



...eine starke Verbindung

DECLARATION OF PERFORMANCE

DoP Nr.: MKT-721 - en

- ✧ **Unique identification code of product-type:** Concrete screw BSZ
- ✧ **Intended use/es:** Fasteners for use in concrete for redundant non-structural systems, see Annex B
- ✧ **Manufacturer:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
Auf dem Immel 2
67685 Weilerbach
- ✧ **System/s of AVCP:** 2+
- ✧ **European Assessment Document:** EAD 330747-00-0601
European Technical Assessment: ETA-16/0439, 07.08.2019
Technical Assessment Body: DIBt, Berlin
Notified body/ies: NB 1343 – MPA, Darmstadt

✧ **Declared performance/s:**

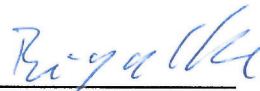
Essential characteristics	Performance
Safety in case of fire (BWR 2)	
Reaction to fire	Class A1
Resistance to fire	Annex C3
Safety in use (BWR 4)	
Characteristic resistance to tension load (static and quasi-static loading)	Annex C1
Characteristic resistance to shear load (static and quasi-static loading)	Annex C1
Characteristic resistance for all load directions and modes of failure for simplified design	Annex C2
Durability	Annex B1

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:



Stefan Weustenhagen
(General manager)
Weilerbach, 07.08.2019

p.p. 

Dipl.-Ing. Detlef Bigalke
(Head of product development)



The original of this declaration of performance was written in German. In the event of deviations in the translation, the German version shall be valid.

Specifications of Intended use

Concrete screw BSZ		BSZ 5	BSZ 6
Anchorage subject to	Redundant non-structural systems according to EN 1992-4:2018	✓	✓
	Static or quasi-static loads	✓	✓
	Fire exposure in solid concrete	-	✓
Base material	Cracked or uncracked concrete	✓	✓
	Compacted, reinforced or unreinforced concrete (without fibres) according to EN 206:2013	✓	✓
	Strength classes according to EN 206:2013: C20/25 to C50/60	✓	✓
	Precast pre-stressed hollow core slabs: C30/37 to C50/60	-	✓

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel)

Note: Particular aggressive conditions are e.g. permanent, alternation immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are 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 relative to reinforcement or to supports, etc.).
- Design method for anchorages acc. to EN 1992-4:2018 and EOTA Technical Report TR 055:
 - Anchorages in solid concrete: design method A
 - Anchorages in precast pre-stressed hollow core slabs: design method C
 - The design method for shear load also applies for the specified diameter d_f of the clearance hole in the fixture in Annex B2, Table B1.

Installation:

- Making of drill hole by hammer drilling or vacuum drill bit.
- Anchor installation carried out by appropriately qualified personal and under the responsibility of the person responsible for technical matters on site
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.

Concrete Screw BSZ

Intended use
Specifications

Annex B1

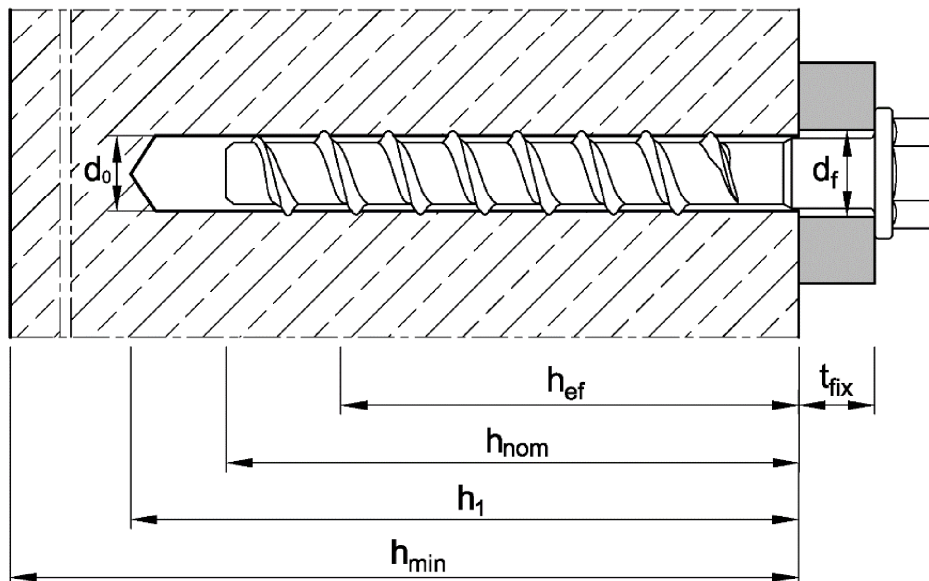
Table B1: Installation parameters

Anchor size			BSZ 5	BSZ 6	
Nominal embedment depth	h_{nom}	[mm]	35	35	55
Nominal drill bit diameter	d_0	[mm]	5	6	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,4	6,4	
Effective anchorage depth	h_{ef}	[mm]	27	27	44
Depth of drill hole	$h_1 \geq$	[mm]	40	40	60
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	8	
Max. Installation torque for screws with metric connection thread	$T_{inst} \leq$	[Nm]	8	10	
Tangential impact screw driver ¹⁾	$T_{imp,max}$	[Nm]	110	160	

¹⁾ Installation with tangential impact screw driver, with maximum power output $T_{imp,max}$ acc. to manufacturers instructions is possible

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing for anchorages in solid concrete

Anchor size			BSZ 5	BSZ 6	
Nominal embedment depth	h_{nom}	[mm]	35	35	55
Minimum thickness of member	h_{min}	[mm]	80	80	100
Minimum edge distance	c_{min}	[mm]	35	35	40
Minimum spacing	s_{min}	[mm]	35	35	40



Concrete Screw BSZ

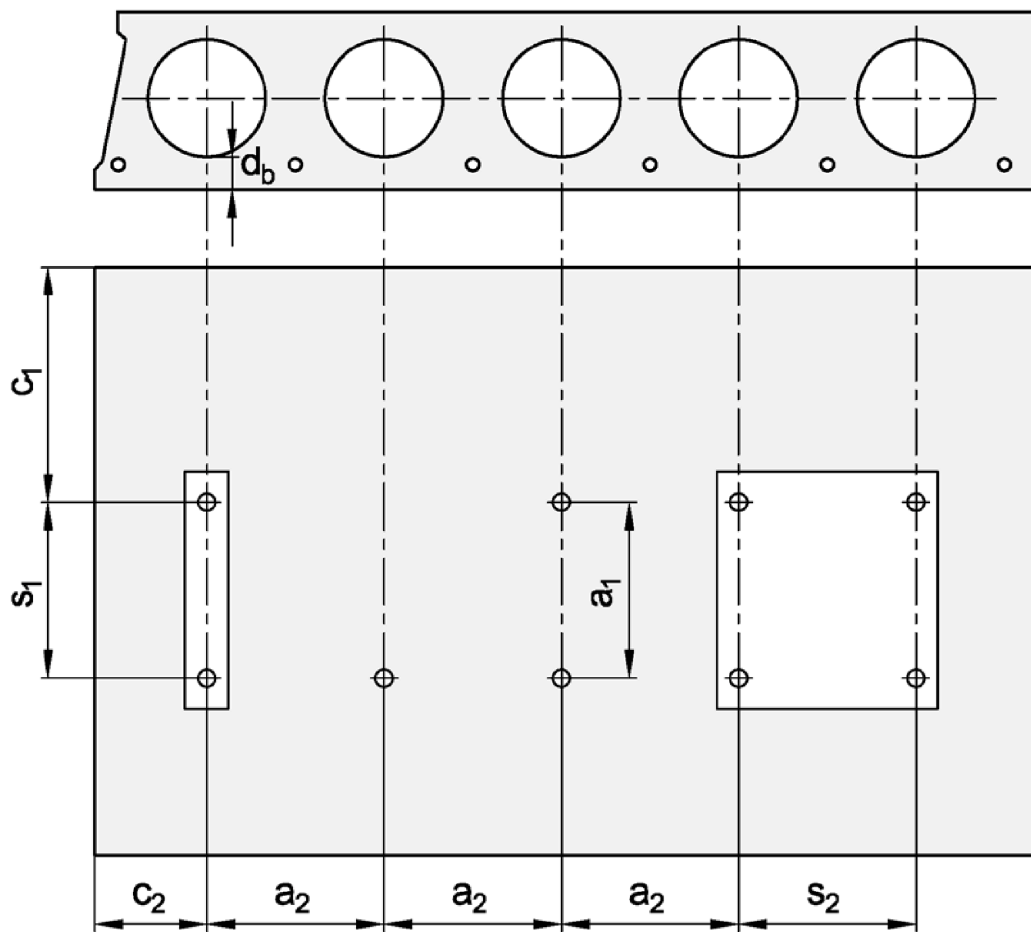
Intended use

Installation parameters
 Minimum thickness of concrete member, minimum spacing and edge distance (solid concrete)

Annex B2

Table B3: Minimum edge distances and minimum spacing for anchorages in precast pre-stressed hollow core slabs

Anchor size			BSZ 6		
Flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
Minimum edge distance	c_{min}	[mm]	≥ 100 mm		
Minimum spacing	s_{min}	[mm]	≥ 100 mm		
Minimum distance between anchor groups	a_{min}	[mm]	≥ 100 mm		



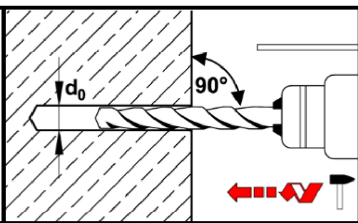
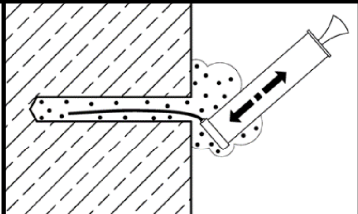
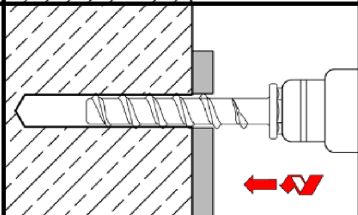
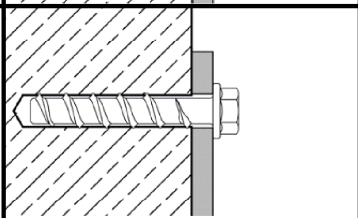
c_1, c_2 Edge distance
 s_1, s_2 Spacing
 a_1, a_2 Distance between anchor groups

Concrete Screw BSZ

Intended use
 Installation parameters (precast pre-stressed hollow core slabs)

Annex B3

Installation instructions for anchorages in solid concrete slabs

1		<p>Drill hole perpendicular to concrete surface. Using a suction drill, continue with step 3.</p>
2		<p>Blow out dust or alternatively vacuum clean down to the bottom of the hole.</p>
3		<p>Screw in concrete screw, e.g. with tangential impact screw driver or torque wrench.</p>
4		<p>After installation, the head of the anchor is supported on the fixture must be undamaged.</p>

Concrete Screw BSZ

Intended use
Installation instructions (solid concrete)

Annex B4

Installation instructions for anchorages in precast pre-stressed hollow core slabs

1		Search for position of pre-stressing steel.
2		Mark position and search for the next position of pre-stressed steel.
3		Mark second position of pre-stressed steel.
4		Drill hole taking into account the installation parameters and distances. Using a suction drill, continue with step 6.
5		Blow out dust or alternatively vacuum drill hole.
6		Screw in concrete screw, e.g. with tangential impact screw driver or torque wrench.
7		After installation, the head of the anchor is supported on the fixture and must be undamaged.

Concrete Screw BSZ

Intended use

Installation instructions (precast pre-stressed hollow core slabs)

Annex B5

Table C1: Characteristic values for anchorages in solid concrete

Anchor size			BSZ 5	BSZ 6	
Nominal embedment depth	h_{nom}	[mm]	35	35	55
Tension load					
Installation factor	γ_{inst}	[-]	1,2	1,0	
Steel failure					
Characteristic resistance	$N_{Rk,s}$	[kN]	8,7	14,0	
Partial factor	$\gamma_{Ms,N}$	[-]	1,5	1,5	
Pull-out					
Characteristic resistance in cracked and uncracked concrete C20/25	$N_{Rk,p}$	[kN]	1,5	3,0	7,5
Increasing factor for $N_{Rk,p}$	Ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$		
Concrete cone failure					
Effective anchorage depth	h_{ef}	[mm]	27	27	44
Spacing	$s_{cr,N}$	[mm]	$3 h_{ef}$		
Edge distance	$c_{cr,N}$	[mm]	$1,5 h_{ef}$		
Factor k_1 for concrete	cracked	$k_{cr,N}$	7,7		
	uncracked	$k_{ucr,N}$	11,0		
Splitting					
Spacing	$s_{cr,sp}$	[mm]	120	120	160
Edge distance	$c_{cr,sp}$	[mm]	60	60	80
Shear load					
Installation factor	γ_{inst}	[-]	1,0	1,0	
Steel failure without lever arm					
Characteristic resistance	$V^0_{Rk,s}$	[kN]	4,4	7,0	
Partial factor	$\gamma_{Ms,V}$	[-]	1,25	1,25	
Ductility factor	k_7	[-]	0,8	0,8	
Steel failure with lever arm					
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	5,3	10,9	
Concrete pry-out failure					
Pry-out factor	k_8	[-]	1,0	1,0	
Concrete edge failure					
Effective length of anchor	$l_f = h_{ef}$	[mm]	27	27	44
Outside diameter of anchor	d_{nom}	[mm]	5	6	

Concrete Screw BSZ**Performance**Characteristic values for **tension and shear loads** (solid concrete)**Annex C1**

Table C2: Characteristic values of resistance in **precast pre-stressed hollow core slabs** C30/37 to C50/60

Anchor size			BSZ 6		
Flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
Characteristic resistance for all directions	F_{Rk}	[kN]	1	2	3
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	10,9		
Edge distance	$c_{cr} = c_{min}$	[mm]	100		
Spacing	$s_{cr} = s_{min}$	[mm]	100		
Partial factor	γ_M	[-]	1,5		
Installation factor	γ_{inst}	[-]	1,0		

Concrete Screw BSZ

Performance
 Characteristic values of resistance in **precast pre-stressed hollow core slabs**

Annex C2

Table C3: Characteristic values of resistance under **fire exposure** for anchorages in solid concrete

Anchor size				BSZ 6			
Material				Steel, zinc plated		Stainless steel A4 / HCR	
Nominal embedment depth		h_{nom}	[mm]	35	55	35	55
Steel failure (tension and shear resistance)							
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	0,9		1,2	
	R60			0,8		1,2	
	R90			0,6		1,2	
	R120			0,4		0,8	
Steel failure with lever arm							
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,7		0,9	
	R60			0,6		0,9	
	R90			0,5		0,9	
	R120			0,3		0,6	
Spacing		$s_{cr,fi}$	[mm]	4 h_{ef}			
Edge distance		$c_{cr,fi}$	[mm]	2 h_{ef}			
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given values							

The characteristic resistance for pull-out, concrete cone failure, concrete pry-out and concrete edge failure shall be calculated according to EN 1992-4:2018.

Concrete Screw BSZ

Performance
Characteristic values of resistance under **fire exposure** (solid concrete)

Annex C3