mm]	499		

- F<sub>rec</sub> - Recommended load for tension, shear or combined tension and shear loading. The recommended load is valid for single screw or for a group of two or four screws with spacing equal or larger than the minimum spacing s<sub>min</sub> according to specification.
- All data is for redundant fastening in non-structural applications
- Due to the natural variation of solid bricks, on - site screw testing is recommended to validate technical data.
- The FBS II was installed and tested in the center area of solid bricks as shown considering minimal edge and space distances.
- The FBS II was not tested outside of this center area, in mortar joints or in hollow bricks. The use of the screw under these conditions is not allowed.
- For brick walls where anchor position in brick cannot be determined, 100% anchor testing is recommended.
- Plaster, lining or leveling courses are regarded as non-bearing and may not be taken into account for the calculation of the embedment depth.
- The decisive resistance to tension loads is the lower value of N<sub>rec</sub> (brick breakout, pull out of the screw) and N<sub>rec,pb</sub> (pull out of one brick)