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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-25/0632
of 13 November 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

Wedge Anchor BZ2 R

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

18 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 330232-01-0601, edition 05/2021

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Specific Part

1 Technical description of the product

The Wedge anchor BZ2 R is a fastener made of 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 B4 and C1
Characteristic resistance to shear load (static and quasi-static loading)	see Annex C2
Characteristic resistance for seismic performance categories C1 and C2	see Annex C3 and C4
Displacements	see Annex C6
Durability	see Annex B1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	see Annex C5

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 330232-01-0601 the applicable European legal act is: 1996/582/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 EAD

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

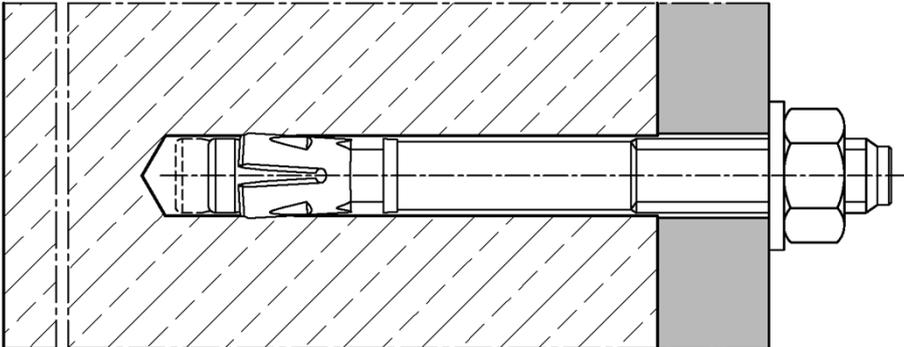
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Dipl.-Ing. Beatrix Wittstock
Head of Section

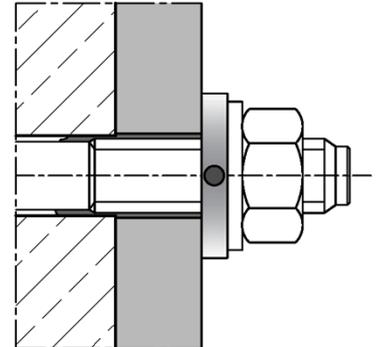
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Ziegler

Wedge Anchor BZ2 R

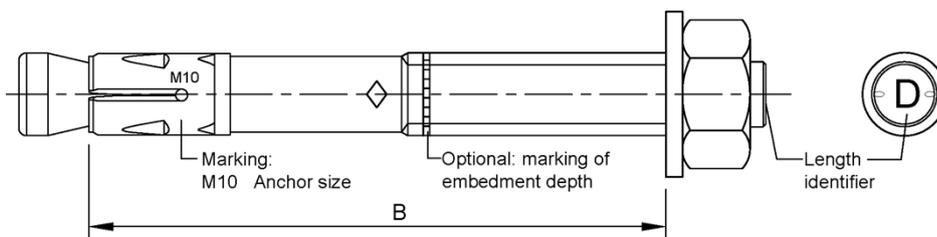
Installation condition



with filling washer VS



Marking



e.g.: \diamond BZ2 50 R

- \diamond Identifying mark of manufacturing plant
- BZ2 fastener identity
- 50 maximum thickness of fixture
- R marking for stainless steel CRC III

Usable length:

$$B = h_{ef} + t_{fix}$$

h_{ef} : (existing) effective anchorage depth

t_{fix} : fixture thickness (including e.g. leveling layers or other non-load-bearing layers or additional filling washer)

$t_{fix, hef, red}$: fixture thickness at reduced anchorage depth

Table A1: Length identification

Length identifier	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Usable length B \geq	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105

Length identifier	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD
Usable length B \geq	110	115	120	125	130	135	140	145	150	160	170	180	190	200	210

Length identifier	EE	FF	GG	HH	II	JJ	KK	LL
Usable length B \geq	220	230	240	250	260	270	280	290

Dimensions in mm

Wedge Anchor BZ2 R

Product description
Installation conditions / Marking

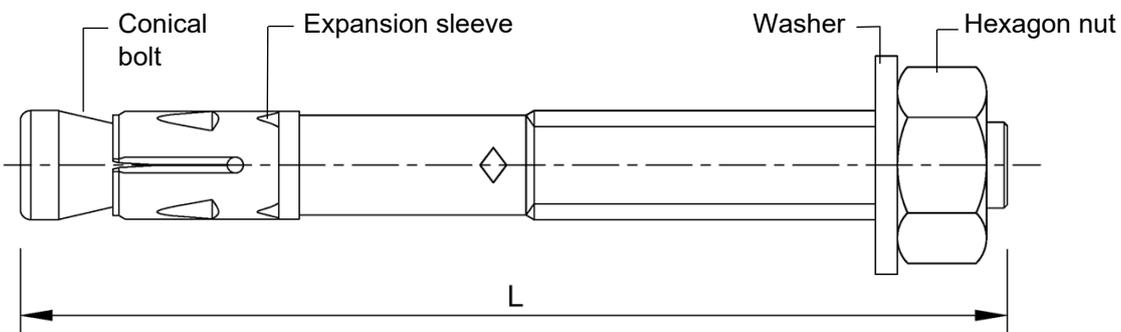
Annex A1

Table A2: Material

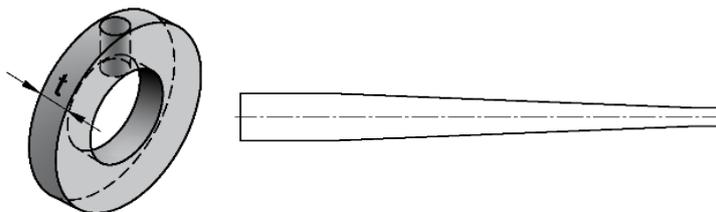
Part	Stainless steel CRC III
Conical bolt	Stainless steel, fracture elongation $A_5 \geq 8\%$
Expansion sleeve	Stainless steel
Washer	Stainless steel
Filling washer VS	
Hexagon nut	

Table A3: Fastener dimensions

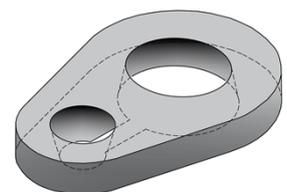
Fastener size		M8	M10	M12	M16
Width across hexagon nut	s [mm]	13	17	19	24
Length of fastener	Standard anchorage depth L [mm]	$t_{fix} + 63,0$	$t_{fix} + 81,5$	$t_{fix} + 96,0$	$t_{fix} + 118,0$
	reduced anchorage depth	$t_{fix\ hef,red} + 53,0$	$t_{fix\ hef,red} + 61,5$	$t_{fix\ hef,red} + 76,0$	$t_{fix\ hef,red} + 98,0$
Thickness of filling washer VS	t [mm]	5			



Filling washer VS with reducing adapter



alternate filling washer



Wedge Anchor BZ2 R

Product description
Material and dimensions

Annex A2

Specifications of intended use

Wedge Anchor BZ2 R	M8	M10	M12	M16
Static or quasi-static action			✓	
Seismic action, performance categories C1 and C2 ¹⁾			✓	
Fire exposure			R30 / R60 / R90 / R120	

¹⁾ for $h_{ef} \geq 40$ mm

Base materials:

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

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
- 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 A2, Table A2 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 fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Design method EN 1992-4:2018.

Installation:

- 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.
- The anchor can be set in pre- and through-setting installation.
- Optionally, the annular gap between fixture and stud can be filled to reduce the hole clearance. For this purpose, the filling washer VS (Annex A2) must be used in addition to the supplied washer. For filling use MKT Injection Adhesive VMH, VMU plus, VMZ or other high-strength injection mortar with compressive strength ≥ 40 N/mm².

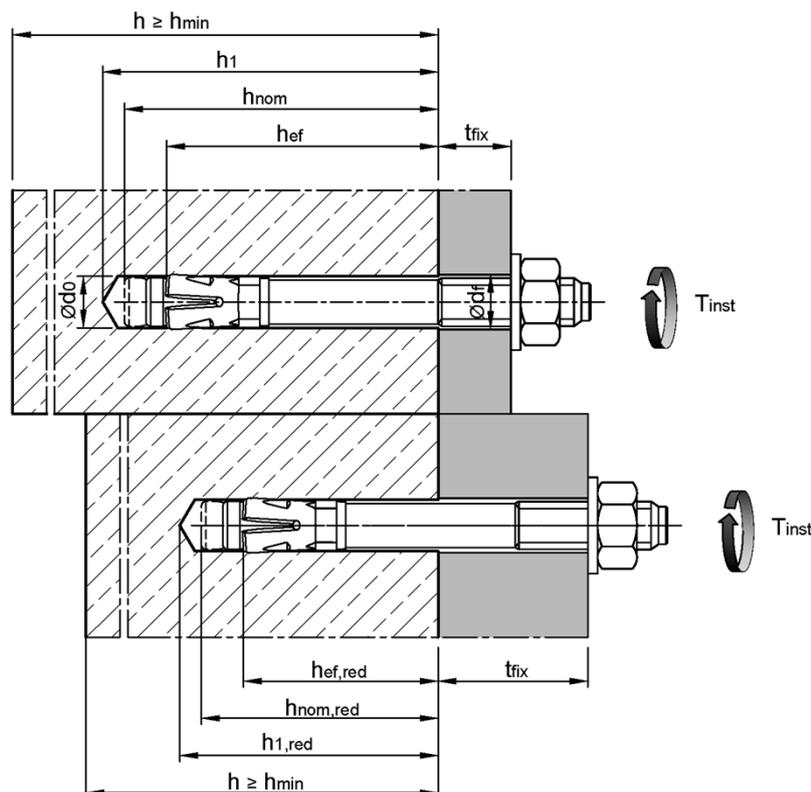
Wedge Anchor BZ2 R	Annex B1
Intended use Specifications	

Table B1: Installation parameters

Anchor size		M8	M10	M12	M16
Nominal drill hole diameter	d_0 [mm]	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8,45	10,45	12,5	16,5
Diameter of clearance hole in the fixture ¹⁾	$d_f \leq$ [mm]	9	12	14	18
Installation torque	T_{inst} [Nm]	15	40	55	100
Standard anchorage depth					
Effective anchorage depth	$h_{ef} \geq$ [mm]	45	60	70	85
Depth of drill hole	$h_1 \geq$ [mm]	55	71	83	102
Nominal anchorage depth	$h_{nom} \geq$ [mm]	53	69	80	99
Reduced anchorage depth					
Effective anchorage depth	$h_{ef,red} \geq$ [mm]	35 ²⁾	40	50	65
Depth of drill hole	$h_{1,red} \geq$ [mm]	45	51	63	82
Nominal anchorage depth	$h_{nom,red} \geq$ [mm]	43	49	60	79

1) For larger diameters of clearance hole in the fixture, see EN 1992-4:2018, chapter 6.2.2.2

2) Fastenings with anchorage depth $h_{ef} < 40$ mm are restricted to the use of structural components which are statically indeterminate and subject to internal exposure conditions only.



Wedge Anchor BZ2 R

Intended use
Installation parameters

Annex B2

Table B2: Minimum spacings and edge distances, standard anchorage depth

Fastener size			M8	M10	M12	M16
Standard thickness of concrete member						
Standard thickness of member	$h_{min,1}$	[mm]	100	110	120	160
Cracked concrete						
Minimum spacing	s_{min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	45	70	70	75
Minimum edge distance	c_{min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	50	105	85	85
Uncracked concrete						
Minimum spacing	s_{min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	55	95	85	95
Minimum edge distance	c_{min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	80	190	130	150
Minimum thickness of concrete member						
Minimum thickness of member	$h_{min,2}$	[mm]	80	90	105	130
Cracked concrete						
Minimum spacing	s_{min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	60	85	80	95
Minimum edge distance	c_{min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	95	155	120	150
Uncracked concrete						
Minimum spacing	s_{min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	75	120	100	120
Minimum edge distance	c_{min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	130	270	175	230
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 BZ2 R

Intended use

Minimum spacings and edge distances, standard anchorage depth

Annex B3

Table B3: Minimum spacings and edge distances, reduced anchorage depth

Fastener size			M8	M10	M12	M16
Minimum thickness of concrete member						
Minimum thickness of member	$h_{\min,3}$	[mm]	80	80	100	120
Cracked concrete						
Minimum spacing	s_{\min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	60	95	85	105
Minimum edge distance	c_{\min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	95	190	135	175
Uncracked concrete						
Minimum spacing	s_{\min}	[mm]	35	40	50	65
	for $c \geq$	[mm]	75	140	105	135
Minimum edge distance	c_{\min}	[mm]	40	45	55	65
	for $s \geq$	[mm]	130	315	190	265
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.

Table B4: Applicable concrete thickness h_{sp} and area A_{sp} to determine characteristic edge distance $c_{cr,sp}$

Anchor size			M8	M10	M12	M16
Applicable concrete thickness	h_{sp}	[mm]	$\min(h; h_{ef} + 1,5 \cdot c \cdot \sqrt{2})$			
Area to determine $c_{cr,sp}$ ¹⁾	A_{sp}	[mm ²]	$\frac{N_{Rk,sp}^0 + 4,177}{0,000862}$	$\frac{N_{Rk,sp}^0 + 7,235}{0,000967}$	$\frac{N_{Rk,sp}^0 + 7,847}{0,000951}$	$\frac{N_{Rk,sp}^0 + 11,415}{0,000742}$

¹⁾ With $N_{Rk,sp}^0$ in kN

Wedge Anchor BZ2 R

Intended use

Minimum spacings and edge distance, reduced anchorage depth
Required area and applicable concrete thickness for characteristic edge distance

Annex B4

Installation instructions

Hole drilling and cleaning – vacuum drilling		
1a		<p>Drill hole perpendicular to concrete surface. Proceed with step 3.</p>
Hole drilling and cleaning – hammer drilling		
1b		<p>Drill hole perpendicular to concrete surface.</p>
2		<p>Blow out dust. Alternatively vacuum clean down to the bottom of the hole.</p>
Insert fastener		
3		<p>Drive in fastener.</p>
4		<p>Apply installation torque T_{inst}.</p>

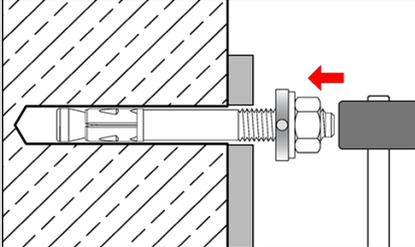
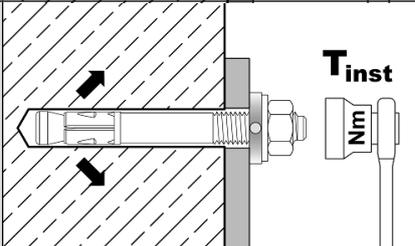
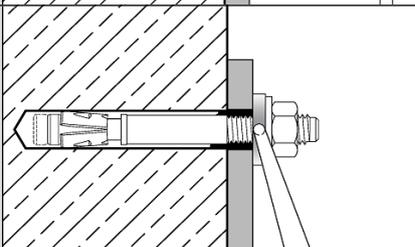
Wedge Anchor BZ2 R

Intended use

Installation instructions – hole drilling, cleaning and set fastener

Annex B5

Installation instructions - continuation

Insert fastener with filling of annular gap	
3	 <p>Install the filling washer in addition to the washer. Drive in fastener. The thickness of the filling washer must be taken into account for t_{fix}.</p>
4	 <p>Apply installation torque T_{inst}.</p>
5	 <p>Fill the annular gap between anchor and fixture with injection adhesive (see Annex B1). Use enclosed reducing adapter. The annular gap is completely filled, when excess mortar seeps out.</p>

Wedge Anchor BZ2 R

Intended use
Installation instruction – filling of annular gap

Annex B6

Table C1: Characteristic values for tension loads under static and quasi-static action

Fastener size			M8	M10	M12	M16
Installation factor	γ_{inst}	[-]	1,0			
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	19,8	30,4	44,9	74,6
Partial factor ⁴⁾	γ_{Ms}	[-]	1,5			
Pull-out						
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	9,5	16,0	20,2	29,0
Increasing factor $N_{Rk,p,cr} = \psi_C \cdot N_{Rk,p,cr} (C20/25)$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,488}$	$\left(\frac{f_{ck}}{20}\right)^{0,500}$	$\left(\frac{f_{ck}}{20}\right)^{0,435}$	$\left(\frac{f_{ck}}{20}\right)^{0,350}$
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	16,0	24,0	38,0	40,0
Increasing factor $N_{Rk,p,ucr} = \psi_C \cdot N_{Rk,p,ucr} (C20/25)$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,240}$	$\left(\frac{f_{ck}}{20}\right)^{0,364}$	$\left(\frac{f_{ck}}{20}\right)^{0,213}$	$\left(\frac{f_{ck}}{20}\right)^{0,196}$
Splitting						
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$\min (N_{Rk,p} ; N^0_{Rk,c})$ ³⁾			
Characteristic edge distance ²⁾	$c_{cr,sp}$	[mm]	$\min\left(\frac{A_{sp} + 0,8 \cdot (h_{sp} - h_{ef})^2}{3,41 \cdot h_{sp} - 0,59 \cdot h_{ef}}; \frac{A_{sp}}{h_{sp} \cdot \sqrt{8}}\right) \geq 1,5 \cdot h_{ef}$			
Characteristic spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$			
Factor	$\psi_{h,sp}$	[-]	1,0			
Concrete cone failure						
Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ¹⁾	40	50	65
Standard anchorage depth	h_{ef}	[mm]	45	60	70	85
Characteristic edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$			
Characteristic spacing	$s_{cr,N}$	[mm]	$2 \cdot c_{cr,N}$			
Factor	cracked concrete	$k_{cr,N}$	7,7			
	uncracked concrete	$k_{ucr,N}$	11,0			

¹⁾ Fastenings with anchorage depth $h_{ef} < 40$ mm are restricted to the use of structural components which are statically indeterminate and subject to internal exposure conditions only.

²⁾ Applicable concrete thickness h_{sp} and area A_{sp} to determine characteristic edge distance $c_{cr,sp}$ according to Table B4.

³⁾ $N^0_{Rk,c}$ according EN 1992-4:2018

⁴⁾ In absence of other national regulations.

Wedge Anchor BZ2 R

Performance
Characteristic values for **tension loads**

Annex C1

Table C2: Characteristic values for **shear loads** under static and quasi-static action

Fastener size			M8	M10	M12	M16
Installation factor	γ_{inst}	[-]	1,0			
Steel failure <u>without</u> lever arm						
Characteristic resistance	$V_{Rk,s}^0$	[kN]	16,8	27,8	39,8	69,5
Partial factor ²⁾	γ_{Ms}	[-]	1,25			
Ductility factor	k_7	[-]	1,0			
Steel failure <u>with</u> lever arm						
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	27	55	99	223
Partial factor ²⁾	γ_{Ms}	[-]	1,25			
Concrete pry-out failure						
Pry-out factor	k_8	[-]	2,7	2,8	3,3	3,4
Concrete edge failure						
Effective length of fastener in shear loading	l_f	[mm]	h_{ef} ¹⁾			
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16

¹⁾ Fastenings with anchorage depth $h_{ef} < 40$ mm are restricted to the use of structural components which are statically indeterminate and subject to internal exposure conditions only.

²⁾ In absence of other national regulations.

Wedge Anchor BZ2 R

Performance
Characteristic values for **shear loads**

Annex C2

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

Fastener size				M8	M10	M12	M16			
Effective anchorage depth	$h_{ef} \geq$	[mm]		45	40	60	50	70	65	85
Tension load										
Installation factor	γ_{inst}	[-]		1,0						
Steel failure										
Characteristic resistance	$N_{Rk,s,C1}$	[kN]		19,8	30,4	44,9	74,6			
Pull-out										
Characteristic resistance	$N_{Rk,p,C1}$	[kN]		8,8	16,0	20,2	29,0			
Shear load										
Steel failure without lever arm										
Characteristic resistance	$V_{Rk,s,C1}$	[kN]		12,7	20,6	22,2	33,2	33,2	61,1	64,3
Factor for anchorages	unfilled annular gap	α_{gap}	[-]	0,5						
	filled annular gap	α_{gap}	[-]	1,0						

Wedge Anchor BZ2 R

Performance

Characteristic resistance for **seismic loading**, performance category **C1**

Annex C3

Table C4: Characteristic values, **seismic loading**, performance category **C2**

Fastener size				M8	M10		M12		M16	
Effective anchorage depth	$h_{ef} \geq$	[mm]		45	40	60	50	70	65	85
Tension load										
Installation factor	γ_{inst}	[-]		1,0						
Steel failure										
Characteristic resistance	$N_{Rk,s,C2}$	[kN]		19,8	30,4		44,9		74,6	
Pull-out										
Characteristic resistance	$N_{Rk,p,C2}$	[kN]		2,7	4,3	6,5	6,8	11,7	16,2	25,0
Shear load										
Steel failure without lever arm										
Characteristic resistance	$V_{Rk,s,C2}$	[kN]		7,3	10,6	13,5	19,0	21,8	36,3	40,2
Factor for anchorages	unfilled annular gap	α_{gap}	[-]	0,5						
	filled annular gap	α_{gap}	[-]	1,0						

Wedge Anchor BZ2 R

Performance

Characteristic resistance for **seismic loading**, performance category **C2**

Annex C4

Table C5: Characteristic values for tension and shear load under fire exposure

Fastener size				M8	M10	M12	M16
Tension load							
Steel failure							
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	1,2	2,6	4,6	7,7
	R60			1,0	1,9	3,3	5,6
	R90			0,7	1,3	2,1	3,5
	R120			0,6	1,0	1,5	2,5
Shear load							
Steel failure <u>without</u> lever arm							
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	4,0	7,5	12,3	20,7
	R60			2,7	5,1	8,5	14,2
	R90			1,4	2,7	4,6	7,7
	R120			0,8	1,6	2,7	4,5
Steel failure <u>with</u> lever arm							
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	4,1	9,6	19,1	43,8
	R60			2,8	6,6	13,1	30,1
	R90			1,5	3,5	7,2	16,4
	R120			0,8	2,0	4,2	9,6

$N_{Rk,p,fi}$ and $N_{Rk,c,fi}$ according to EN 1992-4:2018

Wedge Anchor BZ2 R

Performance
Characteristic values under **fire exposure**

Annex C5

Table C6: Displacements under tension load

Fastener size		M8	M10	M12	M16			
Displacements under static or quasi-static action								
$\delta_{N0} = \delta_{N0\text{-factor}} \cdot N$		N: acting tension load						
$\delta_{N\infty} = \delta_{N\infty\text{-factor}} \cdot N$								
Effective anchorage depth	$h_{ef} \geq$ [mm]	35	40	50	65			
Cracked concrete								
Factor for displacement	$\delta_{N0\text{-factor}}$ [mm/kN]	0,11	0,06	0,05	0,02			
	$\delta_{N\infty\text{-factor}}$ [mm/kN]	0,27	0,17	0,16	0,08			
Uncracked concrete								
Factor for displacement	$\delta_{N0\text{-factor}}$ [mm/kN]	0,02	0,00	0,001	0,00			
	$\delta_{N\infty\text{-factor}}$ [mm/kN]	0,05	0,05	0,05	0,05			
Displacements under seismic action C2								
Effective anchorage depth	$h_{ef} \geq$ [mm]	45	40	60	50	70	65	85
Displacements for DLS	$\delta_{N,C2(DLS)}$ [mm]	2,9	2,6	4,1	3,3	5,7	3,3	5,1
Displacements for ULS	$\delta_{N,C2(ULS)}$ [mm]	11,1	10,8	16,8	10,4	18,0	9,0	13,9

Table C7: Displacements ²⁾ under shear load

Fastener size		M8	M10	M12	M16			
Displacements under static or quasi-static action								
$\delta_{V0} = \delta_{V0\text{-factor}} \cdot V$		V: acting shear load						
$\delta_{V\infty} = \delta_{V\infty\text{-factor}} \cdot V$								
Effective anchorage depth	$h_{ef} \geq$ [mm]	35	40	50	65			
Factor for displacement	$\delta_{V0\text{-factor}}$ [mm/kN]	0,26	0,14	0,12	0,09			
	$\delta_{V\infty\text{-factor}}$ [mm/kN]	0,39	0,20	0,17	0,14			
Displacements under seismic action C2 ¹⁾								
Effective anchorage depth	$h_{ef} \geq$ [mm]	45	40	60	50	70	65	85
Displacements for DLS	$\delta_{V,C2(DLS)}$ [mm]	3,0	3,4	3,5	3,5	4,2	3,8	4,4
Displacements for ULS	$\delta_{V,C2(ULS)}$ [mm]	5,1	7,0	8,4	7,5	11,8	7,8	11,1

¹⁾ For anchorages with clearance in the fixture the annular gap must also be taken into account

²⁾ Displacements valid for unfilled and filled annular gap

Wedge Anchor BZ2 R

Performance
Displacements

Annex C6