

Sika AnchorFix[®]-3030

DECLARATION OF PERFORMANCE

No. 25601660

1	UNIQUE IDENTIFICATION CODE OF THE PRODUCT-TYPE:	25601660
2	INTENDED USE/S	EAD 330499-01-0601:2018 Bonded fastener for use in cracked and uncracked concrete for a service life of 50 and/or 100 years
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 330499-01-0601:2018
	European Technical Assessment:	ETA_17/0694 of 25/10/2021
	Technical Assessment Body:	TECHNICKY A ZKUSEBNI USTAV STAVEBNI PRAHA S. P.
	Notified body/ies:	1020

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7 DECLARED PERFORMANCE/S

Essential Characteristics	Performance	AVCP	Harmonised Technical Specification
Characteristic resistance to tension load (static and quasi-static loading)	Annex C 1, C 2	System 1	
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 3, C 4	System 1	EAD 330499-01-0601:2018
Displacements under short-term	See Annex C 5	System 1	
Characteristic resistance for seismic performance categories C1	See Annex C 6, C 7, C8	System 1	

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

Steel failure – Characteristic resistance										
Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Steel grade 4.8	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,50							
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 for a working life of 50 years and 100 years										
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm ²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm ²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for influence of sustained load for a working life 50 years	T3: 50°C / 70°C ψ_{sus}^0	[-]	0,72							
Factor for concrete	C25/30 C30/37 C35/45 C40/50 C45/55 C50/60	ψ_c	1,02 1,04 1,06 1,07 1,08 1,09							
Concrete cone failure										
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$		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 • h _{ef}							
Spacing	$s_{cr,sp}$	[mm]	2 • c _{cr,sp}							

Performances - Design according to EN 1992-4
Characteristic resistance for tension loads - threaded rod

Annex C 1

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

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

Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm ²]	13	13	13	12	12	12	8	
Dry and wet concrete										
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole										
Installation safety factor	γ_{inst}	[-]	1,2							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm ²]	8	11	10	10	9	8,5	6,5	
Dry and wet concrete										
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole										
Installation safety factor	γ_{inst}	[-]	1,2							
Factor for influence of sustained load for a working life 50 years	T3: 50°C / 70°C	ψ^0_{sus}	[-]			0,72				
Factor for 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	$k_{ucr,N}$	[-]	11
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$		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 • h _{ef}							
Spacing	$s_{cr,sp}$	[mm]	2 • c _{cr,sp}							

Performances
Design according to EN 1992-4
Characteristic resistance for tension loads - rebar

Annex C 2

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

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms} [-]	1,67							
Steel grade 4.8	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms} [-]	1,25							
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	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms} [-]	1,67							
Steel grade 4.8	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 5.8	$M^o_{Rk,s}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 8.8	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 10.9	$M^o_{Rk,s}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms} [-]	1,50							
Stainless steel grade A2-70, A4-70	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms} [-]	1,56							
Stainless steel grade A4-80	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms} [-]	1,33							
Stainless steel grade 1.4529	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms} [-]	1,25							
Stainless steel grade 1.4565	$M^o_{Rk,s}$ [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]	$\min(h_{ef}, 8 d_{nom})$							

Performances - Design according to EN 1992-4
Characteristic resistance for shear loads - threaded rod

Annex C 3

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

Steel failure without lever arm										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	14	22	31	55	86	135	221	
Partial safety factor	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	$M^o_{Rk,s}$	[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 ($h_{ef}, 8 d_{nom}$)							

Performances

Design according to EN 1992-4
Characteristic resistance for shear loads - rebar

Annex C 4

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

Size	M8	M10	M12	M16	M20	M24	M27	M30
Tension load								
Uncracked concrete								
δ_{N0} [mm/kN]	0,03	0,02	0,02	0,02	0,01	0,01	0,01	0,01
$\delta_{N\infty}$ [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,01	0,01
Cracked concrete								
δ_{N0} [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,02	0,02
$\delta_{N\infty}$ [mm/kN]	0,35	0,21	0,14	0,12	0,08	0,07	0,07	0,07
Shear load								
δ_{V0} [mm/kN]	0,71	0,45	0,31	0,17	0,11	0,07	0,06	0,05
$\delta_{V\infty}$ [mm/kN]	1,06	0,67	0,46	0,25	0,16	0,11	0,08	0,07

Table C6: Displacement of rebar under tension and shear load

Size	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load							
Uncracked concrete							
δ_{N0} [mm/kN]	0,04	0,03	0,02	0,01	0,01	0,01	0,01
$\delta_{N\infty}$ [mm/kN]	0,08	0,05	0,04	0,02	0,02	0,01	0,01
Cracked concrete							
δ_{N0} [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,02
$\delta_{N\infty}$ [mm/kN]	0,35	0,21	0,17	0,11	0,08	0,07	0,06
Shear load							
δ_{V0} [mm/kN]	0,38	0,24	0,17	0,10	0,06	0,04	0,02
$\delta_{V\infty}$ [mm/kN]	0,56	0,36	0,25	0,14	0,09	0,06	0,04

Performances

Displacement for threaded rod and rebar

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Table C7: Seismic performance category C1 of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Steel failure									
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C1}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms} [-]	2,00							
Characteristic resistance grade 4.8	$N_{Rk,s,eq,C1}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C1}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C1}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C1}$ [kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms} [-]	1,33							
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C1}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms} [-]	1,87							
Characteristic resistance A4-80	$N_{Rk,s,eq,C1}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms} [-]	1,60							
Characteristic resistance 1.4529	$N_{Rk,s,eq,C1}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance 1.4565	$N_{Rk,s,eq,C1}$ [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 for a working life of 50 years and 100 years									
Characteristic bond resistance									
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$ [N/mm ²]	9,4	8,5	10,0	8,7	7,4	7,7	5,7	4,9
Installation safety factor	γ_{inst} [-]	1,0							
Shear load									
Steel failure without lever arm									
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C1}$ [kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms} [-]	1,67							
Characteristic resistance grade 4.8	$V_{Rk,s,eq,C1}$ [kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C1}$ [kN]	7	11	16	26	40	35	46	56
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C1}$ [kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C1}$ [kN]	14	22	32	51	80	71	92	112
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms} [-]	1,56							
Characteristic resistance A4-80	$V_{Rk,s,eq,C1}$ [kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms} [-]	1,33							
Characteristic resistance 1.4529	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance 1.4565	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
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	$\alpha_{v,h-dg,c1}$ [-]	0,47	0,47	0,47	0,54	0,54	0,88	0,88	0,88
Factor for annular gap	α_{gap} [-]	0,5							

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

Performances

Seismic performance category C1 of threaded rod

Annex C 6

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Table C8: Seismic performance category C1 of rebar

Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load							
Steel failure							
Rebar BSt 500 S	$N_{Rk,s,eq,C1}$ [kN]	43	62	111	173	270	442
Partial safety factor	γ_{Ms} [-]	1,4					
Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years							
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$ [N/mm ²]	9,4	9,8	9,5	8,8	8,0	5,3
Dry and wet concrete							
Installation safety factor	γ_{inst} [-]	1,0					
Flooded hole							
Installation safety factor	γ_{inst} [-]	1,2					
Shear load							
Steel failure without lever arm							
Rebar BSt 500 S	$V_{Rk,s,eq,C1}$ [kN]	16	23	41	69	67	111
Partial safety factor	γ_{Ms} [-]	1,5					
Factor for annular gap	α_{gap} [-]	0,5					

Performances

Seismic performance category C1 of rebar

Annex C 7**Annex C 8 Performances**

Seismic performance category C2 of threaded rod

Table C9: Seismic performance category C2 of threaded rod

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 4.8	$N_{Rk,s,eq,C2}$ [kN]	34	63	98
Partial safety factor	γ_{Ms} [-]	1,50		
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		
Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years				
Characteristic bond resistance				
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$ [N/mm ²]	3,5	4,0	4,5
Installation safety factor	γ_{inst} [-]	1,0		
Performances				Annex C 8
Seismic performance category C2 of threaded rod				

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Table C9 (cont): Seismic performance category C2 of threaded rod

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 4.8	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,25	
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 C9 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{gap}	[-]		0,5	

Table C10: Displacement under tensile and shear load - seismic category C2 of threaded rod

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	9,05	10,99

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

Performances

Seismic performance category C2 of threaded rod

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

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

Signed for and on behalf of the manufacturer by:

Name : Tomasz Gutowski
Function: Corporate Standardization
and Approvals
At Warsaw on 14 December 2021

Name : Marco Poltera
Function: CPE
At Zurich on 16 December 2021



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

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FULL CE MARKING

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Sika Services AG, Zurich, Switzerland
25601660
Characteristic resistance to tension load (static and quasi-static loading - Annex C 1, C 2
Characteristic resistance to shear load (static and quasi-static loading) - Annex C 3, C 4
Displacements under short-term and long term loading - Annex C 5
Characteristic resistance for seismic performance categories C1 - Annex C 6, C 7, C 8

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

Steel failure – Characteristic resistance											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Steel grade 4.6	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224	
Partial safety factor	γ_{Ms}	[-]	2,00								
Steel grade 4.8	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224	
Partial safety factor	γ_{Ms}	[-]	1,50								
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 for a working life of 50 years and 100 years											
Size			M8	M10	M12	M16	M20	M24	M27	M30	
Characteristic bond resistance in uncracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm ²]	17	15	15	12	12	12	11	9,5	
Dry, wet concrete, flooded hole											
Partial safety factor	γ_{inst}	[-]	1,0								
Characteristic bond resistance in cracked concrete											
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm ²]	10	10	10	9,5	9	9	6	6	
Dry, wet concrete, flooded hole											
Partial safety factor	γ_{inst}	[-]	1,0								
Factor for influence of sustained load for a working life 50 years	T3: 50°C / 70°C ψ_{sus}^0	[-]	0,72								
Factor for concrete	C25/30 C30/37 C35/45 C40/50 C45/55 C50/60	ψ_c					1,02 1,04 1,06 1,07 1,08 1,09				
Concrete cone failure											
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11								
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$		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 • h _{ef}								
Spacing	$s_{cr,sp}$	[mm]	2 • c _{cr,sp}								

Performances - Design according to EN 1992-4
Characteristic resistance for tension loads - threaded rod

Annex C 1

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

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

Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm ²]	13	13	13	12	12	12	8	
Dry and wet concrete										
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole										
Installation safety factor	γ_{inst}	[-]	1,2							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm ²]	8	11	10	10	9	8,5	6,5	
Dry and wet concrete										
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole										
Installation safety factor	γ_{inst}	[-]	1,2							
Factor for influence of sustained load for a working life 50 years	T3: 50°C / 70°C	ψ^0_{sus}	[-]			0,72				
Factor for 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	$k_{ucr,N}$	[-]	11
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$		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 • h _{ef}							
Spacing	$s_{cr,sp}$	[mm]	2 • c _{cr,sp}							

Performances
Design according to EN 1992-4
Characteristic resistance for tension loads - rebar

Annex C 2

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

Steel failure without lever arm									
Size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms} [-]	1,67							
Steel grade 4.8	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms} [-]	1,25							
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	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms} [-]	1,67							
Steel grade 4.8	$M^o_{Rk,s}$ [N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 5.8	$M^o_{Rk,s}$ [N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 8.8	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms} [-]	1,25							
Steel grade 10.9	$M^o_{Rk,s}$ [N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms} [-]	1,50							
Stainless steel grade A2-70, A4-70	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms} [-]	1,56							
Stainless steel grade A4-80	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms} [-]	1,33							
Stainless steel grade 1.4529	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms} [-]	1,25							
Stainless steel grade 1.4565	$M^o_{Rk,s}$ [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})							

Performances - Design according to EN 1992-4
Characteristic resistance for shear loads - threaded rod

Annex C 3

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

Steel failure without lever arm										
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	14	22	31	55	86	135	221	
Partial safety factor	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	$M^o_{Rk,s}$	[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 ($h_{ef}, 8 d_{nom}$)							

Performances

Design according to EN 1992-4
Characteristic resistance for shear loads - rebar

Annex C 4

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

Size	M8	M10	M12	M16	M20	M24	M27	M30
Tension load								
Uncracked concrete								
δ_{N0} [mm/kN]	0,03	0,02	0,02	0,02	0,01	0,01	0,01	0,01
$\delta_{N\infty}$ [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,01	0,01
Cracked concrete								
δ_{N0} [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,02	0,02
$\delta_{N\infty}$ [mm/kN]	0,35	0,21	0,14	0,12	0,08	0,07	0,07	0,07
Shear load								
δ_{V0} [mm/kN]	0,71	0,45	0,31	0,17	0,11	0,07	0,06	0,05
$\delta_{V\infty}$ [mm/kN]	1,06	0,67	0,46	0,25	0,16	0,11	0,08	0,07

Table C6: Displacement of rebar under tension and shear load

Size	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load							
Uncracked concrete							
δ_{N0} [mm/kN]	0,04	0,03	0,02	0,01	0,01	0,01	0,01
$\delta_{N\infty}$ [mm/kN]	0,08	0,05	0,04	0,02	0,02	0,01	0,01
Cracked concrete							
δ_{N0} [mm/kN]	0,05	0,04	0,03	0,03	0,02	0,02	0,02
$\delta_{N\infty}$ [mm/kN]	0,35	0,21	0,17	0,11	0,08	0,07	0,06
Shear load							
δ_{V0} [mm/kN]	0,38	0,24	0,17	0,10	0,06	0,04	0,02
$\delta_{V\infty}$ [mm/kN]	0,56	0,36	0,25	0,14	0,09	0,06	0,04

Performances

Displacement for threaded rod and rebar

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Table C7: Seismic performance category C1 of threaded rod

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Steel failure									
Characteristic resistance grade 4.6	$N_{Rk,s,eq,C1}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms} [-]	2,00							
Characteristic resistance grade 4.8	$N_{Rk,s,eq,C1}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 5.8	$N_{Rk,s,eq,C1}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 8.8	$N_{Rk,s,eq,C1}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance grade 10.9	$N_{Rk,s,eq,C1}$ [kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms} [-]	1,33							
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq,C1}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms} [-]	1,87							
Characteristic resistance A4-80	$N_{Rk,s,eq,C1}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms} [-]	1,60							
Characteristic resistance 1.4529	$N_{Rk,s,eq,C1}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance 1.4565	$N_{Rk,s,eq,C1}$ [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 for a working life of 50 years and 100 years									
Characteristic bond resistance									
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$ [N/mm ²]	9,4	8,5	10,0	8,7	7,4	7,7	5,7	4,9
Installation safety factor	γ_{inst} [-]	1,0							
Shear load									
Steel failure without lever arm									
Characteristic resistance grade 4.6	$V_{Rk,s,eq,C1}$ [kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms} [-]	1,67							
Characteristic resistance grade 4.8	$V_{Rk,s,eq,C1}$ [kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 5.8	$V_{Rk,s,eq,C1}$ [kN]	7	11	16	26	40	35	46	56
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 8.8	$V_{Rk,s,eq,C1}$ [kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance grade 10.9	$V_{Rk,s,eq,C1}$ [kN]	14	22	32	51	80	71	92	112
Partial safety factor	γ_{Ms} [-]	1,50							
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms} [-]	1,56							
Characteristic resistance A4-80	$V_{Rk,s,eq,C1}$ [kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms} [-]	1,33							
Characteristic resistance 1.4529	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms} [-]	1,25							
Characteristic resistance 1.4565	$V_{Rk,s,eq,C1}$ [kN]	10	15	22	36	56	49	64	79
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	$\alpha_{v,h-dg,c1}$ [-]	0,47	0,47	0,47	0,54	0,54	0,88	0,88	0,88
Factor for annular gap	α_{gap} [-]	0,5							

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

Performances

Seismic performance category C1 of threaded rod

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Table C8: Seismic performance category C1 of rebar

Size		Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load							
Steel failure							
Rebar BSt 500 S	$N_{Rk,s,eq,C1}$ [kN]	43	62	111	173	270	442
Partial safety factor	γ_{Ms} [-]	1,4					
Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years							
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$ [N/mm ²]	9,4	9,8	9,5	8,8	8,0	5,3
Dry and wet concrete							
Installation safety factor	γ_{inst} [-]	1,0					
Flooded hole							
Installation safety factor	γ_{inst} [-]	1,2					
Shear load							
Steel failure without lever arm							
Rebar BSt 500 S	$V_{Rk,s,eq,C1}$ [kN]	16	23	41	69	67	111
Partial safety factor	γ_{Ms} [-]	1,5					
Factor for annular gap	α_{gap} [-]	0,5					

Performances

Seismic performance category C1 of rebar

Annex C 7**Annex C 8 Performances**

Seismic performance category C2 of threaded rod

Table C9: Seismic performance category C2 of threaded rod

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 4.8	$N_{Rk,s,eq,C2}$ [kN]	34	63	98
Partial safety factor	γ_{Ms} [-]	1,50		
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		
Combined pullout and concrete cone failure in concrete C20/25 for a working life of 50 years and 100 years				
Characteristic bond resistance				
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$ [N/mm ²]	3,5	4,0	4,5
Installation safety factor	γ_{inst} [-]	1,0		
Performances				Annex C 8
Seismic performance category C2 of threaded rod				

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Table C9 (cont): Seismic performance category C2 of threaded rod

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 4.8	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,25	
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 C9 shall be multiplied by following reduction factor for hot-dip galvanized commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{gap}	[-]		0,5	

Table C10: Displacement under tensile and shear load - seismic category C2 of threaded rod

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	9,05	10,99

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

Performances

Seismic performance category C2 of threaded rod

Annex C 8

EAD 330499-01-0601:2018

Notified Body 1020

Bonded fastener for use in cracked and uncracked concrete for a service life of 50 and/or 100 years

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

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