Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

Member of EOTA
www.eota.eu

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-25/0856 of 10 October 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Concrete screw BSZ for masonry
Product family to which the construction product belongs	Screw anchor for use in masonry
Manufacturer	MKT Metall-Kunststoff-Technik GmbH & Co. KG Auf dem Immel 2 67685 Weilerbach GERMANY
Manufacturing plant	MKT Werk 5, D
This European Technical Assessment contains	34 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330460-00-0604, edition 08/2022

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

The Concrete screw BSZ for masonry is an anchor in size 5,6, 8 and 10 mm made of steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterized by mechanical interlock in the special thread.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to steel failure of a single screw anchor under tension loading	$N_{Rk,s}$ see Annex C1
Characteristic resistance to steel failure of a single screw anchor under shear loading	$V_{Rk,s}$ [kN], $M^0_{Rk,s}$ see Annex C1
Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading	$N_{Rk,p}$, $N_{Rk,b}$, $N_{Rk,p,c}$, $N_{Rk,b,c}$ see Annex B6, C3, C7, C11, C15, C19 $\alpha_{j,N}$ see Annex C3, C7, C11, C15, C19
Characteristic resistance to local brick failure and brick edge failure of a single screw anchor under shear loading	$V_{Rk,b,II}$, $V_{Rk,b,\perp}$, $V_{Rk,c,II}$, $V_{Rk,c,\perp}$ see Annex B6, C3, C7, C11, C15, C19 $\alpha_{j,VII}$, $\alpha_{j,V\perp}$ see Annex C3, C7, C11, C15, C19
Characteristic resistance to brick breakout failure of a screw anchor group under tension loading	N^g_{Rk} see Annex B6 $\alpha_{g,N}$ see Annex B6
Characteristic resistance to local brick failure and brick edge failure of a screw anchor group under shear loading	$V^g_{Rk,b,II}$, $V^g_{Rk,b,\perp}$, $V^g_{Rk,c,II}$, $V^g_{Rk,c,\perp}$ see Annex B6 $\alpha_{g,VII}$, $\alpha_{g,V\perp}$ see Annex B6

Essential characteristic	Performance
Edge distances, joint distances, spacing, member thickness	c_{cr}, s_{crII}, $s_{cr\perp}$ see Annex B6 c_{jII}, $c_{j\perp}$ see Annex B6, C3, C7, C11, C15, C19 c_{min}, s_{minII}, $s_{min\perp}$ see Annex B6, C2, C6, C10, C14, C18 h_{min} see Annex C2, C6, C10, C14, C18
Resistance to combined tension and shear loading (hollow and perforated bricks)	Limit value X for interaction see Annex C11
Displacements	δ_{N0}, $\delta_{N\infty}$, δ_{V0}, $\delta_{V\infty}$ see Annex C5, C9, C13, C 17, C 20

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A 1
Resistance to fire	$N_{Rk,s,fi}$, $N_{Rk,p,fi}$, $N_{Rk,b,fi}$, $V_{Rk,s,fi}$, $M^0_{Rk,s,fi}$, $c_{min,fi}$, $c_{j,fi}$ see Annex C4, C8, C12, C16 $N^g_{Rk,fi}$, $s_{min,fi}$, $c_{min,fi}$, $c_{j,fi}$ see Annex C4, C8, C12, C16

3.3 Aspects of durability

Essential characteristic	Performance
Durability	see Annex B1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330460-00-0604 the applicable European legal act is: 97/177/EC.

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 10 Ocotber 2025 by Deutsches Institut für Bautechnik

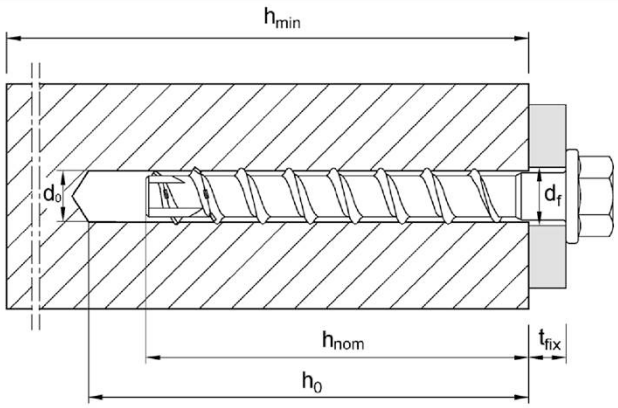
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Aksünger

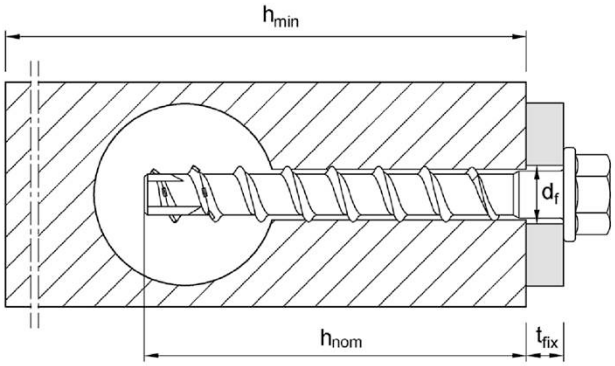
Deutsches Institut für Bautechnik DIBt

Concrete Screw BSZ
Product and Installation in solid and hollow brick

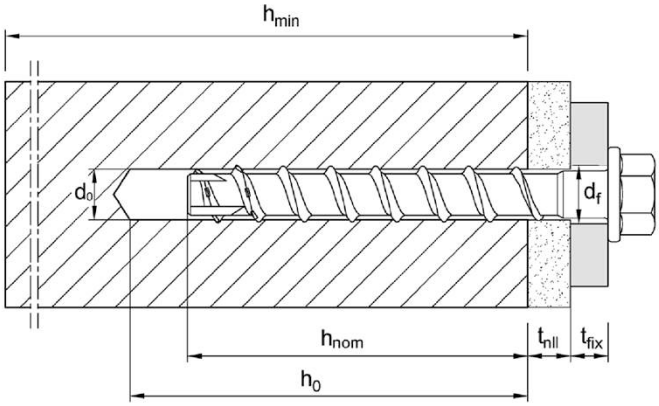
Installation in solid brick



Installation in hollow brick



Installation in solid or hollow brick with non-loadbearing layer

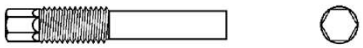
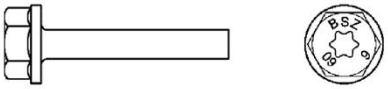
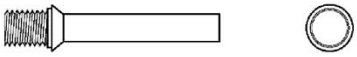
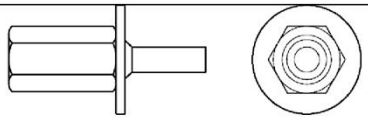


d_0 = nominal drill bit diameter
d_f = diameter of clearance hole in the fixture
t_{fix} = thickness of fixture
t_{nll} = thickness of non-loadbearing layer
h_{min} = minimum thickness of member
h_{nom} = nominal embedment depth
h_0 = depth of the drill hole

Concrete Screw BSZ for masonry	**Annex A1**
Product description Product and installation condition	

Deutsches Institut für Bautechnik DIBt

Table A1: Screw types

Type		Description
B		Screw version with metric connection thread and hexagon drive e.g.: BSZ2-B 10x140 A4
S		Screw version with hexagon head, pressed-on washer and TORX drive e.g.: BSZ2-SU 10x140 A4 TX
		Screw version with hexagon head and pressed-on washer e.g.: BSZ2-SU 10x140 A4
		Screw version with hexagon head e.g.: BSZ2-S 10x140 A4
SK		Screw version with countersunk head and TORX drive e.g.: BSZ2-SK 10x140 A4
LK		Screw version with pan head and TORX drive e.g.: BSZ2-LK 10x140 A4
		Screw version with large pan head and TORX drive e.g.: BSZ2-GLK 10x140 A4
BS		Screw version with countersunk head and metric connection thread e.g.: BSZ2-BSK 10x140 A4
		Screw version with hexagon drive and metric connection thread e.g.: BSZ2-BS 10x140 A4
M		Screw version with internal thread and hexagon drive e.g.: BSZ2-M 10x140 A4

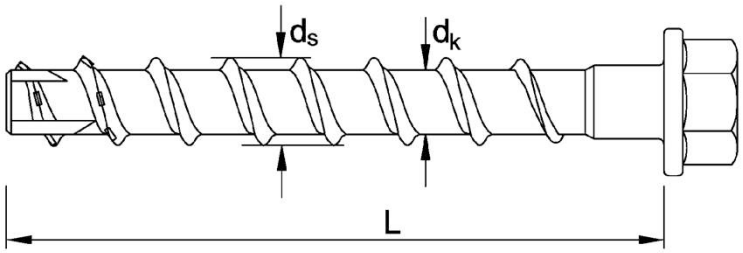
Concrete Screw BSZ for masonry

Product description
Screw types

Annex A2

Table B1: Dimensions

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Length of the Screw	L ≤	[mm]	500						
Core diameter	d_k	[mm]	4,0	5,1		7,1		9,1	
Outside diameter	d_s	[mm]	6,5	7,5		10,6		12,6	



Marking e.g.: ◇ BSZ 10 100
or TSM 10 100

◇ BSZ *or* TSM — Trade name (optional with manufacturer identification ◇)
10 — Screw size
100 — Length of Screw

Table B2: Material

Version		Steel, zinc plated
Material		- steel EN 10263-4:2017 galvanized acc. to EN ISO 4042:2018 - zinc flake coating acc. to EN ISO 10683:2018 (≥ 5µm) - special coating (≥ 20µm)
Characteristic yield strength	f_{yk}	560 N/mm²
Characteristic ultimate strength	f_{uk}	700 N/mm²
Fracture elongation	A_5	≤ 8%

Concrete Screw BSZ for masonry

Product description
Dimensions, marking and materials

Annex A3

Specification of intended use

Concrete screw BSZ		BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	[mm]	h_{nom1}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}
		35	35	55	45	65	55	75
Anchorages subject to		Static and quasi-static loads (Tension-, shear- or combined shear- and tension load or bending)						
		Fire exposure (All joints must be completely filled with mortar of at least compressive strength class M5 according to EN 998-2:2016)						
Base material		Solid or hollow brick masonry, see Annex B2 Minimum thickness of member, see Annex C						
		Bearing joints must be completely filled with mortar of at least compressive strength class M5 according to EN 998-2:2016. Butt joints may, but do not have to be filled with mortar Dry or wet masonry (during installation)						
Use conditions (Environmental conditions)		Concrete screws subject to dry internal conditions: all screw types						
		Temperature range of the masonry over the period of use: -40°C to +80°C						

Design:

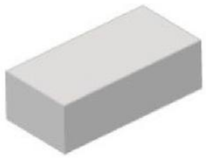
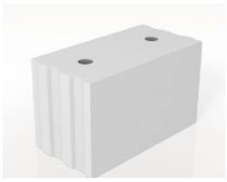
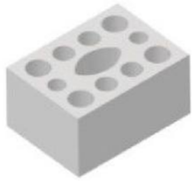
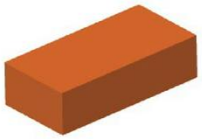
- The anchorage is designed in accordance with EOTA Technical Report TR 054:2022-07.
- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and masonry work.
- Screws with nominal embedment depth smaller than 50 mm may only be used for anchoring of statically indeterminate systems.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor to supports, etc.)
- The screw may be placed in the wall side and in the reveal side of the masonry. The installation parameters for installation in the reveal side must be observed in accordance with Annex B7. In case of Silka XL solid calcium silicate brick KS 12DF, the installation is possible in the wall side only.
- For solid blocks, the characteristic load-bearing capacities also apply to larger block formats, greater compressive strengths and densities of the masonry blocks.
- Installation in the joint and close to the joint is not permitted; the distances to joints according to Annexes C, must be observed.

Installation:

- Bridging of non-load-bearing layers (e.g. plaster) is possible. When selecting the screw length L, the thickness of the non-load-bearing layer t_{nll} must be taken into account.
  $L \geq h_{nom} + t_{nll} + t_{fix}$ (see figures in Annex A1)
- During installation, the joint, axis and edge distances specified by the planner must be taken into account
- The borehole is drilled with hammer, percussion, suction or masonry drills in hammer mode or rotary mode. The masonry must not be damaged during hammer drilling. If cracks occur during drilling, the rotary mode must be used. In this case, the drill hole must be discarded.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- Incorrectly drilled holes must be filled with high-strength mortar.

Concrete Screw BSZ for masonry	
Intended use Specifications	**Annex B1**

Table B1: Overview of brick types and properties

Designation	Picture	Dimension L x B x H [mm]	Mean compressive strength [N/mm²]	Density [kg/dm³]	Annex
Solid calcium silicate brick KS acc. to EN 771-2:2011+A1:2015					
KS 20 – 2,0 - NF		≥ 240 x 115 x 71	≥ 26,0	≥ 2,0	C2 – C5
Silka XL solid calcium silicate brick KS 12 DF acc. to EN 771-2:2011+A1:2015					
KS -R (P) 20 – 2,0 – 12 DF		≥ 498 x 175 x 248	≥ 14,0	≥ 1,8	C6 – C9
Perforated calcium silicate brick KSL 3 DF acc. to EN 771-2:2011+A1:2015					
SWKV KSL 12 – 1,6 – 3DF		≥ 240 x 175 x 113	≥ 17,0	≥ 1,5	C10 – C13
Solid clay brick MZ acc. to EN 771-1:2011+A1:2015					
MZ 20 – 2,0 – NF		≥ 240 x 115 x 71	≥ 21,0	≥ 2,1	C14 – C17
Solid light weight concrete brick acc. to EN 771-3:2011+A1:2015					
VBL 4 – 1,0 – 2DF		≥ 240 x 115 x 113	≥ 4,0	≥ 1,5	C18 – C20

Concrete Screw BSZ for masonry	
Intended use Overview of brick types and properties	**Annex B2**

Table B2: Installation parameters

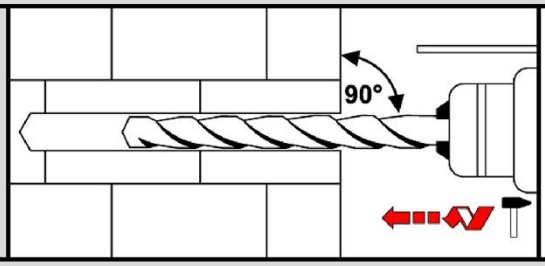
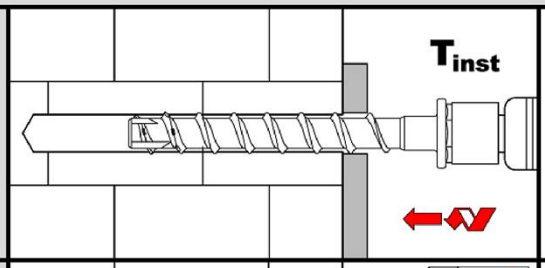
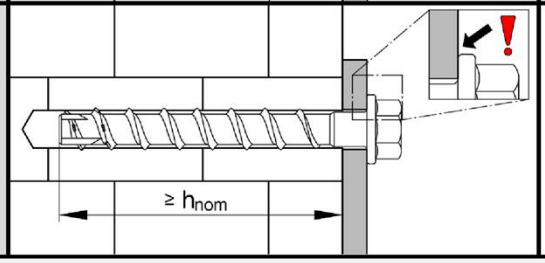
Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Nominal bit hole diameter	d_0	[mm]	5	6		8		10	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,4	6,40		8,45		10,45	
Depth of drill hole	$h_0 \geq$	[mm]	55	55	75	65	85	75	95
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	8		12		14	

Concrete Screw BSZ for masonry

Intended use
Installation parameters

Annex B3

Installation instructions

Drill hole preparation		
1		Drill hole by hammer drilling or rotary drilling.
Installation Concrete Screw		
2		Screw in with tangential impact screwdriver, cordless screwdriver or torque wrench.
3		After installation, the head of the screw is supported on the fixture must be undamaged.

Note:
Step 1: Joint distances, spacing and edge distances must be taken into account.
Step 2: For further details on screwing in, see brick type related Annex C2 – C20.
The installation torque must not exceed $T_{inst,max}$.
Step 3: It must not be possible to turn the screw. $T_{inst,max}$ must not be exceeded during the check.

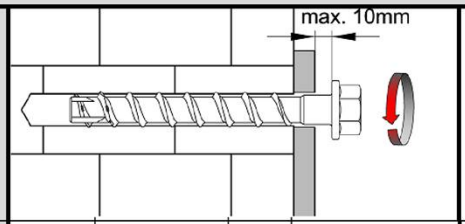
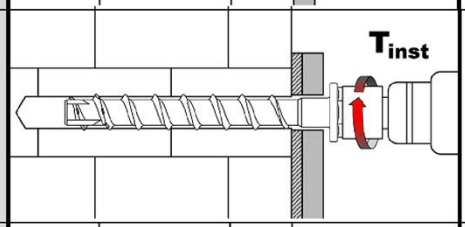
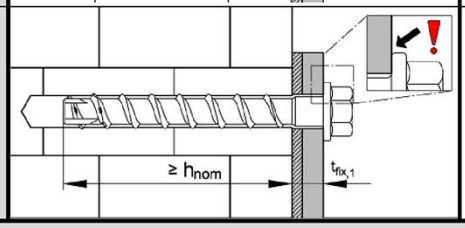
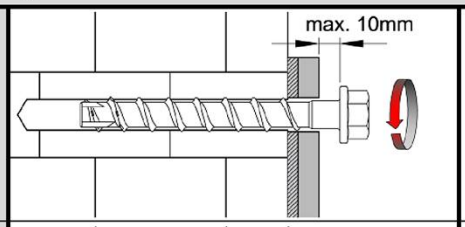
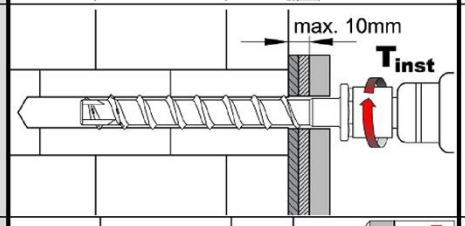
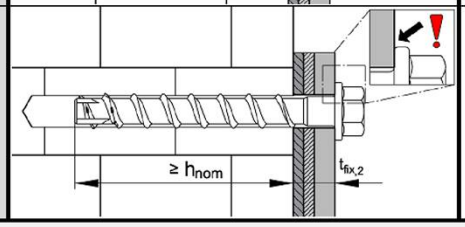
Concrete Screw BSZ for masonry

Intended use
Installation instruction

Annex B4

Deutsches Institut für Bautechnik DIBt

Installation instructions – Adjustment

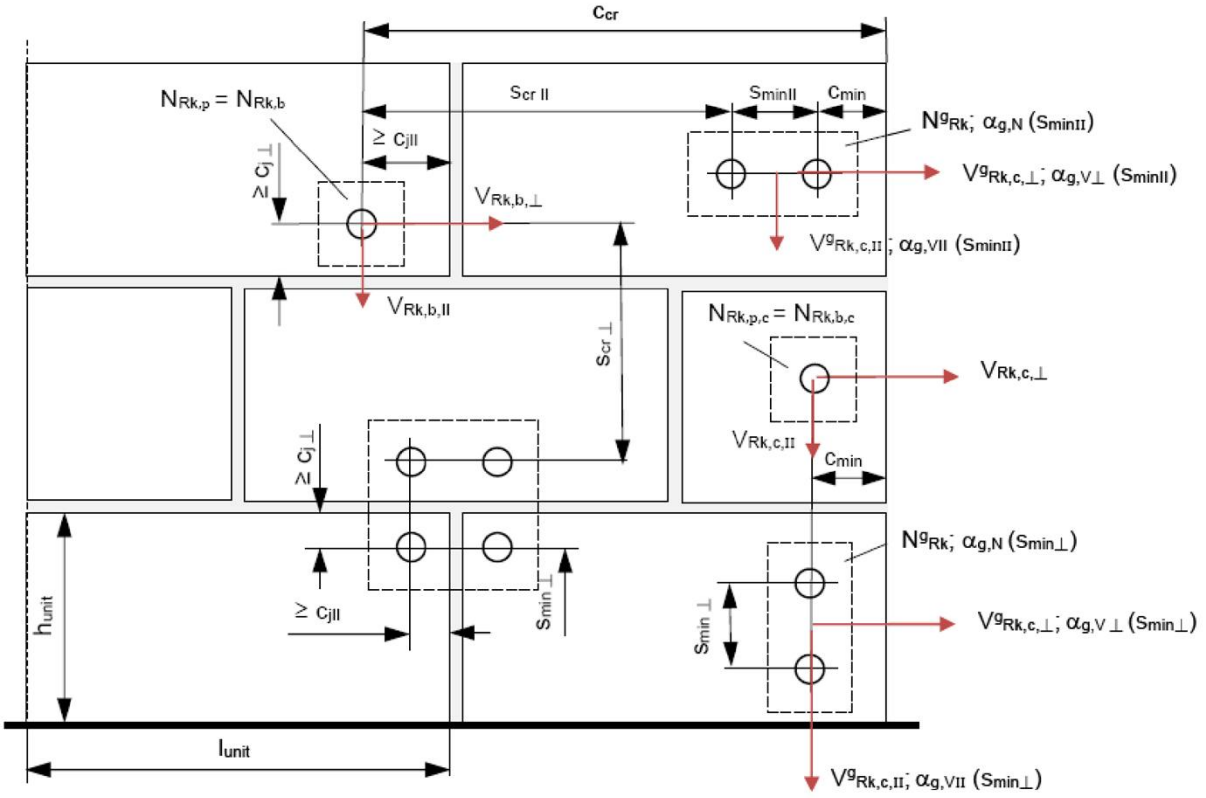
1. Adjustment		
4		Screw may be untightened maximum 10mm.
5		After adjustment, screw in the concrete screw with tangential impact screwdriver, cordless screwdriver or torque wrench.
6		After installation, the head of the screw is supported on the fixture and must be undamaged.
2. Adjustment		
7		Screw may be untightened maximum 10mm.
8		After adjustment, screw in the concrete screw with tangential impact screwdriver, cordless screwdriver or torque wrench.
9		After installation, the head of the screw is supported on the fixture and must be undamaged.

Note:
The screw may be adjusted max. 2x. The fastener must not be screwed back by more than 10mm in each case. The relining carried out during adjustment must not exceed 10 mm in total.
Nominal embedment depth h_{nom} must still be maintained after the adjustment.
For further details on screwing in, see brick type-related Annexes C.

Concrete Screw BSZ for masonry	
Intended use Installation instruction - Adjustment	**Annex B5**

Deutsches Institut für Bautechnik DIBt

Possible installation positions (the distances and spacings must be observed)



c_{min}	= minimum edge distance to the free edge of the wall
$c_{j\parallel}$	= distance to the vertical joints without influence on resistance of the screw anchor
$c_{j\perp}$	= distance to the horizontal joints without influence on resistance of the screw anchor
$s_{min\parallel}$	= minimum spacing parallel to horizontal joint
$s_{min\perp}$	= minimum spacing perpendicular to the horizontal joint
c_{cr}	= edge distance for transmission of the characteristic resistance of single screw anchor = 1,5 h_{nom}
$s_{cr\parallel}$	= characteristic spacing parallel to the horizontal joint = 3 h_{nom}
$s_{cr\perp}$	= characteristic spacing perpendicular to the horizontal joint = 3 h_{nom}
l_{unit}	= length of the masonry unit
h_{unit}	= height of the masonry unit
$\alpha_{g,N}(s_{min\parallel})$	= group factor under tension load for minimum spacing parallel to horizontal joint
$\alpha_{g,N}(s_{min\perp})$	= group factor under tension load for minimum spacing perpendicular to the horizontal joint
$\alpha_{g,V\parallel}$	= group factor under shear load parallel to the edge ($\alpha_{g,V\parallel} = \alpha_{g,V\parallel}(s_{min\parallel}) = \alpha_{g,V\parallel}(s_{min\perp})$)
$\alpha_{g,V\perp}$	= group factor under shear load perpendicular to the edge ($\alpha_{g,V\perp} = \alpha_{g,V\perp}(s_{min\parallel}) = \alpha_{g,V\perp}(s_{min\perp})$)

$N_{Rk} = N_{Rk,b} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c}$
$V_{Rk,\perp} = V_{Rk,,b\perp} = V_{Rk,c\perp}$; $V_{Rk,\perp} = V_{Rk,,b\perp} = V_{Rk,c\perp}$

For $s \geq s_{cr}$: $\alpha_{g,N}(s_{min\parallel}) = \alpha_{g,N}(s_{min\perp}) = \alpha_{g,V\parallel} = \alpha_{g,V\perp} = 2$
For $s_{min} \leq s \leq s_{cr}$: $\alpha_{g,N}(s_{min\parallel})$; $\alpha_{g,N}(s_{min\perp})$; $\alpha_{g,V\parallel}$; $\alpha_{g,V\perp}$ according to installation parameters of brick in Annex C
$N^g_{Rk}(s_{min\parallel}) = \alpha_{g,N}(s_{min\parallel}) \times N_{Rk}$ (group of 2 anchors with minimum spacing parallel to horizontal joint)
$N^g_{Rk}(s_{min\perp}) = \alpha_{g,N}(s_{min\perp}) \times N_{Rk}$ (group of 2 anchors with minimum spacing perpendicular to horizontal joint)
$V^g_{Rk\parallel} = \alpha_{g,V\parallel} \times V_{Rk,\parallel}$; $V^g_{Rk,\perp} = \alpha_{g,V\perp} \times V_{Rk,\perp}$ (group of 2 anchors)
$N^g_{Rk} = \alpha_{g,N}(s_{min\parallel}) \times \alpha_{g,N}(s_{min\perp}) \times N_{Rk}$ (group of 4 anchors)
$V^g_{Rk\parallel} = \alpha_{g,V\parallel}{}^2 \times V_{Rk,\parallel}$; $V^g_{Rk,\perp} = \alpha_{g,V\perp}{}^2 \times V_{Rk,\perp}$ (group of 4 anchors)

Concrete Screw BSZ for masonry

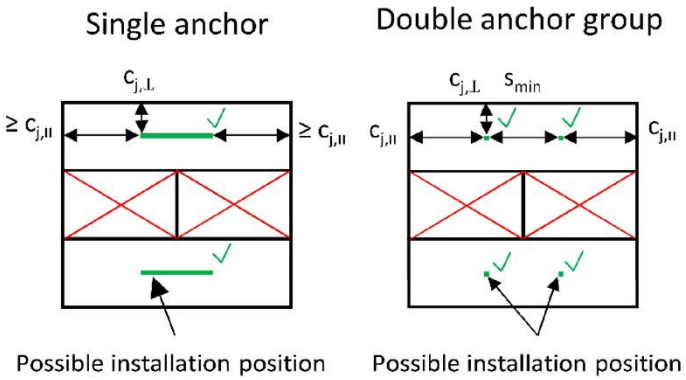
Intended use
Possible installation position

Annex B6

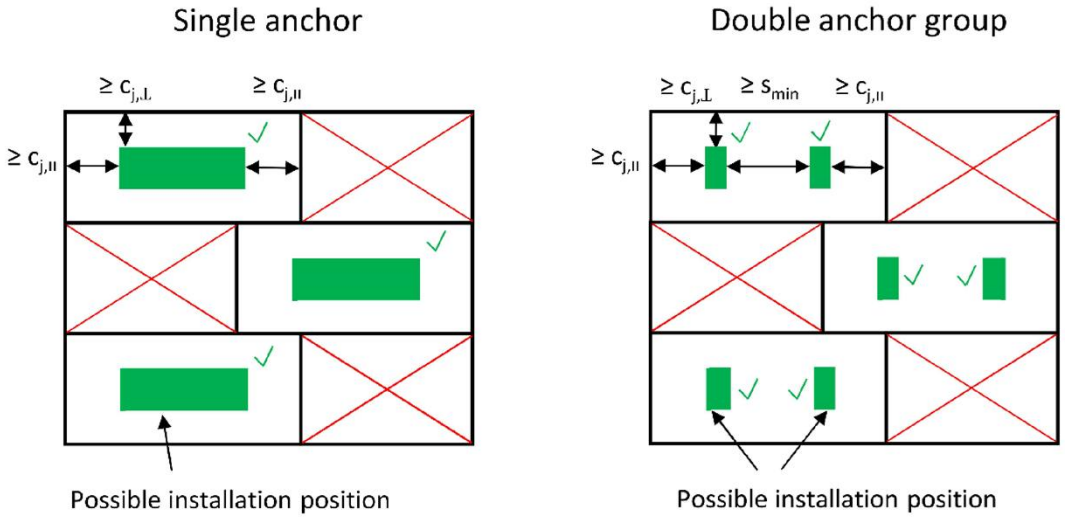
Deutsches Institut für Bautechnik DIBt

Installations parameter for installation in the reveal site

Positioning in reveal in brick types KS NF, MZ NF, VBL 2DF



Positioning in reveal in brick type KSL 3DF



Concrete Screw BSZ for masonry	
Intended use Possible installation in reveal	**Annex B7**

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic steel resistance under tension and shear load

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Steel failure									
Tension load									
Characteristic resistance	$N_{Rk,s}$	[kN]	8,7	14,0		27,0		45,0	
Partial factor [1)]	$\gamma_{Ms,N}$	[-]	1,5						
Shear load									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	4,4	7,0		13,5	17,0	22,5	34,0
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	5,3	10,9		26,0		56,0	
Partial factor [1)]	$\gamma_{Ms,V}$	[-]	1,25						

[1)] In absence of national regulation

Concrete Screw BSZ for masonry

Performances
Characteristic steel resistance

Annex C1

Brick type: Solid calcium silicate brick KS

Table C2: Description

Brick type			**Solid calcium silicate brick KS**
Density	ρ	[kg/dm³]	≥ 2,0
Normalised mean compressive strength	f_{mean}	[N/mm²]	≥ 26
Format		[-]	KS 20 - 2,0 - NF
Brick dimensions		[mm]	≥ 240 x 115 x 71
Norm		[-]	EN 771-2:2011+A1:2015
Minimum wall thickness	h_{min}	[mm]	240

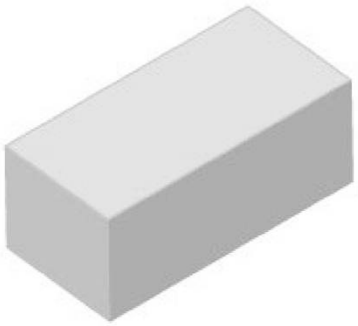


Table C3: Minimum edge distance, spacing, group factors, installation torque

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Minimum edge distance	c_{min}	[mm]	80						
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,65	1,70	1,05	1,15	1,15	1,05	1,65
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,55	1,70	1,05	1,15	1,20	1,10	1,20
	$\alpha_{g,V,II}$	[-]	1,55	1,55	1,35	1,15	1,05	1,05	1,35
	$\alpha_{g,V,\perp}$	[-]	1,30						
Installation torque with									
Manual installation	max. T_{inst}	[Nm]	6	11		27		37	46
Tangential impact screwdriver [1]	$T_{imp,max}$	[Nm]	185	185		300		300	

[1] with maximum power output $T_{imp,max}$ according to manufacturer´s specifications

Table C4: Reduction factors depending on the distance to joints

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 35						
	$c_{j\parallel}$	[mm]	≥ 80						
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)						
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$	[mm]							

[1] If the specified distances are not observed, the screw must not be used

Table C5: Characteristic resistances

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 26,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	3,5	3,1	4,9	4,1	4,3	3,8	4,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,3	5,3	8,6	6,3	11,3	7,7	13,0
	$V_{Rk,\perp}$	[kN]	3,3						
Compressive strength	f_{mean}	[N/mm²]	≥ 30,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	3,7	3,4	5,3	4,4	4,6	4,0	4,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,7	5,7	9,3	6,7	12,1	8,3	13,9
	$V_{Rk,\perp}$	[kN]	3,5						
Compressive strength	f_{mean}	[N/mm²]	≥ 35,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	4,0	3,7	5,7	4,8	5,0	4,4	5,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,1	6,1	10,0	7,3	13,1	8,9	15,0
	$V_{Rk,\perp}$	[kN]	3,8						
Compressive strength	f_{mean}	[N/mm²]	≥ 38,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	4,2	3,8	6,0	5,0	5,2	4,5	5,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,4	6,4	10,4	7,6	13,7	9,3	15,7
	$V_{Rk,\perp}$	[kN]	4,0						

Concrete Screw BSZ for masonry

Performances - Solid calcium silicate brick KS
Reduction factors depending on the distance to joints / Characteristic resistances

Annex C3

Table C6: Characteristic resistance **under fire exposure**

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Steel failure (tension and shear load)										
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	1,3	1,3	1,3	1,3	1,3	3,4	3,4
	R60		[kN]	1,0	1,0	1,0	1,0	1,0	2,7	2,7
	R90		[kN]	0,6	0,6	0,6	0,6	0,6	2,0	2,0
	R120		[kN]	0,5	0,5	0,5	0,5	0,5	1,7	1,7
Steel failure <u>with</u> lever arm										
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,8	1,1	1,1	1,5	1,5	4,9	4,9
	R60		[Nm]	0,5	0,8	0,8	1,1	1,1	4,0	4,0
	R90		[Nm]	0,3	0,5	0,5	0,8	0,8	3,0	3,0
	R120		[Nm]	0,2	0,4	0,4	0,6	0,6	2,5	2,5
Pull-out failure and breakout failure										
Characteristic resistance	R30	$N_{Rk,p,fi}$ = $N_{Rk,b,fi}$	[kN]	1,1	1,3	1,3	1,3	1,3	3,4	3,4
	R60		[kN]	0,8	1,0	1,0	1,0	1,0	2,7	2,7
	R90		[kN]	0,5	0,6	0,6	0,6	0,6	2,0	2,0
	R120		[kN]	0,3	0,5	0,5	0,5	0,5	1,7	1,7
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi,II}$	[mm]	120						
		$c_{j,fi,\perp}$	[mm]	35						
		$s_{cr,fi}$	[mm]	4 x h_{nom}						

Table C7: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Characteristic resistance under fire exposure										
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$ = $N^g_{Rk,b,fi}$ = $N^g_{Rk,p,fi}$	[kN]	0,09 · $N^g_{Rk,b}$	0,09 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,18 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,24 · $N^g_{Rk,b}$
	R120		[kN]	0,08 · $N^g_{Rk,b}$	0,08 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,10 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,19 · $N^g_{Rk,b}$
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi}$	[mm]	2 x h_{nom} [1)]						
		$s_{min,fi}$	[mm]	107						

[1)] At least the distances set out in Table C6 shall be observed.

Concrete Screw BSZ for masonry

Performances - Solid calcium silicate brick KS
Characteristic resistance under fire exposure

Annex C4

Deutsches Institut für Bautechnik DIBt

Table C8: Displacements under static or quasi-static loads

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Tension load									
Tension load	F_N	[kN]	1,00	0,89	1,40	1,17	1,23	1,09	1,29
Displacement	δ_{N0}	[mm]	0,02	0,04	0,04	0,04	0,03	0,02	0,01
	$\delta_{N\infty}$	[mm]	0,03	0,08	0,08	0,07	0,05	0,04	0,03
Shear load									
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	1,51	1,51	2,46	1,80	3,23	2,20	3,71
Displacement	$\delta_{V0,\parallel}$	[mm]	0,93	0,09	1,51	0,52	1,00	0,22	0,98
	$\delta_{V\infty,\parallel}$	[mm]	1,40	0,13	2,26	0,78	1,50	0,33	1,46
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,94						
Displacement	$\delta_{V0,\perp}$	[mm]	0,22	0,22		0,03		0,03	0,02
	$\delta_{V\infty,\perp}$	[mm]	0,33	0,33		0,05		0,05	0,03

Concrete Screw BSZ for masonry

Performances - Solid calcium silicate brick KS
Displacement

Annex C5

Brick type: Silka XL solid calcium silicate brick KS 12DF

Table C9: Description

Brick type			**Silka XL solid calcium silicate brick KS 12DF**
Density	ρ	[kg/dm³]	≥ 1,8
Normalised mean compressive strength	f_{mean}	[N/mm²]	≥ 14
Format		[-]	KS -R (P) 20 – 2,0 – 12 DF
Brick dimensions		[mm]	≥ 498 x 175 x 248
Norm			EN 771-2:2011+A1:2015
Minimum wall thickness	h_{min}	[mm]	175

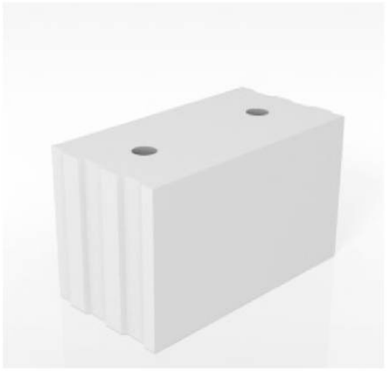


Table C10: Minimum edge distance, spacing, group factors, installation torque

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Minimum edge distance	c_{min}	[mm]	80						
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,65	1,65	1,75	1,40	1,40	1,60	1,30
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,30	1,30	1,80	1,25	1,25	1,40	1,25
	$\alpha_{g,V,II}$	[-]	2,00	2,00	1,65	2,00	1,65	1,40	1,40
	$\alpha_{g,V,\perp}$	[-]	2,00	2,00	1,45	2,00	1,10	1,40	1,05
Installation torque with									
Manual installation	max. T_{inst}	[Nm]	6	10		25		45	
Rotary screwdriver	max. T_{inst}	[Nm]	8	10	No performance assessed				
Tangential impact screwdriver [1)]	$T_{imp,max}$	[Nm]	No performance assessed		185	300			

[1)] maximum power output $T_{imp,max}$ according to manufacturer´s specifications

Table C11: Reduction factors depending on the distance to joints

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 40						
	$c_{j\parallel}$	[mm]	≥ 80						
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)						
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$	[mm]							

[1] If the specified distances are not observed, the screw must not be used

Table C12: Characteristic resistances

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 14,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,3	2,3	4,1	6,3	6,3	6,4	6,7
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,2	3,2	9,7	3,2	9,7	17,4	17,4
	$V_{Rk,\perp}$	[kN]	3,6	3,6	8,3	3,6	7,5	5,9	9,8
Compressive strength	f_{mean}	[N/mm²]	≥ 15,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,4	2,4	4,3	6,5	6,5	6,6	6,9
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,3	3,3	10,1	3,3	10,1	18,0	18,0
	$V_{Rk,\perp}$	[kN]	3,7	3,7	8,6	3,7	7,8	6,1	10,1
Compressive strength	f_{mean}	[N/mm²]	≥ 20,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	2,8	2,8	4,9	7,5	7,5	7,6	8,0
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	11,7	3,8	11,7	20,8	20,8
	$V_{Rk,\perp}$	[kN]	4,3	4,3	9,9	4,3	9,0	7,0	11,7

Concrete Screw BSZ for masonry

Performances - Silka XL solid calcium silicate brick KS 12DF
Reduction factors depending on the distance to joints / Characteristic resistances

Annex C7

Deutsches Institut für Bautechnik DIBt

Table C13: Characteristic resistance **under fire exposure**

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Steel failure (tension and shear load)										
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	1,1	1,5	1,5	1,3	1,3	3,4	3,4
	R60		[kN]	0,8	1,1	1,1	1,0	1,0	2,7	2,7
	R90		[kN]	0,5	0,6	0,6	0,6	0,6	2,0	2,0
	R120		[kN]	0,3	0,4	0,4	0,5	0,5	1,7	1,7
Steel failure with lever arm										
Steel failure with lever arm	R30	$M^0_{Rk,s,fi}$	[Nm]	0,8	1,2	1,2	1,5	1,5	4,9	4,9
	R60		[Nm]	0,5	0,9	0,9	1,1	1,1	4,0	4,0
	R90		[Nm]	0,3	0,5	0,5	0,8	0,8	3,0	3,0
	R120		[Nm]	0,2	0,3	0,3	0,6	0,6	2,5	2,5
Pull-out failure										
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	1,1	0,4	0,72	1,3	1,3	3,4	3,4
	R60		[kN]	0,8	0,4	0,72	1,0	1,0	2,7	2,7
	R90		[kN]	0,5	0,4	0,72	0,6	0,6	2,0	2,0
	R120		[kN]	0,3	0,32	0,57	0,5	0,5	1,7	1,7
Breakout failure										
Characteristic resistance	R30	$N_{Rk,b,fi}$	[kN]	1,1	0,28	0,79	1,3	1,3	3,4	3,4
	R60		[kN]	0,8	0,28	0,79	1,0	1,0	2,7	2,7
	R90		[kN]	0,5	0,28	0,79	0,6	0,6	2,0	2,0
	R120		[kN]	0,3	0,23	0,63	0,5	0,5	1,7	1,7
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi,II}$	[mm]	120						
		$c_{j,fi,\perp}$	[mm]	35						
		$s_{cr,fi}$	[mm]	4 x h_{nom}						

Table C14: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Characteristic resistance under fire exposure										
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$ = $N^g_{Rk,b,fi}$ = $N^g_{Rk,p,fi}$	[kN]	0,09 · $N^g_{Rk,b}$	0,09 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,18 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,24 · $N^g_{Rk,b}$
	R120		[kN]	0,08 · $N^g_{Rk,b}$	0,08 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,10 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,19 · $N^g_{Rk,b}$
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi}$	[mm]	2 x h_{nom} [1)]						
		$s_{min,fi}$	[mm]	107						

[1)] At least the distances set out in Table 13 shall be observed

Concrete Screw BSZ for masonry

Performances - Silka XL solid calcium silicate brick KS 12DF
Characteristic resistance under fire exposure

Annex C8

Deutsches Institut für Bautechnik DIBt

Table C15: Displacements under static or quasi-static loads

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Tension load									
Tension load	F_N	[kN]	0,66	0,66	1,17	1,80	1,80	1,83	1,91
Displacement	δ_{N0}	[mm]	0,02	0,02	0,04	0,01	0,01	0,01	0,02
	$\delta_{N\infty}$	[mm]	0,04	0,04	0,08	0,02	0,02	0,02	0,05
Shear load									
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	0,91	0,91	2,77	0,91	2,77	4,97	4,97
Displacement	$\delta_{V0,\parallel}$	[mm]	0,98	0,98	3,00	0,98	3,00	2,95	2,95
	$\delta_{V\infty,\parallel}$	[mm]	1,47	1,47	4,50	1,47	4,50	4,42	4,42
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	1,03	1,03	2,37	1,03	2,14	1,69	2,80
Displacement	$\delta_{V0,\perp}$	[mm]	0,42	0,42	0,03	0,42	1,00	0,05	0,44
	$\delta_{V\infty,\perp}$	[mm]	0,63	0,63	0,05	0,63	1,50	0,08	0,66

Concrete Screw BSZ for masonry

Performances - Silka XL solid calcium silicate brick KS 12DF
Displacement

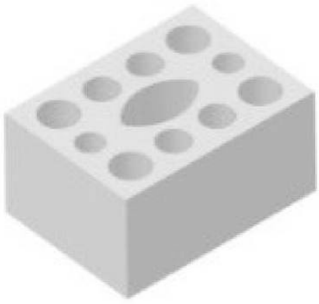
Annex C9

Deutsches Institut für Bautechnik DIBt

Brick type: Perforated calcium silicate brick KSL 3DF

Table C16: Description

Brick type			Perforated calcium silicate brick KSL 3DF
Density	ρ	[kg/dm³]	≥ 1,5
Normalised mean compressive strength	f_{mean}	[N/mm²]	≥ 17
Format		[-]	SWKV KSL 12 – 1,6 – 3 DF
Brick dimensions		[mm]	≥ 240 x 175 x 113
Norm		[-]	EN 771-2:2011+A1:2015
Minimum wall thickness	h_{min}	[mm]	175



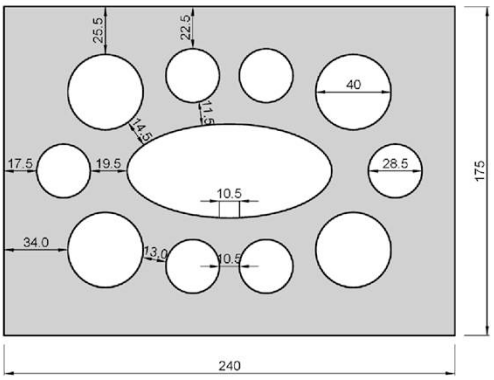


Table C17: Minimum edge distance, spacing, group factors, installation torque

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Minimum edge distance	c_{min}	[mm]	58						
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	2,00	2,00	2,00	1,55	1,55	1,95	1,80
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	2,00	2,00	2,00	1,55	1,55	1,45	1,70
	$\alpha_{g,V,II}$	[-]	2,00	2,00	2,00	2,00	2,00	2,00	2,00
	$\alpha_{g,V,\perp}$	[-]	2,00	1,80	1,80	1,80	1,80	1,30	1,30
Installation torque with									
Manual installation	max. T_{inst}	[Nm]	3	4		9			
Rotary screwdriver	max. T_{inst}	[Nm]	9	11		no performance assessed			
Tangential impact screwdriver [1)]	$T_{imp,max}$	[Nm]	no performance assessed		100	200			

[1)] with maximum power output $T_{imp,max}$ according to manufacturer´s specifications

Concrete Screw BSZ for masonry

Performances - Perforated calcium silicate brick KSL 3DF
Description / Minimum edge distance, spacing, group factors, installation torque

Annex C10

Table C18: Reduction factors depending on the distance to joints

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 35						
	$c_{j\parallel}$	[mm]	≥ 58						
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)						
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$	[mm]							

[1] If the specified distances are not observed, the screw must not be used

Table C19: Characteristic resistances

Screw size			**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 17,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,1	1,1	1,1	1,6	1,6	2,2	2,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,4	3,4	3,4	3,4	3,4	3,4	3,4
	$V_{Rk,\perp}$	[kN]	1,6	1,6	1,6	1,6	1,6	2,2	2,2
Compressive strength	f_{mean}	[N/mm²]	≥ 20,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,3	1,3	1,3	1,9	1,9	2,5	2,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	3,8	3,8	3,8	3,9	3,9
	$V_{Rk,\perp}$	[kN]	1,8	1,8	1,8	1,8	1,8	2,5	2,5
Compressive strength	f_{mean}	[N/mm²]	≥ 25,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,5	1,5	1,5	2,2	2,2	3,0	3,0
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	4,5	4,5	4,5	4,5	4,5	4,6	4,6
	$V_{Rk,\perp}$	[kN]	2,1	2,1	2,1	2,1	2,1	2,9	2,9
Interaction	X	[-]	1,0						

Concrete Screw BSZ for masonry

Performances - Perforated calcium silicate brick KSL 3DF
Reduction factors depending on the distance to joints / Characteristic resistances

Annex C11

Deutsches Institut für Bautechnik DIBt

Table C20: Characteristic resistance **under fire exposure**

Screw size				**BSZ 5**	**BSZ 6**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55
Steel failure (tension and shear load)						
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	0,7	1,0	1,0
	R60		[kN]	0,6	0,8	0,8
	R90		[kN]	0,4	0,5	0,5
	R120		[kN]	0,3	0,4	0,4
Steel failure <u>with</u> lever arm						
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,5	0,8	0,8
	R60		[Nm]	0,4	0,6	0,6
	R90		[Nm]	0,2	0,4	0,4
	R120		[Nm]	0,2	0,3	0,3
Pull-out failure						
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	0,7	0,6	0,6
	R60		[kN]	0,6	0,4	0,4
	R90		[kN]	0,4	0,3	0,3
	R120		[kN]	0,3	0,2	0,2
Breakout failure						
Characteristic resistance	R30	$N_{Rk,b,fi}$	[kN]	0,7	0,6	0,6
	R60		[kN]	0,6	0,4	0,4
	R90		[kN]	0,4	0,3	0,3
	R120		[kN]	0,3	0,2	0,2
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi,II}$	[mm]	101		
		$c_{j,fi,\perp}$	[mm]	56		
		$s_{cr,fi}$	[mm]	4 x h_{nom}		

Table C21: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ 5**	**BSZ 6**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55
Characteristic resistance under fire exposure						
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$ = $N^g_{Rk,b,fi}$	[kN]	0,09 · $N^g_{Rk,b}$	0,09 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$
	R120	= $N^g_{Rk,p,fi}$	[kN]	0,08 · $N^g_{Rk,b}$	0,08 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi}$	[mm]	2 x h_{nom} [1]		
		$s_{min,fi}$	[mm]	107		

[1] At least the distances set out in Table C20 shall be observed

Concrete Screw BSZ for masonry

Performances - Perforated calcium silicate brick KSL 3DF
Characteristic resistance under fire exposure

Annex C12

Deutsches Institut für Bautechnik DIBt

Table C22: Displacements under static or quasi-static loads

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Tension load									
Tension load	F_N	[kN]	0,31	0,31	0,31	0,46	0,46	0,63	0,63
Displacement	δ_{N0}	[mm]	0,01	0,01	0,01	0,01	0,01	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02
Shear load									
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	0,97						
Displacement	$\delta_{V0,\parallel}$	[mm]	0,80	0,80	0,80	0,80	0,80	1,42	1,42
	$\delta_{V\infty,\parallel}$	[mm]	1,19	1,19	1,19	1,19	1,19	2,12	2,12
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,46	0,46	0,46	0,46	0,46	0,63	0,63
Displacement	$\delta_{V0,\perp}$	[mm]	0,01	0,01	0,01	0,01	0,01	0,01	0,01
	$\delta_{V\infty,\perp}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,02	0,02

Concrete Screw BSZ for masonry

Performances - Perforated calcium silicate brick KSL 3DF
Displacement

Annex C13

Brick type: Solid clay brick MZ

Table C23: Description

Brick type			Solid clay brick MZ
Density	ρ	[kg/dm³]	≥ 2,1
Normalised mean compressive strength	f_{mean}	[N/mm²]	≥ 21,0
Format		[-]	MZ 20 – 2,0 - NF
Brick dimensions		[mm]	≥ 240 x 115 x 71
Norm		[-]	EN 771-1:2011+A1:2015
Minimum wall thickness	h_{min}	[mm]	240

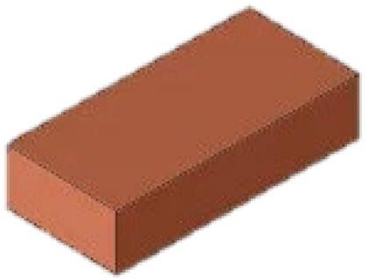


Table C24: Minimum edge distance, spacing, group factors, installation torque

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Minimum edge distance	c_{min}	[mm]	80						
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80						
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,60	1,60	1,60	1,00	1,00	1,70	1,10
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,75	1,75	1,75	1,15	1,15	1,45	1,40
	$\alpha_{g,V,II}$	[-]	1,45	1,45	1,45	1,45	1,45	2,00	1,05
	$\alpha_{g,V,\perp}$	[-]	1,20	1,20	1,20	1,20	1,20	1,50	1,15
Installation torque with									
Manual installation	max. T_{inst}	[Nm]	2	3		16		23	
Rotary screwdriver	max. T_{inst}	[Nm]	4	9		14		no performance assessed	
Tangential impact screw driver[1)]	$T_{imp,max}$	[Nm]	no performance assessed					185	

[1)] maximum power output $T_{imp,max}$ according to manufacturer´s specifications

Concrete Screw BSZ for masonry

Performances - Solid clay brick MZ
Description / Minimum edge distance, spacing, group factors, installation torque

Annex C14

Table C25: Reduction factors depending on the distance to joints

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 35						
	$c_{j\parallel}$	[mm]	≥ 80						
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)						
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$	[mm]							

[1] If the specified distances are not observed, the screw must not be used

Table C26: Characteristic resistances

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 21,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,6	1,6	1,6	2,3	2,3	3,1	3,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,6	8,1
	$V_{Rk,\perp}$	[kN]	2,1	2,1	2,1	2,1	2,1	2,1	2,7
Compressive strength	f_{mean}	[N/mm²]	≥ 25,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,7	1,7	1,7	2,5	2,5	3,4	3,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,7	2,7	2,7	2,7	2,7	2,8	8,9
	$V_{Rk,\perp}$	[kN]	2,3	2,3	2,3	2,3	2,3	2,3	3,0
Compressive strength	f_{mean}	[N/mm²]	≥ 30,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,9	1,9	1,9	2,8	2,8	3,7	3,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,9	2,9	2,9	2,9	2,9	3,1	9,7
	$V_{Rk,\perp}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,5	3,2
Compressive strength	f_{mean}	[N/mm²]	≥ 31,0						
Characteristic resistance to tension load	N_{Rk}	[kN]	1,9	1,9	1,9	2,8	2,8	3,8	3,9
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,0	3,0	3,0	3,0	3,0	3,2	9,9
	$V_{Rk,\perp}$	[kN]	2,5	2,5	2,5	2,5	2,5	2,6	3,3

Concrete Screw BSZ for masonry

Performance -- Solid clay brick MZ
Reduction factors depending on the distance to joints / Characteristic resistances

Annex C15

Table C27: Characteristic resistance **under fire exposure**

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Steel failure (tension and shear load)										
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	1,1	1,3	1,3	1,3	1,3	1,7	1,7
	R60		[kN]	0,8	1,0	1,0	1,0	1,0	1,6	1,6
	R90		[kN]	0,5	0,6	0,6	0,6	0,6	1,6	1,6
	R120		[kN]	0,3	0,5	0,5	0,5	0,5	1,5	1,5
Steel failure <u>with</u> lever arm										
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,8	1,1	1,1	1,5	1,5	2,5	2,5
	R60		[Nm]	0,5	0,8	0,8	1,1	1,1	2,4	2,4
	R90		[Nm]	0,3	0,5	0,5	0,8	0,8	2,3	2,3
	R120		[Nm]	0,2	0,4	0,4	0,6	0,6	2,2	2,2
Pull-out failure and breakout failure										
Characteristic resistance	R30	$N_{Rk,p,fi}$ = $N_{Rk,b,fi}$	[kN]	1,1	1,3	1,3	1,3	1,3	1,7	1,7
	R60		[kN]	0,8	1,0	1,0	1,0	1,0	1,6	1,6
	R90		[kN]	0,5	0,6	0,6	0,6	0,6	1,6	1,6
	R120		[kN]	0,3	0,5	0,5	0,5	0,5	1,5	1,5
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi,II}$	[mm]	120						
		$c_{j,fi,\perp}$	[mm]	35						
		$s_{cr,fi}$	[mm]	4 x h_{nom}						

Table C28: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ 5**	**BSZ 6**		**BSZ 8**		**BSZ 10**	
Nominal embedment depth		h_{nom}	[mm]	35	35	55	45	65	55	75
Characteristic resistance under fire exposure										
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$ = $N^g_{Rk,b,fi}$ = $N^g_{Rk,p,fi}$	[kN]	0,09 · $N^g_{Rk,b}$	0,09 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,18 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,24 · $N^g_{Rk,b}$
	R120		[kN]	0,08 · $N^g_{Rk,b}$	0,08 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,10 · $N^g_{Rk,b}$	0,15 · $N^g_{Rk,b}$	0,12 · $N^g_{Rk,b}$	0,19 · $N^g_{Rk,b}$
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi}$ = $c_{j,fi}$	[mm]	2 x h_{nom} [1)]						
		$s_{min,fi}$	[mm]	107						

[1)] At least the distances set out in Table C27 shall be observed

Concrete Screw BSZ for masonry

Performances - Solid clay brick MZ
Characteristic resistance under fire exposure

Annex C16

Deutsches Institut für Bautechnik DIBt

Table C29: Displacements under static or quasi-static loads

Screw size			BSZ 5	BSZ 6		BSZ 8		BSZ 10	
Nominal embedment depth	h_{nom}	[mm]	35	35	55	45	65	55	75
Tension load									
Tension load	F_N	[kN]	0,46	0,46	0,46	0,66	0,66	0,89	0,91
Displacement	δ_{N0}	[mm]	0,01	0,01	0,01	0,01	0,01	0,03	0,02
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02	0,02	0,02	0,05	0,05
Shear load									
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	0,71	0,71	0,71	0,71	0,71	0,74	2,31
Displacement	$\delta_{V0,\parallel}$	[mm]	1,08	1,08	1,08	1,08	1,08	0,04	2,24
	$\delta_{V\infty,\parallel}$	[mm]	1,61	1,61	1,61	1,61	1,61	0,07	3,36
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,60	0,60	0,60	0,60	0,60	0,60	0,77
Displacement	$\delta_{V0,\perp}$	[mm]	1,13	1,13	1,13	1,13	1,13	0,03	0,34
	$\delta_{V\infty,\perp}$	[mm]	1,69	1,69	1,69	1,69	1,69	0,04	0,51

Concrete Screw BSZ for masonry

Performances - Solid clay brick MZ
Displacement

Annex C17

Brick type: Solid light concrete brick VBL

Table C30: Description

Brick type			**Solid light concrete brick VBL**
Density	ρ	[kg/dm³]	≥ 1,5
Normalised mean compressive strength	f_{mean}	[N/mm²]	≥ 4,0
Format		[-]	VBL 4 – 1,0 – 2DF
Brick dimensions		[mm]	≥ 240 x 115 x 113
Norm		[-]	EN 771-3:2011+A1:2015
Minimum wall thickness	h_{min}	[mm]	240
Installation		[-]	dry masonry

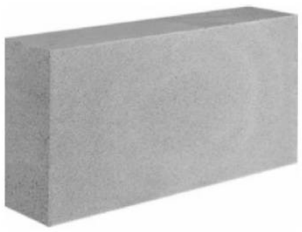


Table C31: Minimum edge distance, spacing, group factors, installation torque

Screw size			**BSZ 8**	**BSZ 10**
Nominal embedment depth	h_{nom}	[mm]	65	75
Minimum edge distance	c_{min}	[mm]	80	
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80	
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,45	1,45
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,35	1,35
	$\alpha_{g,V,II}$	[-]	0,90	0,90
	$\alpha_{g,V,\perp}$	[-]	0,75	0,75
Installation torque with				
Manual installation	max. T_{inst}	[Nm]	6	5
Rotary screwdriver	$T_{imp,max}$	[Nm]	10	14

Concrete Screw BSZ for masonry

Performances - Solid light concrete brick VBL
Description / Minimum edge distance, spacing, group factors, installation torque

Annex C18

Table C32: Reduction factors depending on the distance to joints

Screw size			**BSZ 8**	**BSZ 10**
Nominal embedment depth	h_{nom}	[mm]	65	75
Distance to joints[1)]	$c_{j\perp}$	[mm]	≥ 35	
	$c_{j\parallel}$	[mm]	≥ 80	
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)	
	$\alpha_{j,V\parallel} = \alpha_{j,V\perp}$	[mm]		

[1)] If the specified distances are not observed, the screw must not be used

Table C33: Characteristic resistances

Screw size			**BSZ 8**	**BSZ 10**
Nominal embedment depth	h_{nom}	[mm]	65	75
Compressive strength	f_{mean}	[N/mm²]	≥ 4,0	
Characteristic resistance to tension load	N_{Rk}	[kN]	0,6	1,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	4,0	5,1
	$V_{Rk,\perp}$	[kN]	2,3	3,3
Compressive strength	f_{mean}	[N/mm²]	≥ 5,0	
Characteristic resistance to tension load	N_{Rk}	[kN]	0,7	1,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	4,4	5,7
	$V_{Rk,\perp}$	[kN]	2,6	3,7

Concrete Screw BSZ for masonry

Performances - Solid light concrete brick VBL
Reduction factors depending on the distance to joints / Characteristic resistances

Annex C19

Deutsches Institut für Bautechnik DIBt

Table C34: Displacements under static or quasi-static loads

Screw size			BSZ 8	BSZ 10
Nominal embedment depth	h_{nom}	[mm]	65	75
Tension load	F_N	[kN]	0,17	0,34
Tension load	δ_{N0}	[mm]	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02
Shear load				
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	1,14	1,46
Displacement	$\delta_{V0,\parallel}$	[mm]	1,94	2,11
	$\delta_{V\infty,\parallel}$	[mm]	2,92	3,16
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,66	0,94
Displacement	$\delta_{V0,\perp}$	[mm]	0,36	1,92
	$\delta_{V\infty,\perp}$	[mm]	0,54	2,89

Concrete Screw BSZ for masonry

Performances - Solid light concrete brick VBL
Displacement

Annex C20