

Sika AnchorFix[®]-3001

VYHLÁSENIE O PARAMETROCH č. 10856840

1	JEDINEČNÝ IDENTIFIKAČNÝ KÓD TYPU VÝROBKU:	10856840
2	ZAMÝŠĽANÉ POUŽITIE/POUŽITIA:	ETA 14/0157 zo 04/09/2014 Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín
3	VÝROBCA:	Sika Services AG Tüffenwies 16-22 8048 Zürich, Švajčiarsko
4	SPLNOMOCNENÝ ZÁSTUPCA:	Sika Slovensko, spol. s r.o. Rybničná 38/e 831 06 Bratislava, Slovenská republika
5	SYSTÉM(-Y) POSUDZOVANIA A OVEROVANIA NEMENNOSTI PARAMETROV:	System 1
6b	EURÓPSKY HODNOTIACI DOKUMENT:	ETAG 001 - časť 1 a časť 5, vydanie 2013
	Európske technické posúdenie:	ETA 14/0157 zo 04/09/2014
	Orgán technického posudzovania:	TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA s.p.
	Notifikovaný(-é) subjekt(-y):	1020

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Reakcia na oheň – kotvy vyhovujú požiadavkách pre triedu A1

Odolnosť voči ohňu – Nehodnotené

Kotvenie vystavené:

- Statickému a kvázistatickému zaťaženiu
- Seizmickým účinkom kategórie C1: závitová tyč

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 206-1: 2000-12.

Teplotné rozmedzie:

- Ta): -40°C až +40°C (maximálna krátkodobá teplota +40°C a maximálna dlhodobá teplota +24°C)
- Tb): -40°C až +70°C (maximálna krátkodobá teplota +70°C a maximálna dlhodobá teplota +40°C)
- Tc): -40°C až +80°C (maximálna krátkodobá teplota +80°C a maximálna dlhodobá teplota +40°C)

Podmienky použitia (podmienky prostredia):

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

Podmienky použitia: Kategória 1 - montáž do suchého alebo mokrého (vodou nasýteného) betónu

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Návrh kotvenia:

- Kotvy sú navrhnuté v súlade s EOTA technickou správou TR 029 „Návrh lepených kotiev“ 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 EOTA technická správa TR 045 „Návrh kovových kotiev pri seizmickom zaťažení“.

Zabudovanie/ Montáž:

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

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

Size		M10	M12	M16	M20	M24	M30
Nominal drill hole diameter	$\varnothing d_0$ [mm]	12	14	18	22	26	35
Diameter of cleaning brush	d_b [mm]	S14H/F	S16H/F	S22H/F	S24H/F	S31H/F	S38H/F
Torque moment	T_{inst} [Nm]	20	40	80	135	200	270
Min. embedment depth							
Depth of drill hole	h_d [mm]	60	70	80	90	96	120
Effective anchorage depth	h_{ef} [mm]	60	70	80	90	96	120
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	100	100	115	130	160	200
Max. embedment depth 20d							
Depth of drill hole	h_d [mm]	200	240	320	400	480	600
Effective anchorage depth	h_{ef} [mm]	200	240	320	400	480	600
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	224	268	336	444	532	670

Table B2: Installation parameters of rebar

Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$\varnothing d_0$ [mm]	14	16	20	25	32	40
Diameter of cleaning brush	d_b [mm]	S16H/F	S18H/F	S22H/F	S27H/F	S35H/F	S43H/F
Torque moment	T_{inst} [Nm]	20	40	80	135	200	270
Min. embedment depth							
Depth of drill hole	h_d [mm]	60	70	80	90	100	128
Effective anchorage depth	h_{ef} [mm]	60	70	80	90	100	128
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	100	100	120	140	164	208
Max. embedment depth 20d							
Depth of drill hole	h_d [mm]	200	240	320	400	500	640
Effective anchorage depth	h_{ef} [mm]	200	240	320	400	500	640
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	228	272	360	450	564	720

Table B3: Minimum curing time

Concrete temperature [°C]	Gel time [minutes]	Cure time [hours]
+5 to +10	20	24
+10 to +15		12
+15 to +20	15	8
+20 to +25	11	7
+25 to +30	8	6
+30 to +35	6	5
+35 to +40	4	4
+40	3	3
Cartridge must be conditioned to minimum +10°C		

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Table C1: Design method TR 029

Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance								
Size			M10	M12	M16	M20	M24	M30
Steel grade 5.8	N_{Rk}	[kN]	29	42	79	123	177	281
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,5					
Steel grade 8.8	N_{Rk}	[kN]	46	67	126	196	282	449
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,5					
Steel grade 10.9*	N_{Rk}	[kN]	58	84	157	245	353	561
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,4					
Stainless steel grade A4-70	N_{Rk}	[kN]	41	59	110	172	247	393
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,9					
Stainless steel grade A4-80	N_{Rk}	[kN]	46	67	126	196	282	449
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,6					
Stainless steel grade 1.4529	N_{Rk}	[kN]	41	59	110	172	247	393
Partial safety factor	$\gamma_{M2}^{1)}$	[-]	1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

Pullout failure in concrete C20/25								
Size			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	12	12	12	12	13	11
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	5,5	5,5	5,5	5,5	6	5
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	5	4,5	4,5	4,5	5	4,5
Partial safety factor	$\gamma_{Mc}^{1)}$	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37			1,12					
Factor for non-cracked concrete C40/50	ψ_c		1,23					
Factor for non-cracked concrete C50/60			1,30					
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	9	9	9	6	6	6
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	4	4	4,5	2,5	2,5	2,5
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	3,5	3,5	3,5	2,5	2,5	2,5
Partial safety factor	$\gamma_{Mc}^{1)}$	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37			1,03					
Factor for cracked concrete C40/50	ψ_c		1,06					
Factor for cracked concrete C50/60			1,07					

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Splitting failure							
Size		M10	M12	M16	M20	M24	M30
Edge distance	c_{split} [mm]	$1,0 \frac{h}{h}$	$2,0 \frac{h}{h}$	$2,5 \frac{h}{h}$	$2,4 \frac{h}{h}$	$2,4 \frac{h}{h}$	$2,4 \frac{h}{h}$
Spacing	s_{split} [mm]	$2 \cdot c_{split}$					
Partial safety factor	$\gamma_{M1}^{1)}$ [-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_2=1,2$ is included

³⁾ The partial safety factor $\gamma_2=1,4$ is included

Table C2: Design method TR 029

Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance							
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	N_{Rk} [kN]	43	62	111	173	270	442
Partial safety factor	$\gamma_{M1}^{1)}$ [-]	1,4					

Pullout failure in concrete C20/25							
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in non-cracked concrete C20/25							
Temperature a) -40°C to +40°C	τ_{Rk} [N/mm ²]	12	12	13	13	13	13
Temperature b) -40°C to +70°C	τ_{Rk} [N/mm ²]	5,5	5,5	6	6	6	6
Temperature c) -40°C to +80°C	τ_{Rk} [N/mm ²]	5	5	5	5	5	5
Partial safety factor	$\gamma_{M1}^{1)}$ [-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37	ψ_s	1,06					
Factor for non-cracked concrete C40/50		1,11					
Factor for non-cracked concrete C50/60		1,14					
Characteristic bond resistance in cracked concrete C20/25							
Temperature a) -40°C to +40°C	τ_{Rk} [N/mm ²]	9	9	7	7	5	5
Temperature b) -40°C to +70°C	τ_{Rk} [N/mm ²]	4	4	3	3	2	2
Temperature c) -40°C to +80°C	τ_{Rk} [N/mm ²]	3,5	3,5	2,5	2,5	2	2
Partial safety factor	$\gamma_{M1}^{1)}$ [-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37	ψ_s	1,04					
Factor for cracked concrete C40/50		1,07					
Factor for cracked concrete C50/60		1,09					

Splitting failure							
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Edge distance	c_{split} [mm]	$1,0 \frac{h}{h}$	$2,0 \frac{h}{h}$	$2,5 \frac{h}{h}$	$2,4 \frac{h}{h}$	$2,4 \frac{h}{h}$	$2,4 \frac{h}{h}$
Spacing	s_{split} [mm]	$2 \cdot c_{split}$					
Partial safety factor	$\gamma_{M1}^{1)}$ [-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_2=1,2$ is included

³⁾ The partial safety factor $\gamma_2=1,4$ is included

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Table C3: Design method TR 029

Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm								
Size			M10	M12	M16	M20	M24	M30
Steel grade 5.8	$V_{Rk,s}$	[kN]	15	21	39	61	88	140
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					
Steel grade 8.8	$V_{Rk,s}$	[kN]	23	34	63	98	141	224
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					
Steel grade 10.9*	$V_{Rk,s}$	[kN]	29	42	79	123	177	281
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5					
Stainless steel grade A4-70	$V_{Rk,s}$	[kN]	20	30	55	86	124	196
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,56					
Stainless steel grade A4-80	$V_{Rk,s}$	[kN]	23	34	63	98	141	224
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,33					
Stainless steel grade 1.4529	$V_{Rk,s}$	[kN]	20	30	55	86	124	196
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					

Steel failure with lever arm								
Size			M10	M12	M16	M20	M24	M30
Steel grade 5.8	M^u	[N.m]	37	66	166	325	561	1125
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					
Steel grade 8.8	M^u	[N.m]	60	105	266	519	898	1799
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					
Steel grade 10.9*	M^u	[N.m]	75	131	333	649	1123	2249
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,50					
Stainless steel grade A4-70	M^u	[N.m]	52	92	233	454	786	1574
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,56					
Stainless steel grade A4-80	M^u	[N.m]	60	105	266	519	898	1799
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,33					
Stainless steel grade 1.4529	M^u	[N.m]	52	92	233	454	786	1574
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,25					
Concrete pryout failure								
Factor k from TR 029			2					
Design of bonded anchors. Part 5.2.3.3								
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

Concrete edge failure								
Size			M10	M12	M16	M20	M24	M30
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors								
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5					

¹⁾ In absence of national regulations

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Table C4: Design method TR 029

Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	22	31	55	86	135	221
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					

Steel failure with lever arm								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	M^R	[N.m]	65	112	265	518	1013	2122
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					
Concrete pryout failure								
Factor k from TR 029			2					
Design of bonded anchors, Part 5.2.3.3								
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					

Concrete edge failure								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors								
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					

¹⁾ In absence of national regulations

Table C5: Design method CEN/TS 1992-4

Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance								
Size			M10	M12	M16	M20	M24	M30
Steel grade 5.8	$N_{Rk,s}$	[kN]	29	42	79	123	177	281
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					
Steel grade 8.8	$N_{Rk,s}$	[kN]	46	67	126	196	282	449
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					
Steel grade 10.9*	$N_{Rk,s}$	[kN]	58	84	157	245	353	561
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,4					
Stainless steel grade A4-70	$N_{Rk,s}$	[kN]	41	59	110	172	247	393
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,9					
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	46	67	126	196	282	449
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,6					
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	41	59	110	172	247	393
Partial safety factor	γ_{Mk} ¹⁾	[-]	1,5					

* Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

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Pullout failure in concrete C20/25								
Size			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{ik}	[N/mm ²]	12	12	12	12	13	11
Temperature b) -40°C to +70°C	τ_{ik}	[N/mm ²]	5,5	5,5	5,5	5,5	6	5
Temperature c) -40°C to +80°C	τ_{ik}	[N/mm ²]	5	4,5	4,5	4,5	5	4,5
Partial safety factor	γ_{vc} ¹⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37	ψ_c		1,12					
Factor for non-cracked concrete C40/50			1,23					
Factor for non-cracked concrete C50/60			1,30					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{90}		10,1					
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{ik}	[N/mm ²]	9	9	9	6	6	6
Temperature b) -40°C to +70°C	τ_{ik}	[N/mm ²]	4	4	4,5	2,5	2,5	2,5
Temperature c) -40°C to +80°C	τ_{ik}	[N/mm ²]	3,5	3,5	3,5	2,5	2,5	2,5
Partial safety factor	γ_{vc} ¹⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37	ψ_c		1,03					
Factor for cracked concrete C40/50			1,06					
Factor for cracked concrete C50/60			1,07					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{90}		7,2					

Concrete cone failure								
Size			M10	M12	M16	M20	M24	M30
Factor according to CEN/TS 1992-4-5 Section 6.2.3	k_{con}		10,1					
	k_{cs}		7,2					
Edge distance	$s_{c,ed}$	[mm]	1,5h _{ed}					
Spacing	$s_{c,sp}$	[mm]	3,0h _{ed}					
Solittine failure								
Edge distance	$s_{c,ed}$	[mm]	1,0c	2,0c	h	2,5c	2,48h	
Spacing	$s_{c,sp}$	[mm]	2 • C _{min}					
Partial safety factor	γ_{vc} ¹⁾	[-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_c=1,2$ is included

³⁾ The partial safety factor $\gamma_s=1,4$ is included

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Table C6: Design method CEN/TS 1992-4

Characteristic values of resistance to tension load of rebar

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

Pullout failure in concrete C20/25			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Size								
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	12	12	13	13	13	13
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	5,5	5,5	6	6	6	6
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	5	5	5	5	5	5
Partial safety factor	γ_{Mk} ²⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37			1,06					
Factor for non-cracked concrete C40/50			1,11					
Factor for non-cracked concrete C50/60			1,14					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{90}		10,1					
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	9	9	7	7	5	5
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	4	4	3	3	2	2
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	3,5	3,5	2,5	2,5	2	2
Partial safety factor	γ_{Mk} ²⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37			1,04					
Factor for cracked concrete C40/50			1,07					
Factor for cracked concrete C50/60			1,09					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{90}		7,2					

Concrete cone failure			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Size								
Factor according to CEN/TS 1992-4-5 Section 6.2.3	k_{90}		10,1					
Edge distance	c_{min}	[mm]	1,5h _{ef}					
Spacing	s_{min}	[mm]	3,0h _{ef}					
Splitting failure								
Edge distance	$c_{min,h}$	[mm]	1,0h	2,0h	h	2,5h	2,4h	h
Spacing	$s_{min,h}$	[mm]	2 · c _{min,h}					
Partial safety factor	γ_{Mk} ²⁾	[-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_s=1,2$ is included

³⁾ The partial safety factor $\gamma_s=1,4$ is included

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Table C7: Design method CEN/TS 1992-4

Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm				M10	M12	M16	M20	M24	M30
Size									
Steel grade 5.8	$V_{Rk,3}$	[kN]		15	21	39	61	88	140
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Steel grade 8.8	$V_{Rk,4}$	[kN]		23	34	63	98	141	224
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Steel grade 10.9*	$V_{Rk,4}$	[kN]		29	42	79	123	177	281
Partial safety factor	γ_{Mv}^{-1}	[-]		1,5					
Stainless steel grade A4-70	$V_{Rk,3}$	[kN]		20	30	55	86	124	196
Partial safety factor	γ_{Mv}^{-1}	[-]		1,56					
Stainless steel grade A4-80	$V_{Rk,4}$	[kN]		23	34	63	98	141	224
Partial safety factor	γ_{Mv}^{-1}	[-]		1,33					
Stainless steel grade 1.4529	$V_{Rk,3}$	[kN]		20	30	55	86	124	196
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1		k_2		0,8					
Steel failure with lever arm				M10	M12	M16	M20	M24	M30
Size									
Steel grade 5.8	M^a	[N.m]		37	66	166	325	561	1125
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Steel grade 8.8	M^a	[N.m]		60	105	266	519	898	1799
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Steel grade 10.9*	M^a	[N.m]		75	131	333	649	1123	2249
Partial safety factor	γ_{Mv}^{-1}	[-]		1,50					
Stainless steel grade A4-70	M^a	[N.m]		52	92	233	454	786	1574
Partial safety factor	γ_{Mv}^{-1}	[-]		1,56					
Stainless steel grade A4-80	M^a	[N.m]		60	105	266	519	898	1799
Partial safety factor	γ_{Mv}^{-1}	[-]		1,33					
Stainless steel grade 1.4529	M^a	[N.m]		52	92	233	454	786	1574
Partial safety factor	γ_{Mv}^{-1}	[-]		1,25					
Concrete pryout failure									
Factor according to CEN/TS 1992-4-5 Section 6.3.3				2					
Partial safety factor	γ_M^{-1}	[-]		1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

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Concrete edge failure							
Size		M10	M12	M16	M20	M24	M30
See section 6.3.4 of CEN/TS 1992-4-5							
Effective length of anchor	l_f	[mm] $l_f = \min(h_{ef}; 8 d_{nom})$					
Outside diameter of anchor	d_{nom}	10	12	16	20	24	30
Partial safety factor	γ_{M_s} ¹⁾	1,5					

¹⁾ In absence of national regulations

Table C8: Design method CEN/TS 1992-4 - Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BS500 S	$V_{Rk,s}$	[kN]	22	31	55	86	135	221
Partial safety factor	γ_{M_s}	1,5						
Ductility factor according to	k_2	0,8						
CEN/TS 1992-4-5 Section 6.3.2.1								

Steel failure with lever arm								
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BS500 S	$M_{Rk,s}$	[Nm]	65	112	265	518	1013	2122
Partial safety factor	γ_{M_s} ¹⁾	1,5						
Concrete pryout failure								
Factor according to CEN/TS 1992-4-5 Section 6.3.3		2,0						
Partial safety factor	γ_{M_s} ¹⁾	1,5						

Concrete edge failure							
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
See section 6.3.4 of CEN/TS 1992-4-5							
Effective length of anchor	l_f	[mm] $l_f = \min(h_{ef}; 8 d_{nom})$					
Outside diameter of anchor	d_{nom}	10	12	16	20	24	30
Partial safety factor	γ_{M_s} ¹⁾	1,5					

¹⁾ In absence of national regulations

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Table C9: Displacement of threaded rod Tension load

Anchor size		M10	M12	M16	M20	M24	M30
Non-cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,168	0,206
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,168	0,206
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,239	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,371	0,455
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,239	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,371	0,455
Cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,352	0,426
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,352	0,426

Shear load

Anchor size		M10	M12	M16	M20	M24	M30
Non-cracked concrete							
All temperatures	δ_{V0} [mm/(N/mm ²)]	0,23	0,16	0,09	0,05	0,04	0,04
	$\delta_{V\infty}$ [mm/(N/mm ²)]	0,47	0,32	0,17	0,11	0,08	0,08

Table C10: Displacement of rebar

Tension load

Anchor size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Non-cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,174	0,206
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,174	0,206
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,248	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,385	0,455
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,248	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,385	0,455
Cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,242	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,242	0,283
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,115	0,131	0,163	0,195	0,235	0,274
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,365	0,426
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,115	0,131	0,163	0,195	0,235	0,274
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,365	0,426

Shear load

Anchor size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Non-cracked concrete							
All temperatures	δ_{V0} [mm/(N/mm ²)]	0,23	0,16	0,09	0,05	0,04	0,04
	$\delta_{V\infty}$ [mm/(N/mm ²)]	0,47	0,32	0,17	0,11	0,08	0,08

Vyhľadanie o parametroch

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Table C11: Reduction factors for seismic design category C1 for threaded rods

Size	M10	M12	M16	M20	M24	M30		
Tension load								
Steel failure								
Characteristic resistance grade 5.8	$N_{Rk,5.805}$ [kN]	29.0	42.2	78.5	122.5	176.5	280.5	
Characteristic resistance grade 8.8	$N_{Rk,8.805}$ [kN]	46.4	67.4	125.6	196.0	282.4	448.8	
Characteristic resistance grade 10.9	$N_{Rk,10.905}$ [kN]	58.0	84.3	157.0	245.0	353.0	561.0	
Characteristic resistance A4-70	$N_{Rk,A4-70}$ [kN]	40.6	59.0	109.9	171.5	247.1	392.7	
Characteristic resistance A4-80	$N_{Rk,A4-80}$ [kN]	46.4	67.4	125.6	196.0	282.4	448.8	
Characteristic resistance 1.4529	$N_{Rk,1.4529}$ [kN]	40.6	59.0	109.9	171.5	247.1	392.7	
Combined pull-out and concrete cone failure								
Factor for calculation of $T_{Rk,0.95}$	$\alpha_{R,0.95}$	-	1.00	0.96	0.79	0.79	0.68	0.46
Shear load								
Steel failure without lever arm								
Characteristic resistance grade 5.8	$V_{Rk,5.805}$ [kN]	13.5	19.6	36.5	61.3	86.3	140.3	
Characteristic resistance grade 8.8	$V_{Rk,8.805}$ [kN]	21.6	32.3	58.4	98.0	141.2	224.4	
Characteristic resistance grade 10.9	$V_{Rk,10.905}$ [kN]	27.0	39.2	73.0	122.5	176.5	280.5	
Characteristic resistance A4-70	$V_{Rk,A4-70}$ [kN]	18.9	27.4	51.2	85.8	123.6	196.4	
Characteristic resistance A4-80	$V_{Rk,A4-80}$ [kN]	21.6	31.3	58.4	98.0	141.2	224.4	
Characteristic resistance 1.4529	$V_{Rk,1.4529}$ [kN]	18.9	27.4	51.2	85.8	123.6	196.4	

$$T_{Rk,0.95} = \alpha_{R,0.95} \times T_{Rk}$$

Note: Rebars are not qualified for seismic design

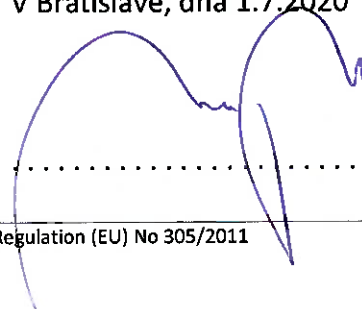
8 VHDNÁ TECHNICKÁ DOKUMENTÁCIA A/ALEBO ŠPECIFICKÁ TECHNICKÁ DOKUMENTÁCIA

Uvedené parametre výrobku sú v zhode so súborom deklarovateľných 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 1.7.2020

Meno : Ing. Marek Mikuš
Funkcia: Konateľ Sika Slovensko, spol. s r.o.
V Bratislave, dňa 1.7.2020

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

SÚVISIACE VYHLÁSENIE O PARAMETROCH

Názov produktu	Harmonizovaná technická špecifikácia	Číslo VoP
Sika AnchorFix®-3001	ETA 14/0368	51057369

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ÚPLNÉ CE OZNAČENIE

 14
Sika Services AG, Zürich, Švajčiarsko
VoP č. 10856840
ETAG 001, časť 1 „Kotvy všeobecne“ a časť 5 „Lepené kotvy“
Notifikovaný subjekt 1020
Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín

Reakcia na oheň – kotvy vyhovujú požiadavkám pre triedu A1

Odolnosť voči ohňu – Nehodnotené

Kotvenie vystavené:

- Statickému a kvázistatickému zaťaženiu
- Seizmickým účinkom kategórie C1: závitová tyč

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 206-1: 2000-12.

Teplotné rozmedzie:

- Ta): -40°C až +40°C (maximálna krátkodobá teplota +40°C a maximálna dlhodobá teplota +24°C)
- Tb): -40°C až +70°C (maximálna krátkodobá teplota +70°C a maximálna dlhodobá teplota +40°C)
- Tc): -40°C až +80°C (maximálna krátkodobá teplota +80°C a maximálna dlhodobá teplota +40°C)

Podmienky použitia (podmienky prostredia):

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

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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 použitia: Kategória 1 - montáž do suchého alebo mokrého (vodou nasýteného) betónu

Návrh kotvenia:

- Kotvy sú navrhnuté v súlade s EOTA technickou správou TR 029 „Návrh lepených kotiev“ 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 EOTA technická správa TR 045 „Návrh kovových kotiev pri seizmickom zaťažení“.

Zabudovanie/ Montáž:

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

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

Size		M10	M12	M16	M20	M24	M30
Nominal drill hole diameter	$\varnothing d_{dr}$ [mm]	12	14	18	22	26	35
Diameter of cleaning brush	d_b [mm]	S14H/F	S16H/F	S22H/F	S24H/F	S31H/F	S38H/F
Torque moment	T_{inst} [Nm]	20	40	80	135	200	270
Min. embedment depth							
Depth of drill hole	h_{dr} [mm]	60	70	80	90	96	120
Effective anchorage depth	h_{ef} [mm]	60	70	80	90	96	120
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	100	100	115	130	160	200
Max. embedment depth 20d							
Depth of drill hole	h_{dr} [mm]	200	240	320	400	480	600
Effective anchorage depth	h_{ef} [mm]	200	240	320	400	480	600
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	224	268	336	444	532	670

Table B2: Installation parameters of rebar

Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$\varnothing d_{dr}$ [mm]	14	16	20	25	32	40
Diameter of cleaning brush	d_b [mm]	S16H/F	S18H/F	S22H/F	S27H/F	S35H/F	S43H/F
Torque moment	T_{inst} [Nm]	20	40	80	135	200	270
Min. embedment depth							
Depth of drill hole	h_{dr} [mm]	60	70	80	90	100	128
Effective anchorage depth	h_{ef} [mm]	60	70	80	90	100	128
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	100	100	120	140	164	208
Max. embedment depth 20d							
Depth of drill hole	h_{dr} [mm]	200	240	320	400	500	640
Effective anchorage depth	h_{ef} [mm]	200	240	320	400	500	640
Minimum edge distance	c_{min} [mm]	40	40	45	50	55	65
Minimum spacing	s_{min} [mm]	40	40	45	50	55	65
Minimum thickness of member	h_{min} [mm]	228	272	360	450	564	720

Table B3: Minimum curing time

Concrete temperature [°C]	Gel time [minutes]	Cure time [hours]
+5 to +10	20	24
+10 to +15		12
+15 to +20	15	8
+20 to +25	11	7
+25 to +30	8	6
+30 to +35	6	5
+35 to +40	4	4
+40	3	3
Cartridge must be conditioned to minimum +10°C		

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Table C1: Design method TR 029

Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance			M10	M12	M16	M20	M24	M30
Size								
Steel grade 5.8	$N_{Rk,s}$	[kN]	29	42	79	123	177	281
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,5					
Steel grade 8.8	$N_{Rk,s}$	[kN]	46	67	126	196	282	449
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,5					
Steel grade 10.9*	$N_{Rk,s}$	[kN]	58	84	157	245	353	561
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,4					
Stainless steel grade A4-70	$N_{Rk,s}$	[kN]	41	59	110	172	247	393
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,9					
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	46	67	126	196	282	449
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,6					
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	41	59	110	172	247	393
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

Pullout failure in concrete C20/25								
Size			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	12	12	12	12	13	11
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	5,5	5,5	5,5	5,5	6	5
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	5	4,5	4,5	4,5	5	4,5
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,8 ⁽²⁾	2,1 ⁽³⁾				
Factor for non-cracked concrete C30/37			1,12					
Factor for non-cracked concrete C40/50	ψ_c		1,23					
Factor for non-cracked concrete C50/60			1,30					
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	9	9	9	6	6	6
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	4	4	4,5	2,5	2,5	2,5
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	3,5	3,5	3,5	2,5	2,5	2,5
Partial safety factor	$\gamma_{Mtr}^{(1)}$	[-]	1,8 ⁽²⁾	2,1 ⁽³⁾				
Factor for cracked concrete C30/37			1,03					
Factor for cracked concrete C40/50	ψ_c		1,06					
Factor for cracked concrete C50/60			1,07					

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Splitting failure			M10	M12	M16	M20	M24	M30
Size								
Edge distance	c_{\min}	[mm]	$1,0 \frac{d}{h}$	$2,0 \frac{d}{h}$	$2,5 \frac{d}{h}$	$2,5 \frac{d}{h}$	$2,4 \frac{d}{h}$	
Spacing	s_{\min}	[mm]	$2 \cdot c_{\min}$					
Partial safety factor	$\gamma_{M1}^{1)}$	[-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_2=1,2$ is included

³⁾ The partial safety factor $\gamma_2=1,4$ is included

Table C2: Design method TR 029

Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Size								
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	43	62	111	173	270	442
Partial safety factor	$\gamma_{M1}^{1)}$	[-]	1,4					

Pullout failure in concrete C20/25			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Size								
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	12	12	13	13	13	13
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	5,5	5,5	6	6	6	6
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	5	5	5	5	5	5
Partial safety factor	$\gamma_{M1}^{1)}$	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37	ψ_s		1,06					
Factor for non-cracked concrete C40/50		1,11						
Factor for non-cracked concrete C50/60		1,14						
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	9	9	7	7	5	5
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	4	4	3	3	2	2
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	3,5	3,5	2,5	2,5	2	2
Partial safety factor	$\gamma_{M1}^{1)}$	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37	ψ_s		1,04					
Factor for cracked concrete C40/50		1,07						
Factor for cracked concrete C50/60		1,09						

Splitting failure			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Size								
Edge distance	c_{\min}	[mm]	$1,0 \frac{d}{h}$	$2,0 \frac{d}{h}$	$2,5 \frac{d}{h}$	$2,5 \frac{d}{h}$	$2,4 \frac{d}{h}$	
Spacing	s_{\min}	[mm]	$2 \cdot c_{\min}$					
Partial safety factor	$\gamma_{M1}^{1)}$	[-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_2=1,2$ is included

³⁾ The partial safety factor $\gamma_2=1,4$ is included

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Table C3: Design method TR 029

Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm			M10	M12	M16	M20	M24	M30
Size								
Steel grade 5.8	V_{Rk} [kN]		15	21	39	61	88	140
Partial safety factor	γ_{Mk} [-]		1,25					
Steel grade 8.8	V_{Rk} [kN]		23	34	63	98	141	224
Partial safety factor	γ_{Mk} [-]		1,25					
Steel grade 10.9*	V_{Rk} [kN]		29	42	79	123	177	281
Partial safety factor	γ_{Mk} [-]		1,5					
Stainless steel grade A4-70	V_{Rk} [kN]		20	30	55	86	124	196
Partial safety factor	γ_{Mk} [-]		1,56					
Stainless steel grade A4-80	V_{Rk} [kN]		23	34	63	98	141	224
Partial safety factor	γ_{Mk} [-]		1,33					
Stainless steel grade 1.4529	V_{Rk} [kN]		20	30	55	86	124	196
Partial safety factor	γ_{Mk} [-]		1,25					

Steel failure with lever arm			M10	M12	M16	M20	M24	M30
Size								
Steel grade 5.8	M^u [N.m]		37	66	166	325	561	1125
Partial safety factor	γ_{Mk} [-]		1,25					
Steel grade 8.8	M^u [N.m]		60	105	266	519	898	1799
Partial safety factor	γ_{Mk} [-]		1,25					
Steel grade 10.9*	M^u [N.m]		75	131	333	649	1123	2249
Partial safety factor	γ_{Mk} [-]		1,50					
Stainless steel grade A4-70	M^u [N.m]		52	92	233	454	786	1574
Partial safety factor	γ_{Mk} [-]		1,56					
Stainless steel grade A4-80	M^u [N.m]		60	105	266	519	898	1799
Partial safety factor	γ_{Mk} [-]		1,33					
Stainless steel grade 1.4529	M^u [N.m]		52	92	233	454	786	1574
Partial safety factor	γ_{Mk} [-]		1,25					
Concrete pryout failure								
Factor k from TR 029			2					
Design of bonded anchors, Part 5.2.3.3								
Partial safety factor	γ_{Mk} [-]		1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

Concrete edge failure			M10	M12	M16	M20	M24	M30
Size								
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors								
Partial safety factor	γ_{Mk} [-]		1,5					

⁴¹ In absence of national regulations

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Table C4: Design method TR 029

Characteristic values of resistance to shear load of rebar

Steel failure without lever arm									
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	22	31	55	86	135	221	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						
Steel failure with lever arm									
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	M^u	[N.m]	65	112	265	518	1013	2122	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						
Concrete pryout failure									
Factor k from TR 029			2						
Design of bonded anchors, Part 5.2.3.3									
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						
Concrete edge failure									
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors									
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						

¹⁾ In absence of national regulations

Table C5: Design method CEN/TS 1992-4

Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance									
Size			M10	M12	M16	M20	M24	M30	
Steel grade 5.8	$N_{Rk,s}$	[kN]	29	42	79	123	177	281	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						
Steel grade 8.8	$N_{Rk,s}$	[kN]	46	67	126	196	282	449	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						
Steel grade 10.9*	$N_{Rk,s}$	[kN]	58	84	157	245	353	561	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,4						
Stainless steel grade A4-70	$N_{Rk,s}$	[kN]	41	59	110	172	247	393	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,9						
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	46	67	126	196	282	449	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,6						
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	41	59	110	172	247	393	
Partial safety factor	γ_{Rk} ¹⁾	[-]	1,5						

* Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

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Pullout failure in concrete C20/25									
Size			M10	M12	M16	M20	M24	M30	
Characteristic bond resistance in non-cracked concrete C20/25									
Temperature a) -40°C to +40°C	τ_{ik}	[N/mm ²]	12	12	12	12	13	11	
Temperature b) -40°C to +70°C	τ_{ik}	[N/mm ²]	5,5	5,5	5,5	5,5	6	5	
Temperature c) -40°C to +80°C	τ_{ik}	[N/mm ²]	5	4,5	4,5	4,5	5	4,5	
Partial safety factor	γ_{M_1} ¹⁾	[-]	1,8 ²⁾	2,1 ³⁾					
Factor for non-cracked concrete C30/37	ψ_s							1,12	
Factor for non-cracked concrete C40/50								1,23	
Factor for non-cracked concrete C50/60								1,30	
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_a							10,1	
Characteristic bond resistance in cracked concrete C20/25									
Temperature a) -40°C to +40°C	τ_{ik}	[N/mm ²]	9	9	9	6	6	6	
Temperature b) -40°C to +70°C	τ_{ik}	[N/mm ²]	4	4	4,5	2,5	2,5	2,5	
Temperature c) -40°C to +80°C	τ_{ik}	[N/mm ²]	3,5	3,5	3,5	2,5	2,5	2,5	
Partial safety factor	γ_{M_1} ¹⁾	[-]	1,8 ²⁾	2,1 ³⁾					
Factor for cracked concrete C30/37	ψ_s							1,03	
Factor for cracked concrete C40/50								1,06	
Factor for cracked concrete C50/60								1,07	
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_a							7,2	

Concrete cone failure								
Size			M10	M12	M16	M20	M24	M30
Factor according to CEN/TS 1992-4-5 Section 6.2.3	k_{con}							10,1
	k_{con}							7,2
Edge distance	s_{edge}	[mm]						1,5h _{ef}
Spacing	s_{max}	[mm]						3,0h _{ef}
Splitting failure								
Edge distance	s_{split}	[mm]	1,0h	2,0h	h	2,5h	2,4h	h
Spacing	s_{split}	[mm]						2 * C _{split}
Partial safety factor	γ_{M_1} ¹⁾	[-]						1,8

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_s=1,2$ is included

³⁾ The partial safety factor $\gamma_s=1,4$ is included

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Table C6: Design method CEN/TS 1992-4

Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	43	62	111	173	270	442
Partial safety factor	γ_{Rb} ¹⁾	[-]	1,4					
Pullout failure in concrete C20/25								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	12	12	13	13	13	13
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	5,5	5,5	6	6	6	6
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	5	5	5	5	5	5
Partial safety factor	γ_{M1} ²⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for non-cracked concrete C30/37			1,06					
Factor for non-cracked concrete C40/50	ψ_c		1,11					
Factor for non-cracked concrete C50/60			1,14					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{s1}		10,1					
Characteristic bond resistance in cracked concrete C20/25								
Temperature a) -40°C to +40°C	τ_{Rk}	[N/mm ²]	9	9	7	7	5	5
Temperature b) -40°C to +70°C	τ_{Rk}	[N/mm ²]	4	4	3	3	2	2
Temperature c) -40°C to +80°C	τ_{Rk}	[N/mm ²]	3,5	3,5	2,5	2,5	2	2
Partial safety factor	γ_{M1} ²⁾	[-]	1,8 ²⁾	2,1 ³⁾				
Factor for cracked concrete C30/37			1,04					
Factor for cracked concrete C40/50	ψ_c		1,07					
Factor for cracked concrete C50/60			1,09					
Factor according to CEN/TS 1992-4-5 Section 6.2.2	k_{s2}		7,2					
Concrete cone failure								
Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Factor according to CEN/TS 1992-4-5 Section 6.2.3	k_{con}		10,1					
Edge distance	c_{con}	[mm]	1,5h _{con}					
Spacing	s_{con}	[mm]	3,0h _{con}					
Splitting failure								
Edge distance	c_{spl}	[mm]	1,0h	2,0h	2,5h	2,5h	2,4h	h
Spacing	s_{spl}	[mm]	2 · c _{spl}					
Partial safety factor	γ_{M2} ³⁾	[-]	1,8					

¹⁾ In absence of national regulations

²⁾ The partial safety factor $\gamma_r=1,2$ is included

³⁾ The partial safety factor $\gamma_r=1,4$ is included

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Table C7: Design method CEN/TS 1992-4

Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm			M10	M12	M16	M20	M24	M30
Size								
Steel grade 5.8	$V_{Rk,1}$	[kN]	15	21	39	61	88	140
Partial safety factor	γ_{M1}	[-]	1,25					
Steel grade 8.8	$V_{Rk,1}$	[kN]	23	34	63	98	141	224
Partial safety factor	γ_{M1}	[-]	1,25					
Steel grade 10.9*	$V_{Rk,1}$	[kN]	29	42	79	123	177	281
Partial safety factor	γ_{M1}	[-]	1,5					
Stainless steel grade A4-70	$V_{Rk,1}$	[kN]	20	30	55	86	124	196
Partial safety factor	γ_{M1}	[-]	1,56					
Stainless steel grade A4-80	$V_{Rk,1}$	[kN]	23	34	63	98	141	224
Partial safety factor	γ_{M1}	[-]	1,33					
Stainless steel grade 1.4529	$V_{Rk,1}$	[kN]	20	30	55	86	124	196
Partial safety factor	γ_{M1}	[-]	1,25					
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1	k_s		0,8					

Steel failure with lever arm			M10	M12	M16	M20	M24	M30
Size								
Steel grade 5.8	M^u	[N.m]	37	66	166	325	561	1125
Partial safety factor	γ_{M1}	[-]	1,25					
Steel grade 8.8	M^u	[N.m]	60	105	266	519	898	1799
Partial safety factor	γ_{M1}	[-]	1,25					
Steel grade 10.9*	M^u	[N.m]	75	131	333	649	1123	2249
Partial safety factor	γ_{M1}	[-]	1,50					
Stainless steel grade A4-70	M^u	[N.m]	52	92	233	454	786	1574
Partial safety factor	γ_{M1}	[-]	1,56					
Stainless steel grade A4-80	M^u	[N.m]	60	105	266	519	898	1799
Partial safety factor	γ_{M1}	[-]	1,33					
Stainless steel grade 1.4529	M^u	[N.m]	52	92	233	454	786	1574
Partial safety factor	γ_{M1}	[-]	1,25					
Concrete prvout failure								
Factor according to CEN/TS 1992-4-5 Section 6.3.3			2					
Partial safety factor	γ_{M1}	[-]	1,5					

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

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Concrete edge failure							
Size		M10	M12	M16	M20	M24	M30
See section 6.3.4 of CEN/TS 1992-4-5							
Effective length of anchor	l_l	[mm] $l_l = \min(h_{ef}; 8 d_{nom})$					
Outside diameter of anchor	d_{nom}	10	12	16	20	24	30
Partial safety factor	$\gamma_{Mk}^{1)}$	1,5					

¹⁾ In absence of national regulations

Table C8: Design method CEN/TS 1992-4 - Characteristic values of resistance to shear load of rebar

Steel failure without lever arm								
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	22	31	55	86	135	221
Partial safety factor	$\gamma_{Mk}^{1)}$	1,5						
Ductility factor according to	k_2	0,8						
CEN/TS 1992-4-5 Section 6.3.2.1								

Steel failure with lever arm								
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$M_{Rk,s}$	[N.m]	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Mk}^{1)}$	1,5						
Concrete pryout failure								
Factor according to CEN/TS 1992-4-5 Section 6.3.3		2,0						
Partial safety factor	$\gamma_{Mk}^{1)}$	1,5						

Concrete edge failure							
Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
See section 6.3.4 of CEN/TS 1992-4-5							
Effective length of anchor	l_l	[mm] $l_l = \min(h_{ef}; 8 d_{nom})$					
Outside diameter of anchor	d_{nom}	10	12	16	20	24	30
Partial safety factor	$\gamma_{Mk}^{1)}$	1,5					

¹⁾ In absence of national regulations

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Table C9: Displacement of threaded rod Tension load

Anchor size		M10	M12	M16	M20	M24	M30
Non-cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,168	0,206
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,168	0,206
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,239	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,371	0,455
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,239	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,371	0,455
Cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,352	0,426
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,234	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,352	0,426

Shear load

Anchor size		M10	M12	M16	M20	M24	M30
Non-cracked concrete							
All temperatures	δ_{V0} [mm/(N/mm ²)]	0,23	0,16	0,09	0,05	0,04	0,04
	$\delta_{V\infty}$ [mm/(N/mm ²)]	0,47	0,32	0,17	0,11	0,08	0,08

Table C10: Displacement of rebar

Tension load

Anchor size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Non-cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,174	0,206
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,080	0,092	0,118	0,143	0,174	0,206
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,248	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,385	0,455
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,113	0,131	0,167	0,203	0,248	0,293
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,176	0,204	0,260	0,316	0,385	0,455
Cracked concrete							
40°C / 24°C	δ_{N0} [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,242	0,283
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,119	0,136	0,168	0,201	0,242	0,283
70°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,115	0,131	0,163	0,195	0,235	0,274
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,365	0,426
80°C / 40°C	δ_{N0} [mm/(N/mm ²)]	0,115	0,131	0,163	0,195	0,235	0,274
	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,179	0,204	0,253	0,303	0,365	0,426

Shear load

Anchor size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Non-cracked concrete							
All temperatures	δ_{V0} [mm/(N/mm ²)]	0,23	0,16	0,09	0,05	0,04	0,04
	$\delta_{V\infty}$ [mm/(N/mm ²)]	0,47	0,32	0,17	0,11	0,08	0,08

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Table C11: Reduction factors for seismic design category C1 for threaded rods

Size		M10	M12	M16	M20	M24	M30
Tension load							
Steel failure							
Characteristic resistance grade 5.8	$N_{Rk,5.8S}$ [kN]	29,0	42,2	78,5	122,5	176,5	280,5
Characteristic resistance grade 8.8	$N_{Rk,8.8S}$ [kN]	46,4	67,4	125,6	196,0	282,4	448,8
Characteristic resistance grade 10.9	$N_{Rk,10.9S}$ [kN]	58,0	84,3	157,0	245,0	353,0	561,0
Characteristic resistance A4-70	$N_{Rk,A4-70S}$ [kN]	40,6	59,0	109,9	171,5	247,1	392,7
Characteristic resistance A4-80	$N_{Rk,A4-80S}$ [kN]	46,4	67,4	125,6	196,0	282,4	448,8
Characteristic resistance 1.4529	$N_{Rk,1.4529S}$ [kN]	40,6	59,0	109,9	171,5	247,1	392,7
Combined pull-out and concrete cone failure							
Factor for calculation of $T_{Rk,seis}$	$\alpha_{N,seis}$	-	1,00	0,96	0,79	0,79	0,68
Shear load							
Steel failure without lever arm							
Characteristic resistance grade 5.8	$V_{Rk,5.8S}$ [kN]	13,5	19,6	36,5	61,3	86,3	140,3
Characteristic resistance grade 8.8	$V_{Rk,8.8S}$ [kN]	21,6	32,3	58,4	98,0	141,2	224,4
Characteristic resistance grade 10.9	$V_{Rk,10.9S}$ [kN]	27,0	39,2	73,0	122,5	176,5	280,5
Characteristic resistance A4-70	$V_{Rk,A4-70S}$ [kN]	18,9	27,4	51,2	85,8	123,6	196,4
Characteristic resistance A4-80	$V_{Rk,A4-80S}$ [kN]	21,6	31,3	58,4	98,0	141,2	224,4
Characteristic resistance 1.4529	$V_{Rk,1.4529S}$ [kN]	18,9	27,4	51,2	85,8	123,6	196,4

$$T_{Rk,seis} = \alpha_{N,seis} \times T_{Rk}$$

Note: Rebars are not qualified for seismic design

CE OZNAČENIE MUSÍ BYŤ UMIESTNENÉ NA OBALE


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Sika Services AG, Zürich, Švajčiarsko
VoP č. 10856840
ETAG 001, časť 1 „Kotvy všeobecne“ a časť 5 „Lepené kotvy“
Notifikovaný subjekt 1020
Injektážne kotvy na použitie v betóne s trhlinami aj bez trhlín
Viac informácií v priložených dokumentoch

<http://dop.sika.com>

Vyhlasenie o parametroch

Sika AnchorFix®-3001

10856840

2017.07, ver. 1

1138

27/28

BUILDING TRUST



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

Pre ďalšie informácie o výrobku kontaktujte:

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Vyhlásenie o parametroch

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