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**European Technical Assessment Body
for construction products**



European Technical Assessment

**ETA-25/0621
of 3 August 2026**

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

Wedge Anchor BZ1

Product family
to which the construction product belongs

Mechanical fastener for use in concrete

Manufacturer

MKT
Metall-Kunststoff-Technik GmbH & Co. KG
Auf dem Immel 2
67685 Weilerbach
GERMANY

Manufacturing plant

MKT
Metall-Kunststoff-Technik GmbH & Co. KG
Auf dem Immel 2
67685 Weilerbach

This European Technical Assessment
contains

23 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Article 95(4) of
Regulation (EU) 2024/3110, on the basis of

EAD 330232-02-0601

This version replaces

ETA-25/0621 issued on 30 September 2025

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Specific Part

1 Technical description of the product

The Wedge Anchor BZ1 is a fastener made of zinc plated steel (galvanized or sherardized) or stainless steel, which is placed into a drilled hole and anchored by torque-controlled expansion. 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 fastener 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 fastener 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 tension load (static and quasi-static loading)	See Annex C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C3
Characteristic resistance for seismic performance category C1 and C2	See Annex C6 and C7
Displacements	See Annex C4, C5 and C8
Stiffness	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C9 and C10

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 330232-02-0601 the applicable European legal act is: [96/582/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 with Deutsches Institut für Bautechnik.

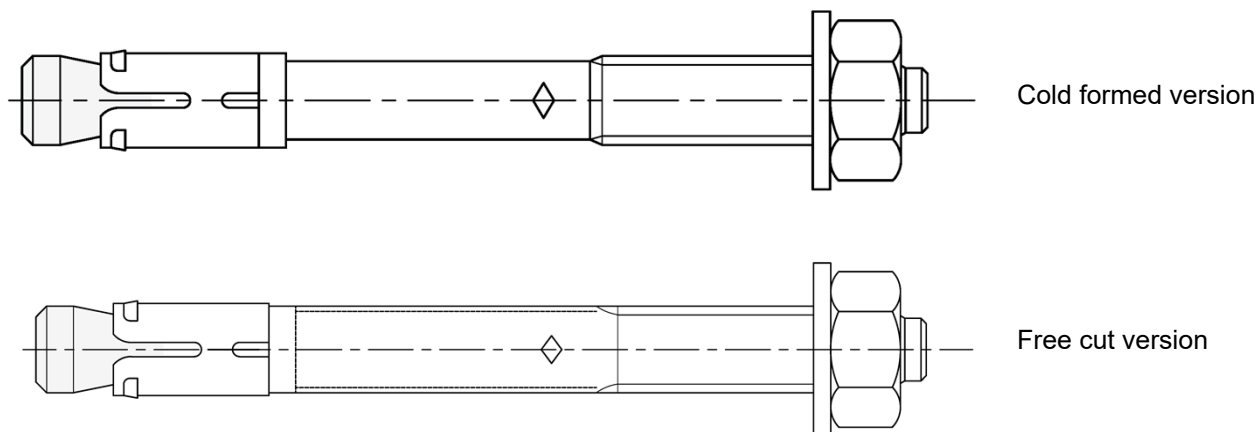
Issued in Berlin on 3 August 2026 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

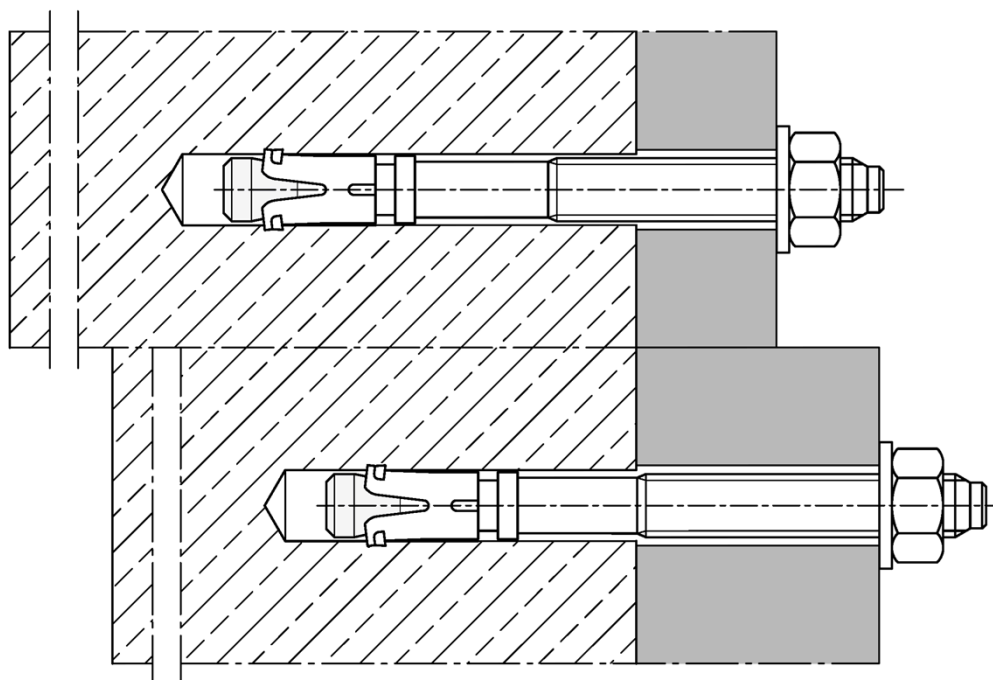
beglaubigt:
Ziegler

Wedge Anchor BZ1

M8 to M20



Installation condition



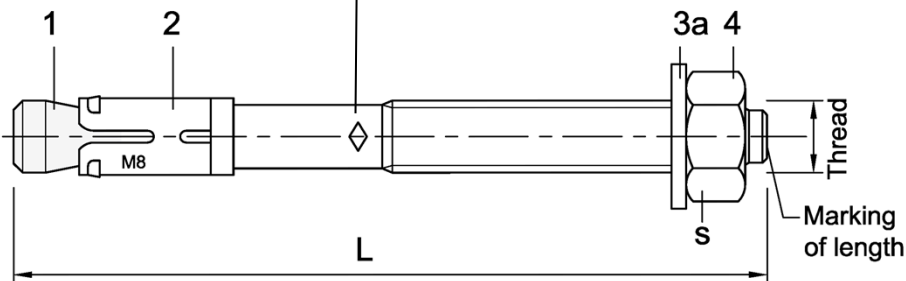
Wedge Anchor BZ1

Product description
Fastener and installation condition

Annex A1

Fastener size BZ1 M8 to M20:

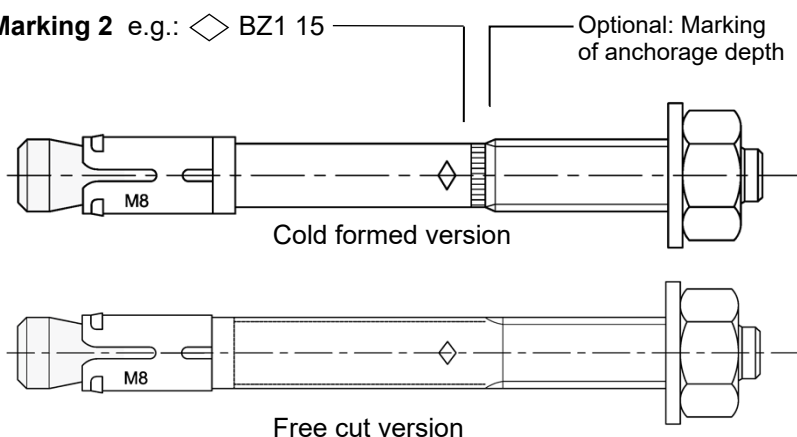
Marking 1 e.g.: $\diamond$ BZ1 15/35



Marking 1 e.g.: $\diamond$ BZ1 15/35

- $\diamond$ Identifying mark of manufacturing plant
- BZ1 - trade name
- BZ - trade name (alternatively)
- 15 - maximum thickness of fixture for h_{ef}
- 35 - maximum thickness of fixture for $h_{ef,red}$
- M8 - thread size
- Additional marking:**
- R - stainless steel
- A4 - alternative marking for stainless steel

Marking 2 e.g.: $\diamond$ BZ1 15



Marking 2 e.g.: $\diamond$ BZ1 15

- $\diamond$ Identifying mark of manufacturing plant
- BZ1 - trade name
- BZ - trade name (alternatively)
- 15 - maximum thickness of fixture for h_{ef}
- M8 - thread size
- Additional marking:**
- R - stainless steel
- A4 - alternative marking for stainless steel

Table A1: Length identification

Marking of length	C (c)	D (d)	E (e)	F (f)	G (g)	H (h)	I (i)	J (j)	K (k)	L (l)	M (m)	N (n)
Length of anchor min $L \geq$	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5	203,2
Length of anchor max $L <$	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5	203,2	215,9

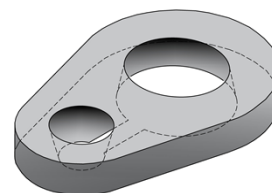
Marking of length	O (o)	P (p)	Q (q)	R (r)	S (s)	T (t)	U (u)	V (v)	W (w)	X (x)	Y (y)	Z (z)
Length of anchor min $L \geq$	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2
Length of anchor max $L <$	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2	483,0

Dimensions in mm

Filling washer VS with reducing adapter



Alternate filling washer



Wedge Anchor BZ1

Product description
Marking and dimensions

Annex A2

Table A2: Fastener dimensions

Fastener size		M8	M10	M12	M16	M20
Conical bolt	thread	M8	M10	M12	M16	M20
Length of anchor ¹⁾	standard anchorage depth L	$65 + t_{fix}$	$80 + t_{fix}$	$96,5 + t_{fix}$	$118 + t_{fix}$	$137 + t_{fix}$
	reduced anchorage depth $L_{hef,red}$	$54 + t_{fix}$	$60 + t_{fix}$	$76,5 + t_{fix}$	$98 + t_{fix}$	- ²⁾
Thickness of filling washer t [mm]		5				
Hexagon nut s		13	17	19	24	30

¹⁾ By additional use of the filling washer 3b, the usable thickness of fixture is reduced by 5mm

Dimensions in mm

²⁾ No performance assessed

Table A3: Material

No.	Part	BZ1		BZ1 R
		Steel, zinc plated		Stainless steel (CRC III) EN 1993-1-4:2006+A1:2015
		galvanized $\geq 5\mu\text{m}$	sherardized $\geq 45\mu\text{m}$	
1	Conical bolt	Cold formed or machined steel, galvanized, cone plastic coated	Cold formed or machined steel, sherardized, cone plastic coated	Stainless steel, EN 10088:2023, cone plastic coated
2	Expansion sleeve	Stainless steel EN 10088:2023	Stainless steel EN 10088:2023	Stainless steel EN 10088:2023
3a	Washer	Steel, zinc plated	Steel, zinc plated	Stainless steel EN 10088:2023
3b	Filling Washer			
4	Hexagon nut	Steel, galvanized, coated	Steel, zinc plated	Stainless steel, EN 10088:2023, coated

Wedge Anchor BZ1

Product description
Fastener dimensions and material

Annex A3

Specifications of intended use

Wedge Anchor BZ1	M8	M10	M12	M16	M20
Static or quasi-static action	✓				✓ ¹⁾
Seismic action, performance category	C1	✓			
	C2	Standard anchorage depth, cold formed version			
Fire exposure	✓				

¹⁾ Only for standard anchorage depth

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013+A2:2021
- Strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021
- Cracked or uncracked concrete

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: all materials
- For all other conditions corresponding to corrosion resistance classes CRC III according to EN 1993-1-4:2006 + A1:2015: stainless steel according to Annex A3, Table A3 of this ETA

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 EN 1992-4:2018

Installation:

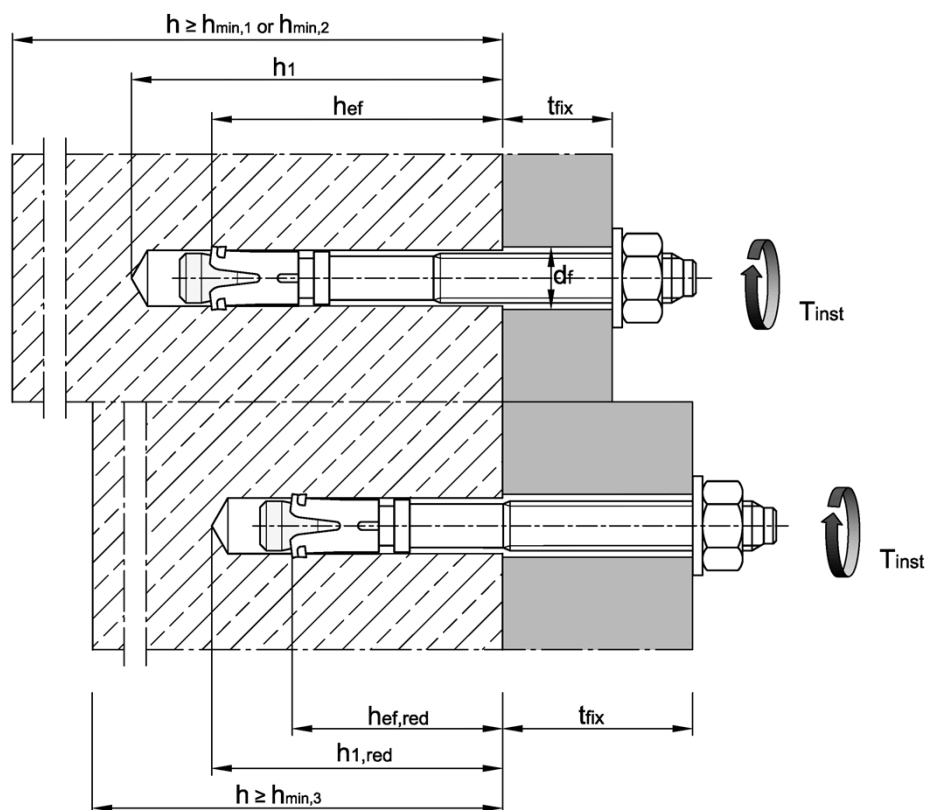
- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Hole drilling by hammer drill bit or vacuum drill bit
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener
- Optionally, the annular gap between fixture and stud of the BZ1 can be filled to reduce the hole clearance. For this purpose, the filling washer (3b) must be used in addition to the supplied washer (3a). For filling use high-strength mortar with compressive strength $\geq 40 \text{ N/mm}^2$ (e.g. Injection System VMZ, VMU plus or VMH)

Wedge Anchor BZ1	Annex B1
Intended Use Specification	

Table B1: Installation parameters

Fastener size			M8	M10	M12	M16	M20
Nominal drill hole diameter	d_0	[mm]	8	10	12	16	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	12,5	16,5	20,55
Installation torque	steel, galvanized	T_{inst}	20	25	45	90	160
	steel, sherardized	T_{inst}	16	22	40	90	160
	stainless steel	T_{inst}	20	35	50	110	200
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14	18	22
Standard anchorage depth							
Depth of drill hole	$h_1 \geq$	[mm]	60	75	90	110	125
Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100
Reduced anchorage depth							
Depth of drill hole	$h_{1,red} \geq$	[mm]	49	55	70	90	- ¹⁾
Reduced, effective anchorage depth	$h_{ef,red}$	[mm]	35	40	50	65	- ¹⁾

¹⁾ No performance assessed



Wedge Anchor BZ1

Intended Use
Installation parameters

Annex B2

Table B2: Minimum spacing and edge distance, standard anchorage depth

Fastener size				M8	M10	M12	M16	M20	
Standard thickness of concrete member			$h_{\min,1}$	[mm]	100	120	140	170	200
Steel, zinc plated	Cracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	45	60	60	95	
		für $c \geq$	[mm]	70	70	100	100	150	
	Minimum edge distance	$c_{\min}$	[mm]	40	45	60	60	95	
		für $s \geq$	[mm]	80	90	140	180	200	
	Uncracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	45	60	65	90	
		für $c \geq$	[mm]	80	70	120	120	180	
Minimum edge distance	$c_{\min}$	[mm]	50	50	75	80	130		
	für $s \geq$	[mm]	100	100	150	150	240		
Standard thickness of concrete member			$h_{\min,1}$	[mm]	100	120	140	160	200
Stainless steel	Cracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	50	60	60	95	
		für $c \geq$	[mm]	70	75	100	100	150	
	Minimum edge distance	$c_{\min}$	[mm]	40	55	60	60	95	
		für $s \geq$	[mm]	80	90	140	180	200	
	Uncracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	50	60	65	90	
		für $c \geq$	[mm]	80	75	120	120	180	
Minimum edge distance	$c_{\min}$	[mm]	50	60	75	80	130		
	für $s \geq$	[mm]	100	120	150	150	240		
Minimum thickness of concrete member			$h_{\min,2}$	[mm]	80	100	120	140	- ¹⁾
Steel, zinc plated Stainless steel	Cracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	45	60	70	- ¹⁾	
		für $c \geq$	[mm]	70	90	100	160	- ¹⁾	
	Minimum edge distance	$c_{\min}$	[mm]	40	50	60	80	- ¹⁾	
		für $s \geq$	[mm]	80	115	140	180	- ¹⁾	
	Uncracked concrete								
	Minimum spacing	$s_{\min}$	[mm]	40	60	60	80	- ¹⁾	
		für $c \geq$	[mm]	80	140	120	180	- ¹⁾	
Minimum edge distance	$c_{\min}$	[mm]	50	90	75	90	- ¹⁾		
	für $s \geq$	[mm]	100	140	150	200	- ¹⁾		
Fire exposure									
All versions	Fire exposure from one side								
	Minimum spacing	$s_{\min,fi}$	[mm]	see normal ambient temperature					
	Minimum edge distance	$c_{\min,fi}$	[mm]	see normal ambient temperature					
	Fire exposure from more than one side								
	Minimum spacing	$s_{\min,fi}$	[mm]	see normal ambient temperature					
	Minimum edge distance	$c_{\min,fi}$	[mm]	≥ 300 mm					

¹⁾ No performance assessed
Intermediate values by linear interpolation.

Wedge Anchor BZ1

Intended Use
Minimum spacing and edge distance, standard anchorage depth

Annex B3

Table B3: Minimum spacing and edge distance, reduced anchorage depth

Fastener size				M8	M10	M12	M16	
Standard thickness of concrete member			$h_{\min,3}$	[mm]	80	80	100	140
All versions	Cracked concrete							
	Minimum spacing	$s_{\min}$	[mm]	50	50	50	65	
		for $c \geq$	[mm]	60	100	160	170	
	Minimum edge distance	$c_{\min}$	[mm]	40	65	65	100	
		for $s \geq$	[mm]	185	180	250	250	
	Uncracked concrete							
	Minimum spacing	$s_{\min}$	[mm]	50	50	50	65	
		for $c \geq$	[mm]	60	100	160	170	
	Minimum edge distance	$c_{\min}$	[mm]	40	65	100	170	
		for $s \geq$	[mm]	185	180	185	65	
Fire exposure								
All versions	Fire exposure from one side							
	Minimum spacing	$s_{\min,fi}$	[mm]	see normal ambient temperature				
	Minimum edge distance	$c_{\min,fi}$	[mm]	see normal ambient temperature				
	Fire exposure from more than one side							
	Minimum spacing	$s_{\min,fi}$	[mm]	see normal ambient temperature				
	Minimum edge distance	$c_{\min,fi}$	[mm]	≥ 300 mm				

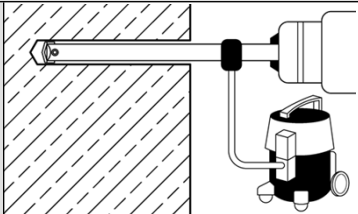
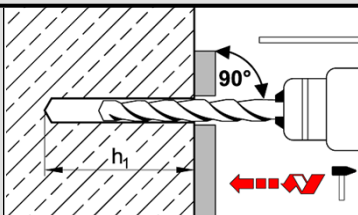
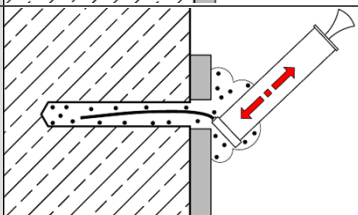
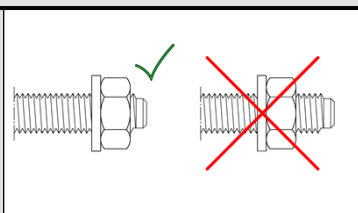
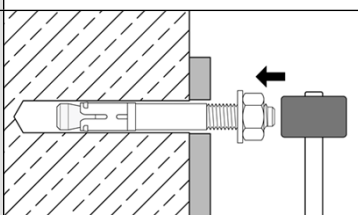
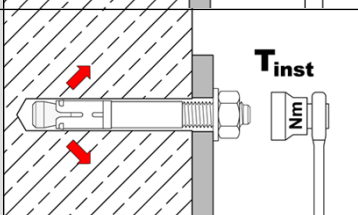
Intermediate values by linear interpolation

Wedge Anchor BZ1

Intended Use
Minimum spacing and edge distance, reduced anchorage depth

Annex B4

Installation instructions

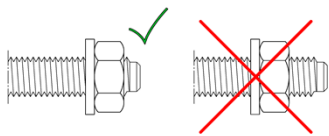
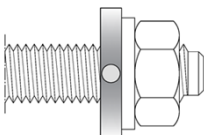
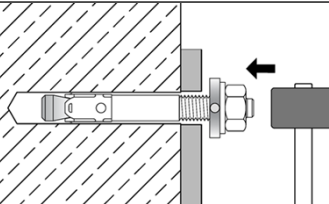
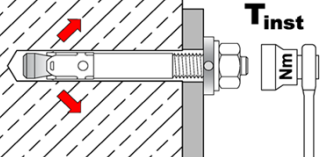
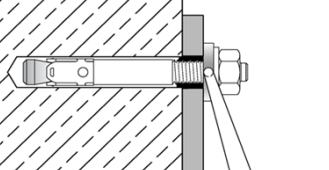
Hole drilling and cleaning – vacuum drilling		
1a		Drill hole perpendicular to concrete surface. Proceed with step 3 .
Hole drilling and cleaning – hammer drilling		
1b		Drill hole perpendicular to concrete surface.
2		Blow out dust. Alternatively vacuum clean down to the bottom of the hole.
Insert fastener		
3		Check position of nut.
4		Drive in anchor, such that h_{ef} is met. This compliance is ensured, if the thickness of fixture is not greater than the maximum thickness of fixture marked on the anchor in accordance with Annex A2.
5		Apply installation torque T_{inst}

Wedge Anchor BZ1

Intended Use
Installation instructions

Annex B5

Installation instructions with filling of annular gap

1	Hole drilling and cleaning	See Annex B5
2		
Insert fastener with filling of annular gap		
3a		Check position of nut.
3b		Fit the filling washer to the fastener. The thickness of the filling washer must be taken into account with t_{fix} .
4		Drive in fastener with filling washer, such that h_{ef} or $h_{ef,red}$ respectively is met. This compliance is ensured, if the thickness of fixture is 5mm smaller than the maximum thickness of fixture marked on the fastener in accordance with Annex A2.
5		Apply installation torque T_{inst}
6		Fill the annular gap between stud and fixture with high strength mortar with compressive strength $\geq 40 \text{ N/mm}^2$ (e.g. VMH, VMZ or VMU plus). Use enclosed reducing adapter. Observe the processing information of the mortar! The annular gap is completely filled, when excess mortar seeps out.

Wedge Anchor BZ1

Intended Use

Installation instruction with filling of annular gap

Annex B6

Table C1: Characteristic resistance to tension load, zinc plated and stainless steel, static and quasi-static action

Fastener size				M8	M10	M12	M16	M20	
Installation factor		γ_{inst}	[-]	1,0					
Steel failure									
Steel, zinc plated	Characteristic resistance	$N_{Rk,s}$	[kN]	16	27	40	60	86	
	Partial factor ¹⁾	γ_{Ms}	[-]	1,53	1,53	1,5	1,5	1,6	
Stainless steel	Characteristic resistance	$N_{Rk,s}$	[kN]	16	27	40	64	108	
	Partial factor ¹⁾	γ_{Ms}	[-]	1,5				1,68	
Pull-out failure									
All versions	Standard anchorage depth								
	Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	12	16	25	35	50,5	
	Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	5	9	16	25	36	
	Reduced anchorage depth								
	Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	7,5	9	17,9	26,5	- ³⁾	
	Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	5	7,5	12,7	18,9	- ³⁾	
	Increasing factor for $N_{Rk,p,ucr} = \psi_c \cdot N_{Rk,p,ucr} (C20/25)$ $N_{Rk,p,cr} = \psi_c \cdot N_{Rk,p,cr} (C20/25)$	ψ_c	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$					
Concrete cone failure									
All versions	Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100	
	Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ²⁾	40	50	65	- ³⁾	
	Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
	Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
	Factor	cracked concrete	$k_{cr,N}$	[-]	7,7				
		uncracked concrete	$k_{ucr,N}$	[-]	11,0				

¹⁾ In absence of other national regulations

²⁾ Use restricted to anchoring of structural components statically indeterminate and subject to dry internal exposure conditions

³⁾ No performance assessed

Wedge Anchor BZ1

Performance

Characteristic values to **tension loads, zinc plated and stainless steel**, static and quasi-static action

Annex C1

Table C2: Characteristic resistance to tension load, zinc plated and stainless steel, static and quasi-static action – continuation

Fastener size			M8	M10	M12	M16	M20	
Installation factor		γ_{inst}	[-]	1,0				
Splitting for <u>standard anchorage depth</u>								
All versions	Standard anchorage depth		h_{ef} [mm]	46	60	70	85	100
	Splitting for standard thickness of concrete member: The higher resistance of case 1 and case 2 may be applied; $s_{\text{cr,sp}}$; $c_{\text{cr,sp}}$ may be linearly interpolated for the member thickness $h_{\text{min},2} < h < h_{\text{min},1}$ (Case 2); $\psi_{h,\text{sp}} = 1,0$							
	Standard thickness of concrete		$h_{\text{min},1} \geq$ [mm]	100	120	140	170 (160) ³⁾	200
	Case 1							
	Characteristic resistance in uncracked concrete C20/25		$N^0_{\text{Rk,sp}}$ [kN]	9	12	20	30	40
	Characteristic edge distance		$c_{\text{cr,sp}}$ [mm]	1,5 h_{ef}				
	Characteristic spacing		$s_{\text{cr,sp}}$ [mm]	3 h_{ef}				
Steel, zinc plated	Case 2							
	Characteristic resistance in uncracked concrete C20/25		$N^0_{\text{Rk,sp}}$ [kN]	12	16	25	35	50,5
	Characteristic edge distance		$c_{\text{cr,sp}}$ [mm]	2 h_{ef}				2,2 h_{ef}
	Characteristic spacing		$s_{\text{cr,sp}}$ [mm]	4 h_{ef}				4,4 h_{ef}
Stainless steel	Case 2							
	Characteristic resistance in uncracked concrete C20/25		$N^0_{\text{Rk,sp}}$ [kN]	12	16	25	35	50,5
	Characteristic edge distance		$c_{\text{cr,sp}}$ [mm]	115	125	140	200	220
	Characteristic spacing		$s_{\text{cr,sp}}$ [mm]	230	250	280	400	440
Splitting for <u>minimum thickness of concrete member</u>								
All versions	Minimum thickness of concrete		$h_{\text{min},2} \geq$ [mm]	80	100	120	140	- ¹⁾
	Characteristic resistance in uncracked concrete C20/25		$N^0_{\text{Rk,sp}}$ [kN]	12	16	25	35	- ¹⁾
	Characteristic edge distance		$c_{\text{cr,sp}}$ [mm]	2,5 h_{ef}				
	Characteristic spacing		$s_{\text{cr,sp}}$ [mm]	5 h_{ef}				
	Reduced anchorage depth		$h_{\text{ef,red}}$ [mm]	35 ²⁾	40	50	65	- ¹⁾
	Minimum thickness of concrete		$h_{\text{min},3} \geq$ [mm]	80	80	100	140	- ¹⁾
	Characteristic resistance in uncracked concrete C20/25		$N^0_{\text{Rk,sp}}$ [kN]	7,5	9	17,9	26,5	- ¹⁾
	Edge distance		$c_{\text{cr,sp}}$ [mm]	100	100	125	150	- ¹⁾
	Characteristic spacing		$s_{\text{cr,sp}}$ [mm]	200	200	250	300	- ¹⁾
	Increasing factor for concrete $N^0_{\text{Rk,sp}} = \psi_c \cdot N^0_{\text{Rk,sp}}$ (C20/25)		ψ_c [-]	$\left(\frac{f_{\text{ck}}}{20}\right)^{0,5}$				

¹⁾ No performance assessed

²⁾ Use restricted to anchoring of structural components statically indeterminate and subject to dry internal exposure conditions

³⁾ Value in brackets for stainless steel

Wedge Anchor BZ1

Performance

Characteristic values for **tension loads, zinc plated and stainless steel**, static and quasi-static action – **continuation**

Annex C2

Table C3: Characteristic resistance for shear loads

Fastener size				M8	M10	M12	M16	M20
Installation factor		γ_{inst}	[-]	1,0				
Steel failure								
Steel zinc plated	Steel failure without lever arm							
	Characteristic resistance	$V^0_{\text{Rk,s}}$	[kN]	8,5	14,1	21,0	38,5	48,3
	Ductility factor	k_7	[-]	1,0				
	Partial factor	γ_{Ms}	[-]	1,25				
	Steel failure with lever arm							
	Characteristic bending resistance	$M^0_{\text{Rk,s}}$	[Nm]	16,1	32,9	57,4	151,2	254,1
	Partial factor	γ_{Ms}	[-]	1,25				
Stainless steel	Steel failure without lever arm							
	Characteristic resistance	$V^0_{\text{Rk,s}}$	[kN]	13	20	30	55	86
	Ductility factor	k_7	[-]	1,0				
	Partial factor	γ_{Ms}	[-]	1,25				
	Steel failure with lever arm							
	Characteristic bending resistance	$M^0_{\text{Rk,s}}$	[Nm]	26	52	92	200	454
	Partial factor	γ_{Ms}	[-]	1,25				
Concrete pry-out failure								
Pry-out factor		k_8	[-]	1,0 for $h_{\text{ef}} < 60 \text{ mm}$ 2,0 for $h_{\text{ef}} \geq 60 \text{ mm}$				
Concrete edge failure								
Effective length of fastener in shear loading	Standard anchorage depth	l_f	[mm]	46	60	70	85	100
	Reduced anchorage depth	$l_{f,\text{red}}$	[mm]	35 ²⁾	40	50	65	- ¹⁾
Effective diameter of fastener		d_{nom}	[mm]	8	10	12	16	20

¹⁾ No performance assessed

²⁾ Use restricted to anchoring of structural components statically indeterminate and subject to dry internal exposure conditions

Wedge Anchor BZ1

Performance
Characteristic values for **shear loads**

Annex C3

Table C4: Displacement under tension load

Fastener size				M8	M10	M12	M16	M20
Standard anchorage depth								
Steel zinc plated	Tension load in cracked concrete	N	[kN]	2,4	4,3	7,6	11,9	17,1
	Displacement	δ_{N0}	[mm]	0,6	1,0	0,4	1,0	0,9
		$\delta_{N\infty}$	[mm]	1,4	1,2	1,4	1,3	1,0
	Tension load in uncracked concrete	N	[kN]	5,7	7,6	11,9	16,7	23,8
	Displacement	δ_{N0}	[mm]	0,4	0,5	0,7	0,3	0,4
		$\delta_{N\infty}$	[mm]	0,8		1,4	0,8	
Stainless steel	Tension load in cracked concrete	N	[kN]	2,4	4,3	7,6	11,9	17,1
	Displacement	δ_{N0}	[mm]	0,7	1,8	0,4	0,7	0,9
		$\delta_{N\infty}$	[mm]	1,2	1,4	1,4	1,4	1,0
	Tension load in uncracked concrete	N	[kN]	5,8	7,6	11,9	16,7	23,8
	Displacement	δ_{N0}	[mm]	0,6	0,5	0,7	0,2	0,4
		$\delta_{N\infty}$	[mm]	1,2	1,0	1,4	0,4	0,8
Reduced anchorage depth								
Steel zinc plated, Stainless steel	Tension load in cracked concrete	N	[kN]	2,4	3,6	6,1	9,0	- ¹⁾
	Displacement	δ_{N0}	[mm]	0,8	0,7	0,5	1,0	
		$\delta_{N\infty}$	[mm]	1,2	1,0	0,8	1,1	
	Tension load in uncracked concrete	N	[kN]	3,7	4,3	8,5	12,6	- ¹⁾
	Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,2	
		$\delta_{N\infty}$	[mm]	0,7	0,7	0,7	0,7	

¹⁾ No performance assessed

Wedge Anchor BZ1

Performance
Displacement under tension load

Annex C4

Table C5: Displacement under shear load

Fastener size			M8	M10	M12	M16	M20
Steel, zinc plated	Standard anchorage depth						
	Shear load in cracked and uncracked concrete	V [kN]	4,8	8,0	12,2	22,0	25,8
	Displacement	δ_{V0} [mm]	1,4	2,2	2,5	2,5	1,3
		$\delta_{V\infty}$ [mm]	2,1	3,3	3,9	3,7	1,9
	Reduced anchorage depth						
	Shear load in cracked and uncracked concrete	V [kN]	4,8	8,0	12,2	22,0	- ¹⁾
	Displacement	δ_{V0} [mm]	1,4	2,2	2,5	2,5	
		$\delta_{V\infty}$ [mm]	2,1	3,3	3,9	3,7	
Stainless steel	Standard anchorage depth						
	Shear load in cracked and uncracked concrete	V [kN]	7,3	11,4	17,1	31,4	43,8
	Displacement	δ_{V0} [mm]	1,9	2,4	4,0	4,3	2,9
		$\delta_{V\infty}$ [mm]	2,9	3,6	5,9	6,4	4,3
	Reduced anchorage depth						
	Shear load in cracked and uncracked concrete	V [kN]	7,3	11,4	17,1	31,4	- ¹⁾
	Displacement	δ_{V0} [mm]	1,9	2,4	4,0	4,3	
		$\delta_{V\infty}$ [mm]	2,9	3,6	5,9	6,4	

¹⁾ No performance assessed

Wedge Anchor BZ1

Performance
Displacement under shear load

Annex C5

Table C6: Characteristic resistance for **seismic loading, standard anchorage depth, performance category C1**

Fastener size				M8	M10	M12	M16	M20	
Tension loads									
Installation factor			γ_{inst}	[-]	1,0				
Steel failure, steel zinc plated									
Characteristic resistance			$N_{Rk,s,C1}$	[kN]	16	27	40	60	86
Partial factor ¹⁾			γ_{Ms}	[-]	1,53		1,5		1,6
Steel failure, stainless steel									
Characteristic resistance			$N_{Rk,s,C1}$	[kN]	16	27	40	64	108
Partial factor ¹⁾			γ_{Ms}	[-]	1,5				1,68
Pull-out (steel zinc plated, stainless steel)									
Characteristic resistance			$N_{Rk,p,C1}$	[kN]	5	9	16	25	36
Shear loads									
Steel failure without lever arm, steel zinc plated									
Characteristic resistance			$V_{Rk,s,C1}$	[kN]	4,7	10,0	13,5	22,0	34,5
Partial factor ¹⁾			γ_{Ms}	[-]	1,25				1,33
Steel failure without lever arm, stainless steel									
Characteristic resistance			$V_{Rk,s,C1}$	[kN]	9,3	20	27	44	69
Partial factor ¹⁾			γ_{Ms}	[-]	1,25				1,4
Factor for annular gap	without filling of annular gap	α_{gap}	[-]	0,5					
	with filling of annular gap	α_{gap}	[-]	1,0					

¹⁾ In absence of other national regulations

Wedge Anchor BZ1

Performance

Characteristic resistance for **seismic loading, standard anchorage depth, performance category C1**

Annex C6

Table C7: Characteristic resistance for **seismic loading, standard anchorage depth, performance category C2**

Fastener size				M8	M10	M12	M16	M20
Tension loads								
Installation factor		γ_{inst}	[-]	1,0				
Steel failure, steel zinc plated								
Characteristic resistance		$N_{Rk,s,C2}$	[kN]	16	27	40	60	86
Partial factor ¹⁾		γ_{Ms}	[-]	1,53		1,5		1,6
Steel failure, stainless steel								
Characteristic resistance		$N_{Rk,s,C2}$	[kN]	16	27	40	64	108
Partial factor ¹⁾		γ_{Ms}	[-]	1,5				1,68
Pull-out (steel zinc plated, stainless steel)								
Characteristic resistance		$N_{Rk,p,C2}$	[kN]	2,3	3,6	10,2	13,8	24,4
Shear loads								
Steel failure without lever arm, steel zinc plated								
Characteristic resistance		$V_{Rk,s,C2}$	[kN]	3,4	7,0	8,1	17,9	27,6
Partial factor ¹⁾		γ_{Ms}	[-]	1,25				1,33
Steel failure without lever arm, stainless steel								
Characteristic resistance		$V_{Rk,s,C2}$	[kN]	6,7	14	16,2	35,7	55,2
Partial factor ¹⁾		γ_{Ms}	[-]	1,25				1,4
Factor for annular gap	without filling of annular gap	α_{gap}	[-]	0,5				
	with filling of annular gap	α_{gap}	[-]	1,0				

¹⁾ In absence of other national regulations

Wedge Anchor BZ1

Performance

Characteristic resistance for **seismic loading, standard anchorage depth, performance category C2**

Annex C7

Table C8: Displacements for **seismic loading, standard anchorage depth,**
performance category **C2**

Fastener size			M8	M10	M12	M16	M20
Displacements under tension load							
Displacements under seismic loading C2, steel zinc plated, stainless steel							
Displacements for DLS	$\delta_{N,C2(0,5)}$	[mm]	2,3	4,1	4,9	3,6	5,1
Displacements for ULS	$\delta_{N,C2(0,8)}$	[mm]	8,2	13,8	15,7	9,5	15,2
Displacements under shear load							
Displacements under seismic loading C2, steel zinc plated							
Displacements for DLS	$\delta_{V,C2(0,5)}$	[mm]	1,5	1,4	1,8	2,2	2,4
Displacements for ULS	$\delta_{V,C2(0,8)}$	[mm]	3,0	2,7	4,8	4,8	5,1
Displacements under seismic loading C2, stainless steel							
Displacements for DLS	$\delta_{V,C2(0,5)}$	[mm]	3,0	2,7	3,5	4,3	4,7
Displacements for ULS	$\delta_{V,C2(0,8)}$	[mm]	5,9	5,3	9,5	9,6	10,1

Wedge Anchor BZ1

Performance
Displacements for seismic loading, performance category **C2**

Annex C8

Table C9: Characteristic resistance to **fire exposure**, **standard anchorage depth** and **reduced anchorage depth**, cracked and uncracked concrete C20/25 to C50/60, steel zinc plated

Fastener size			M8	M10	M12	M16	M20	
Tension load								
Steel failure								
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,4	0,9	1,7	3,1	4,9
	R60			0,3	0,8	1,3	2,4	3,7
	R90			0,3	0,6	1,1	2,0	3,2
	R120			0,2	0,5	0,8	1,6	2,5
Shear load								
Steel failure without lever arm								
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,4	0,9	1,7	3,1	4,9
	R60			0,3	0,8	1,3	2,4	3,7
	R90			0,3	0,6	1,1	2,0	3,2
	R120			0,2	0,5	0,8	1,6	2,5
Steel failure with lever arm								
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,4	1,1	2,6	6,6	13,0
	R60			0,3	1,0	2,0	5,0	9,7
	R90			0,3	0,7	1,7	4,3	8,4
	R120			0,2	0,6	1,3	3,3	6,5

Wedge Anchor BZ1

Performance

Characteristic resistance to **fire exposure**, steel zinc plated

Annex C9

Table C10: Characteristic resistance to **fire exposure, standard anchorage depth and reduced anchorage depth**, cracked and uncracked concrete C20/25 to C50/60, stainless steel

Fastener size			M8	M10	M12	M16	M20	
Tension load								
Steel failure								
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,7	1,5	2,5	4,7	7,4
	R60			0,6	1,2	2,1	3,9	6,1
	R90			0,4	0,9	1,7	3,1	4,9
	R120			0,4	0,8	1,3	2,5	3,9
Shear load								
Steel failure without lever arm								
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,7	1,5	2,5	4,7	7,4
	R60			0,6	1,2	2,1	3,9	6,1
	R90			0,4	0,9	1,7	3,1	4,9
	R120			0,4	0,8	1,3	2,5	3,9
Steel failure with lever arm								
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,7	1,9	3,9	10,0	19,5
	R60			0,6	1,5	3,3	8,3	16,2
	R90			0,4	1,2	2,6	6,6	13,0
	R120			0,4	1,0	2,1	5,3	10,4

Wedge Anchor BZ1

Performance
Characteristic resistance to **fire exposure, stainless steel**

Annex C10