... eine starke Verbindung

IZJAVA O LASTNOSTIH

DoP Št.: **MKT-2.5-301_sl**

- **Enotna identifikacijska oznaka tipa proizvoda:** **Kemični sidro VZ**
- **Predvidena uporaba:** Vezana sidra za sidranje v beton, glej Priloga/Annex B
- **Proizvajalec:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
  Auf dem Immel 2
  67685 Weilerbach
- **Sistem ali sistemi ocenjevanja in preverjanja nespremenljivosti lastnosti:** 1
- **Evropski ocenjevalni dokument:** **EAD 330499-01-0601**
  Evropska tehnična ocena: **ETA-20/0533, 16.12.2022**
  Organ za tehnično ocenjevanje: DIBt, Berlin
  Priglašeni organi: NB 2873 – Technische Universität Darmstadt
- **Navedene lastnosti:**

Bistvene značilnosti	Lastnosti
Mehanska odpornost in stabilnost (BWR 1)	
Karakteristični upori pod natezno obremenitvijo (statični in kvazistatični učinki)	Priloga / Annex C1, C2, C5, B2, B3
Karakteristični upori pod prečnim stresom (statični in kvazistatični učinki)	Priloga / Annex C1, C3, C6
Premiki	Priloga / Annex C7
Karakteristična odpornost in premiki za seizmične zmogljivosti kategorije C1	Priloga / Annex C4
Karakteristična odpornost in premiki za seizmične zmogljivosti kategorije C2	Zmogljivost ni ocenjena
Higiena, zdravje in okolje (BWR 3)	
Vsebina, emisije in / ali sproščanje nevarnih snovi	Zmogljivost ni ocenjena

Učinkovitost zgornjega izdelka je deklarirana zmogljivost / zmogljivost. Zgornji proizvajalec je izključno odgovoren za sestavo izjave o lastnostih v skladu z Uredbo (EU) št. 305/2011.

Podpisal za in v imenu proizvajalca:

Stefan Weustenhagen
(Generalni direktor)
Weilerbach, 16.12.2022

p.p.
Dipl.-Ing. Detlef Bigalke
(Vodja razvoja izdelkov)

Izvirnik te izjave o uspešnosti je bil napisan v nemščini. Za odstopanja v prevodu velja nemška različica.

Specifications of intended use

Chemical Anchor VZ with	**Anchor rod V-A**	**Internally threaded anchor rod VZ-IG**
Static or quasi-static action	**M8** to **M24**	**IG-M6** to **IG-M16**
Seismic action, performance category C1	**M8** to **M24**	**no performance assessed**
Base materials	compacted, reinforced or unreinforced normal weight concrete without fibers acc. to EN 206:2013+A1:2016	
	strength classes C20/25 to C50/60, acc. to EN 206:2013+A1:2016	
	cracked or uncracked concrete	
Temperature range I -40°C to +40°C	max long-term temperature +24°C; max short-term temperature +40°C	
Temperature range II -40°C to +80°C	max long-term temperature +50°C; max short-term temperature +80°C	

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: all versions
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2015, Annex A, Table A1:

  - V-A A4: CRC III
  - V-A HCR: CRC V

Design:

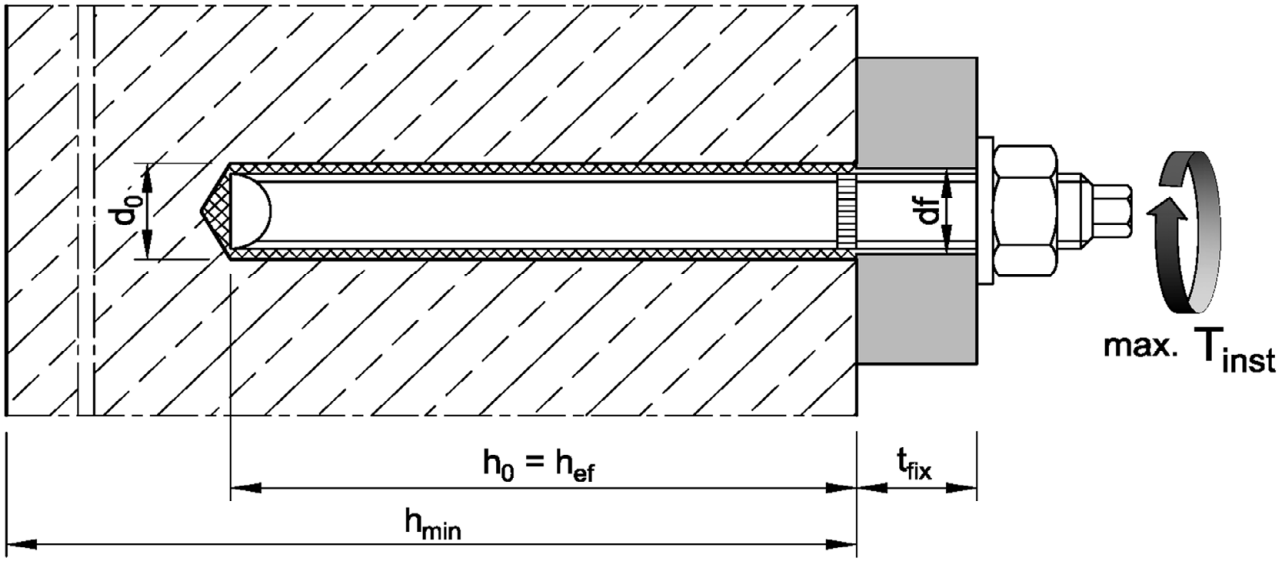
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages are designed under the responsibility of an engineer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

Installation:

- Dry or wet concrete
- Making of drill hole by hammer drilling, compressed air drilling or vacuum drilling
- Installation direction: D3 - downwards, horizontally and upwards (e.g. overhead) installation
- Optionally, the annular gap between anchor rod and attachment can be backfilled. In this case, the washer is replaced by the filling washer (Part 3b, Annex A2). MKT injection mortars VMH, VMU plus, VMZ or other high-strength injection mortars with a compressive strength ≥ 40N/mm² can be used for backfilling.
- Internally threaded anchor rods: Bolts or threaded rod (incl. nut and washer) must at least correspond to the material and strength class of the internally threaded anchor rod that is used.

Table B1: Installation parameters for anchor rods V-A

Anchor rod V-A			M8	M10	M12	M16	M20	M24
Resin Anchor Capsule			VZ-P 8	VZ-P 10	VZ-P 12	VZ-P 16	VZ-P 20	VZ-P 24
Diameter of threaded rod	$d=d_{nom}$	[mm]	8	10	12	16	20	24
Nominal diameter of drill hole	d_0	[mm]	10	12	14	18	22	28
Depth of drill hole	h_0	[mm]	80	90	110	125	170	210
Effective anchorage depth	h_{ef}	[mm]	80	90	110	125	170	210
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26
Cleaning Brush		[-]	RB 10	RB 12	RB 14	RB 18	RB 22	RB 28
Diameter of Cleaning Brush	$d_b \geq$	[mm]	10,5	12,5	14,5	18,5	22,5	28,5
Maximum installation torque	max T_{inst}	[Nm]	10	20	40	80	150	200
Minimum member thickness	h_{min}	[mm]	110	120	140	160	220	270
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60
Minimum spacing	s_{min}	[mm]	40	50	60	75	90	115



Chemical Anchor VZ

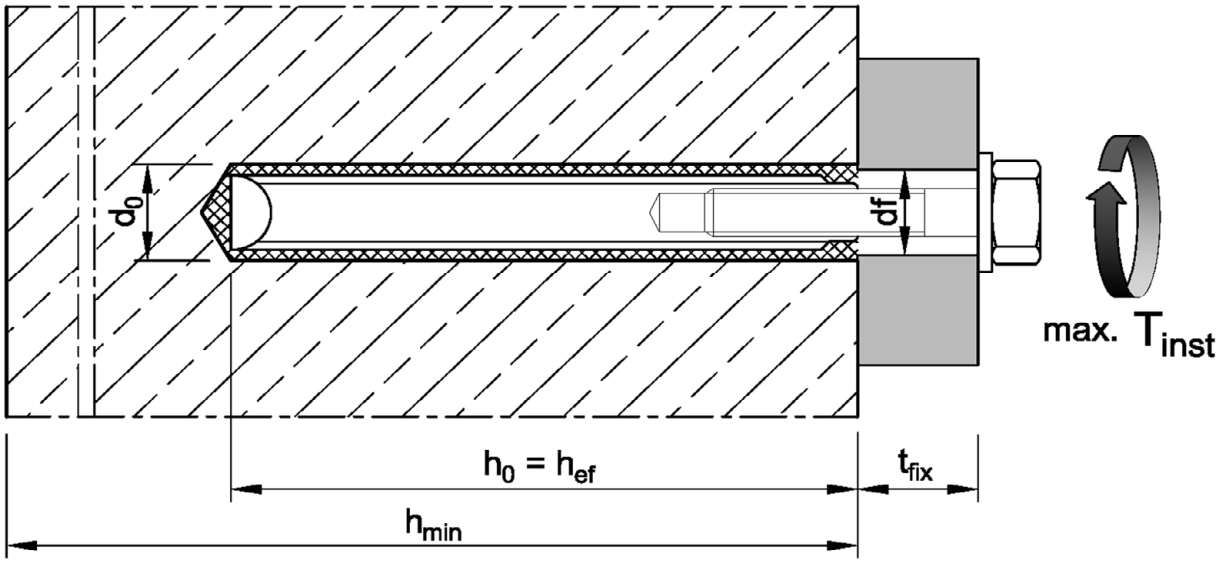
Intended Use
Installation parameters – Anchor rod V-A

Annex B2

Table B2: Installation parameters for internally threaded anchor rods VZ-IG

Internally threaded anchor rod VZ-IG			IG-M 6	IG-M 8	IG-M 10	IG-M 12	IG-M 16
Resin Anchor Capsule			VZ-P 10	VZ-P 12	VZ-P 16	VZ-P 20	VZ-P 24
Outer diameter of threaded rod [1]	$d=d_{nom}$	[mm]	10	12	16	20	24
Inner diameter of threaded rod	d_2	[mm]	6	8	10	12	16
Nominal drill hole diameter	d_0	[mm]	12	14	18	22	28
Depth of drill hole	h_0	[mm]	90	110	125	170	210
Effective anchorage depth	h_{ef}	[mm]	90	110	125	170	210
Diameter of clearance hole in the fixture	d_f	[mm]	7	9	12	14	18
Cleaning Brush		[-]	RB 12	RB 14	RB 18	RB 22	RB 28
Diameter of Cleaning Brush	$d_b \geq$	[mm]	12,5	14,5	18,5	22,5	28,5
Maximum installation torque	max T_{inst}	[Nm]	10	10	20	40	60
Minimum member thickness	h_{min}	[mm]	120	140	160	220	270
Minimum edge distance	c_{min}	[mm]	45	45	50	55	60
Minimum spacing	s_{min}	[mm]	50	60	75	90	115

[1] With metric thread acc. to EN 1993-1-8:2005+AC:2009



Chemical Anchor VZ

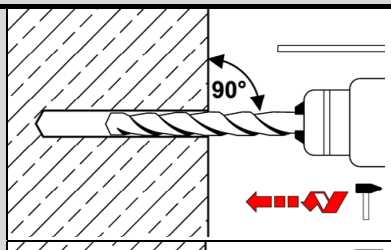
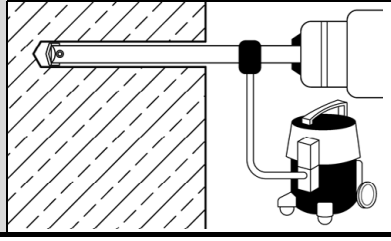
Intended Use
Installation parameters – Internally threaded anchor rod VZ-IG

Annex B3

Table B3: Curing time

Concrete temperature	Minimum curing time
-20°C to -16°C	17 h
-15°C to -11°C	7 h
-10°C to -6°C	4 h
-5°C to -1°C	3 h
0°C to +4°C	50 min
+5°C to +9°C	25 min
+10°C to +19°C	15 min
+20°C to +29°C	6 min
+30°C to +40°C	6 min
Capsule temperature	-15°C to +40°C

Installation instructions

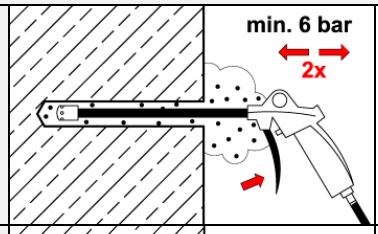
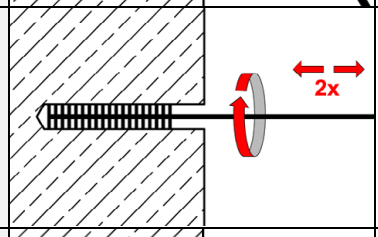
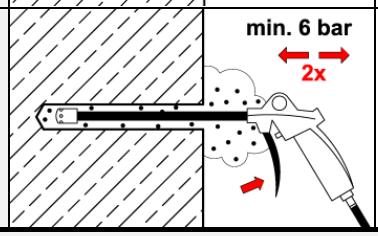
Drilling		
1		**Hammer drill or compressed air drill:** Drill the hole with diameter and depth according to Table B1 and B2. Continue with step 2.
		**Vacuum drill:** see Annex A2 Drill the hole with diameter and depth according to Table B1 and B2. Additional cleaning is not necessary - continue with step 3.

Installation instructions – continuation

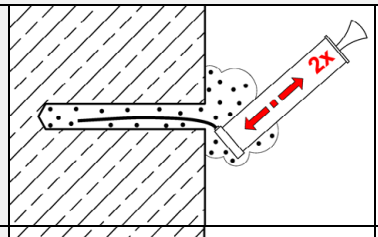
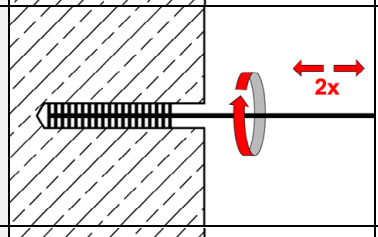
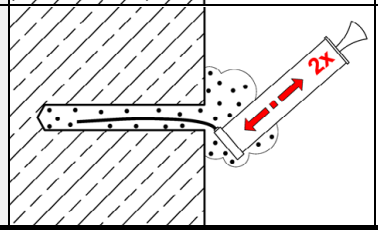
Cleaning - Drill hole must be cleaned directly before installation of the anchor, or it must be protected against recontamination in a suitable manner until installation of the anchor.

2

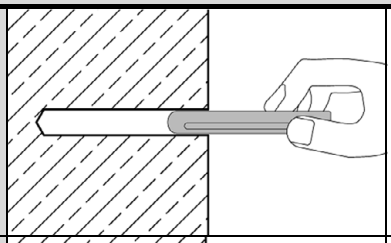
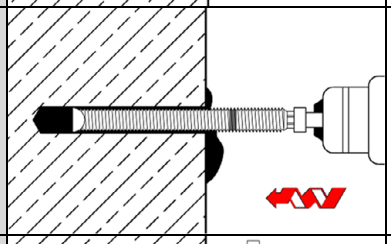
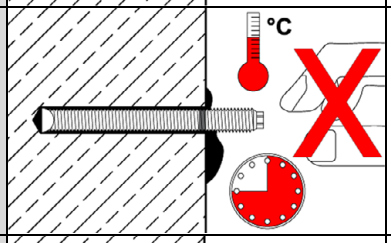
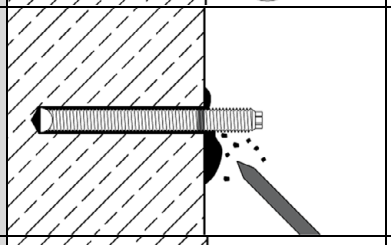
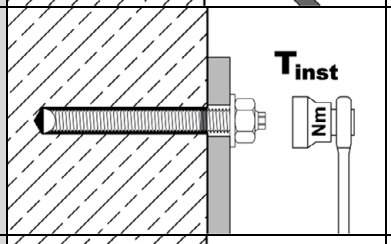
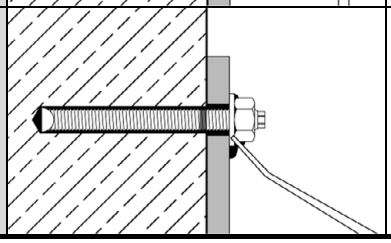
Cleaning with compressed air
Sizes M8 to M24

2a		Blow out the drill hole completely at least **2x** from the bottom of the drill hole with compressed air.
2b		Brush the drill hole **2x** with Cleaning Brush RB (Table B1 or B2). Observe and check brush diameter $d_{b,min}$. When inserting the brush into the drill hole, a clear resistance must be noticeable. Otherwise use a new Cleaning Brush.
2c		Blow out the drill hole completely at least **2x** from the bottom of the drill hole with compressed air.

Manual cleaning
Sizes M8 to M20

2a		Blow out the drill hole completely at least **2x** from the bottom of the drill hole with blow-out pump.
2b		Brush the drill hole **2x** with Cleaning Brush RB (Table B1 or B2). Observe and check brush diameter $d_{b,min}$. When inserting the brush into the drill hole, a clear resistance must be noticeable. Otherwise use a new Cleaning Brush.
2c		Blow out the drill hole completely at least **2x** from the bottom of the drill hole with blow-out pump.

Installation instructions - continuation

Inserting the anchor rod V-A		
3		Check the depth of drill hole. If necessary, mark anchoring depth on the anchor rods. Insert the capsule into the drill hole.
4		Drive in the anchor rod using a hammer drill set on rotary impact. Stop immediately after reaching the setting depth.
5		Observe curing time according to Table B3. Do not move or load the anchor until it is fully cured.
6		Remove excess adhesive.
7		Install fixture and apply installation torque T_{inst} according to Table B1.
8		The annular gap between anchor rod and fixture may optionally be filled with mortar (see Annex B1). Therefore, replace regular washer by filling washer (note thickness of the filling washer) and plug on reducing adapter on static mixer. Annular gap is completely filled, when excess mortar seeps out.

Installation instructions - continuation

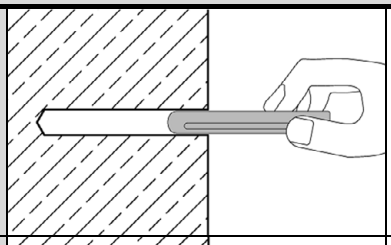
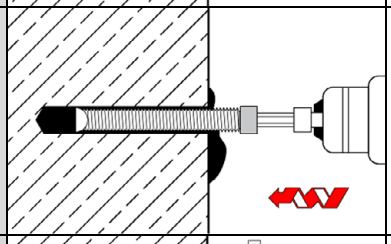
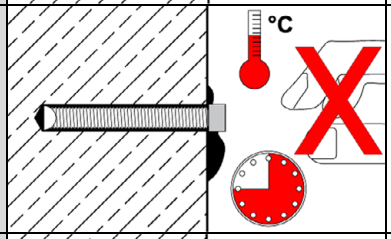
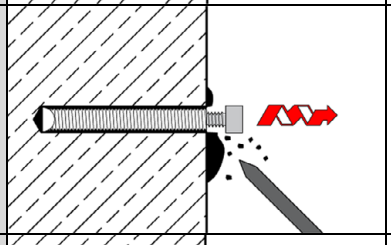
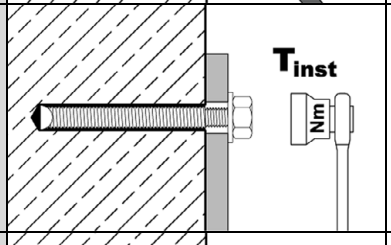
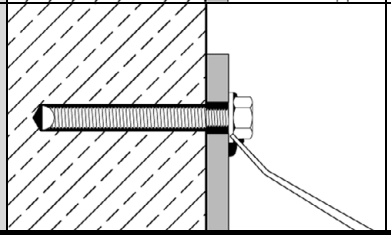
Inserting the internally threaded anchor rod VZ-IG		
3		Check the depth of drill hole. Insert the capsule into the drill hole.
4		Screw the setting tool into the internally threaded anchor rod VZ-IG until stop. Drive in the internally threaded anchor rod with a hammer drill set to rotary impact. Switch off the hammer drill immediately after reaching the setting depth.
5		Observe curing time according to Table B3. Do not move or load the anchor and don't remove the setting tool until it is fully cured.
6		Remove excess adhesive and unscrew the setting tool.
7		The fixture can be mounted with threaded rod, nut and washer or screw. Apply the installation torque T_{inst} according to Table B2.
8		The annular gap between threaded rod or screw and fixture may optionally be filled with mortar (see Annex B1). Therefore, replace regular washer by filling washer or assemble it on the screw (observe thickness of filling washer and minimum screw-in depth). Plug on reducing adapter on static mixer and fill annular gap. It is completely filled, when excess mortar seeps out.

Table C1: Characteristic **steel resistance** under **tension load** for **anchor rods V-A**

Anchor rod V-A				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure									
Characteristic resistance under tension load									
Steel, zinc plated	Property class 5.8	$N_{Rk,s}$	[kN]	18	29	42	79	123	176
	Property class 8.8	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Stainless steel / High corrosion resistant steel	Property class 70	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
	Property class 80	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial factor [1)]									
Steel, zinc plated	Property class 5.8	$\gamma_{Ms,N}$	[-]	1,5					
	Property class 8.8	$\gamma_{Ms,N}$	[-]	1,5					
Stainless steel / High corrosion resistant steel	Property class 70	$\gamma_{Ms,N}$	[-]	1,5					
	Property class 80	$\gamma_{Ms,N}$	[-]	1,6					

[1)] In absence of other national regulations

Table C2: Characteristic **steel resistance** under **shear load** for **anchor rods V-A**

Anchor rod V-A				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Characteristic resistances under shear load									
Steel failure <u>without</u> lever arm									
Steel, zinc plated	Property class 5.8	$V^0_{Rk,s}$	[kN]	11	17	25	47	73	106
	Property class 8.8	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141
Stainless steel / High corrosion resistant steel	Property class 70	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	123
	Property class 80	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141
Steel failure <u>with</u> lever arm									
Steel, zinc plated	Property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	325	561
	Property class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898
Stainless steel / High corrosion resistant steel	Property class 70	$M^0_{Rk,s}$	[Nm]	26	52	92	233	454	785
	Property class 80	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898
Partial factor [1)]									
Steel, zinc plated	Property class 5.8	$\gamma_{Ms,V}$	[-]	1,25					
	Property class 8.8	$\gamma_{Ms,V}$	[-]	1,25					
Stainless steel / High corrosion resistant steel	Property class 70	$\gamma_{Ms,V}$	[-]	1,25					
	Property class 80	$\gamma_{Ms,V}$	[-]	1,33					

[1)] In absence of other national regulations

Table C3: Characteristic values of **tension loads** for **anchor rods V-A**

Anchor rod V-A				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure									
Characteristic resistance under tension load									
Characteristic tension resistance		$N_{Rk,s}$	[kN]	see Table C1					
Partial factor		$\gamma_{Ms,N}$	[-]	see Table C1					
Combined pull-out and concrete failure									
Characteristic bond resistance in uncracked concrete C20/25									
Temperature range I:	+24°C / +40°C	$\tau_{Rk,ucr}$	[N/mm²]	10,0	13,0	13,0	13,0	13,0	13,0
Temperature range II:	+50°C / +80°C	$\tau_{Rk,ucr}$	[N/mm²]	8,5	11,0	11,0	11,0	11,0	11,0
Increasing factors for $\tau_{Rk,ucr}$ $\tau_{Rk,ucr} = \psi_{c,ucr} \cdot \tau_{Rk,ucr}(C20/25)$		$\psi_{c,ucr}$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,17}$					
Characteristic bond resistance in cracked concrete C20/25									
Temperature range I:	+24°C / +40°C	$\tau_{Rk,cr}$	[N/mm²]	5,0	6,5	7,0	7,5	7,5	7,5
Temperature range II:	+50°C / +80°C	$\tau_{Rk,cr}$	[N/mm²]	4,5	5,5	6,0	6,0	6,0	6,5
Increasing factors for $\tau_{Rk,cr}$ $\tau_{Rk,cr} = \psi_{c,cr} \cdot \tau_{Rk,cr}(C20/25)$		$\psi_{c,cr}$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,14}$					
Reduction factor ψ^0_{sus} in concrete C20/25									
Temperature range I:	+24°C / +40°C	ψ^0_{sus}	[-]	0,64					
Temperature range II:	+50°C / +80°C	ψ^0_{sus}	[-]	0,63					
Concrete cone failure									
Factor for	uncracked concrete	$k_{ucr,N}$	[-]	11,0					
	cracked concrete	$k_{cr,N}$	[-]	7,7					
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}					
Spacing		$s_{cr,N}$	[mm]	3 h_{ef}					
Splitting failure									
Edge distance	$h/h_{ef} \geq 2,0$	$c_{cr,sp}$	[mm]	1,0 h_{ef}					
	$2,0 > h/h_{ef} > 1,3$			$2 \cdot h_{ef}$ $(2,5 - h / h_{ef})$					
	$h/h_{ef} \leq 1,3$			2,4 h_{ef}					
Spacing		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$					
Installation factor		γ_{inst}	[-]	1,2					

Table C4: Characteristic values of **shear loads** for **anchor rods V-A**

Anchor rod V-A			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure <u>without</u> lever arm								
Characteristic resistance	$V^0_{Rk,s}$	[kN]	see Table C2					
Ductility factor	k_7	[-]	1,0					
Partial factor	$\gamma_{Ms,V}$	[-]	see Table C2					
Steel failure <u>with</u> lever arm								
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	see Table C2					
Partial factor	$\gamma_{Ms,V}$	[-]	see Table C2					
Concrete pry-out failure								
Pry-out factor	k_8	[-]	2,0					
Concrete edge failure								
Effective length of anchor	l_f	[mm]	80	90	110	125	170	210
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24
Installation factor	γ_{inst}	[-]	1,0					

Table C5: Characteristic values of **tension loads** for **anchor rods V-A** under **seismic action, performance category C1**

Anchor rod V-A				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure									
Characteristic resistance under tension load									
Characteristic tension resistance		$N_{Rk,s,C1}$	[kN]	$N_{Rk,s}$ see Table C1					
Partial factor		$\gamma_{Ms,N}$	[-]	see Table C1					
Combined pull-out and concrete failure									
Characteristic bond resistance in concrete C20/25 to C50/60									
Temperature range I:	+24°C / +40°C	$\tau_{Rk,C1}$	[N/mm²]	4,5	5,5	6,0	6,0	7,5	7,0
Temperature range II:	+50°C / +80°C	$\tau_{Rk,C1}$	[N/mm²]	4,0	4,5	5,5	5,0	6,0	5,5
Installation factor		γ_{inst}	[-]	1,2					

Table C6: Characteristic values of **shear loads** for **anchor rods V-A** under **seismic action, performance category C1**

Anchor rod V-A				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure without lever arm									
Characteristic resistance under shear load									
Steel, zinc plated	Property class 5.8	$V_{Rk,s,C1}$	[kN]	9,0	14,3	20,7	36,3	56,2	81,5
	Property class 8.8	$V_{Rk,s,C1}$	[kN]	12,0	19,0	27,7	48,4	75,5	109,3
Stainless steel / High corrosion resistant steel	Property class 70	$V_{Rk,s,C1}$	[kN]	10,5	16,6	24,2	42,3	66,0	94,7
	Property class 80	$V_{Rk,s,C1}$	[kN]	12,0	19,0	27,7	48,4	75,5	108,7
Partial factor		$\gamma_{Ms,V}$	[-]	see Table C2					
Factor for anchorages	**with** annular gap	α_{gap}	[-]	0,5					
	without annular gap	α_{gap}	[-]	1,0					
Installation factor		γ_{inst}	[-]	1,0					

Table C7: Characteristic **steel resistance** under **tension load** for **internally threaded anchor rods VZ-IG**

Internally threaded anchor rod				**IG-M 6**	**IG-M 8**	**IG-M 10**	**IG-M 12**	**IG-M 16**
Steel failure								
Characteristic resistance, steel, zinc plated	Property class 5.8	$N_{Rk,s}$	[kN]	10	17	29	42	76
	Property class 8.8	$N_{Rk,s}$	[kN]	16	27	46	67	121
Partial factor [1]		$\gamma_{Ms,N}$	[-]	1,5				
Characteristic resistance, stainless steel A4 / HCR	Property class 70	$N_{Rk,s}$	[kN]	14	26	41	59	110
Partial factor [1]		$\gamma_{Ms,N}$	[-]	1,87				
Combined pull-out and concrete failure								
Characteristic bond resistance in uncracked concrete C20/25								
Temperature range I:	+24°C / +40°C	$\tau_{Rk,ucr}$	[N/mm²]	13,0	13,0	13,0	13,0	13,0
Temperature range II:	+50°C / +80°C	$\tau_{Rk,ucr}$	[N/mm²]	11,0	11,0	11,0	11,0	11,0
Increasing factors for $\tau_{Rk,ucr}$ $\tau_{Rk,ucr} = \psi_{c,ucr} \cdot \tau_{Rk,ucr\ (C20/25)}$		$\psi_{c,ucr}$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,17}$				
Characteristic bond resistance in cracked concrete C20/25								
Temperature range I:	+24°C / +40°C	$\tau_{Rk,cr}$	[N/mm²]	6,5	7,0	7,5	7,5	7,5
Temperature range II:	+50°C / +80°C	$\tau_{Rk,cr}$	[N/mm²]	5,5	6,0	6,0	6,0	6,5
Increasing factors for $\tau_{Rk,cr}$ $\tau_{Rk,cr} = \psi_{c,cr} \cdot \tau_{Rk,cr\ (C20/25)}$		$\psi_{c,cr}$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,14}$				
Reduction factor ψ^0_{sus} in concrete C20/25								
Temperature range I:	+24°C / +40°C	ψ^0_{sus}	[-]	0,64				
Temperature range II:	+50°C / +80°C	ψ^0_{sus}	[-]	0,63				
Concrete cone failure								
Factor for	uncracked concrete	$k_{ucr,N}$	[-]	11,0				
	cracked concrete	$k_{cr,N}$	[-]	7,7				
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}				
Spacing		$s_{cr,N}$	[mm]	3 h_{ef}				
Splitting failure								
Edge distance	$h/h_{ef} \geq 2,0$	$c_{cr,sp}$	[mm]	1,0 h_{ef}				
	$2,0 > h/h_{ef} > 1,3$			2 · h_{ef} (2,5 - h / h_{ef})				
	$h/h_{ef} \leq 1,3$			2,4 h_{ef}				
Spacing		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$				
Installation factor		γ_{inst}	[-]	1,2				

[1] In absence of other national regulations

Table C8: Characteristic **steel resistance** under **shear load** for **internally threaded anchor rods VZ-IG**

Internally threaded anchor rod				**IG-M 6**	**IG-M 8**	**IG-M 10**	**IG-M 12**	**IG-M 16**
Steel failure <u>without</u> lever arm [1]								
Steel, zinc plated	Property class 5.8	$V^0_{Rk,s}$	[kN]	6	10	17	25	45
	Property class 8.8	$V^0_{Rk,s}$	[kN]	8	14	23	34	60
Stainless steel A4 / HCR	Property class 70	$V^0_{Rk,s}$	[kN]	7	13	20	30	55
Ductility factor		k_7	[-]	1,0				
Steel failure <u>with</u> lever arm [1]								
Steel, zinc plated	Property class 5.8	$M^0_{Rk,s}$	[Nm]	8	19	37	66	167
	Property class 8.8	$M^0_{Rk,s}$	[Nm]	12	30	60	105	267
Stainless steel A4 / HCR	Property class 70	$M^0_{Rk,s}$	[Nm]	11	26	53	92	234
Partial factor [2]								
Steel, zinc plated	Property class 5.8	$\gamma_{Ms,V}$	[-]	1,25				
	Property class 8.8	$\gamma_{Ms,V}$	[-]	1,25				
Stainless steel A4 / HCR	Property class 70	$\gamma_{Ms,V}$	[-]	1,56				
Concrete pry-out failure								
Pry-out factor		k_8	[-]	2,0				
Concrete edge failure								
Effective length of fastener		l_f	[mm]	90	110	125	170	210
Outside diameter of fastener		d_{nom}	[mm]	10	12	16	20	24
Installation factor		γ_{inst}	[-]	1,0				

[1] Fastening screws or threaded rods (incl. nut and washer) must comply with the appropriate material and property class of the internally threaded anchor rod. The characteristic shear resistance for steel failure of the given strength class are valid for the internally threaded anchor rod and the fastening element

[2] In absence of other national regulations

Table C9: Displacements under tension load

Anchor size			M8	M10 IG-M6	M12 IG-M8	M16 IG-M10	M20 IG-M12	M24 IG-M16
Displacement factor[1] for uncracked concrete								
Displacement	δ_{N0}-factor	[mm/(N/mm²)]	0,015	0,031	0,035	0,015	0,046	0,060
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,085	0,067	0,067	0,067	0,067	0,067
Displacement factor[1] for cracked concrete								
Displacement	δ_{N0}-factor	[mm/(N/mm²)]	0,046	0,038	0,024	0,008	0,024	0,133
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,192	0,142	0,090	0,104	0,082	0,069

[1] Calculation of the displacement
$\delta_{N0} = \delta_{N0}\text{-factor} \cdot \tau$; τ: acting bond stress for tension
$\delta_{N\infty} = \delta_{N\infty}\text{- factor} \cdot \tau$;

Table C10: Displacements under shear load

Anchor size			M8	M10 IG-M6	M12 IG-M8	M16 IG-M10	M20 IG-M12	M24 IG-M16
Displacement factor[1]								
Displacement	δ_{V0}-factor	[mm/(kN)]	0,06	0,06	0,05	0,04	0,04	0,03
	$\delta_{V\infty}$-factor	[mm/(kN)]	0,09	0,08	0,08	0,06	0,06	0,05

[1] Calculation of the displacement
$\delta_{V0} = \delta_{V0}\text{-factor} \cdot V$; V: acting shear load
$\delta_{V\infty} = \delta_{V\infty}\text{-factor} \cdot V$;