Deutsches Institut für Bautechnik

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

European Technical Assessment Body for construction products

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European Technical Assessment ETA-25/0854 of 25 September 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 BSZ2 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 Herstellwerk 5, D
This European Technical Assessment contains	30 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

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Specific Part

1 Technical description of the product

The Concrete Screw BSZ2 for masonry is an anchor in size 6, 8 and 10 mm made of stainless 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 characterised by mechanical interlock in the special thread.

Product and product description are 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 B5, C3, C7, C11, C15 $\alpha_{j,N}$ see Annex C3, C7, C11, C15
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 B5, C3, C7, C11, C15 $\alpha_{j,VII}$, $\alpha_{j,V\perp}$ see Annex C3, C7, C11, C15
Characteristic resistance to brick breakout failure of a screw anchor group under tension loading	N^g_{Rk} see Annex B5 $\alpha_{g,N}$ see Annex B5, C2, C6, C10, C14
Characteristic resistance to local brick failure and brick edge failure of a screw anchor group under shear loading	$V^g_{Rk,II}$, $V^g_{Rk,\perp}$ see Annex B5 $\alpha_{g,VII}$, $\alpha_{g,V\perp}$ see Annex B5, C2, C6, C10, C14

Essential characteristic	Performance
Edge distances, joint distances, spacing, member thickness	c_{cr}, s_{crII}, $s_{cr\perp}$ see Annex B5, C3, C7, C11, C15 c_{jII}, $c_{j\perp}$, see Annex B5 c_{min}, s_{minII}, $s_{min\perp}$ see Annex B5, C2, C6, C10, C14 h_{min} see Annex C2, C6, C10, C14
Resistance to combined tension and shear loading (hollow and perforated bricks)	No performance assessed
Displacements	δ_{N0}, $\delta_{N\infty}$, δ_{V0}, $\delta_{V\infty}$ see Annex C4, C8, C12, C16

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 C5, C9, C13, C17 $N^g_{Rk,fi}$, $s_{min,fi}$, $c_{min,fi}$, $c_{j,fi}$ see Annex C5, C9, C13, C17

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 25 September 2025 by Deutsches Institut für Bautechnik

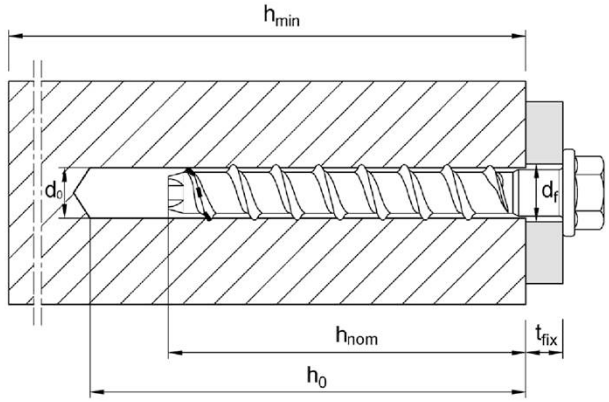
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Aksünger

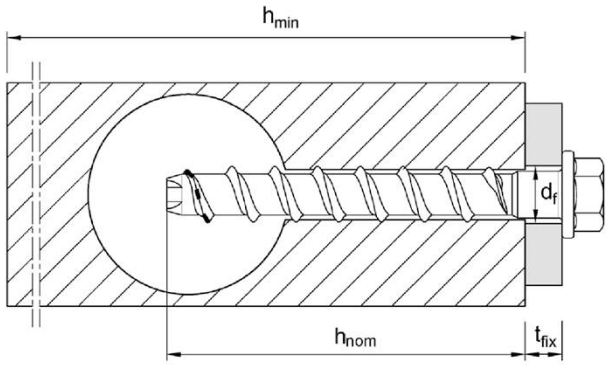
Deutsches Institut für Bautechnik DIBt

Concrete Screw BSZ2
Product and Installation in solid and hollow brick

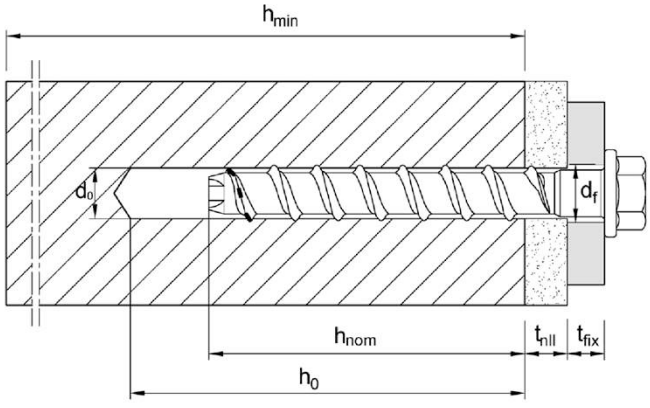
Installation in solid brick



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 BSZ2 for masonry

Product description
Product and installation condition

Annex A1

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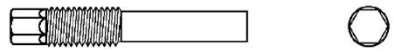
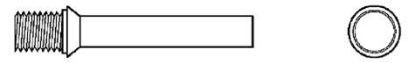
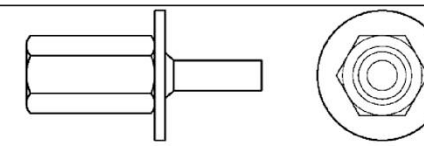
Table A1: Screw types

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 BSZ2 for masonry

Product description
Screw types

Annex A2

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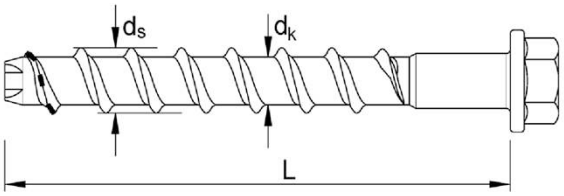
Table A2: Dimensions

Screw size			**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Length of the anchor	L ≤	[mm]	500		
Core diameter	d_k	[mm]	5,1	7,2	9,2
Outside diameter	d_s	[mm]	7,6	10,5	12,5



Marking e.g.: ◇ BSZ A4 10 100

or TSM A4 10 100

◇ BSZ Trade name
or (optional with manufacturer
TSM identification◇)

10 Screw size

100 Length of screw

Additional marking:

A4 Stainless steel

HCR High corrosion resistant steel

Table A3: Material

Screw version		**Stainless steel BSZ2 A4**	**High corrosion resistant steel BSZ2 HCR**
Material		1.4401, 1.404, 1.4571, 1.4578	1.4529
Characteristic yield strength	f_{yk}	560 N/mm²	
Characteristic ultimate strength	f_{uk}	700 N/mm²	
Fracture elongation	A_5	≤ 8%	

Concrete Screw BSZ2 for masonry

Product description
Dimensions, marking and materials

Annex A3

Specification of intended use

Concrete screw BSZ2	**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth h_{nom} [mm]	35	45	55
Anchorages subject to	Static and quasi-static loads (Tension-, Shear- or combined shear- and tension load or bending)		
	Fire exposure (For dry masonry only, all joints must be completely filled with mortar)		
Base material	Solid or hollow brick masonry, see Annex B2 Minimum thickness of member h_{min} see Annex C6, C10, C14, C18		
	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
- For all other conditions corresponding to corrosion resistance CRC according to EN 1993-1-4:2006+A1:2015:
  - stainless steel A4, according to Annex A3, with marking A4: CRC III
  - high corrosion resistant steel HCR, according to Annex A3, with marking HCR: CRC V
- 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, in internal exposure conditions.
- 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 BSZ2 for masonry	**Annex B1**
Intended Use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Overview of brick types and properties

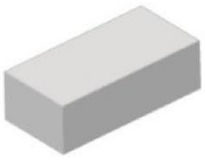
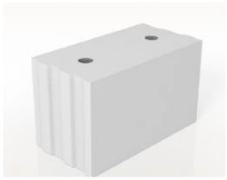
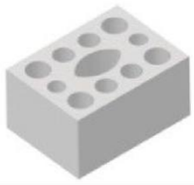
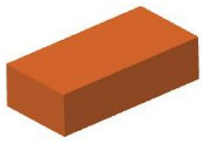
Designation	Picture	Dimension L x B x H [mm]	Mean compressive strength	Desity [kg/dm³]	Annex
Solid calcium silicate brick KS acc. to EN 771-2:2011+A1:2015					
KS 20 – 2,0 - NF		≥ 240 x 115 x 71	≥ 26,0	≥ 2,0	C2 – C5
Silka XL solid calcium silicate brick KS 12 DF acc. to EN 771-2:2011+A1:2015					
KS -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

Table B2: Installation parameters

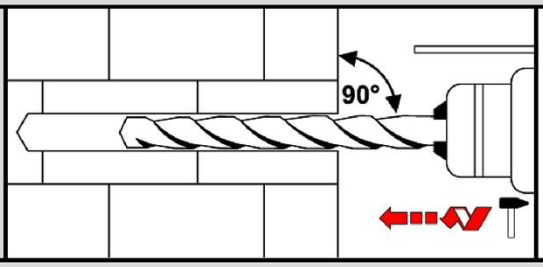
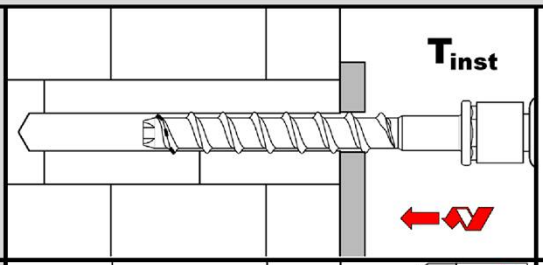
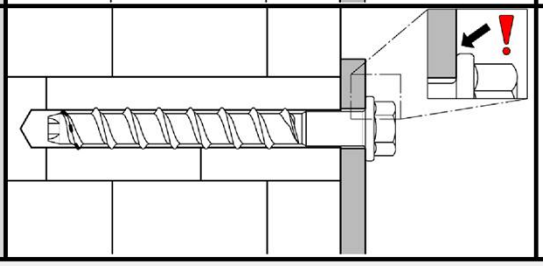
Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Nominal bit hole diameter	d_0	[mm]	6	8	10
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40	8,45	10,45
Depth of drill hole	$h_0 \geq$	[mm]	55	65	85
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	8	12	14

Concrete Screw BSZ2 for masonry

Intended Use
Overview of brick types and properties / Installation parameters

Annex B2

Installation instructions

Drill hole preparation		
1		Drill the hole perpendicular to the surface by hammer drilling or rotary drilling.
Installation Concrete Screw		
2		Screw in with a 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 – C17.
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 BSZ2 for masonry

Intended Use
Installation instruction

Annex B3

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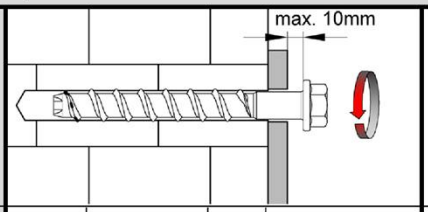
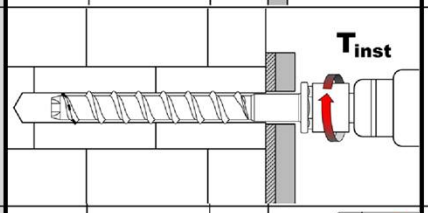
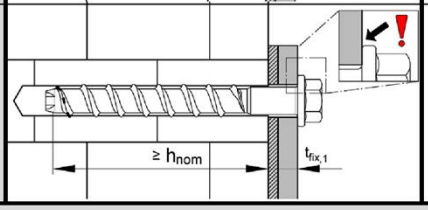
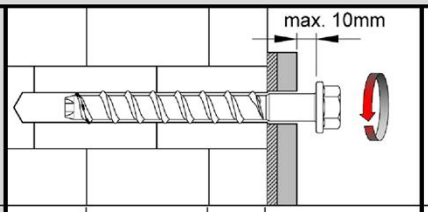
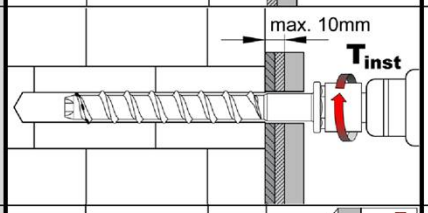
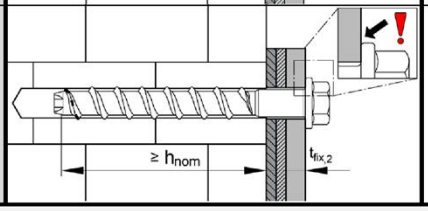
Installation instructions – Adjustment

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 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 BSZ2 for masonry	**Annex B4**
Intended Use Installation instruction - Adjustment	

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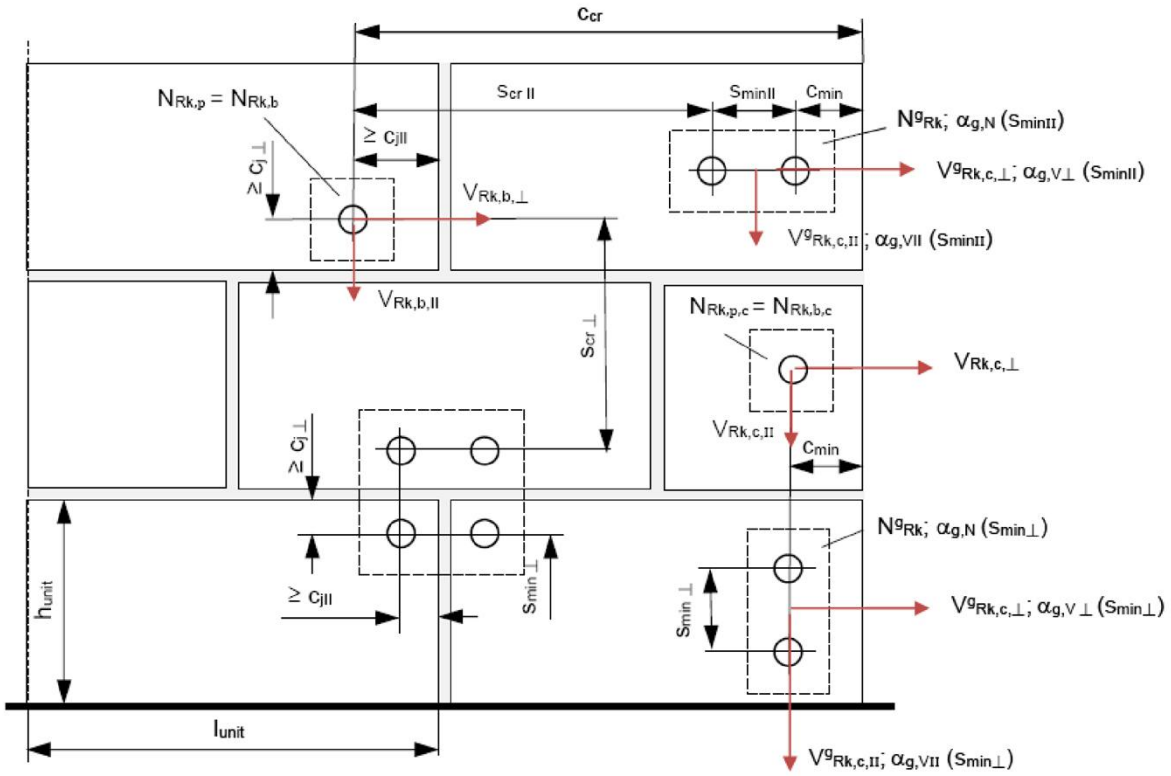
Possible installation positions (the distances and spacings must be observed)



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 = $1{,}5h_{nom}$
$s_{cr\parallel}$ = characteristic spacing parallel to the horizontal joint = $3{,}0h_{nom}$
$s_{cr\perp}$ = characteristic spacing perpendicular to the horizontal joint = $3{,}0h_{nom}$
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)

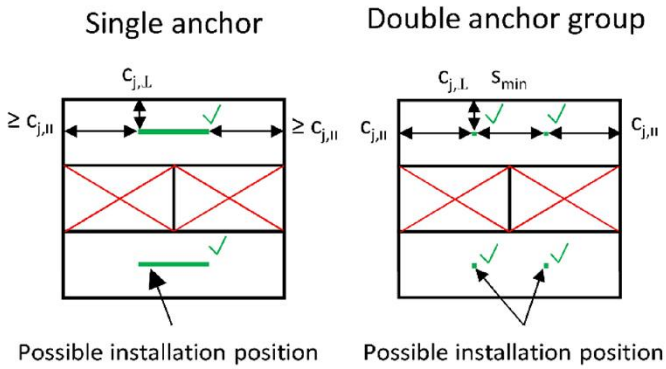
Concrete Screw BSZ2 for masonry

Intended Use
Possible installation positions

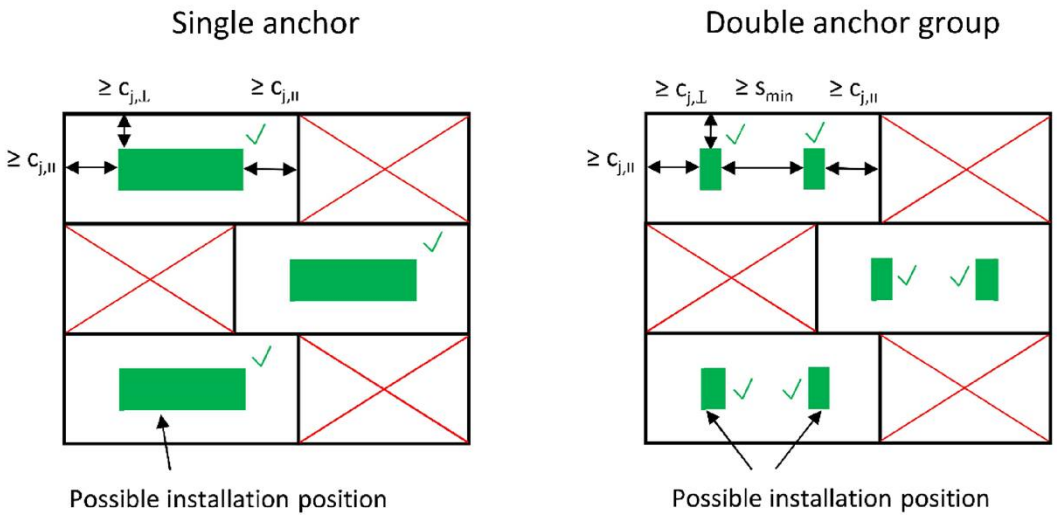
Annex B5

Installations parameter for installation in the reveal site

Positioning in reveal in brick types KS NF, MZ NF



Positioning in reveal in brick type KSL 3DF



Concrete Screw BSZ2 for masonry

Intended Use
Possible installation in reveal

Annex B6

Table C1: Characteristic steel resistance under tension and shear load

Screw size			**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Steel failure					
Tension load					
Characteristic resistance	$N_{Rk,s}$	[kN]	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]	7,0	13,5	34,0
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	10,9	26,0	56,0
Ductility factor	k_7	[-]	0,8		
Partial factor [1)]	$\gamma_{Ms,V}$	[-]	1,25		

[1)] In absence of national regulation

Concrete Screw BSZ2 for masonry

Performance
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
Mean compressive strength	f_{mean}	[N/mm²]	≥ 26,0
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

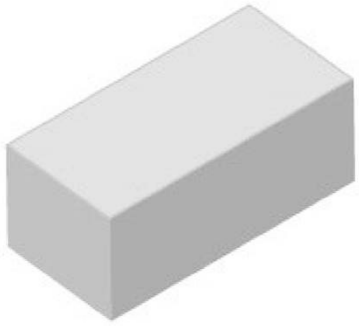


Table C3: Minimum edge distance, spacing, group factors, installation torque

Screw size			**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Minimum edge distance	c_{min}	[mm]	80		
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80		
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,80	1,15	1,20
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,50	1,15	1,65
	$\alpha_{g,V,II}$	[-]	1,55	1,55	1,05
	$\alpha_{g,V,\perp}$	[-]	1,50	1,75	1,75
Installation torque with					
Manual installation	max. $T_{inst.}$	[Nm]	11	24	41
Tangential impact screwdriver [1)]	$T_{imp,max}$	[Nm]	185	300	300

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

Concrete Screw BSZ2 for masonry

Performance – Solid calcium silicate brick KS
Description / Minimum edge distance, spacing, group factors, installation torque

Annex C2

Table C4: Reduction factors depending on the distance to joints

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 35		
	c_{jII}	[mm]	≥ 80		
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)		
	$\alpha_{j,VII} = \alpha_{j,V\perp}$	[mm]			

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

Table C5: Characteristic resistances [1]

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 26,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	2,5	4,1	4,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,3	5,3	7,7
	$V_{Rk,\perp}$	[kN]	2,8	2,1	2,1
Compressive strength	f_{mean}	[N/mm²]	≥ 30,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	2,7	4,4	4,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	5,7	5,7	8,3
	$V_{Rk,\perp}$	[kN]	3,0	2,3	2,3
Compressive strength	f_{mean}	[N/mm²]	≥ 35,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	3,0	4,8	5,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,1	6,1	8,9
	$V_{Rk,\perp}$	[kN]	3,2	2,5	2,5
Compressive strength	f_{mean}	[N/mm²]	≥ 38,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	3,1	5,0	5,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	6,4	6,4	9,3
	$V_{Rk,\perp}$	[kN]	3,4	2,6	2,6

[1] Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading and to local brick failure and brick edge failure of a single screw anchor under shear loading

Concrete Screw BSZ2 for masonry

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

Annex C3

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Table C6: Displacements under static or quasi-static loads

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Tension load					
Tension load	F_N	[kN]	0,60	1,10	1,10
Displacement	δ_{N0}	[mm]	0,01		
	$\delta_{N\infty}$	[mm]	0,02		
Shear load					
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	1,50	1,50	2,20
Displacement	$\delta_{V0,\parallel}$	[mm]	0,76	0,76	0,37
	$\delta_{V\infty,\parallel}$	[mm]	1,14	1,14	0,57
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,80	0,60	0,60
Displacement	$\delta_{V0,\perp}$	[mm]	0,57	0,31	0,01
	$\delta_{V\infty,\perp}$	[mm]	0,85	0,47	0,02

Concrete Screw BSZ2 for masonry

Performance – Solid calcium silicate brick KS
Displacement

Annex C4

Table C7: Characteristic resistance **under fire exposure**

Screw size				**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth		h_{nom}	[mm]	45	55	75
Steel failure (tension and shear load)						
Characteristic resistance	R30	$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	1,30	1,30	3,40
	R60		[kN]	1,00	1,00	2,70
	R90		[kN]	0,60	0,60	2,00
	R120		[kN]	0,50	0,50	1,70
Steel failure <u>with</u> lever arm						
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,10	1,50	4,90
	R60		[Nm]	0,80	1,10	4,00
	R90		[Nm]	0,50	0,80	3,00
	R120		[Nm]	0,40	0,60	2,50
Pull-out failure and breakout failure						
Characteristic resistance	R30	$N_{Rk,p,fi} = N_{Rk,b,fi}$	[kN]	1,30	1,30	3,40
	R60		[kN]	1,00	1,00	2,70
	R90		[kN]	0,60	0,60	2,00
	R120		[kN]	0,50	0,50	1,70
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 C8: Characteristic resistance **under fire exposure** for **anchor groups**

Screw size				**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth		h_{nom}	[mm]	45	55	75
Characteristic resistance under fire exposure						
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$	[kN]	0,12 · N^g_{Rk}	0,14 · N^g_{Rk}	0,24 · N^g_{Rk}
	R120		[kN]	0,10 · N^g_{Rk}	0,11 · N^g_{Rk}	0,19 · N^g_{Rk}
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi}$	[mm]	2 x h_{nom} [1)]		
		$s_{min,fi}$	[mm]	4 x h_{nom}		

[1)] At least the distances set out in Table C7 shall be observed.

Concrete Screw BSZ2 for masonry

Performance – Solid calcium silicate brick KS
Characteristic resistance under fire exposure

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
Mean compressive strength	f_{mean}	[N/mm²]	≥ 14,0
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

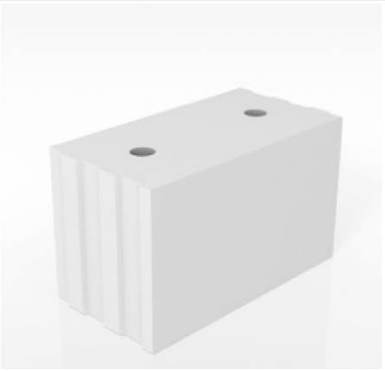

Table C10: Minimum edge distance, spacing, group factors, installation torque

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Minimum edge distance	c_{min}	[mm]	80		
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80		
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,30	1,80	1,40
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,65	1,55	1,60
	$\alpha_{g,V,II}$	[-]	2,00	2,00	1,90
	$\alpha_{g,V,\perp}$	[-]	2,00	2,00	1,40
Installation torque with					
Manual installation	max. T_{inst}	[Nm]	11	25	41
Rotary screwdriver	max. T_{inst}	[Nm]	10	No performance assessed	
Tangential impact screwdriver [1)]	$T_{imp,max}$	[Nm]	185	300	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			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 40		
	c_{jII}	[mm]	≥ 80		
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)		
	$\alpha_{j,VII} = \alpha_{j,V\perp}$	[mm]			

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

Table C12: Characteristic resistances [1]

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 14,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	2,3	7,1	6,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,2	3,2	12,8
	$V_{Rk,\perp}$	[kN]	3,6	3,6	5,9
Compressive strength	f_{mean}	[N/mm²]	≥ 15,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	2,4	7,4	6,9
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,3	3,3	13,3
	$V_{Rk,\perp}$	[kN]	3,7	3,7	6,1
Compressive strength	f_{mean}	[N/mm²]	≥ 20,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	2,8	8,5	8,0
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	15,3
	$V_{Rk,\perp}$	[kN]	4,3	4,3	7,0

[1] Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading and to local brick failure and brick edge failure of a single screw anchor under shear loading

Concrete Screw BSZ2 for masonry

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

Annex C7

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Table C13: Displacements under static or quasi-static loads

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Tension load					
Tension load	F_N	[kN]	0,70	2,20	1,80
Displacement	δ_{N0}	[mm]	0,01	0,02	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,04	0,02
Shear load					
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	0,90	0,90	3,70
Displacement	$\delta_{V0,\parallel}$	[mm]	0,37	0,37	1,70
	$\delta_{V\infty,\parallel}$	[mm]	0,55	0,55	2,55
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	1,00	1,00	1,70
Displacement	$\delta_{V0,\perp}$	[mm]	0,40	0,40	1,50
	$\delta_{V\infty,\perp}$	[mm]	0,60	0,60	2,25

Concrete Screw BSZ2 for masonry

Performance – Silka XL solid calcium silicate brick KS 12DF
Displacement

Annex C8

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Table C14: Characteristic resistance **under fire exposure**

Screw size				**BSZ2 6**
Nominal embedment depth		h_{nom}	[mm]	45
Steel failure (tension and shear load)				
Characteristic resistance	R30	$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	1,50
	R60		[kN]	1,10
	R90		[kN]	0,60
	R120		[kN]	0,40
Steel failure with lever arm				
Steel failure with lever arm	R30	$M^0_{Rk,s,fi}$	[Nm]	1,20
	R60		[Nm]	0,90
	R90		[Nm]	0,50
	R120		[Nm]	0,30
Pull-out failure				
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	0,40
	R60		[kN]	0,40
	R90		[kN]	0,40
	R120		[kN]	0,32
Breakout failure				
Characteristic resistance	R30	$N_{Rk,b,fi}$	[kN]	0,28
	R60		[kN]	0,28
	R90		[kN]	0,28
	R120		[kN]	0,23
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi,II}$	[mm]	120
		$c_{j,fi,\perp}$	[mm]	35
		$s_{min,fi}$	[mm]	4 x h_{nom}

Table C15: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ2 6**
Nominal embedment depth		h_{nom}	[mm]	45
Characteristic resistance under fire exposure				
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$	[kN]	$0,12 \cdot N^g_{Rk}$
	R120		[kN]	$0,10 \cdot N^g_{Rk}$
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi}$	[mm]	2 x h_{nom} [1]
		$s_{min,fi}$	[mm]	4 x h_{nom}

[1] At least the distances set out in Table 14 shall be observed

Concrete Screw BSZ2 for masonry

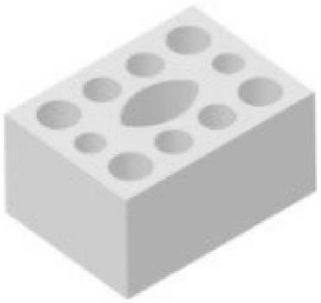
Performance – Silka XL solid calcium silicate brick KS 12DF
Characteristic resistance under fire exposure

Annex C9

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
Mean compressive strength	f_{mean}	[N/mm²]	≥ 17,0
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



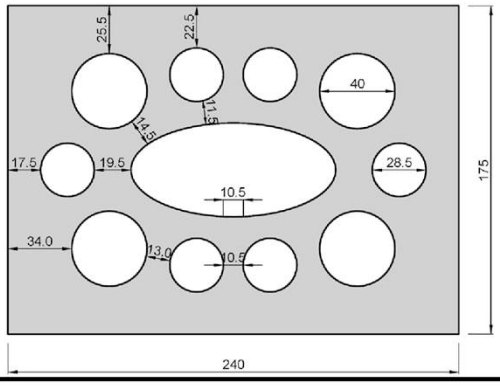


Table C17: Minimum edge distance, spacing, group factors, installation torque

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Minimum edge distance	c_{min}	[mm]	80		
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80		
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	2,00	1,55	1,45
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	2,00	1,55	1,95
	$\alpha_{g,V,II}$ ($s_{min,\perp}$) / ($s_{min,II}$)	[-]	2,00	2,00	2,00
	$\alpha_{g,V,\perp}$ ($s_{min,\perp}$) / ($s_{min,II}$)	[-]	1,80	1,80	1,30
Installation torque with					
Manual installation	max. T_{inst}	[Nm]	2	5	7
Rotary screwdriver	max. T_{inst}	[Nm]	8	9	9
Tangential impact screwdriver [1)]	$T_{imp,max}$	[Nm]	no performance assessed	200	200

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

Concrete Screw BSZ2 for masonry

Performance – 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			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Distance to joints [1]	$c_{j\perp}$	[mm]	≥ 35		
	c_{jII}	[mm]	≥ 58		
Reduction factor	$\alpha_{j,N}$	[mm]	1 (full resistance)		
	$\alpha_{j,VII} = \alpha_{j,V\perp}$	[mm]			

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

Table C19: Characteristic resistances [1]

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 17,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	0,9	1,6	2,2
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,4	3,4	3,4
	$V_{Rk,\perp}$	[kN]	1,6	1,6	2,2
Compressive strength	f_{mean}	[N/mm²]	≥ 20,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	0,9	1,8	2,5
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,8	3,8	3,8
	$V_{Rk,\perp}$	[kN]	1,8	1,8	2,5
Compressive strength	f_{mean}	[N/mm²]	≥ 25,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	1,1	2,2	2,9
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	4,5	4,5	4,6
	$V_{Rk,\perp}$	[kN]	2,1	2,1	2,9
Interaction	X	[-]	1,0		

[1] Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading and to local brick failure and brick edge failure of a single screw anchor under shear loading

Concrete Screw BSZ2 for masonry

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

Annex C11

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Table C20: Displacements under static or quasi-static loads

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Tension load					
Tension load	F_N	[kN]	0,30	0,50	0,60
Displacement	δ_{N0}	[mm]	0,01	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02
Shear load					
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	1,0	1,0	1,0
Displacement	$\delta_{V0,\parallel}$	[mm]	0,68	0,68	0,29
	$\delta_{V\infty,\parallel}$	[mm]	1,02	1,02	0,43
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,50	0,50	0,60
Displacement	$\delta_{V0,\perp}$	[mm]	0,01	0,01	0,01
	$\delta_{V\infty,\perp}$	[mm]	0,01	0,01	0,01

Concrete Screw BSZ2 for masonry

Performance – Perforated calcium silicate brick KSL 3DF
Displacement

Annex C12

Table C21: Characteristic resistance **under fire exposure**

Screw size				**BSZ2 6**
Nominal embedment depth		h_{nom}	[mm]	45
Steel failure (tension and shear load)				
Characteristic resistance	R30	$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	1,00
	R60		[kN]	0,80
	R90		[kN]	0,50
	R120		[kN]	0,40
Steel failure with lever arm				
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,80
	R60		[Nm]	0,60
	R90		[Nm]	0,40
	R120		[Nm]	0,30
Pull-out failure and breakout failure				
Characteristic resistance	R30	$N_{Rk,p,fi} = N_{Rk,b,fi}$	[kN]	0,60
	R60		[kN]	0,40
	R90		[kN]	0,30
	R120		[kN]	0,20
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi,II}$	[mm]	101
		$c_{j,fi,\perp}$	[mm]	56
		$s_{min,fi}$	[mm]	4 x h_{nom}

Table C22: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ2 6**
Nominal embedment depth		h_{nom}	[mm]	45
Characteristic resistance under fire exposure				
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$	[kN]	0,12 · N^g_{Rk}
	R120		[kN]	0,10 · N^g_{Rk}
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi}$	[mm]	2 x h_{nom} [1)]
		$s_{min,fi}$	[mm]	4 x h_{nom}

[1)] At least the distances set out in Table C21 shall be observed

Concrete Screw BSZ2 for masonry

Performance – Perforated calcium silicate brick KSL 3DF
Characteristic resistance under fire exposure

Annex C13

Brick type: Solid clay brick MZ

Table C23: Description

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

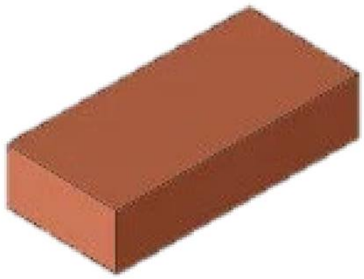

Table C24: Minimum edge distance, spacing, group factors, installation torque

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Minimum edge distance	c_{min}	[mm]	80		
Minimum spacing	$s_{min,II} = s_{min,\perp}$	[mm]	80		
Group factors	$\alpha_{g,N}$ ($s_{min,II}$)	[-]	1,75	1,15	1,45
	$\alpha_{g,N}$ ($s_{min,\perp}$)	[-]	1,60	1,00	1,70
	$\alpha_{g,V,II}$ ($s_{min,\perp}$) / ($s_{min,II}$)	[-]	1,45	1,45	2,00
	$\alpha_{g,V,\perp}$ ($s_{min,\perp}$) / ($s_{min,II}$)	[-]	1,70	1,70	1,50
Installation torque with					
Manual installation	max. T_{inst}	[Nm]	0,3	12	26
Rotary screwdriver	max. T_{inst}	[Nm]	6	10	no performance assessed
Tangential impact screw driver[1)]	$T_{imp,max}$	[Nm]	no performance assessed		155

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

Table C25: Reduction factors depending on the distance to joints

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	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 [1]

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Compressive strength	f_{mean}	[N/mm²]	≥ 21,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	1,4	2,2	2,8
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,5	2,5	2,6
	$V_{Rk,\perp}$	[kN]	1,9	1,9	2,1
Compressive strength	f_{mean}	[N/mm²]	≥ 25,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	1,6	2,4	3,1
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,7	2,7	2,8
	$V_{Rk,\perp}$	[kN]	2,0	2,0	2,3
Compressive strength	f_{mean}	[N/mm²]	≥ 30,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	1,7	2,7	3,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	2,9	2,9	3,1
	$V_{Rk,\perp}$	[kN]	2,2	2,2	2,5
Compressive strength	f_{mean}	[N/mm²]	≥ 31,0		
Characteristic resistance to tension load	N_{Rk}	[kN]	1,8	2,7	3,4
Characteristic resistance to shear load	$V_{Rk,II}$	[kN]	3,0	3,0	3,2
	$V_{Rk,\perp}$	[kN]	2,3	2,3	2,6

[1] Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading and to local brick failure and brick edge failure of a single screw anchor under shear loading

Concrete Screw BSZ2 for masonry

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

Annex C15

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Table C27: Displacements under static or quasi-static loads

Screw size			BSZ2 6	BSZ2 8	BSZ2 10
Nominal embedment depth	h_{nom}	[mm]	45	55	75
Tension load					
Tension load	F_N	[kN]	0,40	0,60	0,80
Displacement	δ_{N0}	[mm]	0,01	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02	0,02
Shear load					
Shear load parallel to the edge	$F_{V,\parallel}$	[kN]	0,70	0,70	0,70
Displacement	$\delta_{V0,\parallel}$	[mm]	0,14	0,14	0,13
	$\delta_{V\infty,\parallel}$	[mm]	0,22	0,22	0,20
Shear load perpendicular to the edge	$F_{V,\perp}$	[kN]	0,50	0,50	0,60
Displacement	$\delta_{V0,\perp}$	[mm]	0,34	0,34	0,33
	$\delta_{V\infty,\perp}$	[mm]	0,50	0,50	0,50

Concrete Screw BSZ2 for masonry

Performance – Solid clay brick MZ
Displacement

Annex C16

Table C28: Characteristic resistance **under fire exposure**

Screw size				**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth		h_{nom}	[mm]	45	55	75
Steel failure (tension and shear load)						
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	1,30	1,30	1,70
	R60		[kN]	1,00	1,00	1,60
	R90		[kN]	0,60	0,60	1,60
	R120		[kN]	0,50	0,50	1,50
Steel failure <u>with</u> lever arm						
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,10	1,50	2,50
	R60		[Nm]	0,80	1,10	2,40
	R90		[Nm]	0,50	0,80	2,30
	R120		[Nm]	0,40	0,60	2,20
Pull-out failure and breakout failure						
Characteristic resistance	R30	$N_{Rk,p,fi}$ = $N_{Rk,b,fi}$	[kN]	1,30	1,30	1,70
	R60		[kN]	1,00	1,00	1,60
	R90		[kN]	0,60	0,60	1,60
	R120		[kN]	0,50	0,50	1,50
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 C29: Characteristic resistance **under fire exposure** for anchor groups

Screw size				**BSZ2 6**	**BSZ2 8**	**BSZ2 10**
Nominal embedment depth		h_{nom}	[mm]	45	55	75
Characteristic resistance under fire exposure						
Characteristic Resistance (anchor groups)	R30 R60 R90	$N^g_{Rk,fi}$	[kN]	0,12 · N^g_{Rk}	0,14 · N^g_{Rk}	0,24 · N^g_{Rk}
	R120		[kN]	0,10 · N^g_{Rk}	0,11 · N^g_{Rk}	0,19 · N^g_{Rk}
Spacing-, edge- and joint distance	R30 - R120	$c_{min,fi} = c_{j,fi}$	[mm]	2 x h_{nom} [1)]		
		$s_{min,fi}$	[mm]	4 x h_{nom}		

[1)] At least the distances set out in Table C28 shall be observed

Concrete Screw BSZ2 for masonry

Performance – Solid clay brick MZ
Characteristic resistance under fire exposure

Annex C17