BUILDING TRUST

Sika AnchorFix®-3030

DECLARATION OF PERFORMANCE
No. 66629518

1	**UNIQUE IDENTIFICATION CODE OF THE PRODUCT-TYPE:**	66629518
2	**INTENDED USE/S**	ETA 17/0694 of 11/07/2018 Bonded injection type anchor for use in cracked and uncracked concrete
3	**MANUFACTURER:**	Sika Services AG Tüffenwies 16-22 8064 Zürich
4	**AUTHORISED REPRESENTATIVE:**	
5	**SYSTEM/S OF AVCP:**	System 1
6b	**EUROPEAN ASSESSMENT DOCUMENT:**	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

Anchorages 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

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

Size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26	30	35
Cleaning brush			S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max T_{fixt}	[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 mm ≥ 100 mm			h_{ef} + $2d_0$				

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

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$Ød_0$	[mm]	12	14	16	20	25	32	40
Cleaning brush			S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max T_{fixt}	[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 mm ≥ 100 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
Ensure cartridge is ≥ 10°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.

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	γ_{Ms}	[-]	2,00							
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **10.9**	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{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	γ_{Ms}	[-]	1,87							
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Stainless steel grade **1.4529**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **1.4565**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{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/mm²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole									
Partial safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0							
Factor for uncracked concrete	C25/30	ψ_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/mm²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole									
Partial safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0							
Factor for cracked concrete	C25/30	ψ_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			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$							
Partial safety factor	γ_{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	γ_{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/mm²]	13	13	13	12	12	12	8
Dry and wet concrete								
Installation safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0						
Flooded hole								
Installation safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,2						
Factor for uncracked concrete	C25/30	[-]	1,02						
	C30/37		1,04						
	C35/45		1,06						
	C40/50 ψ_c		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/mm²]	8	11	10	10	9	8,5	6
Dry and wet concrete								
Installation safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0						
Flooded hole								
Installation safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,2						
Factor for cracked concrete	C25/30	[-]	1,02						
	C30/37		1,04						
	C35/45		1,06						
	C40/50 ψ_c		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]	$2 \bullet h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$						
Partial safety factor Dry and wet concrete	γ_{Msp}	[-]	1,5						
Partial safety factor Flooded hole	γ_{Msp}	[-]	1,8						

[1] Design according EOTA Technical Report TR 055
[2] Design according EN 1992-4:2016

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	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{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	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{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**	$M^0_{Rk,s}$	[N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$M^0_{Rk,s}$	[N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$M^0_{Rk,s}$	[N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **A2-70, A4-70**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{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	γ_{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	$M^0_{Rk,s}$	[N.m]	33	65	112	265	518	1013	2122
Partial safety factor	γ_{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
δ_{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
δ_{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
δ_{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
δ_{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
δ_{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
δ_{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
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	5,2	6,6	6,8
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70, A4-70**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{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	$\alpha_{v,h\text{-}dg,c1}$	[-]	0,44	0,58	0,58
Factor for annular gap	α_{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
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm²]	3,5	4,0	4,5
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{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	$\alpha_{v,h\text{-}dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{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%.

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: Nikos Anagnostopoulos
Function: TMM Refurbishment
At Athens on 15 January 2019

. . . . . .

Name: Spyros Hatzifotis
Function: Managing Director
At Athens on 15 January 2019

. . . . . .

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

RELATED DECLARATION OF PERFORMANCE

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

FULL CE MARKING

CE

17

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

Reaction to fire - Anchorages satisfy requirements for Class A1

Resistance to fire - No performance determined

Anchorages 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

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

Size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26	30	35
Cleaning brush			S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max T_{fixt}	[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 mm ≥ 100 mm			h_{ef} + $2d_0$				

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

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$Ød_0$	[mm]	12	14	16	20	25	32	40
Cleaning brush			S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max T_{fixt}	[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 mm ≥ 100 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
Ensure cartridge is ≥ 10°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.

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	γ_{Ms}	[-]	2,00							
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **10.9**	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{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	γ_{Ms}	[-]	1,87							
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Stainless steel grade **1.4529**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **1.4565**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{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/mm²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole									
Partial safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0							
Factor for uncracked concrete	C25/30	[-]	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/mm²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole									
Partial safety factor	γ_2 [1] = γ_{inst} [2]	[-]	1,0							
Factor for cracked concrete	C25/30	[-]	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			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$							
Partial safety factor	γ_{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	γ_{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/mm²]	13	13	13	12	12	12	8
Dry and wet concrete									
Installation safety factor	γ_2[1] = γ_{inst}[2]	[-]	1,0						
Flooded hole									
Installation safety factor	γ_2[1] = γ_{inst}[2]	[-]	1,2						
Factor for uncracked concrete C25/30	ψ_c	[-]	1,02						
Factor for uncracked concrete C30/37	ψ_c	[-]	1,04						
Factor for uncracked concrete C35/45	ψ_c	[-]	1,06						
Factor for uncracked concrete C40/50	ψ_c	[-]	1,07						
Factor for uncracked concrete C45/55	ψ_c	[-]	1,08						
Factor for uncracked concrete C50/60	ψ_c	[-]	1,09						
Characteristic bond resistance in cracked concrete									
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm²]	8	11	10	10	9	8,5	6
Dry and wet concrete									
Installation safety factor	γ_2[1] = γ_{inst}[2]	[-]	1,0						
Flooded hole									
Installation safety factor	γ_2[1] = γ_{inst}[2]	[-]	1,2						
Factor for cracked concrete C25/30	ψ_c	[-]	1,02						
Factor for cracked concrete C30/37	ψ_c	[-]	1,04						
Factor for cracked concrete C35/45	ψ_c	[-]	1,06						
Factor for cracked concrete C40/50	ψ_c	[-]	1,07						
Factor for cracked concrete C45/55	ψ_c	[-]	1,08						
Factor for cracked concrete C50/60	ψ_c	[-]	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]	$2 \bullet h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$						
Partial safety factor Dry and wet concrete	γ_{Msp}	[-]	1,5						
Partial safety factor Flooded hole	γ_{Msp}	[-]	1,8						

[1] Design according EOTA Technical Report TR 055
[2] Design according EN 1992-4:2016

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	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{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	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{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**	$M^0_{Rk,s}$	[N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$M^0_{Rk,s}$	[N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$M^0_{Rk,s}$	[N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **A2-70, A4-70**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{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	γ_{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	$M^0_{Rk,s}$	[N.m]	33	65	112	265	518	1013	2122
Partial safety factor	γ_{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
δ_{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
δ_{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
δ_{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
δ_{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
δ_{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
δ_{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
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C1}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C1}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C1}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C1}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C1}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	5,2	6,6	6,8
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C1}$	[kN]	13	19	29
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C1}$	[kN]	17	24	37
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C1}$	[kN]	34	47	74
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70, A4-70**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C1}$	[kN]	27	38	59
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C1}$	[kN]	24	33	51
Partial safety factor	γ_{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	$\alpha_{v,h\text{-}dg,c1}$	[-]	0,44	0,58	0,58
Factor for annular gap	α_{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
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C2}$	[kN]	34	63	98

Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm²]	3,5	4,0	4,5
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{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	$\alpha_{v,h\text{-}dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{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

CE 17
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
http://dop.sika.com

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.

LEGAL NOTE

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