BUILDING TRUST

Sika AnchorFix®-2+

DECLARATION OF PERFORMANCE
No. 85492927

UNIQUE IDENTIFICATION CODE OF THE PRODUCT-TYPE:	85492927
INTENDED USE/S	Bonded injection type anchor for use in cracked and uncracked concrete
MANUFACTURER:	Sika Services AG Tüffenwies 16 8064 Zürich
SYSTEM/S OF AVCP:	System 1+
EUROPEAN ASSESSMENT DOCUMENT:	EAD 330499-02-0601:2025 Bonded fasteners for use in concrete
European Technical Assessment:	ETA 14/0346 of 7/11/2025
Technical Assessment Body:	Technical and Test Institute for Construction Prague
Notified body/ies:	1020

6 DECLARED PERFORMANCE/S

Essential Characteristics	Performance	AVCP	Harmonised Technical Specification
Durability	Annex B1	System 1	EAD 330499-02-0601 :2025
Serviceability	Annex B1	System 1	
Reaction to fire	Class A1	System 1	
Resistance to fire	Annex C 19 to C 21	System 1	
Characteristic resistance to tension load (static and quasi-static loading)	Annex C 1 to C 13	System 1	
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 14 to C 16	System 1	
Displacements under short-term and long-term loading	See Annex C 17	System 1	
Characteristic resistance for seismic performance categories C1	See Annex C 18	System 1	

Specifications of intended use

Anchorages subject to:
- Static and quasi-static load.
- Fire exposure
- Seismic actions category C1: threaded rod size M10, M12, M16, M20, M24

Base materials
- Uncracked concrete.
- Cracked and uncracked concrete:
  - threaded rod size M10, M12, M16, M20, M24
  - threaded socket M6, M8, M10, M12, M16
- Reinforced or unreinforced normal weight concrete without fibres of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013 + A2:2021.

Temperature range:
- -40°C to +80°C (max. short. term temperature +80°C and max. long term temperature +50°C)

Use conditions (Environmental conditions)
- Structures subject to dry, internal conditions (all materials)
- For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance class:
  - Stainless steel A2 according to Annex A 4, Table A1: CRC II
  - Stainless steel A4 according to Annex A 4, Table A1: CRC III
  - High corrosion resistance steel HCR according to Annex A 4, Table A1: CRC V

Concrete conditions:
- I1 – installation in dry or wet (water saturated) concrete and use in service in dry or wet concrete.
- 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 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.
- For applications with resistance to fire exposure, the fasteners are designed in accordance with EOTA TR 082 "Design of bonded fasteners in concrete under fire conditions"

Installation:
- Hole drilling by hammer drilling, dustless drilling or diamond core drilling 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

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex B 1**
Intended use Specifications	

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}	[-]	1,40							
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							

Table C2: Design method EN 1992-4
Steel failure - Characteristic values of resistance to tension load of threaded socket

Steel failure – Characteristic resistance								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Steel grade **4.6**	$N_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	2,00					
Steel grade **5.8**	$N_{Rk,s}$	[kN]	10	18	29	42	79	123
Partial safety factor	γ_{Ms}	[-]	1,50					
Steel grade **8.8**	$N_{Rk,s}$	[kN]	16	29	46	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,50					
Steel grade **10.9**	$N_{Rk,s}$	[kN]	20	37	58	84	157	245
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **A2-70, A4-70**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87					
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	16	29	46	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,60					
High corrosion resistant steel grade **1.4529**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,50					
High corrosion resistant steel grade **1.4565**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87					

Table C3: Design method EN 1992-4
Steel failure - 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						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 1**
Performances Steel failure characteristic resistance	

Table C4: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod

Combined pullout and concrete cone failure in concrete C20/25									
Hammer drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	10,0	9,5	9,0	8,5	8,0	6,5	5,5
Installation safety factor	γ_{inst}	[-]	1,2						1,4	
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,0	7,5	7,0	6,5	5,5		
Installation safety factor	γ_{inst}	[-]	1,4							
Size			M10		M12		M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4							
Characteristic bond resistance in cracked concrete for a working life of 100 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4							
Dustless drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	10,0	9,5	9,0	8,5	8,0	6,5	5,5
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,0	8,5	8,5	8,5	6,5	5,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4							
Size			M10		M12		M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4							
Characteristic bond resistance in cracked concrete for a working life of 100 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4							
Factor for uncracked concrete	C50/60	ψ_c	[-]	1						
Factor for cracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,12 1,23 1,30						
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
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]	$1,5h_{ef}$						
Spacing		$s_{cr,sp}$	[mm]	$3,0h_{ef}$						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 2**

Performances

Hammer drilling, Dustless drilling

Characteristic resistance for tension loads - threaded rod

Table C5: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25

Hammer drilling

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,2						1,4	
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	7,5	7,0	6,5	6,0	5,0		
Installation safety factor	γ_{inst}	[-]	1,4							

Size			M10	M12	M16	M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,4				
Characteristic bond resistance in cracked concrete for a working life of 100 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,4				

Dustless drilling

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	10,0	8,5	8,0	8,0	8,0	6,0	5,0	4,5
Installation safety factor	γ_{inst}	[-]	1,4							

Size			M10	M12	M16	M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,4				
Characteristic bond resistance in cracked concrete for a working life of 100 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,4				

Factor for uncracked concrete	C50/60	ψ_c	[-]	1
Factor for cracked concrete	C30/37	ψ_c	[-]	1,12
	C40/50			1,23
	C50/60			1,30
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C	ψ^0_{sus}	[-]	0,75
	T2: 50°C / 80°C			0,73

Concrete cone failure

See Annex C 2

Splitting failure

See Annex C 2

Sika AnchorFix®-2+ Arctic	**Annex C 3**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded rod	

Table C6: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket

Combined pullout and concrete cone failure in concrete C20/25								
Hammer drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2					1,4
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,0	7,5	7,0	6,5	5,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4					
Dustless drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,5	8,5	8,5	6,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4					
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete	C50/60	ψ_c	[-]	1				
Factor for cracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,12 1,23 1,30				
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73				
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								
Edge distance		$c_{cr,sp}$	[mm]	$1,5h_{ef}$				
Spacing		$s_{cr,sp}$	[mm]	$3,0h_{ef}$				

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 4**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded socket	

Table C7: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25								
Hammer drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]			1,2			1,4
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	7,0	6,5	6,0	5,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,4			
Dustless drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	8,0	8,0	8,0	6,0	4,5
Installation safety factor	γ_{inst}	[-]			1,4			
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,4			
Concrete cone failure								
See Annex C 4								
Splitting failure								
See Annex C 4								

Sika AnchorFix®-2+ Arctic,	**Annex C 5**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded socket	

Table C8: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar

Combined pullout and concrete cone failure in uncracked concrete C20/25									
Hammer drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for influence of sustained load T1: 24°C / 40°C for a working life 50 and 100 years T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Dustless drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,0	9,0	8,0	8,0	8,0	4,5
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for concrete C50/60	ψ_c	[-]	1						
Factor for influence of sustained load T1: 24°C / 40°C for a working life 50 and 100 years T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Concrete cone failure									
Factor for concrete cone failure	$k_{ucr,N}$	[-]	11						
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]	$1,5h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 6**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - rebar	

Table C9: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar for
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in uncracked concrete C20/25									
Hammer drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4						
Dustless drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	10,0	8,5	8,5	7,5	7,5	7,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for concrete C50/60	ψ_c	[-]	1						
Factor for influence of sustained load for a working life 50 and 100 years T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Concrete cone failure									
See Annex C 6									
Splitting failure									
See Annex C 6									

Table C10: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	7,5	7,0	6,5	6,5	5,5	4,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4							
Factor for uncracked concrete C30/37	ψ_c	[-]	1,04							
Factor for uncracked concrete C40/50	ψ_c	[-]	1,07							
Factor for uncracked concrete C50/60	ψ_c	[-]	1,09							
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77							
Concrete cone failure									
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
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]	$1,5h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$							

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 8**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded rod	

Table C11: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	7,0	5,5	4,5
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,0	7,0	6,5	6,0	6,0	5,0	4,0	3,5
Installation safety factor	γ_{inst}	[-]	1,4							
Factor for uncracked concrete	C30/37 C40/50 C50/60 ψ_c	[-]	1,04 1,07 1,09							
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77							
Concrete cone failure										
See Annex C 8										
Splitting failure										
See Annex C 8										

Sika AnchorFix®-2+ Arctic,	**Annex C 9**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded rod	

Table C12: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket

Combined pullout and concrete cone failure in concrete C20/25								
Diamond core drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	7,0	6,5	6,5	5,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete C30/37 / C40/50 / C50/60	ψ_c	[-]	1,04 / 1,07 / 1,09					
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77					
Concrete cone failure								
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11					
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$					
Splitting failure								
Edge distance	$c_{cr,sp}$	[mm]	$1,5h_{ef}$					
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$					

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 10**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded socket	

Table C13: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25								
Diamond core drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,5	8,0	7,5	7,0	4,5
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,0	6,5	6,0	6,0	5,0	3,5
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09					
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77					
Concrete cone failure								
See Annex C 10								
Splitting failure								
See Annex C 10								

Sika AnchorFix®-2+ Arctic	**Annex C 11**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded socket	

Table C14: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete		$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	6,5	3,5
Installation safety factor		γ_{inst}	[-]	1,2						
Flooded hole		$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	6,0	3,0
Installation safety factor		γ_{inst}	[-]	1,4						
Factor for uncracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09						
Factor for influence of sustained load for a working life 50 and 100 years		ψ^0_{sus}	[-]	0,77						

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11
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]	$1,5h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 12**
Performances Diamond core drilling Characteristic resistance for tension loads - rebar	

Table C15: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar for
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]		9,0	8,5	8,0	7,5	7,0	6,0	3,0
Installation safety factor	γ_{inst}	[-]		1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]		9,0	8,5	8,0	7,5	7,0	5,5	2,5
Installation safety factor	γ_{inst}	[-]		1,4						
Factor for uncracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09						
Factor for influence of sustained load for a working life 50 and 100 years		ψ^0_{sus}	[-]	0,77						
Concrete cone failure										
See Annex C 8										
Splitting failure										
See Annex C 8										

Sika AnchorFix®-2+ Arctic	**Annex C 13**
Performances Diamond core drilling Characteristic resistance for tension loads - rebar	

Table C16: 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	$V^0_{Rk,s}$	[kN]	9	14	20	38	59	85	110	135
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade 5.8	$V^0_{Rk,s}$	[kN]	11	17	25	47	74	106	138	168
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade 8.8	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade 10.9	$V^0_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,5							
Stainless steel grade A2-70, A4-70	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade A4-80	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade 1.4529	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade 1.4565	$V^0_{Rk,s}$	[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 pry-out 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})							

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Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 14**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - threaded rod	

Table C17: Design method EN 1992-4
Characteristic values of resistance to shear load of threaded socket

Steel failure without lever arm								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Steel grade **4.6**	$V^0_{Rk,s}$	[kN]	5	9	14	20	38	59
Partial safety factor	γ_{Ms}	[-]	1,67					
Steel grade **5.8**	$V^0_{Rk,s}$	[kN]	6	11	17	25	47	74
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **8.8**	$V^0_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **10.9**	$V^0_{Rk,s}$	[kN]	10	18	29	42	79	123
Partial safety factor	γ_{Ms}	[-]	1,5					
Stainless steel grade **A2-70, A4-70**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless steel grade **A4-80**	$V^0_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **1.4529**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
Partial safety factor	γ_{Ms}	[-]	1,25					
Stainless steel grade **1.4565**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
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			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Steel grade **4.6**	$M^0_{Rk,s}$	[N.m]	6	15	30	52	133	260
Partial safety factor	γ_{Ms}	[-]	1,67					
Steel grade **5.8**	$M^0_{Rk,s}$	[N.m]	8	19	37	66	166	325
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **8.8**	$M^0_{Rk,s}$	[N.m]	12	30	60	105	266	519
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **10.9**	$M^0_{Rk,s}$	[N.m]	15	37	75	131	333	649
Partial safety factor	γ_{Ms}	[-]	1,50					
Stainless steel grade **A2-70, A4-70**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless steel grade **A4-80**	$M^0_{Rk,s}$	[N.m]	12	30	60	105	266	519
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **1.4529**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,25					
Stainless steel grade **1.4565**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,56					
Concrete pryout failure								
Factor for resistance to pry-out failure	k_8	[-]	2					

Concrete edge failure								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Outside diameter of fastener	d_{nom}	[mm]	10	12	16	20	24	30
Effective length of fastener	l_f	[mm]	min (h_{ef}, 8 d_{nom})					

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 15**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - threaded socket	

Table C18: 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	$V^0_{Rk,s}$	[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 pry-out 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})						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 16**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - rebar	

Table C19: Displacement of threaded rod under tension and shear load
Hammer drilling, dustless drilling

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
δ_{N0}	[mm/kN]	0,05	0,04	0,03	0,02	0,02	0,02	0,01	0,01
$\delta_{N\infty}$	[mm/kN]	0,11	0,09	0,06	0,04	0,03	0,02	0,02	0,02
Cracked concrete									
δ_{N0}	[mm/kN]		0,08	0,09	0,05	0,03	0,02		
$\delta_{N\infty}$	[mm/kN]		0,51	0,32	0,18	0,13	0,11		
Shear load									
δ_{V0}	[mm/kN]	0,48	0,30	0,20	0,11	0,10	0,08	0,06	0,05
$\delta_{V\infty}$	[mm/kN]	0,72	0,45	0,30	0,17	0,14	0,12	0,10	0,08

Table C20: Displacement of threaded rod under tension and shear load
Diamond core drilling

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
δ_{N0}	[mm/kN]	0,02	0,02	0,03	0,02	0,01	0,01	0,02	0,02
$\delta_{N\infty}$	[mm/kN]	0,11	0,07	0,05	0,03	0,02	0,02	0,02	0,02
Cracked concrete									
δ_{N0}	[mm/kN]		0,07	0,05	0,05	0,03	0,03		
$\delta_{N\infty}$	[mm/kN]		0,37	0,23	0,16	0,10	0,07		
Shear load									
δ_{V0}	[mm/kN]	0,48	0,30	0,20	0,11	0,10	0,08	0,06	0,05
$\delta_{V\infty}$	[mm/kN]	0,72	0,45	0,30	0,17	0,14	0,12	0,10	0,08

Table C21: Displacement of rebar under tension and shear load
Hammer drilling, dustless drilling

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
δ_{N0}	[mm/kN]	0,04	0,03	0,02	0,02	0,01	0,01	0,01
$\delta_{N\infty}$	[mm/kN]	0,09	0,07	0,05	0,03	0,02	0,01	0,01
Shear load								
δ_{V0}	[mm/kN]	0,05	0,04	0,03	0,02	0,01	0,01	0,01
$\delta_{V\infty}$	[mm/kN]	0,08	0,06	0,05	0,03	0,02	0,01	0,01

Table C22: Displacement of rebar under tension and shear load
Diamond core drilling

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
δ_{N0}	[mm/kN]	0,04	0,04	0,03	0,02	0,02	0,02	0,02
$\delta_{N\infty}$	[mm/kN]	0,10	0,07	0,05	0,03	0,02	0,02	0,02
Cracked concrete								
δ_{N0}	[mm/kN]		0,07	0,06	0,04	0,03	0,03	
$\delta_{N\infty}$	[mm/kN]		0,34	0,23	0,16	0,09	0,07	
Shear load								
δ_{V0}	[mm/kN]	0,05	0,04	0,03	0,02	0,01	0,01	0,01
$\delta_{V\infty}$	[mm/kN]	0,08	0,06	0,05	0,03	0,02	0,01	0,01

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 17**
Performances Displacement	

Table C23: Seismic performance category C1 - Hammer drilling, Dustless drilling

Size			M10	M12	M16	M20	M24
Tension load							
Steel failure							
Characteristic resistance grade 4.6	$N_{Rk,s,eq}$	[kN]	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]			2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq}$	[kN]	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq}$	[kN]	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq}$	[kN]	58	84	157	245	353
Partial safety factor	γ_{Ms}	[-]			1,40		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq}$	[kN]	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]			1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,87		
Characteristic resistance to pull-out for a working life of 50 years							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,9	3,9	3,9	3,9	3,9
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,7	3,7	3,7	3,7	3,7
Characteristic resistance to pull-out for a working life of 100 years							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,5	3,5	3,5	2,5	3,0
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,3	3,3	3,3	2,3	2,8
Installation safety factor – Dry and wet concrete	γ_{inst}	[-]			1,2		
Installation safety factor – Flooded hole	γ_{inst}	[-]			1,4		

Shear load							
Steel failure without lever arm							
Characteristic resistance grade 4.6	$V_{Rk,s,eq}$	[kN]	7	10	23	30	40
Partial safety factor	γ_{Ms}	[-]			1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq}$	[kN]	9	13	28	38	51
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq}$	[kN]	14	21	45	61	81
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq}$	[kN]	18	26	56	76	101
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq}$	[kN]	14	21	45	61	81
Partial safety factor	γ_{Ms}	[-]			1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,56		
Factor for annular gap	α_{gap}	[-]			0,5		

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 18**
Performances Hammer drilling, Dustless drilling Seismic performance category C1 of threaded rod	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for threaded rods for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$	for	$\theta < 21°C$
$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$	for	$21°C \leq \theta \leq 367°C$
$k_{fi,p}(\theta) = 0$	for	$\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*
$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*
$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

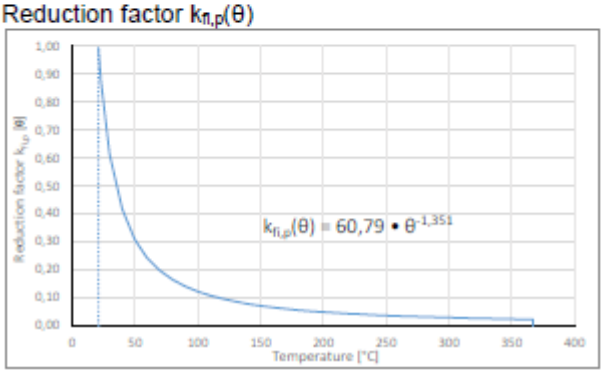

Table C24: Steel failure - Characteristic resistance under tension load under fire conditions

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel grade: 4.6; 5.8; 8.8; 10.9	$N_{Rk,s,fi(30)}$	[kN]	0,37	0,87	1,69	3,14	4,90	7,06	9,18	11,22
	$N_{Rk,s,fi(60)}$	[kN]	0,33	0,75	1,26	2,36	3,68	5,30	6,89	8,42
	$N_{Rk,s,fi(90)}$	[kN]	0,26	0,58	1,10	2,04	3,19	4,59	5,97	7,29
	$N_{Rk,s,fi(120)}$	[kN]	0,18	0,46	0,84	1,57	2,45	3,53	4,59	5,61
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$N_{Rk,s,fi(30)}$	[kN]	0,73	1,45	2,53	4,71	7,35	10,59	13,77	16,83
	$N_{Rk,s,fi(60)}$	[kN]	0,59	1,16	2,11	3,93	6,13	8,83	11,48	14,03
	$N_{Rk,s,fi(90)}$	[kN]	0,44	0,93	1,69	3,14	4,90	7,06	9,18	11,22
	$N_{Rk,s,fi(120)}$	[kN]	0,37	0,81	1,35	2,51	3,92	5,65	7,34	8,98

Table C25: Steel failure - Characteristic resistance under shear load under fire conditions

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel grade: **4.6; 5.8; 8.8; 10.9**	$V_{Rk,s,fi(30)}$	[kN]	0,37	0,87	1,69	3,14	4,90	7,06	9,18	11,22
	$V_{Rk,s,fi(60)}$	[kN]	0,33	0,75	1,26	2,36	3,68	5,30	6,89	8,42
	$V_{Rk,s,fi(90)}$	[kN]	0,26	0,58	1,10	2,04	3,19	4,59	5,97	7,29
	$V_{Rk,s,fi(120)}$	[kN]	0,18	0,46	0,84	1,57	2,45	3,53	4,59	5,61
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,4	1,1	2,6	6,7	13,0	22,5	33,3	45,0
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,3	1,0	2,0	5,0	9,7	16,8	25,0	33,7
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,3	0,7	1,7	4,3	8,4	14,6	21,6	29,2
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,2	0,6	1,3	3,3	6,5	11,2	16,6	22,5
Stainless steel grade: **A2-70; A4-70; A4-80** High corrosion resistant steel grade: **1.4529; 1.4565**	$V_{Rk,s,fi(30)}$	[kN]	0,73	1,45	2,53	4,71	7,35	10,59	13,77	16,83
	$V_{Rk,s,fi(60)}$	[kN]	0,59	1,16	2,11	3,93	6,13	8,83	11,48	14,03
	$V_{Rk,s,fi(90)}$	[kN]	0,44	0,93	1,69	3,14	4,90	7,06	9,18	11,22
	$V_{Rk,s,fi(120)}$	[kN]	0,37	0,81	1,35	2,51	3,92	5,65	7,34	8,98
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,7	1,9	3,9	10,0	19,5	33,7	49,9	67,5
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,6	1,5	3,3	8,3	16,2	28,1	41,6	56,2
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,4	1,2	2,6	6,7	13,0	22,5	33,3	45,0
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,4	1,0	2,1	5,3	10,4	18,0	26,6	36,0

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 19**
Performances Bond resistance under fire conditions for threaded rods	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for threaded sockets for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$ for $\theta < 21°C$

$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$ for $21°C \leq \theta \leq 367°C$

$k_{fi,p}(\theta) = 0$ for $\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*

$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*

$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

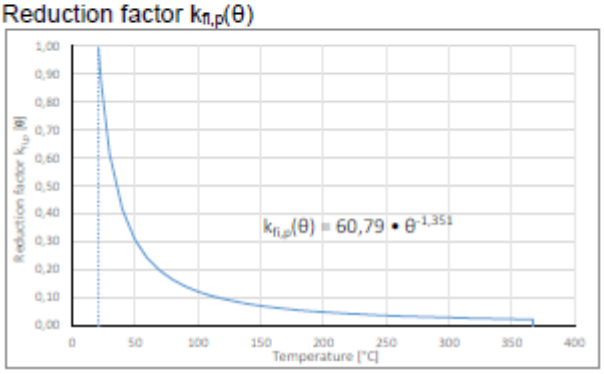

Table C26: Steel failure - Characteristic resistance under tension load under fire conditions

Size			M6	M8	M10	M12	M16	M20
Steel grade: 4.6; 5.8; 8.8; 10.9	$N_{Rk,s,fi(30)}$	[kN]	0,20	0,37	0,87	1,69	3,14	4,90
	$N_{Rk,s,fi(60)}$	[kN]	0,18	0,33	0,75	1,26	2,36	3,68
	$N_{Rk,s,fi(90)}$	[kN]	0,14	0,26	0,58	1,10	2,04	3,19
	$N_{Rk,s,fi(120)}$	[kN]	0,10	0,18	0,46	0,84	1,57	2,45
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$N_{Rk,s,fi(30)}$	[kN]	0,20	0,73	1,45	2,53	4,71	7,35
	$N_{Rk,s,fi(60)}$	[kN]	0,18	0,59	1,16	2,11	3,93	6,13
	$N_{Rk,s,fi(90)}$	[kN]	0,14	0,44	0,93	1,69	3,14	4,90
	$N_{Rk,s,fi(120)}$	[kN]	0,10	0,37	0,81	1,35	2,51	3,92

Table C27: Steel failure - Characteristic resistance under shear load under fire conditions

Size			M6	M8	M10	M12	M16	M20
Steel grade: 4.6; 5.8; 8.8; 10.9	$V_{Rk,s,fi(30)}$	[kN]	0,20	0,37	0,87	1,69	3,14	4,90
	$V_{Rk,s,fi(60)}$	[kN]	0,18	0,33	0,75	1,26	2,36	3,68
	$V_{Rk,s,fi(90)}$	[kN]	0,14	0,26	0,58	1,10	2,04	3,19
	$V_{Rk,s,fi(120)}$	[kN]	0,10	0,18	0,46	0,84	1,57	2,45
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,2	0,4	1,1	2,6	6,7	13,0
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,1	0,3	1,0	2,0	5,0	9,7
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,1	0,3	0,7	1,7	4,3	8,4
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,1	0,2	0,6	1,3	3,3	6,5
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$V_{Rk,s,fi(30)}$	[kN]	0,20	0,73	1,45	2,53	4,71	7,35
	$V_{Rk,s,fi(60)}$	[kN]	0,18	0,59	1,16	2,11	3,93	6,13
	$V_{Rk,s,fi(90)}$	[kN]	0,14	0,44	0,93	1,69	3,14	4,90
	$V_{Rk,s,fi(120)}$	[kN]	0,10	0,37	0,81	1,35	2,51	3,92
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,2	0,7	1,9	3,9	10,0	19,5
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,1	0,6	1,5	3,3	8,3	16,2
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,1	0,4	1,2	2,6	6,7	13,0
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,1	0,4	1,0	2,1	5,3	10,4

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 20**
Performances Bond resistance under fire conditions for threaded sockets	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for rebars for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$ for $\theta < 21°C$

$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$ for $21°C \leq \theta \leq 367°C$

$k_{fi,p}(\theta) = 0$ for $\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*

$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*

$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

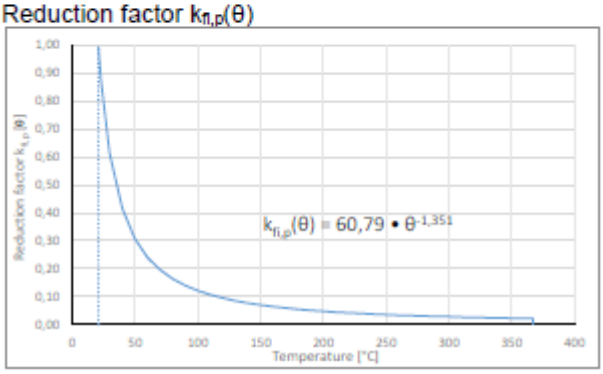

Table C28: Steel failure - Characteristic resistance under tension load under fire conditions

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$N_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	6,28	9,82	16,08
	$N_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	4,71	7,36	12,06
	$N_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	4,08	6,38	10,45
	$N_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	3,14	4,91	8,04

Table C29: Steel failure - Characteristic resistance under shear load under fire conditions

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	6,28	9,82	16,08
	$V_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	4,71	7,36	12,06
	$V_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	4,08	6,38	10,45
	$V_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	3,14	4,91	8,04
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,6	1,8	4,1	9,7	18,9	36,8	77,2
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,5	1,5	3,1	7,2	14,1	27,6	57,9
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,4	1,2	2,6	6,3	12,3	23,9	50,2
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,3	0,9	2,0	4,8	9,4	18,4	38,6

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 21**
Performances Bond resistance under fire conditions for rebars	

7 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 Product Certification Manager
At Warsaw on 23 December 2025

. . . . . .

Name : Barbara Karpała
Function: Data Processing Specialist
Corporate Technical Department
At Warsaw on 23 December 2025

. . . . . .

End of information as required by Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance

FULL CE MARKING LABEL

CE

21

Sika Services AG, Zurich, Switzerland

DoP No. 85492927

Notified Body 1020

Durability	Annex B1
Serviceability	Annex B1
Reaction to fire	Class A1
Resistance to fire	Annex C 19 to C 21
Characteristic resistance to tension load (static and quasi-static loading)	Annex C 1 to C 13
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 14 to C 16
Displacements under short-term and long-term loading	See Annex C 17
Characteristic resistance for seismic performance categories C1	See Annex C 18

Specifications of intended use

Anchorages subject to:
- Static and quasi-static load.
- Fire exposure
- Seismic actions category C1: threaded rod size M10, M12, M16, M20, M24

Base materials
- Uncracked concrete.
- Cracked and uncracked concrete:
  - threaded rod size M10, M12, M16, M20, M24
  - threaded socket M6, M8, M10, M12, M16
- Reinforced or unreinforced normal weight concrete without fibres of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013 + A2:2021.

Temperature range:
- -40°C to +80°C (max. short. term temperature +80°C and max. long term temperature +50°C)

Use conditions (Environmental conditions)
- Structures subject to dry, internal conditions (all materials)
- For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance class:
  - Stainless steel A2 according to Annex A 4, Table A1: CRC II
  - Stainless steel A4 according to Annex A 4, Table A1: CRC III
  - High corrosion resistance steel HCR according to Annex A 4, Table A1: CRC V

Concrete conditions:
- I1 – installation in dry or wet (water saturated) concrete and use in service in dry or wet concrete.
- 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 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.
- For applications with resistance to fire exposure, the fasteners are designed in accordance with EOTA TR 082 “Design of bonded fasteners in concrete under fire conditions”

Installation:
- Hole drilling by hammer drilling, dustless drilling or diamond core drilling 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

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex B 1**
Intended use Specifications	

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}	[-]	1,40							
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							

Table C2: Design method EN 1992-4
Steel failure - Characteristic values of resistance to tension load of threaded socket

Steel failure – Characteristic resistance								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Steel grade **4.6**	$N_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	2,00					
Steel grade **5.8**	$N_{Rk,s}$	[kN]	10	18	29	42	79	123
Partial safety factor	γ_{Ms}	[-]	1,50					
Steel grade **8.8**	$N_{Rk,s}$	[kN]	16	29	46	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,50					
Steel grade **10.9**	$N_{Rk,s}$	[kN]	20	37	58	84	157	245
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **A2-70, A4-70**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87					
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	16	29	46	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,60					
High corrosion resistant steel grade **1.4529**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,50					
High corrosion resistant steel grade **1.4565**	$N_{Rk,s}$	[kN]	14	26	41	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87					

Table C3: Design method EN 1992-4
Steel failure - 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						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 1**
Performances Steel failure characteristic resistance	

Table C4: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod

Combined pullout and concrete cone failure in concrete C20/25									
Hammer drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	10,0	9,5	9,0	8,5	8,0	6,5	5,5
Installation safety factor	γ_{inst}	[-]	1,2						1,4	
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,0	7,5	7,0	6,5	5,5		
Installation safety factor	γ_{inst}	[-]	1,4							
Size			M10		M12		M16		M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0		4,5	4,5
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0		4,5	4,5
Installation safety factor	γ_{inst}	[-]	1,4							
Characteristic bond resistance in cracked concrete for a working life of 100 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5		3,0	3,0
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5		3,0	3,0
Installation safety factor	γ_{inst}	[-]	1,4							
Dustless drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	10,0	9,5	9,0	8,5	8,0	6,5	5,5
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,0	8,5	8,5	8,5	6,5	5,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4							
Size			M10		M12		M16		M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0		4,5	4,5
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0		5,0		5,0		4,5	4,5
Installation safety factor	γ_{inst}	[-]	1,4							
Characteristic bond resistance in cracked concrete for a working life of 100 years										
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5		3,0	3,0
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5		3,5		3,5		3,0	3,0
Installation safety factor	γ_{inst}	[-]	1,4							

Factor for uncracked concrete	C50/60	ψ_c	[-]	1
Factor for cracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,12 1,23 1,30
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73

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]	$1,5h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$							

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 2**

Performances

Hammer drilling, Dustless drilling

Characteristic resistance for tension loads - threaded rod

Table C5: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25

Hammer drilling

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,2						1,4	
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	7,5	7,0	6,5	6,0	5,0		
Installation safety factor	γ_{inst}	[-]	1,4							

Size			M10	M12	M16	M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,4				
Characteristic bond resistance in cracked concrete for a working life of 100 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,4				

Dustless drilling

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,2							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	10,0	8,5	8,0	8,0	8,0	6,0	5,0	4,5
Installation safety factor	γ_{inst}	[-]	1,4							

Size			M10	M12	M16	M20	M24
Characteristic bond resistance in cracked concrete for a working life of 50 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0
Installation safety factor	γ_{inst}	[-]	1,4				
Characteristic bond resistance in cracked concrete for a working life of 100 years							
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,2				
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5
Installation safety factor	γ_{inst}	[-]	1,4				

Factor for uncracked concrete	C50/60	ψ_c	[-]	1
Factor for cracked concrete	C30/37	ψ_c	[-]	1,12
	C40/50			1,23
	C50/60			1,30
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C	ψ^0_{sus}	[-]	0,75
	T2: 50°C / 80°C			0,73

Concrete cone failure

See Annex C 2

Splitting failure

See Annex C 2

Sika AnchorFix®-2+ Arctic	**Annex C 3**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded rod	

Table C6: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket

Combined pullout and concrete cone failure in concrete C20/25								
Hammer drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2					1,4
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,0	7,5	7,0	6,5	5,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4					
Dustless drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,5	8,5	8,5	6,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4					
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,0	4,5	4,5	
Installation safety factor	γ_{inst}	[-]	1,4					
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,2					
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,0	3,0	
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete	C50/60	ψ_c	[-]	1				
Factor for cracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,12 1,23 1,30				
Factor for influence of sustained load for a working life 50 and 100 years	T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73				
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								
Edge distance		$c_{cr,sp}$	[mm]	$1,5h_{ef}$				
Spacing		$s_{cr,sp}$	[mm]	$3,0h_{ef}$				

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 4**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded socket	

Table C7: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25								
Hammer drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]			1,2			1,4
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	7,0	6,5	6,0	5,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,4			
Dustless drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	8,0	8,0	8,0	6,0	4,5
Installation safety factor	γ_{inst}	[-]			1,4			
Size			**M6**	**M8**	**M10**	**M12**	**M16**	
Nominal external diameter of socket			M10	M12	M16	M20	M24	
Characteristic bond resistance in cracked concrete for a working life of 50 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,0	4,0	
Installation safety factor	γ_{inst}	[-]			1,4			
Characteristic bond resistance in cracked concrete for a working life of 100 years								
Dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,2			
Flooded hole	$\tau_{Rk,cr}$	[N/mm²]	3,0	3,0	3,0	2,5	2,5	
Installation safety factor	γ_{inst}	[-]			1,4			
Concrete cone failure								
See Annex C 4								
Splitting failure								
See Annex C 4								

Sika AnchorFix®-2+ Arctic,	**Annex C 5**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - threaded socket	

Table C8: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar

Combined pullout and concrete cone failure in uncracked concrete C20/25									
Hammer drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for influence of sustained load T1: 24°C / 40°C for a working life 50 and 100 years T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Dustless drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	12,0	10,0	10,0	9,0	9,0	9,0	5,5
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,0	9,0	8,0	8,0	8,0	4,5
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for concrete C50/60	ψ_c	[-]	1						
Factor for influence of sustained load T1: 24°C / 40°C for a working life 50 and 100 years T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Concrete cone failure									
Factor for concrete cone failure	$k_{ucr,N}$	[-]	11						
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]	$1,5h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 6**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - rebar	

Table C9: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar for
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in uncracked concrete C20/25									
Hammer drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,4						
Dustless drilling									
Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	11,0	9,5	9,5	8,5	8,5	8,5	5,0
Installation safety factor	γ_{inst}	[-]	1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	10,0	8,5	8,5	7,5	7,5	7,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4						
Factor for concrete C50/60	ψ_c	[-]	1						
Factor for influence of sustained load for a working life 50 and 100 years T1: 24°C / 40°C T2: 50°C / 80°C	ψ^0_{sus}	[-]	0,75 0,73						
Concrete cone failure									
See Annex C 6									
Splitting failure									
See Annex C 6									

Sika AnchorFix®-2+ Arctic,	**Annex C 7**
Performances Hammer drilling, Dustless drilling Characteristic resistance for tension loads - rebar	

Table C10: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years									
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,5	9,0	8,5	8,0	7,5	6,0	5,0
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	7,5	7,0	6,5	6,5	5,5	4,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4							
Factor for uncracked concrete C30/37	ψ_c	[-]	1,04							
Factor for uncracked concrete C40/50	ψ_c	[-]	1,07							
Factor for uncracked concrete C50/60	ψ_c	[-]	1,09							
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77							
Concrete cone failure									
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
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]	$1,5h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$							

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 8**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded rod	

Table C11: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	7,0	5,5	4,5
Installation safety factor	γ_{inst}	[-]	1,0							
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	8,0	7,0	6,5	6,0	6,0	5,0	4,0	3,5
Installation safety factor	γ_{inst}	[-]	1,4							
Factor for uncracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09						
Factor for influence of sustained load for a working life 50 and 100 years		ψ^0_{sus}	[-]	0,77						
Concrete cone failure										
See Annex C 8										
Splitting failure										
See Annex C 8										

Sika AnchorFix®-2+ Arctic,	**Annex C 9**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded rod	

Table C12: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket

Combined pullout and concrete cone failure in concrete C20/25								
Diamond core drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	5,0
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	7,0	6,5	6,5	5,5	4,0
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete C30/37 / C40/50 / C50/60	ψ_c	[-]	1,04 / 1,07 / 1,09					
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77					
Concrete cone failure								
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11					
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$					
Splitting failure								
Edge distance	$c_{cr,sp}$	[mm]	$1,5h_{ef}$					
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$					

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 10**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded socket	

Table C13: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded socket for Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25								
Diamond core drilling								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years								
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,5	8,0	7,5	7,0	4,5
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]	7,0	6,5	6,0	6,0	5,0	3,5
Installation safety factor	γ_{inst}	[-]	1,4					
Factor for uncracked concrete C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09					
Factor for influence of sustained load for a working life 50 and 100 years	ψ^0_{sus}	[-]	0,77					
Concrete cone failure								
See Annex C 10								
Splitting failure								
See Annex C 10								

Sika AnchorFix®-2+ Arctic	**Annex C 11**
Performances Diamond core drilling Characteristic resistance for tension loads - threaded socket	

Table C14: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete		$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	6,5	3,5
Installation safety factor		γ_{inst}	[-]	1,2						
Flooded hole		$\tau_{Rk,ucr}$	[N/mm²]	9,5	9,0	8,5	8,0	7,5	6,0	3,0
Installation safety factor		γ_{inst}	[-]	1,4						
Factor for uncracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09						
Factor for influence of sustained load for a working life 50 and 100 years		ψ^0_{sus}	[-]	0,77						

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11
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]	$1,5h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$3,0h_{ef}$						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 12**
Performances Diamond core drilling Characteristic resistance for tension loads - rebar	

Table C15: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar for
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C

Combined pullout and concrete cone failure in concrete C20/25									
Diamond core drilling									
Size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years										
Dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]		9,0	8,5	8,0	7,5	7,0	6,0	3,0
Installation safety factor	γ_{inst}	[-]		1,2						
Flooded hole	$\tau_{Rk,ucr}$	[N/mm²]		9,0	8,5	8,0	7,5	7,0	5,5	2,5
Installation safety factor	γ_{inst}	[-]		1,4						
Factor for uncracked concrete	C30/37 C40/50 C50/60	ψ_c	[-]	1,04 1,07 1,09						
Factor for influence of sustained load for a working life 50 and 100 years		ψ^0_{sus}	[-]	0,77						
Concrete cone failure										
See Annex C 8										
Splitting failure										
See Annex C 8										

Sika AnchorFix®-2+ Arctic	**Annex C 13**
Performances Diamond core drilling Characteristic resistance for tension loads - rebar	

Table C16: 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	$V^0_{Rk,s}$	[kN]	9	14	20	38	59	85	110	135
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade 5.8	$V^0_{Rk,s}$	[kN]	11	17	25	47	74	106	138	168
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade 8.8	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade 10.9	$V^0_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,5							
Stainless steel grade A2-70, A4-70	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade A4-80	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade 1.4529	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade 1.4565	$V^0_{Rk,s}$	[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 pry-out 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})							

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Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 14**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - threaded rod	

Table C17: Design method EN 1992-4
Characteristic values of resistance to shear load of threaded socket

Steel failure without lever arm								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Steel grade **4.6**	$V^0_{Rk,s}$	[kN]	5	9	14	20	38	59
Partial safety factor	γ_{Ms}	[-]	1,67					
Steel grade **5.8**	$V^0_{Rk,s}$	[kN]	6	11	17	25	47	74
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **8.8**	$V^0_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **10.9**	$V^0_{Rk,s}$	[kN]	10	18	29	42	79	123
Partial safety factor	γ_{Ms}	[-]	1,5					
Stainless steel grade **A2-70, A4-70**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless steel grade **A4-80**	$V^0_{Rk,s}$	[kN]	8	15	23	34	63	98
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **1.4529**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
Partial safety factor	γ_{Ms}	[-]	1,25					
Stainless steel grade **1.4565**	$V^0_{Rk,s}$	[kN]	7	13	20	30	55	86
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			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Steel grade **4.6**	$M^0_{Rk,s}$	[N.m]	6	15	30	52	133	260
Partial safety factor	γ_{Ms}	[-]	1,67					
Steel grade **5.8**	$M^0_{Rk,s}$	[N.m]	8	19	37	66	166	325
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **8.8**	$M^0_{Rk,s}$	[N.m]	12	30	60	105	266	519
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade **10.9**	$M^0_{Rk,s}$	[N.m]	15	37	75	131	333	649
Partial safety factor	γ_{Ms}	[-]	1,50					
Stainless steel grade **A2-70, A4-70**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless steel grade **A4-80**	$M^0_{Rk,s}$	[N.m]	12	30	60	105	266	519
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless steel grade **1.4529**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,25					
Stainless steel grade **1.4565**	$M^0_{Rk,s}$	[N.m]	11	26	52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,56					
Concrete pryout failure								
Factor for resistance to pry-out failure	k_8	[-]	2					

Concrete edge failure								
Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Nominal external diameter of socket			M10	M12	M16	M20	M24	M30
Outside diameter of fastener	d_{nom}	[mm]	10	12	16	20	24	30
Effective length of fastener	l_f	[mm]	min (h_{ef}, 8 d_{nom})					

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 15**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - threaded socket	

Table C18: 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	$V^0_{Rk,s}$	[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 pry-out 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})						

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 16**
Performances Design according to EN 1992-4 Characteristic resistance for shear loads - rebar	

Table C19: Displacement of threaded rod under tension and shear load
Hammer drilling, dustless drilling

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
δ_{N0}	[mm/kN]	0,05	0,04	0,03	0,02	0,02	0,02	0,01	0,01
$\delta_{N\infty}$	[mm/kN]	0,11	0,09	0,06	0,04	0,03	0,02	0,02	0,02
Cracked concrete									
δ_{N0}	[mm/kN]		0,08	0,09	0,05	0,03	0,02		
$\delta_{N\infty}$	[mm/kN]		0,51	0,32	0,18	0,13	0,11		
Shear load									
δ_{V0}	[mm/kN]	0,48	0,30	0,20	0,11	0,10	0,08	0,06	0,05
$\delta_{V\infty}$	[mm/kN]	0,72	0,45	0,30	0,17	0,14	0,12	0,10	0,08

Table C20: Displacement of threaded rod under tension and shear load
Diamond core drilling

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
δ_{N0}	[mm/kN]	0,02	0,02	0,03	0,02	0,01	0,01	0,02	0,02
$\delta_{N\infty}$	[mm/kN]	0,11	0,07	0,05	0,03	0,02	0,02	0,02	0,02
Cracked concrete									
δ_{N0}	[mm/kN]		0,07	0,05	0,05	0,03	0,03		
$\delta_{N\infty}$	[mm/kN]		0,37	0,23	0,16	0,10	0,07		
Shear load									
δ_{V0}	[mm/kN]	0,48	0,30	0,20	0,11	0,10	0,08	0,06	0,05
$\delta_{V\infty}$	[mm/kN]	0,72	0,45	0,30	0,17	0,14	0,12	0,10	0,08

Table C21: Displacement of rebar under tension and shear load
Hammer drilling, dustless drilling

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
δ_{N0}	[mm/kN]	0,04	0,03	0,02	0,02	0,01	0,01	0,01
$\delta_{N\infty}$	[mm/kN]	0,09	0,07	0,05	0,03	0,02	0,01	0,01
Shear load								
δ_{V0}	[mm/kN]	0,05	0,04	0,03	0,02	0,01	0,01	0,01
$\delta_{V\infty}$	[mm/kN]	0,08	0,06	0,05	0,03	0,02	0,01	0,01

Table C22: Displacement of rebar under tension and shear load
Diamond core drilling

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
δ_{N0}	[mm/kN]	0,04	0,04	0,03	0,02	0,02	0,02	0,02
$\delta_{N\infty}$	[mm/kN]	0,10	0,07	0,05	0,03	0,02	0,02	0,02
Cracked concrete								
δ_{N0}	[mm/kN]		0,07	0,06	0,04	0,03	0,03	
$\delta_{N\infty}$	[mm/kN]		0,34	0,23	0,16	0,09	0,07	
Shear load								
δ_{V0}	[mm/kN]	0,05	0,04	0,03	0,02	0,01	0,01	0,01
$\delta_{V\infty}$	[mm/kN]	0,08	0,06	0,05	0,03	0,02	0,01	0,01

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 17**
Performances Displacement	

Table C23: Seismic performance category C1 - Hammer drilling, Dustless drilling

Size			M10	M12	M16	M20	M24
Tension load							
Steel failure							
Characteristic resistance grade 4.6	$N_{Rk,s,eq}$	[kN]	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]			2,00		
Characteristic resistance grade 5.8	$N_{Rk,s,eq}$	[kN]	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance grade 8.8	$N_{Rk,s,eq}$	[kN]	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance grade 10.9	$N_{Rk,s,eq}$	[kN]	58	84	157	245	353
Partial safety factor	γ_{Ms}	[-]			1,40		
Characteristic resistance A2-70, A4-70	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,87		
Characteristic resistance A4-80	$N_{Rk,s,eq}$	[kN]	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]			1,60		
Characteristic resistance 1.4529	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance 1.4565	$N_{Rk,s,eq}$	[kN]	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]			1,87		
Characteristic resistance to pull-out for a working life of 50 years							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,9	3,9	3,9	3,9	3,9
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,7	3,7	3,7	3,7	3,7
Characteristic resistance to pull-out for a working life of 100 years							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,5	3,5	3,5	2,5	3,0
Sika AnchorFix®-2+ Arctic with installation temperature < -10°C							
Dry, wet concrete and flooded hole	$\tau_{Rk,C1}$	[N/mm²]	3,3	3,3	3,3	2,3	2,8
Installation safety factor – Dry and wet concrete	γ_{inst}	[-]			1,2		
Installation safety factor – Flooded hole	γ_{inst}	[-]			1,4		

Shear load							
Steel failure without lever arm							
Characteristic resistance grade 4.6	$V_{Rk,s,eq}$	[kN]	7	10	23	30	40
Partial safety factor	γ_{Ms}	[-]			1,67		
Characteristic resistance grade 5.8	$V_{Rk,s,eq}$	[kN]	9	13	28	38	51
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance grade 8.8	$V_{Rk,s,eq}$	[kN]	14	21	45	61	81
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance grade 10.9	$V_{Rk,s,eq}$	[kN]	18	26	56	76	101
Partial safety factor	γ_{Ms}	[-]			1,50		
Characteristic resistance A2-70, A4-70	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,56		
Characteristic resistance A4-80	$V_{Rk,s,eq}$	[kN]	14	21	45	61	81
Partial safety factor	γ_{Ms}	[-]			1,33		
Characteristic resistance 1.4529	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,25		
Characteristic resistance 1.4565	$V_{Rk,s,eq}$	[kN]	12	18	39	53	71
Partial safety factor	γ_{Ms}	[-]			1,56		
Factor for annular gap	α_{gap}	[-]			0,5		

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 18**
Performances Hammer drilling, Dustless drilling Seismic performance category C1 of threaded rod	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for threaded rods for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$ for $\theta < 21°C$

$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$ for $21°C \leq \theta \leq 367°C$

$k_{fi,p}(\theta) = 0$ for $\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*

$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*

$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

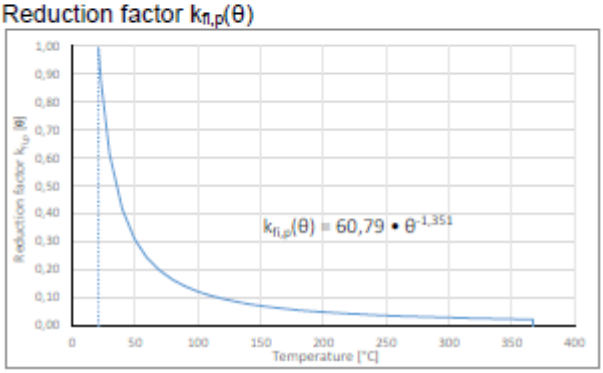

Table C24: Steel failure - Characteristic resistance under tension load under fire conditions

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel grade: 4.6; 5.8; 8.8; 10.9	$N^0_{Rk,s,fi(30)}$	[kN]	0,37	0,87	1,69	3,14	4,90	7,06	9,18	11,22
	$N^0_{Rk,s,fi(60)}$	[kN]	0,33	0,75	1,26	2,36	3,68	5,30	6,89	8,42
	$N^0_{Rk,s,fi(90)}$	[kN]	0,26	0,58	1,10	2,04	3,19	4,59	5,97	7,29
	$N^0_{Rk,s,fi(120)}$	[kN]	0,18	0,46	0,84	1,57	2,45	3,53	4,59	5,61
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$N^0_{Rk,s,fi(30)}$	[kN]	0,73	1,45	2,53	4,71	7,35	10,59	13,77	16,83
	$N^0_{Rk,s,fi(60)}$	[kN]	0,59	1,16	2,11	3,93	6,13	8,83	11,48	14,03
	$N^0_{Rk,s,fi(90)}$	[kN]	0,44	0,93	1,69	3,14	4,90	7,06	9,18	11,22
	$N^0_{Rk,s,fi(120)}$	[kN]	0,37	0,81	1,35	2,51	3,92	5,65	7,34	8,98

Table C25: Steel failure - Characteristic resistance under shear load under fire conditions

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel grade: **4.6; 5.8; 8.8; 10.9**	$V^0_{Rk,s,fi(30)}$	[kN]	0,37	0,87	1,69	3,14	4,90	7,06	9,18	11,22
	$V^0_{Rk,s,fi(60)}$	[kN]	0,33	0,75	1,26	2,36	3,68	5,30	6,89	8,42
	$V^0_{Rk,s,fi(90)}$	[kN]	0,26	0,58	1,10	2,04	3,19	4,59	5,97	7,29
	$V^0_{Rk,s,fi(120)}$	[kN]	0,18	0,46	0,84	1,57	2,45	3,53	4,59	5,61
	$M^{0}_{Rk,s,fi(30)}$	[N.m]	0,4	1,1	2,6	6,7	13,0	22,5	33,3	45,0
	$M^{0}_{Rk,s,fi(60)}$	[N.m]	0,3	1,0	2,0	5,0	9,7	16,8	25,0	33,7
	$M^{0}_{Rk,s,fi(90)}$	[N.m]	0,3	0,7	1,7	4,3	8,4	14,6	21,6	29,2
	$M^{0}_{Rk,s,fi(120)}$	[N.m]	0,2	0,6	1,3	3,3	6,5	11,2	16,6	22,5
Stainless steel grade: **A2-70; A4-70; A4-80** High corrosion resistant steel grade: **1.4529; 1.4565**	$V^0_{Rk,s,fi(30)}$	[kN]	0,73	1,45	2,53	4,71	7,35	10,59	13,77	16,83
	$V^0_{Rk,s,fi(60)}$	[kN]	0,59	1,16	2,11	3,93	6,13	8,83	11,48	14,03
	$V^0_{Rk,s,fi(90)}$	[kN]	0,44	0,93	1,69	3,14	4,90	7,06	9,18	11,22
	$V^0_{Rk,s,fi(120)}$	[kN]	0,37	0,81	1,35	2,51	3,92	5,65	7,34	8,98
	$M^{0}_{Rk,s,fi(30)}$	[N.m]	0,7	1,9	3,9	10,0	19,5	33,7	49,9	67,5
	$M^{0}_{Rk,s,fi(60)}$	[N.m]	0,6	1,5	3,3	8,3	16,2	28,1	41,6	56,2
	$M^{0}_{Rk,s,fi(90)}$	[N.m]	0,4	1,2	2,6	6,7	13,0	22,5	33,3	45,0
	$M^{0}_{Rk,s,fi(120)}$	[N.m]	0,4	1,0	2,1	5,3	10,4	18,0	26,6	36,0

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 19**
Performances Bond resistance under fire conditions for threaded rods	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for threaded sockets for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$ for $\theta < 21°C$

$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$ for $21°C \leq \theta \leq 367°C$

$k_{fi,p}(\theta) = 0$ for $\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*

$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*

$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

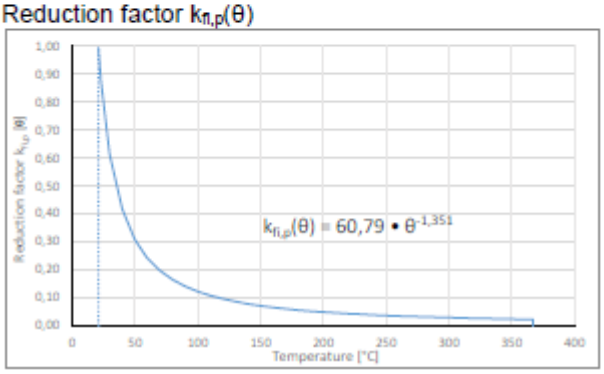

Table C26: Steel failure - Characteristic resistance under tension load under fire conditions

Size			M6	M8	M10	M12	M16	M20
Steel grade: 4.6; 5.8; 8.8; 10.9	$N_{Rk,s,fi(30)}$	[kN]	0,20	0,37	0,87	1,69	3,14	4,90
	$N_{Rk,s,fi(60)}$	[kN]	0,18	0,33	0,75	1,26	2,36	3,68
	$N_{Rk,s,fi(90)}$	[kN]	0,14	0,26	0,58	1,10	2,04	3,19
	$N_{Rk,s,fi(120)}$	[kN]	0,10	0,18	0,46	0,84	1,57	2,45
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$N_{Rk,s,fi(30)}$	[kN]	0,20	0,73	1,45	2,53	4,71	7,35
	$N_{Rk,s,fi(60)}$	[kN]	0,18	0,59	1,16	2,11	3,93	6,13
	$N_{Rk,s,fi(90)}$	[kN]	0,14	0,44	0,93	1,69	3,14	4,90
	$N_{Rk,s,fi(120)}$	[kN]	0,10	0,37	0,81	1,35	2,51	3,92

Table C27: Steel failure - Characteristic resistance under shear load under fire conditions

Size			M6	M8	M10	M12	M16	M20
Steel grade: 4.6; 5.8; 8.8; 10.9	$V_{Rk,s,fi(30)}$	[kN]	0,20	0,37	0,87	1,69	3,14	4,90
	$V_{Rk,s,fi(60)}$	[kN]	0,18	0,33	0,75	1,26	2,36	3,68
	$V_{Rk,s,fi(90)}$	[kN]	0,14	0,26	0,58	1,10	2,04	3,19
	$V_{Rk,s,fi(120)}$	[kN]	0,10	0,18	0,46	0,84	1,57	2,45
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,2	0,4	1,1	2,6	6,7	13,0
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,1	0,3	1,0	2,0	5,0	9,7
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,1	0,3	0,7	1,7	4,3	8,4
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,1	0,2	0,6	1,3	3,3	6,5
Stainless steel grade: A2-70; A4-70; A4-80 High corrosion resistant steel grade: 1.4529; 1.4565	$V_{Rk,s,fi(30)}$	[kN]	0,20	0,73	1,45	2,53	4,71	7,35
	$V_{Rk,s,fi(60)}$	[kN]	0,18	0,59	1,16	2,11	3,93	6,13
	$V_{Rk,s,fi(90)}$	[kN]	0,14	0,44	0,93	1,69	3,14	4,90
	$V_{Rk,s,fi(120)}$	[kN]	0,10	0,37	0,81	1,35	2,51	3,92
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,2	0,7	1,9	3,9	10,0	19,5
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,1	0,6	1,5	3,3	8,3	16,2
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,1	0,4	1,2	2,6	6,7	13,0
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,1	0,4	1,0	2,1	5,3	10,4

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 20**
Performances Bond resistance under fire conditions for threaded sockets	

Characteristic resistance to combined pull-out and concrete failure $\tau_{Rk,fi}(\theta)$ under fire exposure for rebars for hammer or dustless drilling

The characteristic resistance to combined pull-out and concrete failure under fire $\tau_{Rk,fi,p}(\theta)$ shall be determined according to following equation:

$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) \cdot \tau_{Rk,cr}$

$k_{fi,p}(\theta) = 1$	for	$\theta < 21°C$
$k_{fi,p}(\theta) = 60{,}79 \cdot \theta^{-1{,}351} \leq 1$	for	$21°C \leq \theta \leq 367°C$
$k_{fi,p}(\theta) = 0$	for	$\theta > 367°C$

$\tau_{Rk,fi,p}$ = *characteristic bond resistance for cracked concrete under fire exposure tor given temperature (θ)*
$\tau_{Rk,cr}$ = *characteristic bond resistance for cracked concrete for concrete strength class C20/25*
$k_{fi,p}(\theta)$ = *reduction factor for bond resistance under fire conditions*

Reduction factor $k_{fi,p}(\theta)$

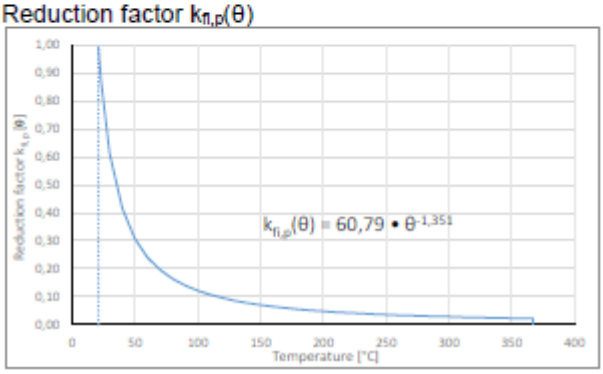

Table C28: Steel failure - Characteristic resistance under tension load under fire conditions

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$N_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	6,28	9,82	16,08
	$N_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	4,71	7,36	12,06
	$N_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	4,08	6,38	10,45
	$N_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	3,14	4,91	8,04

Table C29: Steel failure - Characteristic resistance under shear load under fire conditions

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar BSt 500 S	$V_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	6,28	9,82	16,08
	$V_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	4,71	7,36	12,06
	$V_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	4,08	6,38	10,45
	$V_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	3,14	4,91	8,04
	$M^0_{Rk,s,fi(30)}$	[N.m]	0,6	1,8	4,1	9,7	18,9	36,8	77,2
	$M^0_{Rk,s,fi(60)}$	[N.m]	0,5	1,5	3,1	7,2	14,1	27,6	57,9
	$M^0_{Rk,s,fi(90)}$	[N.m]	0,4	1,2	2,6	6,3	12,3	23,9	50,2
	$M^0_{Rk,s,fi(120)}$	[N.m]	0,3	0,9	2,0	4,8	9,4	18,4	38,6

Sika AnchorFix®-2+, Sika AnchorFix®-2+ Arctic, Sika AnchorFix®-2+ Tropical	**Annex C 21**
Performances Bond resistance under fire conditions for rebars	

EAD 330499-02-0601:2025
Bonded injection type anchor for use incracked and uncracked concrete

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21
Sika Services AG, Zurich, Switzerland
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EAD 330499-02-0601:2025
Bonded injection type anchor for use in cracked and uncracked concrete

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ECOLOGY, HEALTH AND SAFETY INFORMATION (REACH)

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

LEGAL NOTE