... eine starke Verbindung

DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH

DoP Nr: .: **MKT-1.1-200_pl**

- ✧ **Niepowtarzalny kod identyfikacyjny typu wyrobu:** **Wedge kotwica B**
- ✧ **Zamierzone zastosowanie lub zastosowania:** Kotwa mechaniczna do kotwienia w betonie, patrz załącznik B /Annex B
- ✧ **Producent:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
  Auf dem Immel 2
  67685 Weilerbach
- ✧ **System(-y) oceny i weryfikacji stałości właściwości użytkowych:** 1
- ✧ **Europejski dokument oceny:** **EAD 330232-01-0601**
  Europejska ocena techniczna: **ETA-01/0013, 17.09.2020**
  Jednostka ds. oceny technicznej: DIBt, Berlin
  Jednostka lub jednostki notyfikowane: NB 2873 – Technische Universität Darmstadt

✧ **Deklarowane właściwości użytkowe:**

Zasadnicze charakterystyki	Właściwości użytkowe
Nośność i stateczność (BWR 1)	
Charakterystyczny opór przy naprężeniu rozciągającym (efekty statyczne i quasi-statyczne)	Załącznik/Annex B4, C1, C2
Charakterystyczny opór przy naprężeniu bocznym (efekty statyczne i quasi-statyczne)	Załącznik/Annex C3
Przesunięcia (efekty statyczne i quasi-statyczne)	Załącznik/Annex B1, C4
Charakterystyka rezystancji i przemieszczeń dla kategorii C1+C2 dla badań sejsmicznych	właściwości użytkowe nieustalone
Bezpieczeństwo pożarowe (BWR 2)	
Zachowanie ogień	Klasa A1
Odporność ogniowa	właściwości użytkowe nieustalone

Właściwości użytkowe określonego powyżej wyrobu są zgodne z zestawem deklarowanych właściwości użytkowych. Niniejsza deklaracja właściwości użytkowych wydana zostaje zgodnie z rozporządzeniem (UE) nr 305/2011 na wyłączną odpowiedzialność producenta określonego powyżej.

W imieniu producenta podpisał(-a):

Stefan Weustenhagen
(Kierownik)
Weilerbach, 23.10.2020

p.p.
Dipl.-Ing. Detlef Bigalke
(Kierownik Rozwoju Produktu)

Oryginał tej deklaracji właściwości użytkowych został sporządzony w języku niemieckim. W przypadku odchyleń w tłumaczeniu obowiązuje wersja niemiecka.

Specifications of intended use

B / B fvz / B sh / B A2 / B A4 / B HCR		M6	M8	M10	M12	M16	M20
B	electroplated	✓	✓	✓	✓	✓	✓
B fvz	hot-dip galvanized	-	✓	✓	✓	✓	✓
B sh	sherardized	✓	✓	✓	✓	✓	✓
B A2	stainless steel	✓	✓	✓	✓	✓	✓
B A4	stainless steel	✓	✓	✓	✓	✓	✓
B HCR	high corrosion resistant steel	✓	✓	✓	✓	✓	✓
All versions	static or quasi-static action	✓					
	uncracked concrete	✓					

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013 + A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (all materials)
- For all other conditions:

Anchor version	Use according to EN 1993-1-4:2015 corresponding to the corrosion resistance class CRC according to Annex A, Table A.2
B A2	CRC II
B A4	CRC III
B HCR	CRC V

Design:

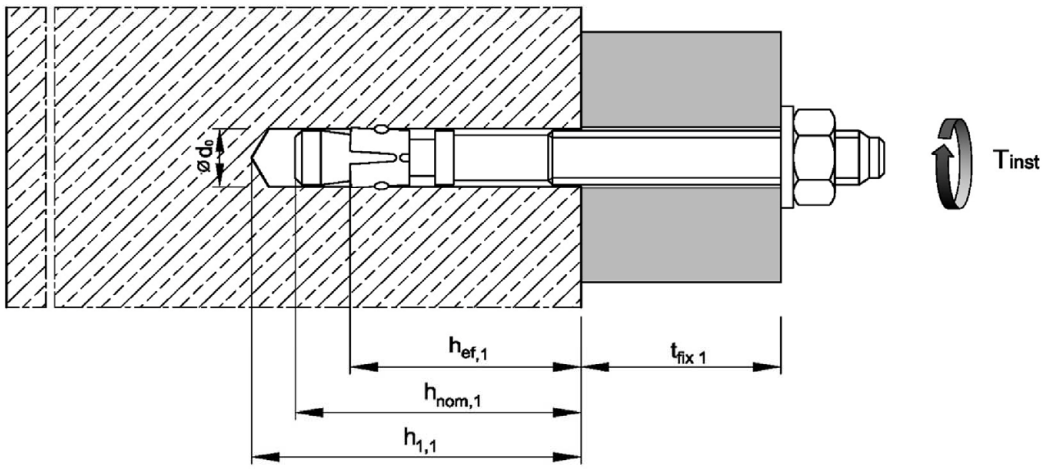
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages are designed according to EN 1992-4:2018 or TR 055

Installation:

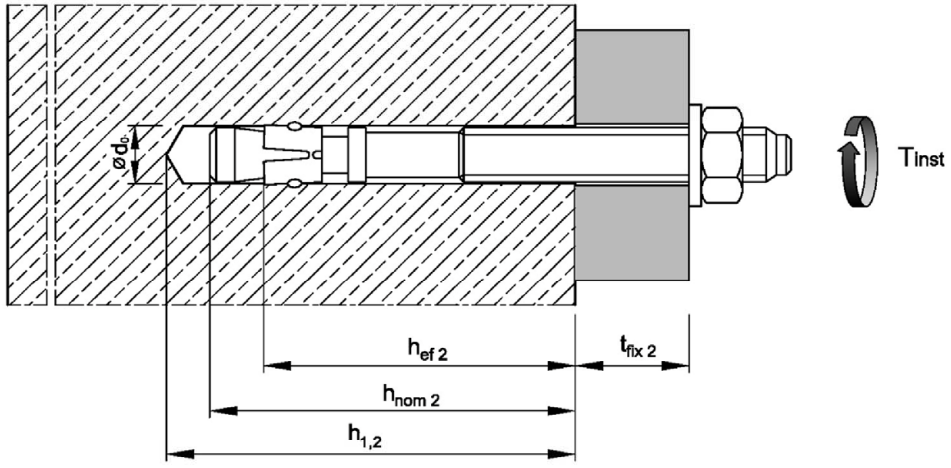
- Hole drilling by hammer drill bit or vacuum drill bit
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener

Installation parameters

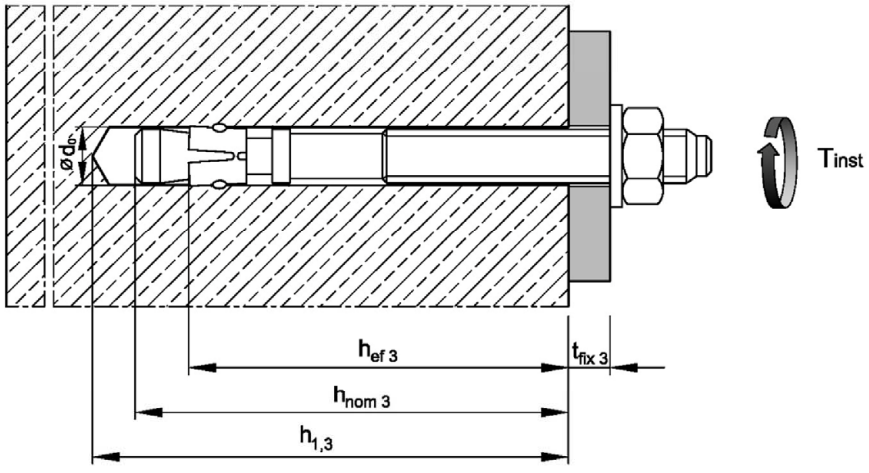
Effective embedment depths $h_{ef,1}$



Effective embedment depths $h_{ef,2}$



Effective embedment depths $h_{ef,3}$



Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use
Installation parameters

Annex B2

Table B1: Installation parameters

Anchor size				M6	M8	M10	M12	M16	M20
Nominal drill hole diameter		d_0 =	[mm]	6	8	10	12	16	20
Cutting diameter of drill bit		$d_{cut} \leq$	[mm]	6,40	8,45	10,45	12,5	16,5	20,55
Installation torque	B	T_{inst} =	[Nm]	8	15	30	50	100	200
	B fvz	T_{inst} =	[Nm]	-	15	30	40	90	120
	B sh	T_{inst} =	[Nm]	5	15	30	40	90	120
	B A2 / B A4 / B HCR	T_{inst} =	[Nm]	6	15	25	50	100	160
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	7	9	12	14	18	22
Embedment depth $h_{ef,1}$									
Effective embedment depth		$h_{ef,1} \geq$	[mm]	30	35	42	50	64	78
Depth of drill hole		$h_{1,1} \geq$	[mm]	45	55	65	75	95	110
Embedment depth		$h_{nom,1} \geq$	[mm]	39	47	56	67	84	99
Embedment depth $h_{ef,2}$									
Effective embedment depth		$h_{ef,2} \geq$	[mm]	40	44	48	65	82 (80)[1)]	100
Depth of drill hole		$h_{1,2} \geq$	[mm]	55	65	70	90	110	130
Embedment depth		$h_{nom,2} \geq$	[mm]	49	56	62	82	102	121
Embedment depth $h_{ef,3}$									
Effective embedment depth		$h_{ef,3} \geq$	[mm]	60	70	80	100	120	115
Depth of drill hole		$h_{1,3} \geq$	[mm]	75	91	102	125	148	145
Embedment depth		$h_{nom,3} \geq$	[mm]	69	82	94	117	140	136

[1)] Anchor version B A2 / B A4 / B HCR

Table B2: Minimum spacings and edge distances for B / B fvz[1] / B sh

Anchor size			M6	M8	M10	M12	M16	M20
Embedment depth $h_{ef,1}$								
Minimum member thickness	h_{min}	[mm]	80	80	100	100	130	160
Minimum spacing	s_{min}	[mm]	35	40	55	100	100	140
Minimum edge distance	c_{min}	[mm]	40	45	65	100	100	140
Embedment depth $h_{ef,2}$								
Minimum member thickness	h_{min}	[mm]	100	100	100	130	170	200
Minimum spacing	s_{min}	[mm]	35	40	55	75	90	105
Minimum edge distance	c_{min}	[mm]	40	45	65	90	105	125
Embedment depth $h_{ef,3}$								
Minimum member thickness	h_{min}	[mm]	120	126	132	165	208	215
Minimum spacing	s_{min}	[mm]	35	40	55	75	90	105
Minimum edge distance	c_{min}	[mm]	40	45	65	90	105	125

[1] Anchor version B fvz: M8-M20

Table B3: Minimum spacings and edge distances for B A2 / B A4 / B HCR

Anchor size			M6	M8	M10	M12	M16	M20
Embedment depth $h_{ef,1}$								
Minimum member thickness	h_{min}	[mm]	80	80	100	100	130	160
Minimum spacing	s_{min}	[mm]	35	60	55	100	110	140
Minimum edge distance	c_{min}	[mm]	40	60	65	100	110	140
Embedment depth $h_{ef,2}$								
Minimum member thickness	h_{min}	[mm]	100	100	100	130	160	200
Minimum spacing	s_{min}	[mm]	35	35	45	60	80	100
	for $c \geq$	[mm]	40	65	70	100	120	150
Minimum edge distance	c_{min}	[mm]	35	45	55	70	80	100
	for $s \geq$	[mm]	60	110	80	100	140	180
Embedment depth $h_{ef,3}$								
Minimum member thickness	h_{min}	[mm]	120	126	132	165	200	215
Minimum spacing	s_{min}	[mm]	35	35	45	60	80	100
	for $c \geq$	[mm]	40	65	70	100	120	150
Minimum edge distance	c_{min}	[mm]	35	45	55	70	80	100
	for $s \geq$	[mm]	60	110	80	100	140	180

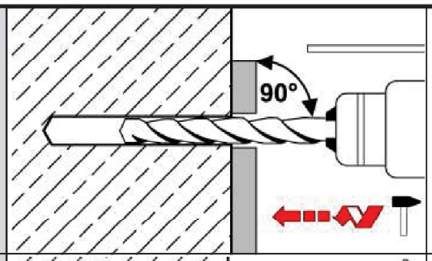
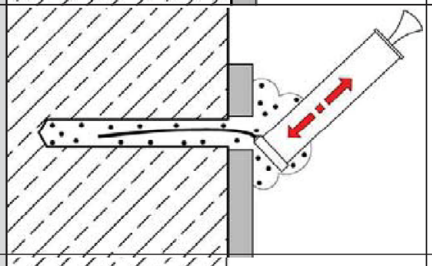
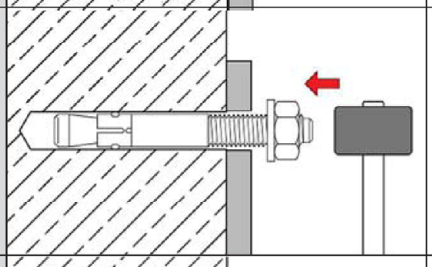
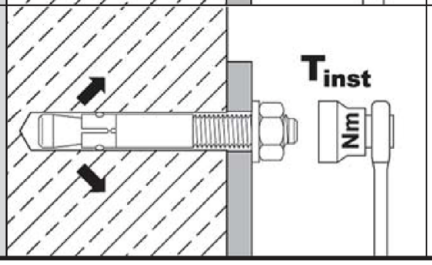
Intermediate values by linear interpolation

Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use
Minimum spacings and edge distances

Annex B4

Installation instructions

1		Drill hole perpendicular to concrete surface, positioning of the drill holes without damaging the reinforcement. If using a vacuum drill bit, proceed with step 3.
2		Blow out dust. Alternatively, vacuum clean down to the bottom of the hole.
3		Drive in anchor, such that the selected embedment depth is met.
4		Apply installation torque T_{inst} as specified in Table B1.

Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use
Installation instructions

Annex B5

Table C1: Characteristic values for **tension loads for B / B fvz[1] / B sh**

Anchor size				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation factor		γ_{inst}	[-]	1,0					
Steel failure									
Characteristic resistance		$N_{Rk,s}$	[kN]	8,7	15,3	26	35	65	107
Partial factor		γ_{Ms}	[-]	1,5				1,6	
Pull-out									
Characteristic resistance in uncracked concrete C20/25	for $h_{ef,1}$	$N_{Rk,p}$	[kN]	6,5 [2]	10,2 [2]	13,4	17,4	25,2	33,9
	for $h_{ef,2}$	$N_{Rk,p}$	[kN]	10	13	16,4	25,8	36,5	49,2
	for $h_{ef,3}$	$N_{Rk,p}$	[kN]	10	13	16,4	26	40	55
Increasing factor for $N_{Rk,p}$		ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			$\left(\frac{f_{ck}}{20}\right)^{0,29}$	$\left(\frac{f_{ck}}{20}\right)^{0,33}$	$\left(\frac{f_{ck}}{20}\right)^{0,5}$
Splitting									
Characteristic resistance in uncracked concrete C20/25		$N^0_{Rk,sp}$	[kN]	min [$N_{Rk,p}$; $N^0_{Rk,c}$ [3]]					
Embedment depth $h_{ef,1}$									
Spacing		$s_{cr,sp}$	[mm]	180	210	230	240	320	400
Edge distance		$c_{cr,sp}$	[mm]	90	105	115	120	160	200
Embedment depth $h_{ef,2}$									
Spacing		$s_{cr,sp}$	[mm]	160	220	240	330	410	500
Edge distance		$c_{cr,sp}$	[mm]	80	110	120	165	205	250
Embedment depth $h_{ef,3}$									
Spacing		$s_{cr,sp}$	[mm]	360	240	480	600	720	690
Edge distance		$c_{cr,sp}$	[mm]	180	210	240	300	360	345
Concrete cone failure									
Effective embedment depth	for $h_{ef,1} \geq$		[mm]	30 [2]	35 [2]	42	50	64	78
	for $h_{ef,2} \geq$		[mm]	40	44	48	65	82	100
	for $h_{ef,3} \geq$		[mm]	60	70	80	100	120	115
Spacing		$s_{cr,N}$	[mm]	3 $h_{ef\,(1,2,3)}$					
Edge distance		$c_{cr,N}$	[mm]	1,5 $h_{ef\,(1,2,3)}$					
Factor	uncracked concrete	$k_{ucr,N}$	[-]	11,0					
	cracked concrete	$k_{cr,N}$	[-]	No performance assessed					

[1] Anchor version B fvz: M8-M20

[2] Restricted to the use of structural components with $h_{ef} < 40$mm which are statically indeterminate and subject to internal exposure conditions only

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

Table C2: Characteristic values for **tension loads for B A2 / B A4 / B HCR**

Anchor size				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation factor		γ_{inst}	[-]	1,0					
Steel failure									
Characteristic resistance		$N_{Rk,s}$	[kN]	10	18	30	44	88	134
Partial factor		γ_{Ms}	[-]	1,50					1,68
Pull-out									
Characteristic resistance in uncracked concrete C20/25	for $h_{ef,1}$	$N_{Rk,p}$	[kN]	6,5 [1]	9 [1]	12	17,4	25,2	33,9
	for $h_{ef,2}$	$N_{Rk,p}$	[kN]	8	15	16,4	25	35,2	49,2
	for $h_{ef,3}$	$N_{Rk,p}$	[kN]	8	15	16,4	25	42	60
Increasing factor for $N_{Rk,p}$		ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$					
Splitting									
Characteristic resistance in uncracked concrete C20/25		$N^0_{Rk,sp}$	[kN]	min [$N_{Rk,p}$; $N^0_{Rk,c}$ [2]]					
Embedment depth $h_{ef,1}$									
Spacing		$s_{cr,sp}$	[mm]	180	180	180	180	180	180
Edge distance		$c_{cr,sp}$	[mm]	90	90	90	90	90	90
Embedment depth $h_{ef,2}$									
The higher one of the decisive resistances of Case 1 and Case 2 is applicable									
Case 1									
Characteristic resistance in uncracked concrete C20/25		$N^0_{Rk,sp}$	[kN]	6	9	12	20	30	40
Spacing		$s_{cr,sp}$	[mm]	3 h_{ef}					
Edge distance		$c_{cr,sp}$	[mm]	1,5 h_{ef}					
Increasing factor for $N^0_{Rk,sp}$		ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$					
Case 2									
Spacing		$s_{cr,sp}$	[mm]	160	220	240	340	410	560
Edge distance		$c_{cr,sp}$	[mm]	80	110	120	170	205	280
Embedment depth $h_{ef,3}$									
Spacing		$s_{cr,sp}$	[mm]	360	240	480	600	720	690
Edge distance		$c_{cr,sp}$	[mm]	180	210	240	300	360	345
Concrete cone failure									
Effective Embedment depth	for $h_{ef,1} \geq$		[mm]	30 [1]	35 [1]	42	50	64	78
	for $h_{ef,2} \geq$		[mm]	40	44	48	65	80	100
	for $h_{ef,3} \geq$		[mm]	60	70	80	100	120	115
Spacing		$s_{cr,N}$	[mm]	3 h_{ef}					
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}					
Factor	uncracked concrete	$k_{ucr,N}$	[-]	11,0					
	cracked concrete	$k_{cr,N}$	[-]	No performance assessed					

[1] Restricted to the use of structural components with $h_{ef} < 40$mm which are statically indeterminate and subject to internal exposure conditions only

[2] $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C3: Characteristic values for **shear loads**

Anchor size				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation factor		γ_{inst}	[-]	1,0					
Steel failure without lever arm									
Characteristic resistance	**B / B fvz[1] / B sh**	$V^0_{Rk.s}$	[kN]	5	11	17	25	44	69
	B A2 / B A4 / B HCR	$V^0_{Rk,s}$	[kN]	7	12	19	27	50	86
Ductility factor		k_7	[-]	1,0					
Steel failure with lever arm									
Characteristic bending resistance	**B / B fvz[1] / B sh**	$M^0_{Rk.s}$	[Nm]	9	23	45	78	186	363
	B A2 / B A4 / B HCR	$M^0_{Rk,s}$	[Nm]	10	24	49	85	199	454
Partial factor for $V^0_{Rk,s}$ and $M^0_{Rk,s}$	**B / B fvz[1] / B sh**	γ_{Ms}	[-]	1,25				1,33	
	B A2 / B A4 / B HCR	γ_{Ms}	[-]	1,25					1,4
Concrete pry-out failure									
Factor for $\mathbf{h_{ef}}$	**B / B fvz[1] / B sh**	k_8	[-]	1,0	2,3	2,5	2,9	2,8	3,1
	B A2 / B A4 / B HCR	k_8	[-]	1,0	2,3	2,8	2,8	3,0	3,3
Concrete edge failure									
Effective length of anchor in shear loading	for $\mathbf{h_{ef,1}}$	l_f	[mm]	30 [2]	35 [2]	42	50	64	78
	for $\mathbf{h_{ef,2}}$	l_f	[mm]	40	44	48	65	82 (80) [3]	100
	for $\mathbf{h_{ef,3}}$	l_f	[mm]	60	70	80	100	120	115
Outside diameter of anchor		d_{nom}	[mm]	6	8	10	12	16	20

[1] Anchor version B fvz: M8-M20

[2] Restricted to the use of structural components which are statically indeterminate and subject to internal exposure conditions only

[3] Anchor version B A2 / B A4 / B HCR

Table C5: Displacements under tension loads

Anchor size			M6	M8	M10	M12	M16	M20
Embedment depth $h_{ef,1}$								
B / B fvz[1] / B sh								
Tension load	N	[kN]	2,9	5,0	6,5	8,5	12,3	16,6
Displacement	δ_{N0}	[mm]	0,3	0,4				
	$\delta_{N\infty}$	[mm]	0,6	1,8				
B A2 / B A4 / B HCR								
Tension load	N	[kN]	2,9	4,3	5,7	8,5	12,3	16,6
Displacement	δ_{N0}	[mm]	0,4	0,7	0,4	0,4	0,6	1,5
	$\delta_{N\infty}$	[mm]	1,3					2,9
Embedment depth $h_{ef,2}$ and $h_{ef,3}$								
B / B fvz[1] / B sh								
Tension load	N	[kN]	4,3	5,8	7,6	11,9	16,7	23,8
Displacement	δ_{N0}	[mm]	0,4	0,5				
	$\delta_{N\infty}$	[mm]	0,7	2,3				
B A2 / B A4 / B HCR								
Tension load	N	[kN]	3,6	5,7	7,6	11,9	17,2	24,0
Displacement	δ_{N0}	[mm]	0,7	0,9	0,5	0,6	0,9	2,1
	$\delta_{N\infty}$	[mm]	1,8					4,2

[1] Anchor version B fvz: M8-M20

Table C6: Displacements under shear loads

Anchor size			M6	M8	M10	M12	M16	M20
B / B fvz[1] / B sh								
Shear load	V	[kN]	2,9	6,3	9,7	14,3	23,6	37,0
Displacement	δ_{V0}	[mm]	1,2	1,5	1,6	2,6	3,1	4,4
	$\delta_{V\infty}$	[mm]	2,4	2,2	2,4	3,9	4,6	6,6
B A2 / B A4 / B HCR								
Shear load	V	[kN]	4,0	6,9	10,9	15,4	28,6	43,7
Displacement	δ_{V0}	[mm]	1,1	2,0	1,2	2,0	2,2	2,1
	$\delta_{V\infty}$	[mm]	1,7	3,0	1,8	3,0	3,3	3,2

[1] Anchor version B fvz: M8-M20