

TELJESÍTMÉNYNYILATKOZAT
DoP Nr. MKT-113 - hu

1. A terméktípus egyedi azonosító kódja: **MKT Bolzenanker BZ plus & BZ-IG**
2. Típus-, tétel- vagy sorozatszám vagy egyéb ilyen elem, amely lehetővé teszi az építési termék azonosítását a 11. cikk (4) bekezdésében előírtaknak megfelelően:

ETA-99/0010, Melléklet A3 & A5
Gyártási szám a csomagoláson vagy a címkén

3. Az építési terméknek a gyártó által meghatározott rendeltetése vagy rendeltetései az alkalmazandó harmonizált műszaki előírással összhangban:

általános típus	Nyomaték kontrollált feszítő tőcsavar (ék típusú)
való használatra	Repedéses és repedésmentes betonban C20/25 - C50/60 (EN 206)
opció	1
terhelés	Statikus vagy kvázi-statikus, szeizmikus, kategória C1+C2 (Méretek BZ plus M8, M10, M12, M16, M20)
anyag	<p><u>Horganyzott acé:</u> száraz belső használatra Méretek: BZ plus: M8, M10, M12, M16, M20, M24, M27 BZ-IG: M6, M8, M10, M12</p> <p><u>Diffúziós horganyzott acé:</u> száraz belső használatra Méretek: BZ plus: M10, M12, M16, M20</p> <p><u>Rozsdamentes acél (jelölés A4):</u> belső és külső használatra nem különösen agresszív feltételek Méretek: BZ plus: M8, M10, M12, M16, M20, M24 BZ-IG: M6, M8, M10, M12</p> <p><u>Magas korrózióállóságú acél (jelölés HCR):</u> belső és kültéri alkalmazás különösen agresszív körülmények között Méretek: BZ plus: M8, M10, M12, M16, M20, M24 BZ-IG: M6, M8, M10, M12</p>
hőmérséklet tartomány, ha alkalmazható	--

4. A gyártók neve, bejegyzett kereskedelmi neve, illetve bejegyzett védjegye, valamint értesítési címe a 11. cikk (5) bekezdésében előírtaknak megfelelően:

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

5. Adott esetben annak a meghatalmazott képviselőnek a neve és értesítési címe, akinek a megbízása körébe a 12. cikk (2) bekezdésében meghatározott feladatok tartoznak: --
6. Az építési termékek teljesítménye állandóságának értékelésére és ellenőrzésére szolgáló, az V. mellékletben szereplők szerinti rendszer vagy rendszerek: **Rendszer 1**
7. Harmonizált szabványok által szabályozott építési termékekre vonatkozó gyártói nyilatkozat esetén: --

8. Olyan építési termékekre vonatkozó gyártói nyilatkozat esetén, amelyekre európai műszaki értékelést adtak ki:

Deutsches Institut für Bautechnik, Berlin

a következőt adta ki:

ETA-99/0010

alapján

ETAG 001-2

A bejelentett termék tanúsító szervezet 1343-CPR tette, hogy a rendszer 1:

- i) a terméktípus meghatározása típusvizsgálat (ideértve a mintavételt is), típusszámítás, táblázatba foglalt értékek vagy a termék leíró dokumentációja alapján;
- ii) a gyártó üzem és az üzemi gyártásellenőrzés alapvizsgálata;
- iii) az üzemi gyártásellenőrzés folyamatos felügyelete, vizsgálata és értékelése.

és a következőt adta ki: A termék megfeleléségi tanúsítványa 1343-CPR-M 550-1

9. A nyilatkozat szerinti teljesítmény:

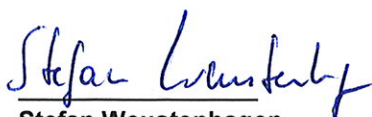
Alapvető tulajdonságok	Tervezési módszer	Teljesítmény		Harmonizált műszaki előírások
		BZ plus	BZ-IG	
karakterisztikus ellenállás húzásra	ETAG 001, Melléklet C CEN/TS 1992-4	Melléklet C1-C4	Melléklet C11-C12	ETAG 001
karakterisztikus ellenállás nyírásra	ETAG 001, Melléklet C CEN/TS 1992-4	Melléklet C5	Melléklet C13	
karakterisztikus ellenállás szeizmikus kereslet	TR 045	Melléklet C6	NPD	
elmozdulás használhatósági határállapot	ETAG 001, Melléklet C CEN/TS 1992-4	Melléklet C9-C10	Melléklet C15	
karakterisztikus ellenállás tűz expozíció	TR 020 CEN/TS 1992-4	Melléklet C7-C8	Melléklet C14	

Amennyiben a 37. és 38. cikknek megfelelően egyedi műszaki dokumentáció alkalmazására került sor, a termék által teljesített követelmények: --

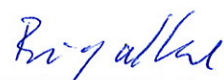
10. Az 1. és 2. pontban meghatározott termék teljesítménye megfelel a 9. pontban feltüntetett, nyilatkozat szerinti teljesítménynek.

E teljesítménynyilatkozat kiadásáért kizárólag a 4. pontban meghatározott gyártó a felelős.

A gyártó nevében és részéről aláíró személy:



Stefan Weustenhagen
(Menedzser)
Weilerbach, 21.04.2016

i.V. 

Dipl.-Ing. Detlef Bigalke
(Menedzser termékfejlesztés)



Table C1: Characteristic values for **tension loads, BZ plus zinc plated, cracked concrete**, static and quasi-static action

Anchor size			M8	M10	M12	M16	M20	M24	M27
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0						
Steel failure									
Characteristic tension resistance	$N_{Rk,s}$	[kN]	16	27	40	60	86	126	196
Partial safety factor	γ_{Ms}	[-]	1,53		1,5		1,6	1,5	
Pull-out									
Standard anchorage depth									
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	5	9	16	25	1)	1)	1)
Reduced anchorage depth									
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	5	7,5	1)	1)	-	-	-
Increasing factor for $N_{Rk,p}$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$						
Concrete cone failure									
Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100	115	125
Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ²⁾	40	50	65	-	-	-
Factor acc. to CEN/TS 1992-4	k_{cr}	[-]	7,2						

1) Pull-out is not decisive.

2) Use restricted to anchoring of structural components statically indeterminate.

Wedge Anchor BZ plus

Performance

Characteristic values for **tension loads, BZ plus zinc plated, cracked concrete**, static and quasi-static action

Annex C1

Table C2: Characteristic values for **tension loads**, BZ plus **A4 / HCR**, **cracked concrete**, static and quasi-static action

Anchor size			M8	M10	M12	M16	M20	M24
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure								
Characteristic tension resistance	$N_{Rk,s}$	[kN]	16	27	40	64	108	110
Partial safety factor	γ_{Ms}	[-]	1,5				1,68	1,5
Pull-out								
Standard anchorage depth								
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	5	9	16	25	1)	40
Reduced anchorage depth								
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	5	7,5	1)	1)	-	-
Increasing factor for $N_{Rk,p}$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$					
Concrete cone failure								
Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100	125
Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ²⁾	40	50	65	-	-
Factor according to CEN/TS 1992-4	k_{cr}	[-]	7,2					

1) Pull-out is not decisive.

2) Use restricted to anchoring of structural components statically indeterminate.

Wedge Anchor BZ plus

Performance

Characteristic values for **tension loads**, BZ plus **A4 / HCR**, **cracked concrete**, static and quasi-static action

Annex C2

Table C3: Characteristic values for tension loads, BZ plus zinc plated, non-cracked concrete, static and quasi-static action

Anchor size			M8	M10	M12	M16	M20	M24	M27
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0						
Steel failure									
Characteristic tension resistance	$N_{Rk,s}$	[kN]	16	27	40	60	86	126	196
Partial safety factor	γ_{Ms}	[-]	1,53		1,5		1,6	1,5	
Pull-out									
Standard anchorage depth									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	12	16	25	35	1)	1)	1)
Reduced anchorage depth									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	7,5	9	1)	1)	-	-	-
Splitting For the proof against splitting failure $N_{Rk,c}^0$ has to be replaced by $N_{Rk,sp}^0$ with consideration of the member thickness									
Standard anchorage depth									
Splitting for standard thickness of concrete member (The higher resistance of case 1 and case 2 may be applied; the values $s_{cr,sp}$ and $c_{cr,sp}$ may be linearly interpolated for the member thickness $h_{min,2} < h < h_{min,1}$ (Case 2); $\psi_{h,sp} = 1,0$)									
Standard thickness of concrete	$h_{min,1} \geq$	[mm]	100	120	140	170	200	230	250
Case 1									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	9	12	20	30	40	62,3	50
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	3 h_{ef}						
Case 2									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	12	16	25	35	50,5	62,3	70,6
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	4 h_{ef}				4,4 h_{ef}	3 h_{ef}	5 h_{ef}
Splitting for minimum thickness of concrete member									
Minimum thickness of concrete	$h_{min,2} \geq$	[mm]	80	100	120	140			
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	12	16	25	35	-	-	-
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	5 h_{ef}						
Reduced anchorage depth									
Minimum thickness of concrete	$h_{min,3} \geq$	[mm]	80	80	100	140			
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	7,5	9	17,9	26,5	-	-	-
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	200	200	250	300			
Increasing factor for $N_{Rk,p}$ and $N_{Rk,sp}^0$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$						
Concrete cone failure									
Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100	115	125
Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ²⁾	40	50	65	-	-	-
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1						

¹⁾ Pull-out is not decisive.

²⁾ Use restricted to anchoring of structural components statically indeterminate.

Wedge Anchor BZ plus

Performance

Characteristic values for **tension loads, BZ plus zinc plated, non-cracked concrete**, static and quasi-static action

Annex C3

Table C4: Characteristic values for tension loads, BZ plus A4 / HCR, non-cracked concrete, static and quasi-static action

Anchor size			M8	M10	M12	M16	M20	M24
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure								
Characteristic tension resistance	$N_{RK,s}$	[kN]	16	27	40	64	108	110
Partial safety factor	γ_{Ms}	[-]	1,5				1,68	1,5
Pull-out								
Standard anchorage depth								
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,p}$	[kN]	12	16	25	35	1)	1)
Reduced anchorage depth								
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,p}$	[kN]	7,5	9	1)	1)	-	-
Splitting For the proof against splitting failure $N_{RK,c}^0$ has to be replaced by $N_{RK,sp}^0$ with consideration of the member thickness								
Standard anchorage depth								
Splitting for standard thickness of concrete member (The higher resistance of case 1 and case 2 may be applied; the values $s_{cr,sp}$ and $c_{cr,sp}$ may be linearly interpolated for the member thickness $h_{min,2} < h < h_{min,1}$ (Case 2); $\psi_{h,sp} = 1,0$)								
Standard thickness of concrete	$h_{min,1} \geq$	[mm]	100	120	140	160	200	250
Case 1								
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,sp}^0$	[kN]	9	12	20	30	40	-
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	3 h_{ef}					
Case 2								
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,sp}^0$	[kN]	12	16	25	35	50,5	70,6
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	230	250	280	400	440	500
Splitting for minimum thickness of concrete member								
Minimum thickness of concrete	$h_{min,2} \geq$	[mm]	80	100	120	140	-	-
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,sp}^0$	[kN]	12	16	25	35		
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	5 h_{ef}					
Reduced anchorage depth								
Minimum thickness of concrete	$h_{min,3} \geq$	[mm]	80	80	100	140	-	-
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,sp}^0$	[kN]	7,5	9	17,9	26,5		
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	200	200	250	300		
Increasing factor for $N_{RK,p}$ and $N_{RK,sp}^0$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$					
Concrete cone failure								
Effective anchorage depth	h_{ef}	[mm]	46	60	70	85	100	125
Reduced anchorage depth	$h_{ef,red}$	[mm]	35 ²⁾	40	50	65	-	-
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1					

1) Pull-out is not decisive.

2) Use restricted to anchoring of structural components statically indeterminate.

Wedge Anchor BZ plus

Performance

Characteristic values for **tension loads, BZ plus A4 / HCR, non-cracked concrete**, static and quasi-static action

Annex C4

Table C5: Characteristic values for **shear loads**, BZ plus, **cracked and non-cracked concrete**, static or quasi static action

Anchor size			M8	M10	M12	M16	M20	M24	M27	
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0							
Steel failure without lever arm, Steel zinc plated										
Characteristic shear resistance	$V_{Rk,s}$	[kN]	12,2	20,1	30	55	69	114	169,4	
Factor for ductility	k_2	[-]	1,0							
Partial safety factor	γ_{Ms}	[-]	1,25				1,33	1,25	1,25	
Steel failure without lever arm, Stainless steel A4, HCR										
Characteristic shear resistance	$V_{Rk,s}$	[kN]	13	20	30	55	86	123,6	-	
Factor for ductility	k_2	[-]	1,0							
Partial safety factor	γ_{Ms}	[-]	1,25				1,4	1,25		
Steel failure with lever arm, Steel zinc plated										
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	23	47	82	216	363	898	1331,5	
Partial safety factor	γ_{Ms}	[-]	1,25				1,33	1,25	1,25	
Steel failure with lever arm, Stainless steel A4, HCR										
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	200	454	785,4	-	
Partial safety factor	γ_{Ms}	[-]	1,25				1,4	1,25		
Concrete pry-out failure										
Factor k acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS 1992-4	$k_{(3)}$	[-]	2,4				2,8			
Concrete edge failure										
Effective length of anchor in shear loading with h_{ef}	Steel zinc plated	l_f	[mm]	46	60	70	85	100	115	125
	Stainless steel A4, HCR	l_f	[mm]	46	60	70	85	100	125	-
Effective length of anchor in shear loading with $h_{ef,red}$	Steel zinc plated	$l_{f,red}$	[mm]	35 ¹⁾	40	50	65	-	-	-
	Stainless steel A4, HCR	$l_{f,red}$	[mm]	35 ¹⁾	40	50	65			
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24	27	

¹⁾ Use restricted to anchoring of structural components statically indeterminate.

Wedge Anchor BZ plus

Performance

Characteristic values for **shear loads**, BZ plus, **cracked and non-cracked concrete**, static or quasi static action

Annex C5

Table C6: Characteristic resistance for seismic loading, BZ plus, standard anchorage depth, performance category C1 and C2

Anchor size			M8	M10	M12	M16	M20
Tension loads							
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0				
Steel failure, Steel zinc plated							
Characteristic resistance C1	$N_{Rk,s,seis,C1}$	[kN]	16	27	40	60	86
Characteristic resistance C2	$N_{Rk,s,seis,C2}$	[kN]	16	27	40	60	86
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,53		1,5		1,6
Steel failure, Stainless steel A4, HCR							
Characteristic resistance C1	$N_{Rk,s,seis,C1}$	[kN]	16	27	40	64	108
Characteristic resistance C2	$N_{Rk,s,seis,C2}$	[kN]	16	27	40	64	108
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,5				1,68
Pull-out (steel zinc plated, stainless steel A4 and HCR)							
Characteristic resistance C1	$N_{Rk,p,seis,C1}$	[kN]	5	9	16	25	36
Characteristic resistance C2	$N_{Rk,p,seis,C2}$	[kN]	2,3	3,6	10,2	13,8	24,4
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	1,0				
Shear loads							
Steel failure without lever arm, Steel zinc plated							
Characteristic resistance C1	$V_{Rk,s,seis,C1}$	[kN]	9,3	20	27	44	69
Characteristic resistance C2	$V_{Rk,s,seis,C2}$	[kN]	6,7	14	16,2	35,7	55,2
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,25				1,33
Steel failure without lever arm, Stainless steel A4, HCR							
Characteristic resistance C1	$V_{Rk,s,seis,C1}$	[kN]	9,3	20	27	44	69
Characteristic resistance C2	$V_{Rk,s,seis,C2}$	[kN]	6,7	14	16,2	35,7	55,2
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,25				1,4

Wedge Anchor BZ plus

Performance

Characteristic resistance for **seismic loading**, BZ plus, **standard anchorage depth**, performance category **C1** and **C2**

Annex C6

Table C7: Characteristic values for tension and shear load under fire exposure, BZ plus, standard anchorage depth, cracked and non-cracked concrete C20/25 to C50/60

Anchor size		M8	M10	M12	M16	M20	M24	M27		
Tension load										
Steel failure										
Steel, galvanised										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	1,5	2,6	4,1	7,7	9,4	13,6	17,6
	R60			1,1	1,9	3,0	5,6	8,2	11,8	15,3
	R90			0,8	1,4	2,4	4,4	6,9	10,0	13,0
	R120			0,7	1,2	2,2	4,0	6,3	9,1	11,8
Stainless steel A4, HCR										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	3,8	6,9	12,7	23,7	33,5	48,2	-
	R60			2,9	5,3	9,4	17,6	25,0	35,9	
	R90			2,0	3,6	6,1	11,5	16,4	23,6	
	R120			1,6	2,8	4,5	8,4	12,1	17,4	
Shear load										
Steel failure without lever arm										
Steel, galvanised										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	1,6	2,6	4,1	7,7	11	16	20,6
	R60			1,5	2,5	3,6	6,8	11	15	19,8
	R90			1,2	2,1	3,5	6,5	10	15	19,0
	R120			1,0	2,0	3,4	6,4	10	14	18,6
Stainless steel A4, HCR										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	3,8	6,9	12,7	23,7	33,5	48,2	-
	R60			2,9	5,3	9,4	17,6	25,0	35,9	
	R90			2,0	3,6	6,1	11,5	16,4	23,6	
	R120			1,6	2,8	4,5	8,4	12,1	17,4	
Steel failure with lever arm										
Steel, galvanised										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,7	3,3	6,4	16,3	29	50	75
	R60			1,6	3,2	5,6	14	28	48	72
	R90			1,2	2,7	5,4	14	27	47	69
	R120			1,1	2,5	5,3	13	26	46	68
Stainless steel A4, HCR										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	3,8	9,0	19,7	50,1	88,8	153,5	-
	R60			2,9	6,8	14,6	37,2	66,1	114,3	
	R90			2,1	4,7	9,5	24,2	43,4	75,1	
	R120			1,6	3,6	7,0	17,8	32,1	55,5	

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out and concrete edge failure can be calculated according to TR020 / CEN/TS 1992-4. If pull-out is not decisive in Eq. 2.4 and Eq. 2.5, TR 020 $N_{Rk,p}$ must be replaced by $N^0_{Rk,c}$.

Wedge Anchor BZ plus

Performance

Characteristic values for tension and shear load under fire exposure, BZ plus, standard anchorage depth, cracked and non-cracked concrete C20/25 to C50/60

Annex C7

Table C8: Characteristic values for tension and shear load under fire exposure, BZ plus, reduced anchorage depth, cracked and non-cracked concrete C20/25 to C50/60

Anchor size		M8	M10	M12	M16		
Tension load							
Steel failure							
Steel, galvanised							
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	1,5	2,6	4,1	7,7
	R60			1,1	1,9	3,0	5,6
	R90			0,8	1,3	1,9	3,5
	R120			0,6	1,0	1,3	2,5
Stainless steel A4, HCR							
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	3,2	6,9	12,7	23,7
	R60			2,5	5,3	9,4	17,6
	R90			1,9	3,6	6,1	11,5
	R120			1,6	2,8	4,5	8,4
Shear load							
Steel failure without lever arm							
Steel, galvanised							
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	1,5	2,6	4,1	7,7
	R60			1,1	1,9	3,0	5,6
	R90			0,8	1,3	1,9	3,5
	R120			0,6	1,0	1,3	2,5
Stainless steel A4, HCR							
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	3,2	6,9	12,7	23,7
	R60			2,5	5,3	9,4	17,6
	R90			1,9	3,6	6,1	11,5
	R120			1,6	2,8	4,5	8,4
Steel failure with lever arm							
Steel, galvanised							
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,5	3,3	6,4	16,3
	R60			1,2	2,5	4,7	11,9
	R90			0,8	1,7	3,0	7,5
	R120			0,6	1,2	2,1	5,3
Stainless steel A4, HCR							
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	3,2	8,9	19,7	50,1
	R60			2,6	6,8	14,6	37,2
	R90			2,0	4,7	9,5	24,2
	R120			1,6	3,6	7,0	17,8

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out and concrete edge failure can be calculated according to TR020 / CEN/TS 1992-4. If pull-out is not decisive in Eq. 2.4 and Eq. 2.5, TR 020 $N_{Rk,p}$ must be replaced by $N^0_{Rk,c}$.

Wedge Anchor BZ plus

Performance

Characteristic values for tension and shear load under fire exposure, BZ plus, reduced anchorage depth, cracked and non-cracked concrete C20/25 to C50/60

Annex C8

Table C9: Displacements under tension load, BZ plus

Anchor size			M8	M10	M12	M16	M20	M24	M27
Standard anchorage depth									
Steel zinc plated									
Tension load in cracked concrete	N	[kN]	2,4	4,3	7,6	11,9	17,1	21,1	24
Displacement	δ_{N0}	[mm]	0,6	1,0	0,4	1,0	0,9	0,7	0,9
	$\delta_{N\infty}$	[mm]	1,4	1,2	1,4	1,3	1,0	1,2	1,4
Tension load in non-cracked concrete	N	[kN]	5,7	7,6	11,9	16,7	23,8	29,6	34
Displacement	δ_{N0}	[mm]	0,4	0,5	0,7	0,3	0,4	0,5	0,3
	$\delta_{N\infty}$	[mm]	0,8		1,4	0,8		1,4	
Displacements under seismic tension loads C2									
Displacements for DLS	$\delta_{N,seis,C2(DLS)}$	[mm]	2,3	4,1	4,9	3,6	5,1	-	-
Displacements for ULS	$\delta_{N,seis,C2(ULS)}$	[mm]	8,2	13,8	15,7	9,5	15,2	-	-
Stainless steel A4, HCR									
Tension load in cracked concrete	N	[kN]	2,4	4,3	7,6	11,9	17,1	19,0	-
Displacement	δ_{N0}	[mm]	0,7	1,8	0,4	0,7	0,9	0,5	
	$\delta_{N\infty}$	[mm]	1,2	1,4	1,4	1,4	1,0	1,8	
Tension load in non-cracked concrete	N	[kN]	5,8	7,6	11,9	16,7	23,8	33,5	-
Displacement	δ_{N0}	[mm]	0,6	0,5	0,7	0,2	0,4	0,5	
	$\delta_{N\infty}$	[mm]	1,2	1,0	1,4	0,4	0,8	1,1	
Displacements under seismic tension loads C2									
Displacements for DLS	$\delta_{N,seis,C2(DLS)}$	[mm]	2,3	4,1	4,9	3,6	5,1	-	-
Displacements for ULS	$\delta_{N,seis,C2(ULS)}$	[mm]	8,2	13,8	15,7	9,5	15,2	-	-
Reduced anchorage depth									
Steel zinc plated, stainless steel A4, HCR									
Tension load in cracked concrete	N	[kN]	2,4	3,6	6,1	9,0	-	-	-
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 non-cracked concrete	N	[kN]	3,7	4,3	8,5	12,6	-	-	-
Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,2			
	$\delta_{N\infty}$	[mm]	0,7	0,7	0,7	0,7			

Wedge Anchor BZ plus

Performance
Displacements under tension load

Annex C9

Table C10: Displacements under shear load, BZ plus

Anchor size			M8	M10	M12	M16	M20	M24	M27
Standard anchorage depth									
Steel zinc plated									
Shear load in cracked and non-cracked concrete	V	[kN]	6,9	11,4	17,1	31,4	36,8	64,9	96,8
Displacement	δ_{V0}	[mm]	2,0	3,2	3,6	3,5	1,8	3,5	3,6
	$\delta_{V\infty}$	[mm]	3,0	4,7	5,5	5,3	2,7	5,3	5,4
Displacements under seismic shear loads C2									
Displacements for DLS	$\delta_{V,seis,C2(DLS)}$	[mm]	3,0	2,7	3,5	4,3	4,7	-	-
Displacements for ULS	$\delta_{V,seis,C2(ULS)}$	[mm]	5,9	5,3	9,5	9,6	10,1	-	-
Stainless steel A4, HCR									
Shear load in cracked and non-cracked concrete	V	[kN]	7,3	11,4	17,1	31,4	43,8	70,6	-
Displacement	δ_{V0}	[mm]	1,9	2,4	4,0	4,3	2,9	2,8	-
	$\delta_{V\infty}$	[mm]	2,9	3,6	5,9	6,4	4,3	4,2	-
Displacements under seismic shear loads C2									
Displacements for DLS	$\delta_{V,seis,C2(DLS)}$	[mm]	3,0	2,7	3,5	4,3	4,7	-	-
Displacements for ULS	$\delta_{V,seis,C2(ULS)}$	[mm]	5,9	5,3	9,5	9,6	10,1	-	-
Reduced anchorage depth									
Steel zinc plated									
Shear load in cracked and non-cracked concrete	V	[kN]	6,9	11,4	17,1	31,4	-	-	-
Displacement	δ_{V0}	[mm]	2,0	3,2	3,6	3,5	-	-	-
	$\delta_{V\infty}$	[mm]	3,0	4,7	5,5	5,3	-	-	-
Stainless steel A4, HCR									
Shear load in cracked and non-cracked concrete	V	[kN]	7,3	11,4	17,1	31,4	-	-	-
Displacement	δ_{V0}	[mm]	1,9	2,4	4,0	4,3	-	-	-
	$\delta_{V\infty}$	[mm]	2,9	3,6	5,9	6,4	-	-	-

Wedge Anchor BZ plus

Performance
Displacements under shear load

Annex C10

Table C11: Characteristic values for **tension loads, BZ-IG, cracked concrete**, static and quasi-static action

Anchor size			M6	M8	M10	M12
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,2			
Steel failure						
Characteristic tension resistance, steel zinc plated	$N_{Rk,s}$	[kN]	16,1	22,6	26,0	56,6
Partial safety factor	γ_{Ms}	[-]	1,5			
Characteristic tension resistance, stainless steel A4, HCR	$N_{Rk,s}$	[kN]	14,1	25,6	35,8	59,0
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	5	9	12	20
Increasing factor	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	45	58	65	80
Factor according to CEN/TS 1992-4	k_{cr}	[-]	7,2			

Wedge Anchor BZ-IG

Performance

Characteristic values for **tension loads, BZ-IG, cracked concrete**, static and quasi-static action

Annex C11

Table C12: Characteristic values for tension loads, BZ-IG, non-cracked concrete, static and quasi-static action

Anchor size			M6	M8	M10	M12
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,2			
Steel failure						
Characteristic tension resistance, steel zinc plated	$N_{Rk,s}$	[kN]	16,1	22,6	26,0	56,6
Partial safety factor	γ_{Ms}	[-]	1,5			
Characteristic tension resistance, stainless steel A4, HCR	$N_{Rk,s}$	[kN]	14,1	25,6	35,8	59,0
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	12	16	20	30
Splitting ($N_{Rk,c}^0$ has to be replaced by $N_{Rk,sp}^0$. The higher resistance of Case 1 and Case 2 may be applied.)						
Minimum thickness of concrete member	h_{min}	[mm]	100	120	130	160
Case 1						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	9	12	16	25
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	3 h_{ef}			
Case 2						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,sp}^0$	[kN]	12	16	20	30
Spacing (edge distance)	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	5 h_{ef}			
Increasing factor for $N_{Rk,p}$ and $N_{Rk,sp}^0$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	45	58	65	80
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1			

Wedge Anchor BZ-IG

Performance
Characteristic values for tension loads, BZ-IG, non-cracked concrete, static and quasi-static action

Annex C12

Table C13: Characteristic values for shear loads, BZ-IG, cracked and non-cracked concrete, static and quasi-static action

Anchor size			M6	M8	M10	M12
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0			
BZ-IG, steel zinc plated						
Steel failure without lever arm, Installation type V						
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5,8	6,9	10,4	25,8
Steel failure without lever arm, Installation type D						
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5,1	7,6	10,8	24,3
Steel failure with lever arm, Installation type V						
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	12,2	30,0	59,8	104,6
Steel failure with lever arm, Installation type D						
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	36,0	53,2	76,0	207
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	γ_{Ms}	[-]	1,25			
Factor of ductility	k_2	[-]	1,0			
BZ-IG, stainless steel A4, HCR						
Steel failure without lever arm, Installation type V						
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5,7	9,2	10,6	23,6
Partial safety factor	γ_{Ms}	[-]	1,25			
Steel failure without lever arm, Installation type D						
Characteristic shear resistance	$V_{Rk,s}$	[kN]	7,3	7,6	9,7	29,6
Partial safety factor	γ_{Ms}	[-]	1,25			
Steel failure with lever arm, Installation type V						
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	10,7	26,2	52,3	91,6
Partial safety factor	γ_{Ms}	[-]	1,56			
Steel failure with lever arm, Installation type D						
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	28,2	44,3	69,9	191,2
Partial safety factor	γ_{Ms}	[-]	1,25			
Factor of ductility	k_2	[-]	1,0			
Concrete pry-out failure						
Factor k acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS 1992-4	$k_{(3)}$	[-]	1,5	1,5	2,0	2,0
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	45	58	65	80
Effective diameter of anchor	d_{nom}	[mm]	8	10	12	16

Wedge Anchor BZ-IG

Performance
 Characteristic values for shear loads, BZ-IG, cracked and non-cracked concrete, static and quasi-static action

Annex C13

Table C14: Characteristic values for **tension** and **shear load** under **fire exposure, BZ-IG**, cracked and non-cracked concrete C20/25 to C50/60

Anchor size		M6	M8	M10	M12		
Tension load							
Steel failure							
Steel zinc plated							
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,7	1,4	2,5	3,7
	R60			0,6	1,2	2,0	2,9
	R90			0,5	0,9	1,5	2,2
	R120			0,4	0,8	1,3	1,8
Stainless steel A4, HCR							
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	2,9	5,4	8,7	12,6
	R60			1,9	3,8	6,3	9,2
	R90			1,0	2,1	3,9	5,7
	R120			0,5	1,3	2,7	4,0
Shear load							
Steel failure without lever arm							
Steel zinc plated							
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,7	1,4	2,5	3,7
	R60			0,6	1,2	2,0	2,9
	R90			0,5	0,9	1,5	2,2
	R120			0,4	0,8	1,3	1,8
Stainless steel A4, HCR							
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	2,9	5,4	8,7	12,6
	R60			1,9	3,8	6,3	9,2
	R90			1,0	2,1	3,9	5,7
	R120			0,5	1,3	2,7	4,0
Steel failure with lever arm							
Steel zinc plated							
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,5	1,4	3,3	5,7
	R60			0,4	1,2	2,6	4,6
	R90			0,4	0,9	2,0	3,4
	R120			0,3	0,8	1,6	2,8
Stainless steel A4, HCR							
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	2,2	5,5	11,2	19,6
	R60			1,5	3,9	8,1	14,3
	R90			0,7	2,2	5,1	8,9
	R120			0,4	1,3	3,5	6,2

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out failure and concrete edge failure can be designed according to TR020 / CEN/TS 1992-4.

Wedge Anchor BZ-IG

Performance

Characteristic values for **tension** and **shear loads** under **fire exposure, BZ-IG** cracked and non-cracked concrete C20/25 to C50/60

Annex C14

Table C15: Displacements under tension load, BZ-IG

Anchor size			M6	M8	M10	M12
Tension load in cracked concrete	N	[kN]	2,0	3,6	4,8	8,0
	Displacements	δ_{N0}	[mm]	0,6	0,6	0,8
		$\delta_{N\infty}$	[mm]	0,8	0,8	1,2
Tension load in non-cracked concrete	N	[kN]	4,8	6,4	8,0	12,0
	Displacements	δ_{N0}	[mm]	0,4	0,5	0,7
		$\delta_{N\infty}$	[mm]	0,8	0,8	1,2

Table C16: Displacements under shear load, BZ-IG

Anchor size			M6	M8	M10	M12
Shear load in cracked and non-cracked concrete	V	[kN]	4,2	5,3	6,2	16,9
	Displacements	δ_{V0}	[mm]	2,8	2,9	2,5
		$\delta_{V\infty}$	[mm]	4,2	4,4	3,8

Wedge Anchor BZ-IG**Performance**

Displacements under tension load and under shear load

Annex C15