

# Sika AnchorFix<sup>®</sup>-3030

## VYHLÁSENIE O PARAMETROCH č. 66629518

1	<b>JEDINEČNÝ IDENTIFIKAČNÝ KÓD TYPU VÝROBKU:</b>	66629518
2	<b>ZAMÝŠĽANÉ POUŽITIE/POUŽITIA:</b>	ETA 17/0694 z 11/07/2018 Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín
3	<b>VÝROBCA:</b>	Sika Services AG Tüffenwies 16-22 8048 Zürich, Švajčiarsko
4	<b>SPLNOMOCNENÝ ZÁSTUPCA:</b>	Sika Slovensko, spol. s r.o. Rybničná 38/e 831 06 Bratislava, Slovenská republika
5	<b>SYSTÉM(-Y) POSUDZOVANIA A OVEROVANIA NEMENNOSTI PARAMETROV:</b>	System 1
6b	<b>EURÓPSKY HODNOTIACI DOKUMENT:</b>	EAD 330499-00-0601
	Európske technické posúdenie:	ETA 17/0694 z 11/07/2018
	Orgán technického posudzovania:	TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA s.p.
	Notifikovaný(-é) subjekt(-y):	1020

### Vyhlásenie o parametroch

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## 7 DEKLAROVANÉ PARAMETRE

**Reakcia na oheň** – kotvy vyhovujú požiadavkách pre triedu A1

**Odolnosť voči ohňu** – Nehodnotené

### Kotvenie vystavené:

- Statickému a kvázistatickému zaťaženiu
- Seizmickým účinkom kategórie C1 (max.  $w = 0,5$  mm): závitová tyč s rozmermi M12, M16, M20
- Seizmickým účinkom kategórie C2 (max.  $w = 0,8$  mm): závitová tyč s rozmermi M12, M16, M20

### Podkladné materiály:

- Betón s trhlinami a bez trhlín
- Vystužený alebo nevystužený betón s normálnou hmotnosťou s triedou pevnosti minimálne C20/25 a maximálne C50/60 podľa normy EN 206: 2013.

### Teplotné rozmedzie:

- T3:  $-40^{\circ}\text{C}$  až  $+70^{\circ}\text{C}$  (maximálna krátkodobá teplota  $+70^{\circ}\text{C}$  a maximálna dlhodobá teplota  $+50^{\circ}\text{C}$ )

### Podmienky použitia (podmienky prostredia):

- (X1) Konštrukcie vystavené suchým vnútorným podmienkam (pozinkovaná oceľ, nehrdzavejúca oceľ, oceľ s vysokou odolnosťou proti korózii).
- (X2) Konštrukcie vystavené vonkajšiemu atmosferickému zaťaženiu (vrátane priemyselného a morského prostredia) a trvale vlhkým vnútorným podmienkam, ak neexistujú žiadne osobitné agresívne podmienky (nehrdzavejúca oceľ A4, oceľ s vysokou odolnosťou proti korózii).
- (X3) Konštrukcie vystavené vonkajšiemu atmosferickému zaťaženiu a trvale vlhkým vnútorným podmienkam, ak neexistujú žiadne osobitné agresívne podmienky (oceľ s vysokou odolnosťou proti korózii).

Poznámka: Osobitné agresívne podmienky sú napr. trvalé, striedavé ponorenie do morskej vody alebo striekajúcej zóny morskej vody, chlórové prostredie vnútorných bazénov alebo prostredie s extrémnym chemickým znečistením (napr. v odsírovacích závodoch alebo cestných tuneloch, kde sa používajú odmrazovacie materiály).

### Podmienky betónu:

- I1 – montáž do suchého alebo mokrého (vodou nasýteného) betónu alebo zaplaveného otvoru.
- I2 – montáž do vodou vyplneného betónu (nie morskej vody) a prevádzka v suchom alebo mokrom betóne

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#### Návrh kotvenia:

- Kotvy sú navrhnuté v súlade s normou EN 1992-4 alebo technickou správou EOTA TR 055 v zodpovednosti inžiniera s praxou v oblasti kotviacej techniky a prípravy betónu.
- Musia byť pripravené overiteľné výpočty a výkresy s ohľadom na zaťaženie, ktoré má kotva prenášať. Poloha kotvy musí byť vyznačená na konštrukčných výkresoch.
- Kotvy so seizmickým zaťažením (betón s trhlinami) musia byť navrhnuté v súlade s normou EN 1992-4.

#### Zabudovanie/ Montáž:

- Vrtanie otvorov pomocou vrtačky s príklepom.
- Montáž kotiev sa musí vykonávať vhodne kvalifikovaným personálom a pod dohľadom osoby zodpovednej za technické záležitosti na stavbe.

#### Smer montáže:

D3 – montáž nadol a horizontálne a nahor (napr. nad hlavou)

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• Table B1: Installation parameters of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$\varnothing_{db}$ [mm]	10	12	14	18	22	26	30	35
Cleaning brush		S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max $T_{br}$ [Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{ef,min}$	$h_{ef}$ [mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{ef,max}$	$h_{ef}$ [mm]	160	200	240	320	400	480	540	600
Depth of drill hole	$h_0$ [mm]	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_b$			

• Table B2: Installation parameters of rebar

Size		$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$	$\varnothing 25$	$\varnothing 32$	
Nominal drill hole diameter	$\varnothing_{db}$ [mm]	12	14	16	20	25	32	40	
Cleaning brush		S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF	
Torque moment	max $T_{br}$ [Nm]	10	20	40	80	120	180	200	
Min. embedment depth									
Embedment depth for $h_{ef,min}$	$h_{ef}$ [mm]	60	60	70	80	90	100	128	
Embedment depth for $h_{ef,max}$	$h_{ef}$ [mm]	160	200	240	320	400	500	640	
Depth of drill hole	$h_0$ [mm]	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	70	
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	70	
Minimum thickness of member	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_b$			

• Table B3: Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

• Table B4: Minimum curing time

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
Ensure cartridge is $\geq 10^\circ\text{C}$			

- T Work is typical gel time at highest base material temperature in the range.
- T Load is minimum set time required until load can be applied at the lowest temperature in the range.

#### Vyhľadanie o parametroch

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Table C1: Design method EN 1992-4  
Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$N_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Mc}$ [-]	2,00							
Steel grade 5.8	$N_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Mc}$ [-]	1,50							
Steel grade 8.8	$N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	$\gamma_{Mc}$ [-]	1,50							
Steel grade 10.9	$N_{Rk,s}$ [kN]	37	58	84	157	245	353	459	561
Partial safety factor	$\gamma_{Mc}$ [-]	1,33							
Stainless steel grade A2-70, A4-70	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Mc}$ [-]	1,87							
Stainless steel grade A4-80	$N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	$\gamma_{Mc}$ [-]	1,60							
Stainless steel grade 1.4529	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Mc}$ [-]	1,50							
Stainless steel grade 1.4565	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Mc}$ [-]	1,87							
Combined pullout and concrete cone failure in concrete C20/25									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete									
Temperature T3: -40°C to +70°C		$\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]							
Dry, wet concrete, flooded hole		17	15	15	12	12	12	11	9,5
Partial safety factor	$\gamma_{2^2} = \gamma_{inst^2}$ [-]	1,0							
Factor for uncracked concrete	C25/30	$\psi_c$ [-]	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					
Characteristic bond resistance in cracked concrete									
Temperature T3: -40°C to +70°C		$\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]							
Dry, wet concrete, flooded hole		10	10	10	9,5	9	9	6	6
Partial safety factor	$\gamma_{2^2} = \gamma_{inst^2}$ [-]	1,0							
Factor for cracked concrete	C25/30	$\psi_c$ [-]	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					
Concrete cone failure									
Factor for concrete cone failure for uncracked concrete	$k_c^{(1)}$	[-]	10,1						
	$k_{u,cr,N^{(2)}}$		11						
Factor for concrete cone failure for cracked concrete	$k_c^{(1)}$	[-]	7,2						
	$k_{cr,N^{(2)}}$		7,7						
Edge distance	$c_{cr,N}$ [mm]	1,5 $h_{ef}$							
Splitting failure									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Edge distance	$c_{cr,sp}$ [mm]	2 • $h_{ef}$							
Spacing	$s_{cr,sp}$ [mm]	2 • $c_{cr,sp}$							
Partial safety factor	$\gamma_{Msp}$ [-]	1,5							

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016

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Table C2: Design method EN 1992-4  
Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442	
Partial safety factor	$\gamma_{Ms}$	[-]	1,4							

Pullout failure in concrete C20/25										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13	13	13	12	12	12	8	
Dry and wet concrete										
Installation safety factor	$\gamma_z^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,0							
Flooded hole										
Installation safety factor	$\gamma_z^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,2							
Factor for uncracked concrete	C25/30	$\psi_c$	[-]						1,02	
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
C50/60	1,09									
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	8	11	10	10	9	8,5	6	
Dry and wet concrete										
Installation safety factor	$\gamma_z^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,0							
Flooded hole										
Installation safety factor	$\gamma_z^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,2							
Factor for cracked concrete	C25/30	$\psi_c$	[-]						1,02	
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
C50/60	1,09									

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{t}^{(1)}$	[-]	10,1
	$k_{ucr,N}^{(2)}$		11
Factor for concrete cone failure for cracked concrete	$k_{t}^{(1)}$	[-]	7,2
	$k_{cr,N}^{(2)}$		7,7
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Edge distance	$c_{cr,sp}$	[mm]	$2 \cdot h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$						
Partial safety factor	$\gamma_{Msp}$	[-]	1,5						
Partial safety factor	$\gamma_{Msp}$	[-]	1,8						

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016

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Table C3: Design method EN 1992-4  
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$V_{Rk,s}$ [kN]	9	15	21	39	61	88	115	140
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$V_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Ms}$ [-]	1,5							
Stainless steel grade A2-70, A4-70	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Characteristic resistance of group of fasteners									
Ductility factor $k_{\gamma} = 1,0$ for steel with rupture elongation $A_{\gamma} > 8\%$									

Steel failure with lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$M_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$M_{Rk,s}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$M_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$M_{Rk,s}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	$\gamma_{Ms}$ [-]	1,50							
Stainless steel grade A2-70, A4-70	$M_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$M_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$M_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$M_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Concrete pryout failure									
Factor for resistance to pry-out failure	$k_B$ [-]	2							

Concrete edge failure									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	24	27	30
Effective length of fastener	$l_{ef}$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )							

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**Table C4: Design method EN 1992-4**  
Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s}$ [kN]	14	22	31	55	86	135	221
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Characteristic resistance of group of fasteners								
Ductility factor	$k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$							

Steel failure with lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$M^p_{Rk,s}$ [N.m]	33	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Concrete pryout failure								
Factor for resistance to pry-out failure	$k_8$ [-]	2						

Concrete edge failure								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	25	32
Effective length of fastener	$l_r$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )						

**Table C5: Displacement of threaded rod under tension and shear load**

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
$\delta_{ND}$	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N^*}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
$\delta_{ND}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N^*}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
$\delta_{VD}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V^*}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

**Table C6: Displacement of rebar under tension and shear load**

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
$\delta_{ND}$	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N^*}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
$\delta_{ND}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N^*}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
$\delta_{VD}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V^*}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

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Table C7: Seismic performance category C1

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$T_{Rk,p,eq,C1}$	[N/mm <sup>2</sup> ]	5,2	6,6	6,8
Installation safety factor	$\gamma_{z=inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,hd-gal,C1}$	[-]	0,44	0,58	0,58
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

The anchor shall be used with minimum rupture elongation after fracture  $A_5$  equal to 19%.

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Table C8: Seismic performance category C2

Size		M12	M16	M20
<b>Tension load</b>				
<b>Steel failure</b>				
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C2}$ [kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$ [-]	2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C2}$ [kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$ [-]	1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C2}$ [kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C2}$ [kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$ [-]	1,33		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C2}$ [kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$ [-]	1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq,C2}$ [kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq,C2}$ [kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$ [-]	1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq,C2}$ [kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$ [-]	1,87		
<b>Characteristic resistance to pull-out</b>				
Temperature T3: -40°C to +70°C	$T_{Rk,p,eq,C2}$ [N/mm <sup>2</sup> ]	3,5	4,0	4,5
Installation safety factor	$\gamma_z = \gamma_{int}$ [-]	1,0		
<b>Shear load</b>				
<b>Steel failure without lever arm</b>				
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C2}$ [kN]	13	18	28
Partial safety factor	$\gamma_{Ms}$ [-]	1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C2}$ [kN]	16	22	35
Partial safety factor	$\gamma_{Ms}$ [-]	1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C2}$ [kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$ [-]	1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C2}$ [kN]	32	45	70
Partial safety factor	$\gamma_{Ms}$ [-]	1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C2}$ [kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$ [-]	1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq,C2}$ [kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$ [-]	1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq,C2}$ [kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$ [-]	1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq,C2}$ [kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$ [-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods				
Reduction factor for hot-dip galvanized rods	$\alpha_{V,hot-dip,C2}$ [-]	0,46	0,61	0,61
Factor for annular gap	$\alpha_{gap}$ [-]	0,5		

Table C9: Displacement under tensile and shear load - seismic category C2

Size		M12	M16	M20
$\delta_{N,eq}(DLS)$	[mm]	0,20	0,40	0,77
$\delta_{N,eq}(ULS)$	[mm]	0,76	0,74	1,68
$\delta_{V,eq}(DLS)$	[mm]	5,29	4,12	4,94
$\delta_{V,eq}(ULS)$	[mm]	10,20	90,5	10,99

The anchor shall be used with minimum rupture elongation after fracture  $A_s$  equal to 19%.

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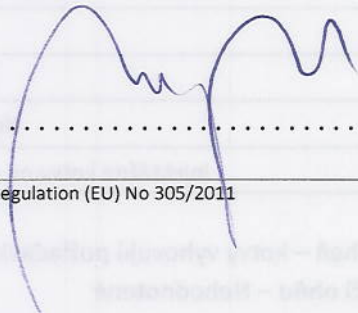
**8 VHDNÁ TECHNICKÁ DOKUMENTÁCIA A/ALEBO ŠPECIFICKÁ  
TECHNICKÁ DOKUMENTÁCIA**

Uvedené parametre výrobku sú v zhode so súborom deklarovaných parametrov. Toto vyhlásenie o parametroch sa v súlade s nariadením (EÚ) č. 305/2011 vydáva na výhradnú zodpovednosť uvedeného výrobcu.

Podpísal(-a) za Sika Slovensko, spol. s r.o:

Meno : Ing. Henrieta Absolonová  
Funkcia: Manažér kvality a EMS  
V Bratislave, dňa 28.10.2019

Meno : Ing. Marek Mikuš  
Funkcia: Konateľ Sika Slovensko, spol. s r.o.  
V Bratislave, dňa 28.10.2019

  
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End of information as required by Regulation (EU) No 305/2011

**SÚVISIACE VYHLÁSENIE O PARAMETROCH**

Názov produktu	Harmonizovaná technická špecifikácia	Číslo VoP
Sika AnchorFix®-3030 pre injektážne kotvy	ETA 17/0693	10823672

**Vyhlasenie o parametroch**

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## ÚPLNÉ CE OZNAČENIE



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Sika Services AG, Zürich, Švajčiarsko

VoP č. 66629518

EAD 330499-00-0601

Notifikovaný subjekt 1020

Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín

**Reakcia na oheň** – kotvy vyhovujú požiadavkách pre triedu A1

**Odolnosť voči ohňu** – Nehodnotené

**Kotvenie vystavené:**

- Statickému a kvázistatickému zaťaženiu
- Seizmickým účinkom kategórie C1 (max.  $w = 0,5$  mm): závitová tyč s rozmermi M12, M16, M20
- Seizmickým účinkom kategórie C2 (max.  $w = 0,8$  mm): závitová tyč s rozmermi M12, M16, M20

**Podkladné materiály:**

- Betón s trhlinami a bez trhlín
- Vystužený alebo nevystužený betón s normálnou hmotnosťou s triedou pevnosti minimálne C20/25 a maximálne C50/60 podľa normy EN 206: 2013.

**Teplotné rozmedzie:**

- T3:  $-40^{\circ}\text{C}$  až  $+70^{\circ}\text{C}$  (maximálna krátkodobá teplota  $+70^{\circ}\text{C}$  a maximálna dlhodobá teplota  $+50^{\circ}\text{C}$ )

**Podmienky použitia (podmienky prostredia):**

- (X1) Konštrukcie vystavené suchým vnútorným podmienkam (pozinkovaná oceľ, nehrdzavejúca oceľ, oceľ s vysokou odolnosťou proti korózii).
- (X2) Konštrukcie vystavené vonkajšiemu atmosferickému zaťaženiu (vrátane priemyselného a morského prostredia) a trvale vlhkým vnútorným podmienkam, ak neexistujú žiadne osobitné agresívne podmienky (nehrdzavejúca oceľ A4, oceľ s vysokou odolnosťou proti korózii).
- (X3) Konštrukcie vystavené vonkajšiemu atmosferickému zaťaženiu a trvale vlhkým vnútorným podmienkam, ak neexistujú žiadne osobitné agresívne podmienky (oceľ s vysokou odolnosťou proti korózii).

Poznámka: Osobitné agresívne podmienky sú napr. trvalé, striedavé ponorenie do morskej vody alebo striekajúcej zóny morskej vody, chlórové prostredie vnútorných bazénov alebo prostredie s extrémnym chemickým znečistením (napr. v odsírovacích závodoch alebo cestných tuneloch, kde sa používajú odmrázovacie materiály).

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**Podmienky betónu:**

- I1 – montáž do suchého alebo mokrého (vodou nasýteného) betónu alebo zaplaveného otvoru.
- I2 – montáž do vodou vyplneného betónu (nie morskej vody) a prevádzka v suchom alebo mokrom betóne

**Návrh kotvenia:**

- Kotvy sú navrhnuté v súlade s normou EN 1992-4 alebo technickou správou EOTA TR 055 v zodpovednosti inžiniera s praxou v oblasti kotviacej techniky a prípravy betónu.
- Musia byť pripravené overiteľné výpočty a výkresy s ohľadom na zaťaženie, ktoré má kotva prenášať. Poloha kotvy musí byť vyznačená na konštrukčných výkresoch.
- Kotvy so seizmickým zaťažením (betón s trhlinami) musia byť navrhnuté v súlade s normou EN 1992-4.

**Zabudovanie/ Montáž:**

- Vŕtanie otvorov pomocou vrtačky s príklepom.
- Montáž kotiev sa musí vykonávať vhodne kvalifikovaným personálom a pod dohľadom osoby zodpovednej za technické záležitosti na stavbe.

**Smer montáže:**

D3 – montáž nadol a horizontálne a nahor (napr. nad hlavou)

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• Table B1: Installation parameters of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$\varnothing d_0$ [mm]	10	12	14	18	22	26	30	35
Cleaning brush		S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max $T_{ed}$ [Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{er,min}$	$h_{er}$ [mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{er,max}$	$h_{er}$ [mm]	160	200	240	320	400	480	540	600
Depth of drill hole	$h_0$ [mm]	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	$h_{min}$ [mm]	$h_{er} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{er} + 2d_0$				

• Table B2: Installation parameters of rebar

Size		$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$	$\varnothing 25$	$\varnothing 32$
Nominal drill hole diameter	$\varnothing d_0$ [mm]	12	14	16	20	25	32	40
Cleaning brush		S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max $T_{ed}$ [Nm]	10	20	40	80	120	180	200
Min. embedment depth								
Embedment depth for $h_{er,min}$	$h_{er}$ [mm]	60	60	70	80	90	100	128
Embedment depth for $h_{er,max}$	$h_{er}$ [mm]	160	200	240	320	400	500	640
Depth of drill hole	$h_0$ [mm]	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$	$h_{er}+5$
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	70
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	70
Minimum thickness of member	$h_{min}$ [mm]	$h_{er} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{er} + 2d_0$			

• Table B3: Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

• Table B4: Minimum curing time

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
Ensure cartridge is $\geq 10^\circ\text{C}$			

- T Work is typical gel time at highest base material temperature in the range.
- T Load is minimum set time required until load can be applied at the lowest temperature in the range.

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Table C1: Design method EN 1992-4  
Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Steel grade 4.6	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224	
Partial safety factor	$\gamma_{Ms}$	[-]	2,00								
Steel grade 5.8	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Steel grade 8.8	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Steel grade 10.9	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561	
Partial safety factor	$\gamma_{Ms}$	[-]	1,33								
Stainless steel grade A2-70, A4-70	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	398	
Partial safety factor	$\gamma_{Ms}$	[-]	1,87								
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449	
Partial safety factor	$\gamma_{Ms}$	[-]	1,60								
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	398	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Stainless steel grade 1.4565	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	398	
Partial safety factor	$\gamma_{Ms}$	[-]	1,87								
Combined pullout and concrete cone failure in concrete C20/25											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Characteristic bond resistance in uncracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	17	15	15	12	12	12	11	9,5	
Dry, wet concrete, flooded hole											
Partial safety factor	$\gamma_s^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0								
Factor for uncracked concrete	C25/30	$\psi_c$	[-]							1,02	
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
C50/60	1,09										
Characteristic bond resistance in cracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10	10	10	9,5	9	9	6	6	
Dry, wet concrete, flooded hole											
Partial safety factor	$\gamma_s^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0								
Factor for cracked concrete	C25/30	$\psi_c$	[-]							1,02	
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
C50/60	1,09										
Concrete cone failure											
Factor for concrete cone failure for uncracked concrete	$k_s^{(1)}$	[-]							10,1		
	$k_{ucr,N}^{(2)}$		11								
Factor for concrete cone failure for cracked concrete	$k_s^{(1)}$	[-]							7,2		
	$k_{cr,N}^{(2)}$		7,7								
Edge distance	$c_{cr,N}$	[mm]							1,5h <sub>ef</sub>		
Splitting failure											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Edge distance	$c_{cr,sp}$	[mm]							2 • h <sub>ef</sub>		
Spacing	$s_{cr,sp}$	[mm]							2 • c <sub>cr,sp</sub>		
Partial safety factor	$\gamma_{Msp}$	[-]	1,5								

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016

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**Table C2: Design method EN 1992-4**  
Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442	
Partial safety factor	$\gamma_{Ms}$	[-]	1,4							

Pullout failure in concrete C20/25										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13	13	13	12	12	12	8	
Dry and wet concrete										
Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0							
Flooded hole										
Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,2							
Factor for uncracked concrete	C25/30	$\psi_c$	[-]	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
C50/60	1,09									

Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	8	11	10	10	9	8,5	6	
Dry and wet concrete										
Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0							
Flooded hole										
Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,2							
Factor for cracked concrete	C25/30	$\psi_c$	[-]	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
C50/60	1,09									

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_c^{(1)}$	[-]	10,1
	$k_{ucr,N}^{(2)}$		11
Factor for concrete cone failure for cracked concrete	$k_c^{(1)}$	[-]	7,2
	$k_{cr,N}^{(2)}$		7,7
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Edge distance	$c_{cr,sp}$	[mm]	$2 \cdot h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$						
Partial safety factor	$\gamma_{Msp}$	[-]	1,5						
Dry and wet concrete									
Partial safety factor	$\gamma_{Msp}$	[-]	1,8						
Flooded hole									

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016

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Table C3: Design method EN 1992-4  
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,z}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Mc}$ [-]	1,67							
Steel grade 5.8	$V_{Rk,z}$ [kN]	9	15	21	39	61	88	115	140
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Steel grade 8.8	$V_{Rk,z}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Steel grade 10.9	$V_{Rk,z}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Mc}$ [-]	1,5							
Stainless steel grade A2-70, A4-70	$V_{Rk,z}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Mc}$ [-]	1,56							
Stainless steel grade A4-80	$V_{Rk,z}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Mc}$ [-]	1,33							
Stainless steel grade 1.4529	$V_{Rk,z}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Stainless steel grade 1.4565	$V_{Rk,z}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Mc}$ [-]	1,56							
Characteristic resistance of group of fasteners									
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$									

Steel failure with lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$M^o_{Rk,z}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Mc}$ [-]	1,67							
Steel grade 5.8	$M^o_{Rk,z}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Steel grade 8.8	$M^o_{Rk,z}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Steel grade 10.9	$M^o_{Rk,z}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	$\gamma_{Mc}$ [-]	1,50							
Stainless steel grade A2-70, A4-70	$M^o_{Rk,z}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Mc}$ [-]	1,56							
Stainless steel grade A4-80	$M^o_{Rk,z}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Mc}$ [-]	1,33							
Stainless steel grade 1.4529	$M^o_{Rk,z}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Mc}$ [-]	1,25							
Stainless steel grade 1.4565	$M^o_{Rk,z}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Mc}$ [-]	1,56							
Concrete pryout failure									
Factor for resistance to pry-out failure	$k_8$ [-]	2							

Concrete edge failure									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	24	27	30
Effective length of fastener	$l_f$ [mm]	$\min(h_{ef}, 8 d_{nom})$							

Vyhlasenie o parametroch

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**Table C4: Design method EN 1992-4**  
Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s}$ [kN]	14	22	31	55	86	135	221
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Characteristic resistance of group of fasteners								
Ductility factor $k_T = 1,0$ for steel with rupture elongation $A_5 > 8\%$								

Steel failure with lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$M^o_{Rk,s}$ [N.m]	33	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Concrete pryout failure								
Factor for resistance to pry-out failure	$k_g$ [-]	2						

Concrete edge failure								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	25	32
Effective length of fastener	$l_e$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )						

**Table C5: Displacement of threaded rod under tension and shear load**

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
$\delta_{ND}$	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N^o}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
$\delta_{ND}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N^o}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
$\delta_{VD}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V^o}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

**Table C6: Displacement of rebar under tension and shear load**

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
$\delta_{ND}$	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N^o}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
$\delta_{ND}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N^o}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
$\delta_{VD}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V^o}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

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Table C7: Seismic performance category C1

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm <sup>2</sup> ]	5,2	6,6	6,8
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,hd-gal,C1}$	[-]	0,44	0,58	0,58
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

The anchor shall be used with minimum rupture elongation after fracture  $A_s$  equal to 19%.

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Table C8: Seismic performance category C2

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm <sup>2</sup> ]	3,5	4,0	4,5
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{V,hot-dip,C2}$	[-]	0,46	0,61	0,61
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

Table C9: Displacement under tensile and shear load - seismic category C2

Size		M12	M16	M20
$\delta_{N,eq}(DLS)$	[mm]	0,20	0,40	0,77
$\delta_{N,eq}(ULS)$	[mm]	0,76	0,74	1,68
$\delta_{V,eq}(DLS)$	[mm]	5,29	4,12	4,94
$\delta_{V,eq}(ULS)$	[mm]	10,20	90,5	10,99

The anchor shall be used with minimum rupture elongation after fracture  $A_s$  equal to 19%.

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## CE OZNAČENIE MUSÍ BYŤ UMIESTNENÉ NA OBALE

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Sika Services AG, Zürich, Švajčiarsko
VoP č. 66629518
EAD 330499-00-0601
Notifikovaný subjekt 1020
Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín
Viac informácií v priložených dokumentoch

<http://dop.sika.com>

### INFORMÁCIE O OCHRANE ŽIVOTNÉHO PROSTREDIA, ZDRAVIA A BEZPEČNOSTI PRI PRÁCI (REACH)

Informácie a pokyny týkajúce sa bezpečnej prepravy, manipulácie, skladovania a likvidácie chemických produktov nájdete v aktuálnom vydaní karty bezpečnostných údajov, ktorá obsahuje fyzikálne, ekologické, toxikologické a iné údaje, týkajúce sa bezpečnej manipulácie s produktom.

### PRÁVNE OZNÁMENIE

Informácie a najmä odporúčania, vzťahujúce sa na aplikáciu a použitie produktov spoločnosti Sika koncovými užívateľmi, sa poskytujú v dobrej viere na základe súčasných vedomostí a skúseností spoločnosti Sika s týmito produktmi, za predpokladu správneho skladovania, manipulácie a aplikácie za bežných podmienok v súlade s doporučeniami spoločnosti Sika. V praxi sa vzhľadom na rozdiely v materiáloch, podkladoch a v skutočných podmienkach na danom mieste nemôže vyvodzovať z týchto informácií ani z písomných odporúčaní, či iného poskytnutého poradenstva žiadna záruka za predaj alebo vhodnosť a použiteľnosť pre určitý účel, ani žiadna zodpovednosť vyplývajúca z akéhokoľvek právneho vzťahu. Spracovávateľ produktu musí vopred vyskúšať vhodnosť produktu pre plánované použitie a účel. Spoločnosť Sika si vyhradzuje právo na zmenu vlastností svojich produktov. Vlastnícke práva tretích strán musia byť dodržané. Všetky objednávky sa akceptujú v súlade s platnými všeobecnými obchodnými podmienkami. Užívateľia sú vždy povinní preštudovať si poslednú verziu príslušného produktového listu, ktorého kópiu zašleme na vyžiadanie alebo je k dispozícii na [www.sika.sk](http://www.sika.sk)

#### Pre ďalšie informácie o výrobku kontaktujte:

Sika Slovensko, spol. s r.o., Rybníčná 38/e, 831 06 Bratislava  
tel: +421 2 49200403  
Fax: +421 2 49200444  
e-mail: [sika@sk.sika.com](mailto:sika@sk.sika.com)

#### Vyhlásenie o parametroch

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Priloha AD k normě EN 12518

Verze 2.00 (2018)

EN 12518-2:2012

Technický předpis 2012

Technické podmínky pro použití v souvislosti s výstavbou a údržbou

Pro informaci o technických podmínkách

[www.sika.com](http://www.sika.com)

### INFORMÁCIE O OCHRANĚ ŽIVOTNĚHO PROSTŘEDÍ, ZDRAVÍ A BEZPEČNOSTI PŘI PRÁCI (REACH)

Informace o ochraně životního prostředí, zdraví a bezpečnosti při práci (REACH) jsou uvedeny v příloze AD k normě EN 12518-2:2012. Tyto informace jsou uvedeny v příloze AD k normě EN 12518-2:2012. Tyto informace jsou uvedeny v příloze AD k normě EN 12518-2:2012.

### PRÁVNĚ OZNAČENÍ

Informace o právním označení výrobku jsou uvedeny v příloze AD k normě EN 12518-2:2012. Tyto informace jsou uvedeny v příloze AD k normě EN 12518-2:2012. Tyto informace jsou uvedeny v příloze AD k normě EN 12518-2:2012.

Technická příloha k vyhlášení  
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Technický předpis 2012

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### Vyhlasenie o parametroch

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# Sika AnchorFix<sup>®</sup>-3030

## DECLARATION OF PERFORMANCE

### No. 66629518

1	<b>UNIQUE IDENTIFICATION CODE OF THE PRODUCT-TYPE:</b>	66629518
2	<b>INTENDED USE/S</b>	ETA 17/0694 of 11/07/2018 Bonded injection type anchor for use in cracked and uncracked concrete
3	<b>MANUFACTURER:</b>	Sika Services AG Tüffenwies 16-22 8064 Zürich
4	<b>AUTHORISED REPRESENTATIVE:</b>	
5	<b>SYSTEM/S OF AVCP:</b>	System 1
6b	<b>EUROPEAN ASSESSMENT DOCUMENT:</b>	EAD 330499-00-0601
	European Technical Assessment:	ETA 17/0694 of 11/07/2018
	Technical Assessment Body:	TECHNICKY A ZKUSEBNI USTAV STAVEBNI PRAHA s.p.
	Notified body/ies:	1020

## 7 DECLARED PERFORMANCE/S

**Reaction to fire** - Anchorages satisfy requirements for Class A1

**Resistance to fire** - No performance determined

### **Anchorage subject to:**

- Static and quasi-static load
- Seismic actions category C1 (max w = 0,5 mm): threaded rod size M12, M16, M20
- Seismic actions category C2 (max w = 0,8 mm): threaded rod size M12, M16, M20

### **Base materials**

- Cracked and uncracked concrete
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013.

### **Temperature range:**

- T3: -40°C to +70°C (max. short. term temperature +70°C and max. long term temperature +50°C)

### **Use conditions (Environmental conditions)**

- (X1) Structures subject to dry internal conditions (zinc coated steel, stainless steel, high corrosion resistance steel).
- (X2) Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel A4, high corrosion resistant steel).
- (X3) Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

### **Concrete conditions:**

- I1 – installation in dry or wet (water saturated) concrete or flooded hole.
- I2 – installation in water-filled (not sea water) and use in service in dry or wet concrete

### **Design:**

- The anchorages are designed in accordance with the EN 1992-4 or EOTA Technical Report TR 055 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.
- Anchorages under seismic actions (cracked concrete) have to be designed in accordance with EN 1992-4.

### **Installation:**

- Hole drilling by hammer drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

### **Installation direction:**

D3 – downward and horizontal and upwards (e.g. overhead) installation

### **Declaration of Performance**

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Template for translation. Only for  
internal use



- **Table B1:** Installation parameters of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$\varnothing d_0$ [mm]	10	12	14	18	22	26	30	35
Cleaning brush		S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max $T_{fix}$ [Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{ef,min}$	$h_{ef}$ [mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{ef,max}$	$h_{ef}$ [mm]	160	200	240	320	400	480	540	600
Depth of drill hole	$h_0$ [mm]	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_0$			

- **Table B2:** Installation parameters of rebar

Size		$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$	$\varnothing 25$	$\varnothing 32$	
Nominal drill hole diameter	$\varnothing d_0$ [mm]	12	14	16	20	25	32	40	
Cleaning brush		S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF	
Torque moment	max $T_{fix}$ [Nm]	10	20	40	80	120	180	200	
Min. embedment depth									
Embedment depth for $h_{ef,min}$	$h_{ef}$ [mm]	60	60	70	80	90	100	128	
Embedment depth for $h_{ef,max}$	$h_{ef}$ [mm]	160	200	240	320	400	500	640	
Depth of drill hole	$h_0$ [mm]	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	
Minimum edge distance	$c_{min}$ [mm]	40	40	40	40	50	50	70	
Minimum spacing	$s_{min}$ [mm]	40	40	40	40	50	50	70	
Minimum thickness of member	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_0$			

- **Table B3:** Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

- **Table B4:** Minimum curing time

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
<b>Ensure cartridge is <math>\geq 10^\circ\text{C}</math></b>			

- T Work is typical gel time at highest base material temperature in the range.
- T Load is minimum set time required until load can be applied at the lowest temperature in the range.

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**Table C1:** Design method EN 1992-4  
Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance												
Size			M8	M10	M12	M16	M20	M24	M27	M30		
Steel grade 4.6	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224		
Partial safety factor	$\gamma_{Ms}$	[-]	2,00									
Steel grade 5.8	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281		
Partial safety factor	$\gamma_{Ms}$	[-]	1,50									
Steel grade 8.8	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449		
Partial safety factor	$\gamma_{Ms}$	[-]	1,50									
Steel grade 10.9	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561		
Partial safety factor	$\gamma_{Ms}$	[-]	1,33									
Stainless steel grade A2-70, A4-70	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393		
Partial safety factor	$\gamma_{Ms}$	[-]	1,87									
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449		
Partial safety factor	$\gamma_{Ms}$	[-]	1,60									
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393		
Partial safety factor	$\gamma_{Ms}$	[-]	1,50									
Stainless steel grade 1.4565	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393		
Partial safety factor	$\gamma_{Ms}$	[-]	1,87									
Combined pullout and concrete cone failure in concrete C20/25												
Size			M8	M10	M12	M16	M20	M24	M27	M30		
Characteristic bond resistance in uncracked concrete												
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	17	15	15	12	12	12	11	9,5		
Dry, wet concrete, flooded hole												
Partial safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0									
Factor for uncracked concrete	C25/30	$\psi_c$	[-]	1,02								
	C30/37			1,04								
	C35/45			1,06								
	C40/50			1,07								
	C45/55			1,08								
	C50/60			1,09								
Characteristic bond resistance in cracked concrete												
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10	10	10	9,5	9	9	6	6		
Dry, wet concrete, flooded hole												
Partial safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0									
Factor for cracked concrete	C25/30	$\psi_c$	[-]	1,02								
	C30/37			1,04								
	C35/45			1,06								
	C40/50			1,07								
	C45/55			1,08								
	C50/60			1,09								
Concrete cone failure												
Factor for concrete cone failure for uncracked concrete	$k_1^{(1)}$	[-]	10,1									
	$k_{ucr,N}^{(2)}$		11									
Factor for concrete cone failure for cracked concrete	$k_1^{(1)}$		7,2									
	$k_{cr,N}^{(2)}$		7,7									
Edge distance	$c_{Cr,N}$	[mm]	1,5h <sub>ef</sub>									
Splitting failure												
Size			M8	M10	M12	M16	M20	M24	M27	M30		
Edge distance	$c_{cr,sp}$	[mm]	2 • h <sub>ef</sub>									
Spacing	$s_{cr,sp}$	[mm]	2 • c <sub>cr,sp</sub>									
Partial safety factor	$\gamma_{Msp}$	[-]	1,5									

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016



**Table C2:** Design method EN 1992-4  
Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442	
Partial safety factor	$\gamma_{Ms}$	[-]	1,4							

Pullout failure in concrete C20/25									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
<b>Characteristic bond resistance in uncracked concrete</b>									
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13	13	13	12	12	12	8
<b>Dry and wet concrete</b>									
Installation safety factor	$\gamma_2^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,0						
<b>Flooded hole</b>									
Installation safety factor	$\gamma_2^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,2						
Factor for uncracked concrete	C25/30	$\psi_c$	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					
<b>Characteristic bond resistance in cracked concrete</b>									
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	8	11	10	10	9	8,5	6
<b>Dry and wet concrete</b>									
Installation safety factor	$\gamma_2^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,0						
<b>Flooded hole</b>									
Installation safety factor	$\gamma_2^{(1)}=\gamma_{inst}^{(2)}$	[-]	1,2						
Factor for cracked concrete	C25/30	$\psi_c$	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_1^{(1)}$	[-]	10,1
	$k_{ucr,N}^{(2)}$		11
Factor for concrete cone failure for cracked concrete	$k_1^{(1)}$		7,2
	$k_{cr,N}^{(2)}$		7,7
Edge distance	$c_{Cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Edge distance	$c_{Cr,sp}$	[mm]	$2 \cdot h_{ef}$						
Spacing	$s_{Cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$						
Partial safety factor	$\gamma_{Msp}$	[-]	1,5						
Dry and wet concrete									
Partial safety factor	$\gamma_{Msp}$	[-]	1,8						
Flooded hole									

<sup>1)</sup> Design according EOTA Technical Report TR 055

<sup>2)</sup> Design according EN 1992-4:2016

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**Table C3:** Design method EN 1992-4  
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$V_{Rk,s}$ [kN]	9	15	21	39	61	88	115	140
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$V_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Ms}$ [-]	1,5							
Stainless steel grade A2-70, A4-70	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Characteristic resistance of group of fasteners									
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$									

Steel failure with lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$M^o_{Rk,s}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$M^o_{Rk,s}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	$\gamma_{Ms}$ [-]	1,50							
Stainless steel grade A2-70, A4-70	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Concrete pryout failure									
Factor for resistance to pry-out failure	$k_8$ [-]	2							

Concrete edge failure									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	24	27	30
Effective length of fastener	$l_f$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )							



**Table C4:** Design method EN 1992-4  
Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s}$ [kN]	14	22	31	55	86	135	221
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Characteristic resistance of group of fasteners								
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$								

Steel failure with lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$M^o_{Rk,s}$ [N.m]	33	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Concrete pryout failure								
Factor for resistance to pry-out failure	$k_8$ [-]	2						

Concrete edge failure								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	25	32
Effective length of fastener	$l_f$ [mm]	$\min(h_{ef}, 8 d_{nom})$						

**Table C5:** Displacement of threaded rod under tension and shear load

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
$\delta_{N0}$	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

**Table C6:** Displacement of rebar under tension and shear load

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
$\delta_{N0}$	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

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**Table C7: Seismic performance category C1**

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade <b>4.6</b>	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade <b>5.8</b>	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>8.8</b>	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>10.9</b>	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>A2-70, A4-70</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance <b>A4-80</b>	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance <b>1.4529</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>1.4565</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm <sup>2</sup> ]	5,2	6,6	6,8
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade <b>4.6</b>	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade <b>5.8</b>	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>8.8</b>	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>10.9</b>	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>A2-70, A4-70</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance <b>A4-80</b>	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>1.4529</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance <b>1.4565</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for <b>hot-dip galvanized</b> commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c1}$	[-]	0,44	0,58	0,58
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

The anchor shall be used with minimum rupture elongation after fracture  $A_s$  equal to 19%.



**Table C8: Seismic performance category C2**

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm <sup>2</sup> ]	3,5	4,0	4,5
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for <b>hot-dip galvanized</b> commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,C2}$	[-]	0,46	0,61	0,61
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

**Table C9: Displacement under tensile and shear load - seismic category C2**

Size		M12	M16	M20
$\delta_{N,eq}(DLS)$	[mm]	0,20	0,40	0,77
$\delta_{N,eq}(ULS)$	[mm]	0,76	0,74	1,68
$\delta_{V,eq}(DLS)$	[mm]	5,29	4,12	4,94
$\delta_{V,eq}(ULS)$	[mm]	10,20	90,5	10,99

The anchor shall be used with minimum rupture elongation after fracture  $A_5$  equal to 19%.

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**8 APPROPRIATE TECHNICAL DOCUMENTATION AND/OR -  
SPECIFIC TECHNICAL DOCUMENTATION**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Name : Tomasz Gutowski  
Function: Corporate Standardization  
and Approvals  
At Warsaw on 19 July 2018

Name : Tatiana Ageyeva  
Function: Standardization and Approvals  
At Warsaw on 19 July 2018




End of information as required by Regulation (EU) No 305/2011

**RELATED DECLARATION OF PERFORMANCE**

Product Name	Harmonised technical specification	DoP Number
Sika AnchorFix®-3030 for rebar connection	ETA 17/0693	10823672



## FULL CE MARKING

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Sika Services AG, Zurich, Switzerland
DoP No. 66629518
EAD 330499-00-0601
Notified Body 1020
Bonded injection type anchor for use in cracked and uncracked concrete
<p><b>Reaction to fire</b> - Anchorages satisfy requirements for Class A1 <b>Resistance to fire</b> - No performance determined</p> <p><b>Anchorage subject to:</b></p> <ul style="list-style-type: none"><li>• Static and quasi-static load</li><li>• Seismic actions category C1 (max w = 0,5 mm): threaded rod size M12, M16, M20</li><li>• Seismic actions category C2 (max w = 0,8 mm): threaded rod size M12, M16, M20</li></ul> <p><b>Base materials</b></p> <ul style="list-style-type: none"><li>• Cracked and uncracked concrete</li><li>• Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013.</li></ul> <p><b>Temperature range:</b></p> <ul style="list-style-type: none"><li>• T3: -40°C to +70°C (max. short. term temperature +70°C and max. long term temperature +50°C)</li></ul> <p><b>Use conditions (Environmental conditions)</b></p> <ul style="list-style-type: none"><li>• (X1) Structures subject to dry internal conditions (zinc coated steel, stainless steel, high corrosion resistance steel).</li><li>• (X2) Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel A4, high corrosion resistant steel).</li><li>• (X3) Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).</li></ul> <p>Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).</p> <p><b>Concrete conditions:</b></p> <ul style="list-style-type: none"><li>• I1 – installation in dry or wet (water saturated) concrete or flooded hole.</li><li>• I2 – installation in water-filled (not sea water) and use in service in dry or wet concrete</li></ul> <p><b>Design:</b></p> <ul style="list-style-type: none"><li>• The anchorages are designed in accordance with the EN 1992-4 or EOTA Technical Report TR 055 under the responsibility of an engineer experienced in anchorages and concrete work.</li></ul>

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- 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.
- Anchorages under seismic actions (cracked concrete) have to be designed in accordance with EN 1992-4.

**Installation:**

- Hole drilling by hammer drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

**Installation direction:**

D3 – downward and horizontal and upwards (e.g. overhead) installation

- **Table B1:** Installation parameters of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$\varnothing d_0$ [mm]	10	12	14	18	22	26	30	35
Cleaning brush		S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	$\max T_{\text{fix}}$ [Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{\text{ef,min}}$	$h_{\text{ef}}$ [mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{\text{ef,max}}$	$h_{\text{ef}}$ [mm]	160	200	240	320	400	480	540	600
Depth of drill hole	$h_0$ [mm]	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$
Minimum edge distance	$c_{\text{min}}$ [mm]	40	40	40	40	50	50	50	60
Minimum spacing	$s_{\text{min}}$ [mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	$h_{\text{min}}$ [mm]	$h_{\text{ef}} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{\text{ef}} + 2d_0$				

- **Table B2:** Installation parameters of rebar

Size		$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$	$\varnothing 25$	$\varnothing 32$
Nominal drill hole diameter	$\varnothing d_0$ [mm]	12	14	16	20	25	32	40
Cleaning brush		S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	$\max T_{\text{fix}}$ [Nm]	10	20	40	80	120	180	200
Min. embedment depth								
Embedment depth for $h_{\text{ef,min}}$	$h_{\text{ef}}$ [mm]	60	60	70	80	90	100	128
Embedment depth for $h_{\text{ef,max}}$	$h_{\text{ef}}$ [mm]	160	200	240	320	400	500	640
Depth of drill hole	$h_0$ [mm]	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$	$h_{\text{ef}}+5$
Minimum edge distance	$c_{\text{min}}$ [mm]	40	40	40	40	50	50	70
Minimum spacing	$s_{\text{min}}$ [mm]	40	40	40	40	50	50	70
Minimum thickness of member	$h_{\text{min}}$ [mm]	$h_{\text{ef}} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{\text{ef}} + 2d_0$			

- **Table B3:** Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

- **Table B4:** Minimum curing time

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
<b>Ensure cartridge is <math>\geq 10^\circ\text{C}</math></b>			

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- T Work is typical gel time at highest base material temperature in the range.
- T Load is minimum set time required until load can be applied at the lowest temperature in the range.

**Table C1:** Design method EN 1992-4  
Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Steel grade 4.6	$N_{Rk,S}$	[kN]	15	23	34	63	98	141	184	224	
Partial safety factor	$\gamma_{Ms}$	[-]	2,00								
Steel grade 5.8	$N_{Rk,S}$	[kN]	18	29	42	79	123	177	230	281	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Steel grade 8.8	$N_{Rk,S}$	[kN]	29	46	67	126	196	282	367	449	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Steel grade 10.9	$N_{Rk,S}$	[kN]	37	58	84	157	245	353	459	561	
Partial safety factor	$\gamma_{Ms}$	[-]	1,33								
Stainless steel grade A2-70, A4-70	$N_{Rk,S}$	[kN]	26	41	59	110	172	247	321	393	
Partial safety factor	$\gamma_{Ms}$	[-]	1,87								
Stainless steel grade A4-80	$N_{Rk,S}$	[kN]	29	46	67	126	196	282	367	449	
Partial safety factor	$\gamma_{Ms}$	[-]	1,60								
Stainless steel grade 1.4529	$N_{Rk,S}$	[kN]	26	41	59	110	172	247	321	393	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50								
Stainless steel grade 1.4565	$N_{Rk,S}$	[kN]	26	41	59	110	172	247	321	393	
Partial safety factor	$\gamma_{Ms}$	[-]	1,87								
Combined pullout and concrete cone failure in concrete C20/25											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Characteristic bond resistance in uncracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	17	15	15	12	12	12	11	9,5	
Dry, wet concrete, flooded hole											
Partial safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0								
Factor for uncracked concrete	C25/30	$\psi_c$	[-]	1,02							
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
	C50/60			1,09							
Characteristic bond resistance in cracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10	10	10	9,5	9	9	6	6	
Dry, wet concrete, flooded hole											
Partial safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0								
Factor for cracked concrete	C25/30	$\psi_c$	[-]	1,02							
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
	C50/60			1,09							
Concrete cone failure											
Factor for concrete cone failure for uncracked concrete	$k_1^{(1)}$	[-]	10,1								
Factor for concrete cone failure for cracked concrete	$k_{ucr,N}^{(2)}$		11								
Factor for concrete cone failure for cracked concrete	$k_1^{(1)}$		7,2								
Factor for concrete cone failure for cracked concrete	$k_{cr,N}^{(2)}$		7,7								
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$								
Splitting failure											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Edge distance	$C_{cr,sp}$	[mm]	2 • $h_{ef}$								
Spacing	$S_{cr,sp}$	[mm]	2 • $C_{cr,sp}$								
Partial safety factor	$\gamma_{Msp}$	[-]	1,5								

1) Design according EOTA Technical Report TR 055

2) Design according EN 1992-4:2016

**Table C2:** Design method EN 1992-4  
Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442	
Partial safety factor	$\gamma_{Ms}$	[-]	1,4							

**Pullout failure in concrete C20/25**

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
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**Characteristic bond resistance in uncracked concrete**

Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13	13	13	12	12	12	8
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**Dry and wet concrete**

Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0							
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**Flooded hole**

Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,2							
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Factor for uncracked concrete	C25/30	$\psi_c$	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					

**Characteristic bond resistance in cracked concrete**

Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	8	11	10	10	9	8,5	6
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**Dry and wet concrete**

Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,0							
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**Flooded hole**

Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$	[-]	1,2							
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Factor for cracked concrete	C25/30	$\psi_c$	[-]	1,02					
	C30/37			1,04					
	C35/45			1,06					
	C40/50			1,07					
	C45/55			1,08					
	C50/60			1,09					

**Concrete cone failure**

Factor for concrete cone failure for uncracked concrete	$k_1^{(1)}$	[-]	10,1					
	$k_{ucr,N}^{(2)}$		11					
Factor for concrete cone failure for cracked concrete	$k_1^{(1)}$	[-]	7,2					
	$k_{cr,N}^{(2)}$		7,7					
Edge distance	$c_{cr,N}$	[mm]	1,5h <sub>ef</sub>					

**Splitting failure**

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
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Edge distance	$c_{cr,sp}$	[mm]	2 • h <sub>ef</sub>					
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Spacing	$s_{cr,sp}$	[mm]	2 • c <sub>cr,sp</sub>					
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Partial safety factor	$\gamma_{Msp}$	[-]	1,5					
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Dry and wet concrete								
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Partial safety factor	$\gamma_{Msp}$	[-]	1,8					
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Flooded hole								
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1) Design according EOTA Technical Report TR 055

2) Design according EN 1992-4:2016

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**Table C3:** Design method EN 1992-4  
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$V_{Rk,s}$ [kN]	9	15	21	39	61	88	115	140
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$V_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Ms}$ [-]	1,5							
Stainless steel grade A2-70, A4-70	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Characteristic resistance of group of fasteners									
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$									

Steel failure with lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Ms}$ [-]	1,67							
Steel grade 5.8	$M^o_{Rk,s}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 8.8	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Steel grade 10.9	$M^o_{Rk,s}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	$\gamma_{Ms}$ [-]	1,50							
Stainless steel grade A2-70, A4-70	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Stainless steel grade A4-80	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms}$ [-]	1,33							
Stainless steel grade 1.4529	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,25							
Stainless steel grade 1.4565	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms}$ [-]	1,56							
Concrete pryout failure									
Factor for resistance to pry-out failure	$k_8$ [-]	2							

Concrete edge failure									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	24	27	30
Effective length of fastener	$l_f$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )							

**Table C4:** Design method EN 1992-4  
Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s}$ [kN]	14	22	31	55	86	135	221
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Characteristic resistance of group of fasteners								
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$								

Steel failure with lever arm								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$M^o_{Rk,s}$ [N.m]	33	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Ms}$ [-]	1,5						
Concrete pryout failure								
Factor for resistance to pry-out failure	$k_8$ [-]	2						

Concrete edge failure								
Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	25	32
Effective length of fastener	$l_f$ [mm]	$\min(h_{ef}, 8 d_{nom})$						

**Table C5:** Displacement of threaded rod under tension and shear load

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
$\delta_{N0}$	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

**Table C6:** Displacement of rebar under tension and shear load

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
$\delta_{N0}$	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7



**Table C7:** Seismic performance category C1

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade <b>4.6</b>	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade <b>5.8</b>	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>8.8</b>	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>10.9</b>	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>A2-70, A4-70</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance <b>A4-80</b>	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance <b>1.4529</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>1.4565</b>	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm <sup>2</sup> ]	5,2	6,6	6,8
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		
<b>Shear load</b>					
<b>Steel failure without lever arm</b>					
Characteristic resistance grade <b>4.6</b>	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade <b>5.8</b>	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>8.8</b>	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>10.9</b>	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>A2-70, A4-70</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance <b>A4-80</b>	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>1.4529</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance <b>1.4565</b>	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for <b>hot-dip galvanized</b> commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c1}$	[-]	0,44	0,58	0,58
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		

The anchor shall be used with minimum rupture elongation after fracture  $A_5$  equal to 19%.

**Table C8:** Seismic performance category C2

Size			M12	M16	M20
<b>Tension load</b>					
<b>Steel failure</b>					
Characteristic resistance grade <b>4.6</b>	$N_{Rk,s,eq,C2}$	[kN]	34	63	98

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Partial safety factor	$\gamma_{Ms}$	[-]	2,00		
Characteristic resistance grade <b>5.8</b>	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>8.8</b>	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance grade <b>10.9</b>	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>A2-70, A4-70</b>	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
Characteristic resistance <b>A4-80</b>	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	$\gamma_{Ms}$	[-]	1,60		
Characteristic resistance <b>1.4529</b>	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>1.4565</b>	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	$\gamma_{Ms}$	[-]	1,87		
<b>Characteristic resistance to pull-out</b>					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm <sup>2</sup> ]	3,5	4,0	4,5
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0		

<b>Shear load</b>					
Steel failure without lever arm					
Characteristic resistance grade <b>4.6</b>	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		
Characteristic resistance grade <b>5.8</b>	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>8.8</b>	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance grade <b>10.9</b>	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	$\gamma_{Ms}$	[-]	1,50		
Characteristic resistance <b>A2-70, A4-70</b>	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic resistance <b>A4-80</b>	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	$\gamma_{Ms}$	[-]	1,33		
Characteristic resistance <b>1.4529</b>	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic resistance <b>1.4565</b>	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	$\gamma_{Ms}$	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for <b>hot-dip galvanized</b> commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	$\alpha_{gap}$	[-]	0,5		


**Table C9:** Displacement under tensile and shear load - seismic category C2

Size		M12	M16	M20
$\delta_{N,eq}(DLS)$	[mm]	0,20	0,40	0,77
$\delta_{N,eq}(ULS)$	[mm]	0,76	0,74	1,68
$\delta_{V,eq}(DLS)$	[mm]	5,29	4,12	4,94
$\delta_{V,eq}(ULS)$	[mm]	10,20	90,5	10,99

The anchor shall be used with minimum rupture elongation after fracture  $A_5$  equal to 19%.

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## CE MARKING TO BE PLACED ON THE LABEL

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Sika Services AG, Zurich, Switzerland
DoP No. 66629518
EAD 330499-00-0601
Notified Body 1020
Bonded injection type anchor for use in cracked and uncracked concrete
For details see accompanying documents
<a href="http://dop.sika.com">http://dop.sika.com</a>

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### ECOLOGY, HEALTH AND SAFETY INFORMATION (REACH)

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety related data.

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