...eine starke Verbindung

ДЕКЛАРАЦИЯ ЗА ЕКСПЛОАТАЦИОННИ ПОКАЗАТЕЛИ

DoP № **MKT-1.3-300_bg**

- ✧ **Уникален идентификационен код на типа продукт:** **бетон винт BSZ2**
- ✧ **Предвидена употреба/употреби:** Механичен дюбел за използване в бетон, виж приложение Б /Annex B
- ✧ **Производител:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
Auf dem Immel 2
67685 Weilerbach
- ✧ **Система или системи за оценяване и проверка на постоянството на експлоатационните показатели:** 1
- ✧ **Европейски документ за оценяване:** **EAD 330232-01-0601**
Европейска техническа оценка: **ETA-22/0551, 24.10.2022**
Орган за техническа оценка: DIBt, Berlin
отифициран орган/органи: NB 2873 – Technische Universität Darmstadt
- ✧ **Декларирани експлоатационни показатели:**

Съществени характеристики	Експлоатационни показатели
Механично съпротивление и устойчивост (BWR 1)	
характерна якост на опън (статична и квази-статична)	виж приложение / Annex B2, C1
характерна напречна товароносимост (статична и квази-статична)	виж приложение / Annex C2
Характерна устойчивост и премествания за категорията на сеизмични показатели C1	виж приложение / Annex C3
Изместване (статична и квази-статична)	виж приложение / Annex C5
трайност	виж приложение / Annex B1
Безопасност в случай на пожар (BWR 2)	
на поведение при пожар	клас A1
пожароустойчивост	виж приложение / Annex C4

ксплоатационните показатели на продукта, посочени по-горе, са в съответствие с декларираните експлоатационни показатели. Настоящата декларация за експлоатационни показатели се издава в съответствие с Регламент (EU) № 305/2011, като отговорността за нея се носи изцяло от посочения по-горе производител.

Подписано за и от името на производителя от:

Stefan Weustenhagen
(Управител)
Weilerbach, 24.10.2022

p.p.
Dipl.-Ing. Detlef Bigalke
(Продуктов мениджър)

Оригиналът на тази декларация за експлоатационни показатели е на немски език. В случай на отклонения в превода, немската версия е валидна.

Specifications of Intended use

Concrete screw BSZ			BSZ2 6			BSZ2 8			BSZ2 10		
Nominal embedment depth	h_{nom}		h_{nom1} [1]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	35	45	55	45	55	65	55	75	85
Anchorages subject to	Static or quasi-static action		✓								
	Fire exposure		✓								
	Seismic action, performance category C1	Tension load:	[2]	✓	✓	✓	[2]	✓	✓	[2]	✓
		Shear load:	all anchor types								
			anchor types B, S, SK, LK								
Base material	Cracked or uncracked concrete		✓								
	Compacted, reinforced or unreinforced concrete without fibres acc. to EN 206:2013+A1:2016		✓								
	Strength classes according to EN 206:2013+A1:2016, C20/25 to C50/60		✓								

[1] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.
[2] no performance assessed

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: all screw types
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2006 +A1:2015:
  - stainless steel A4, according to Annex A3, Table A3: CRC III
  - high corrosion resistant steel HCR, according to Annex A3, Table A3: CRC V

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 of anchorages according to EN 1992-4:2018 (if required in connection with EOTA Technical Report TR 055, version February 2018)

Installation:

- Making of drill hole by hammer drilling (all sizes) or vacuum drilling (BSZ 8 und BSZ 10). When using a vacuum drill bit no drill hole cleaning is required.
- 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.
- The borehole may be filled with the Injection System VME plus.
- Adjustment according to Annex B4 (except for anchorages with filled borehole and anchorages with seismic action).

Table B1: Installation parameters

Screw size			BSZ2 6			BSZ2 8			BSZ2 10		
Nominal embedment depth	h_{nom}	[mm]	35[1)]	45	55	45	55	65	55	75	85
Nominal drill bit 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]	40	50	60	55	65	75	65	85	95
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	8			12			14		
Max. installation torque for screws with metric connection thread	$T_{inst} \leq$	[Nm]	10			20			40		
Tangential impact screw driver [2)]	$T_{imp,max}$	[Nm]	160			300			450		

[1)] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.

[2)] Installation with tangential impact screw driver, with maximum torque $T_{imp,max}$ acc. to manufacturer's instructions is possible.

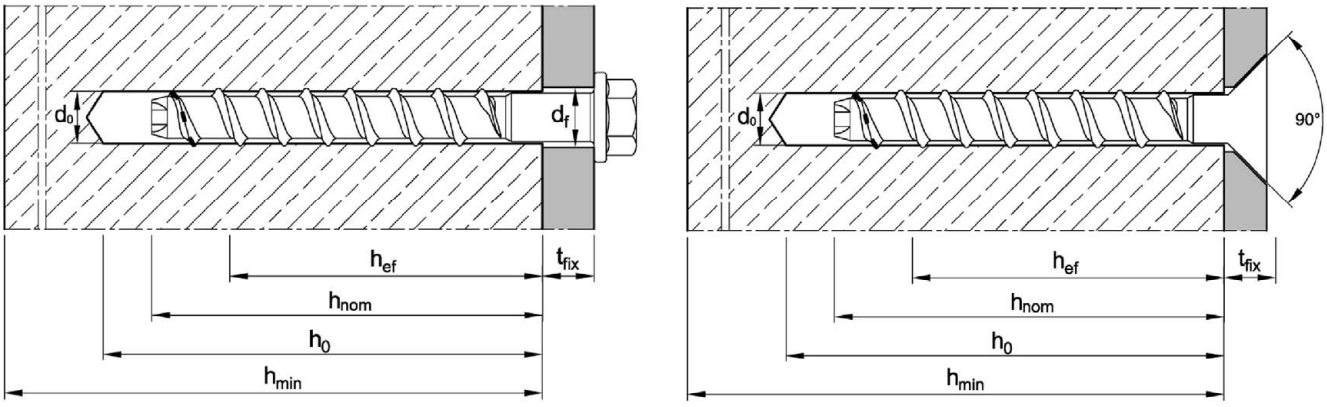
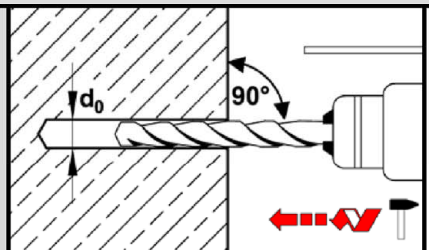
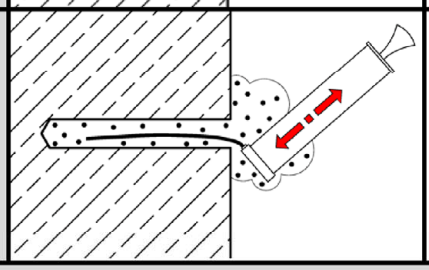
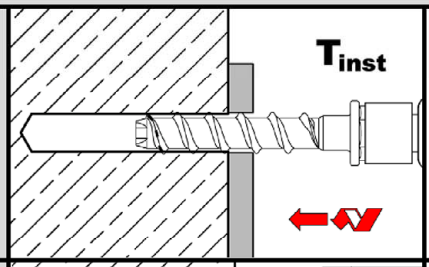
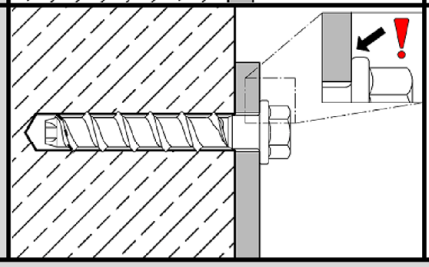


Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

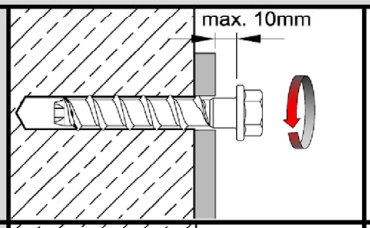
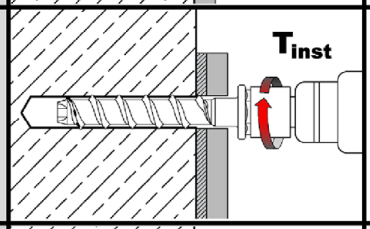
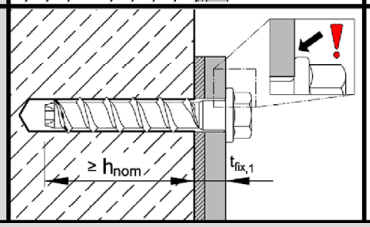
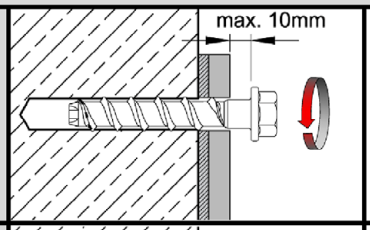
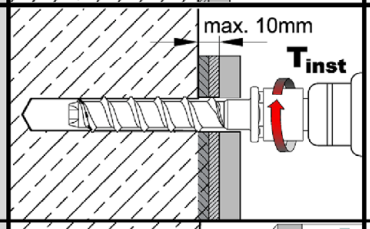
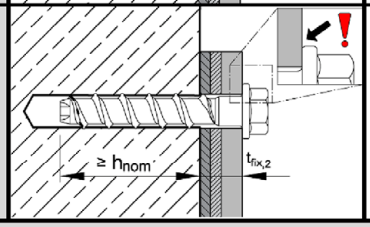
Screw size			BSZ2 6			BSZ2 8			BSZ2 10		
Nominal embedment depth	h_{nom}	[mm]	35[1)]	45	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	80	80	100	80	100	120	100	130	130
Minimum spacing	s_{min}	[mm]	35			35			40		
Minimum edge distance	c_{min}	[mm]	35			35			40		

[1)] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.

Installation instructions

Drill hole preparation and cleaning		
1		Drill hole perpendicular to concrete surface. Using a vacuum drill, continue with step 3.
2		Blow out dust or alternatively vacuum clean down to the bottom of the hole.
Installation concrete screw		
3		Screw in, e.g. with tangential impact screw driver or torque wrench.
4		After installation, the head of the anchor is supported on the fixture and must be undamaged.
For screw size BSZ2 6 with h_{nom} = 35 mm, installation only with impact screw drivers.		

Installation instructions - Adjustment

1. Adjustment		
5		Screw may be untightened maximum 10 mm.
6		After adjustment, screw in the concrete screw with tangential impact screw driver or torque wrench.
7		After installation, the head of the anchor is supported on the fixture must be undamaged.
2. Adjustment		
8		Screw may be untightened maximum 10 mm.
9		After adjustment, screw in the concrete screw with tangential impact screw driver or torque wrench.
10		After installation, the head of the anchor is supported on the fixture and must be undamaged.
Note: The concrete screw may be adjusted max. 2 times. The fastener must not be screwed back by more than 10 mm 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.		

Installation instructions - filling of annular gap

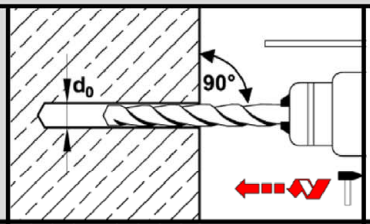
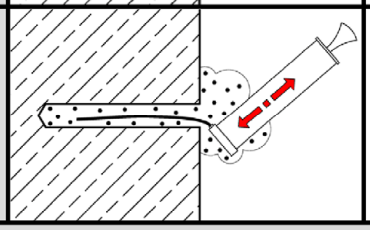
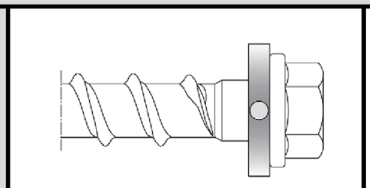
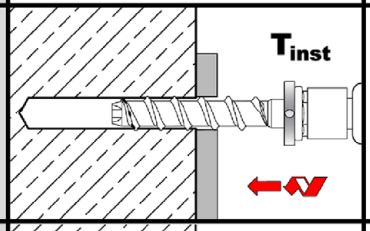
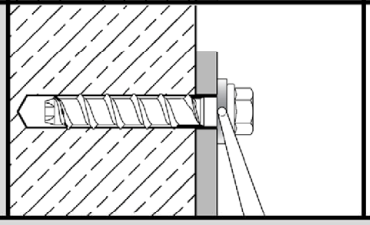
Drill hole preparation and cleaning		
1		Drill hole perpendicular to concrete surface. Using a vacuum drill, continue with step 3.
2		Blow out dust or alternatively vacuum clean down to the bottom of the hole.
Installation concrete screw with filling washer		
3		Fit the filling washer to the concrete screw or position at the attachment. The thickness of the filling washer must be taken into account with t_{fix}.
4		Screw in, e.g. with tangential impact screw driver or torque wrench.
5		Fill the annular gap between concrete screw and fixture with mortar (compressive strength ≥ 40 N/mm², e.g. Injection mortar VMH, VMZ or VMU plus). Use enclosed reducing adapter. Observe information on processing of the mortar! The annular gap is completely filled, when excess mortar seeps out.
For seismic loading, the application <u>with</u> and <u>without</u> filling of annular gap is permitted (Annex C3).		

Table C1: Characteristic values for **tension load** under **static** or **quasi-static action**

Screw size				**BSZ2 6**			**BSZ2 8**			**BSZ2 10**		
Nominal embedment depth		h_{nom}	[mm]	35[1]	45	55	45	55	65	55	75	85
Installation factor		γ_{inst}	[-]	1,0								
Steel failure												
Characteristic resistance		$N_{Rk,s}$	[kN]	14,0			27,0			45,0		
Partial factor [2]		$\gamma_{Ms,N}$	[-]	1,5								
Pull-out failure (concrete strength class C20/25)												
Characteristic resistance	cracked	$N_{Rk,p,cr}$	[kN]	2,5	1,5	3,0	3,0	5,5	8,0	6,0	13,0	17,0
	uncracked	$N_{Rk,p,ucr}$	[kN]	3,5	4,0	8,5	9,0	12,0	17,0	11,0	19,0	25,0
Exponent m for concrete increasing factor $\Psi_c = \left(\frac{f_{ck}}{20}\right)^m$												
Concrete strength class C25/30 to C50/60				$N_{Rk,p} = \psi_C \cdot N_{Rk,p\,(C20/25)}$								
Exponent m	cracked	m	[-]	0,41	0,35	0,50	0,50	0,50	0,50	0,50	0,39	0,39
	uncracked	m	[-]	0,35	0,50	0,38	0,50	0,50	0,30	0,50	0,50	0,50
Splitting failure												
Case 1	Characteristic resistance	$N^0_{Rk,sp}$	[kN]	min ($N_{Rk,p}$; $N^0_{Rk,c}$)								
	Characteristic edge distance	$c_{cr,sp}$	[mm]	60	80	120	100	120	145	115	140	160
	Characteristic spacing	$s_{cr,sp}$	[mm]	120	160	240	200	240	290	230	280	320
Case 2	Characteristic resistance	$N^0_{Rk,sp}$	[kN]	[3]	2,5	5,5	5,5	8,0	11,0	7,0	15,0	20,0
	Characteristic edge distance	$c_{cr,sp}$	[mm]	[3]	58	84	64	82	98	80	114	130
	Characteristic spacing	$s_{cr,sp}$	[mm]	[3]	116	168	128	164	196	160	224	260
Concrete cone failure												
Effective anchorage depth		h_{ef}	[mm]	25	34	42	32	41	49	40	57	65
Factor	cracked	$k_{cr,N}$	[-]	7,7								
	uncracked	$k_{ucr,N}$	[-]	11,0								
Characteristic edge distance		$c_{cr,N}$	[mm]	$1{,}5 \cdot h_{ef}$								
Characteristic spacing		$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$								

[1] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.
[2] In absence of other national regulations.
[3] No performance assessed.

Table C2: Characteristic values for **shear load** under **static** or **quasi static action**

Screw size			**BSZ2 6**			**BSZ2 8**			**BSZ2 10**		
Nominal embedment depth	h_{nom}	[mm]	35[1)]	45	55	45	55	65	55	75	85
Installation factor	γ_{inst}	[-]	1,0								
Steel failure <u>without</u> lever arm											
Characteristic resistance	$V^0_{Rk,s}$	[kN]	7,0			13,5		17,0	22,5	34,0	
Partial factor [2)]	$\gamma_{Ms,V}$	[-]	1,25								
Ductility factor	k_7	[-]	0,8								
Steel failure <u>with</u> lever arm											
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	10,9			26,0			56,0		
Concrete pry-out failure											
Pry-out factor	k_8	[-]	1,0	1,6		2,1	2,8		2,5		
Concrete edge failure											
Effective length of fastener in shear loading	$l_f = h_{nom}$	[mm]	35	45	55	45	55	65	55	75	85
Outside diameter of anchor	d_{nom}	[mm]	6			8			10		

[1)] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.

[2)] In absence of other national regulations

Table C3: Characteristic values for **seismic loading**, performance category **C1**

Screw size			**BSZ2 6**		**BSZ2 8**		**BSZ2 10**	
Nominal embedment depth	h_{nom}	[mm]	45	55	45	65	55	85
Installation factor	γ_{inst}	[-]	1,0					
Tension load	(all types)							
Steel failure								
Characteristic resistance	$N_{Rk,s,C1}$	[kN]	14,0		27,0		45,0	
Partial factor [1]	$\gamma_{Ms,N}$	[-]	1,5					
Pull-out failure								
Characteristic resistance	$N_{Rk,p,C1}$	[kN]	1,5	3,0	3,0	8,5	6,0	17,0
Concrete cone failure								
Effective anchorage depth	h_{ef}	[mm]	34	42	32	49	40	65
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$					
Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$					
Shear load	(Type : B, S, SK, LK)							
Steel failure without lever arm								
Characteristic resistance Type B, S, LK	$V_{Rk,s,C1}$	[kN]	3,5	4,0	8,0	10,0	14,0	16,0
Type SK	$V_{Rk,s,C1}$	[kN]	2,5	[2]	4,5	7,0	14,0	10,0
Partial factor [1]	$\gamma_{Ms,V}$	[-]	1,25					
with filling of annular gap	α_{gap}	[-]	1,0					
without filling of annular gap	α_{gap}	[-]	0,5					
Concrete pry-out failure								
Pry-out factor	k_8	[-]	1,6		2,1	2,8	2,5	
Concrete edge failure								
Effective length of anchor	$l_f = h_{nom}$	[mm]	45	55	45	65	55	85
Outside diameter of anchor	d_{nom}	[mm]	6		8		10	

[1] In absence of other national regulations
[2] No performance assessed

Table C4: Characteristic values under **fire exposure**

Screw size				**BSZ2 6**			**BSZ2 8**			**BSZ2 10**		
Nominal anchorage depth		h_{nom}	[mm]	35[1)]	45	55	45	55	65	55	75	85
Steel failure (tension and shear resistance)												
Characteristic resistance	R30	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$	[kN]	0,9			2,4			4,4		
	R60			0,8			1,7			3,3		
	R90			0,6			1,1			2,3		
	R120			0,4			0,7			1,7		
Steel failure <u>with</u> lever arm												
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,7			2,4			5,9		
	R60			0,6			1,8			4,5		
	R90			0,5			1,2			3,0		
	R120			0,3			0,9			2,3		
Pull-out failure												
Characteristic resistance	R30-R90	$N_{Rk,p,fi}$	[kN]	0,6	0,4	0,8	0,8	1,4	2,0	1,5	3,3	4,3
	R120	$N_{Rk,p,fi}$	[kN]	0,5	0,3	0,6	0,6	1,1	1,6	1,2	2,6	3,4
Concrete cone failure												
Characteristic resistance	R30-R90	$N^0_{Rk,c,fi}$	[kN]	0,5	1,2	2,0	1,0	1,9	2,9	1,7	4,2	5,9
	R120	$N^0_{Rk,c,fi}$	[kN]	0,4	0,9	1,6	0,8	1,5	2,3	1,4	3,4	4,7
Edge distance		$c_{cr,fi}$	[mm]	$2 \cdot h_{ef}$								
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm												
Spacing		$s_{cr,fi}$	[mm]	$4 \cdot h_{ef}$								
Concrete pry-out failure												
Pry-out factor		k_8	[-]	1,0	1,6		2,1	2,8		2,5		
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given values.												

[1)] Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.

Table C5: Displacements under static or quasi-static loads

Screw size				BSZ2 6		BSZ2 8			BSZ2 10		
Nominal embedment depth		h_{nom}	[mm]	45	55	45	55	65	55	75	85
Tension load											
cracked concrete	Tension load	N	[kN]	0,72	1,45	1,63	2,74	4,06	3,04	6,22	8,46
	Displacement	δ_{N0}	[mm]	0,19	0,27	0,27	0,53	0,45	0,26	0,58	0,61
		$\delta_{N\infty}$	[mm]	0,55	0,84	0,49	0,66	0,61	0,69	0,92	1,10
uncracked concrete	Tension load	N	[kN]	2,11	4,07	4,24	5,97	8,03	5,42	9,17	12,28
	Displacement	δ_{N0}	[mm]	0,42	0,43	0,33	0,49	0,58	0,84	0,62	0,79
		$\delta_{N\infty}$	[mm]	0,42	0,43	0,58			0,79		
Shear load											
Shear load		V	[kN]	3,3		8,6			16,2		
Displacement		δ_{V0}	[mm]	1,55		2,7			2,7		
		$\delta_{V\infty}$	[mm]	3,1		4,1			4,3		