Technical Documentation

Sika AnchorFix®-2

Product Information

Sika Services AG

BUILDING TRUST

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CHEMICAL RESISTANCE

The chemical mortar has undergone extensive chemical resistance testing. The results are summarised in the table below.

Chemical Environment	Concentration	Result
Aqueous Solution Acetic Acid	10%	✓
Acetone	100%	×
Aqueous Solution Aluminium Chloride	Saturated	✓
Aqueous Solution Aluminium Nitrate	10%	✓
Ammonia Solution	5%	✓
Jet Fuel	100%	✓
Benzene	100%	×
Benzoic Acid	Saturated	✓
Benzyl Alcohol	100%	×
Sodium Hypochlorite Solution	5 - 15%	C
Butyl Alcohol	100%	C
Calcium Sulphate Aqueous Solution	Saturated	✓
Carbon Monoxide	Gas	✓
Carbon Tetrachloride	100%	✓
Chlorine Water	Saturated	✓
Chloro Benzene	100%	×
Citric Acid Aqueous Solution	Saturated	✓
Cyclohexanol	100%	✓
Diesel Fuel	100%	✓
Diethylene Glycol	100%	✓
Ethanol	95%	C
Ethanol Aqueous Solution	20%	C
Heptane	100%	✓
Hexane	100%	C
Hydrochloric Acid	10%	✓
	15%	✓
	25%	C
Hydrogen Sulphide Gas	100%	✓
Isoproyl Alcohol	100%	C
Linseed Oil	100%	✓
Lubricating Oil	100%	✓
Mineral Oil	100%	✓
Paraffin / Kerosene (Domestic)	100%	✓
Phenol Aqueous Solution	1%	×
Phosphoric Acid	50%	✓
Potassium Hydroxide	10% / pH13	✓
Sea Water	100%	✓
Styrene	100%	×
Sulphur Dioxide Solution	10%	✓
Sulphur Dioxide (40°C)	5%	✓

Sulphuric Acid	10%	✓
	50%	✓
Turpentine	100%	C
White Spirit	100%	✓
Xylene	100%	×

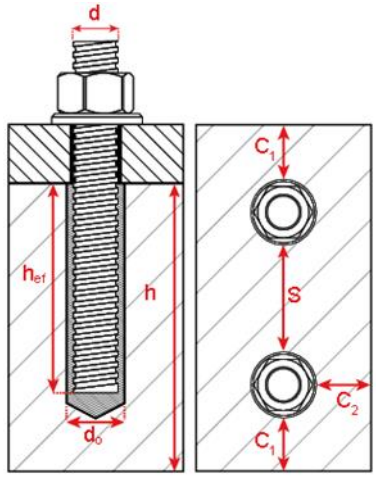
✓ = Resistant to 75°C with at least 80% of physical properties retained.

C = Contact only to a maximum of 25°C.

× = Not Resistant

INSTALLATION PARAMETER

Size			M8	M10	M12	M16	M20	M24
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26
Diameter of cleaning brush d_b	d_b	[mm]	14	14	20	20	29	29
Torque moment T_{inst}	T_{inst}	[Nm]	10	20	40	80	150	200
$h_{ef,min}$ = 8d								
Depth of drill hole h_0	h_0	[mm]	64	80	96	128	160	192
Minimum edge distance c_{min}	c_{min}	[mm]	35	40	50	65	80	96
Minimum spacing s_{min}	s_{min}	[mm]	35	40	50	65	80	96
Minimum thickness of member h_{min}	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm				h_{ef} + $2d_0$	
$h_{ef,max}$ = 12d								
Depth of drill hole h_0	h_0	[mm]	96	120	144	192	240	288
Minimum edge distance c_{min}	c_{min}	[mm]	50	60	70	95	120	145
Minimum spacing s_{min}	s_{min}	[mm]	50	60	70	95	120	145
Minimum thickness of member h_{min}	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm				h_{ef} + $2d_0$	



THEORETICAL NUMBER OF FIXINGS PER CARTRIDGE

Applies to installations in solid substrates only

Cartridge Volume	h_{ef}	M8	M10	M12	M16	M20	M24
		Drilling Ø 10mm	Drilling Ø 12mm	Drilling Ø 14mm	Drilling Ø 18mm	Drilling Ø 22mm	Drilling Ø 26mm
410 ml	8d	148	91	60	32	19	12
	10d	118	72	48	26	15	9
	STD	118	81	52	32	17	11
	12d	98	60	40	21	12	8
300 ml	8d	106	65	43	23	13	8
	10d	85	52	34	18	11	7
	STD	85	58	38	23	12	8
	12d	71	43	29	15	9	5

Note: Jobsite/contractor installations usually result in more resin being injected than the theoretical requirement resulting in lower number of fixings per cartridge. The reduction to the number of fixings per cartridge in practice is greater for smaller diameter holes and shallower embedment depths.

STEEL FAILURE INFORMATION - THREADED BARS

Characteristic resistance values to tension load

Steel Failure - Characteristic resistance								
Size			M8	M10	M12	M16	M20	M24
Steel grade 4.6	$N_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	2					
Steel grade 5.8	$N_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]	1.5					
Steel grade 8.8	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]	1.5					
Steel grade 10.9	$N_{Rk,s}$	[kN]	37	58	84	157	245	353
Partial safety factor	γ_{Ms}	[-]	1.4					
Stainless steel grade A4-70	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]	1.9					
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]	1.6					
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]	1.5					

CHARACTERISTIC RESISTANCE VALUES TO SHEAR LOAD

Steel Failure - without lever arm								
Size			M8	M10	M12	M16	M20	M24
Steel grade 4.6	$V_{Rk,s}$	[kN]	7	12	17	31	49	71
Partial safety factor	γ_{Ms}	[-]	1.67					
Steel grade 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88
Partial safety factor	γ_{Ms}	[-]	1.25					
Steel grade 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	1.25					
Steel grade 10.9	$V_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]	1.5					
Stainless steel grade A4-70	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms}	[-]	1.56					
Stainless steel grade A4-80	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	1.33					
Stainless steel grade 1.4529	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms}	[-]	1.25					

Steel Failure - with lever arm								
Size			M8	M10	M12	M16	M20	M24
Steel grade 4.6	$M^{\circ}_{Rk,s}$	[N.m]	15	30	52	133	260	449
Partial safety factor	γ_{Ms}	[-]	1.66					
Steel grade 5.8	$M^{\circ}_{Rk,s}$	[N.m]	19	37	66	166	325	561
Partial safety factor	γ_{Ms}	[-]	1.25					
Steel grade 8.8	$M^{\circ}_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	[-]	1.25					
Steel grade 10.9	$M^{\circ}_{Rk,s}$	[N.m]	37	75	131	333	649	1123
Partial safety factor	γ_{Ms}	[-]	1.50					
Stainless steel grade A4-70	$M^{\circ}_{Rk,s}$	[N.m]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	[-]	1.56					
Stainless steel grade A4-80	$M^{\circ}_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	[-]						
Stainless steel grade 1.4529	$M^{\circ}_{Rk,s}$	[N.m]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	[-]	1.25					
Concrete pryout failure								
Factor k from TR 029 Design of bonded anchors pt 5.2.3.3			2					
Partial safety factor	γ_{Ms}	[-]	1.5					

USING SIKA ANCHORFIX®-2 WITH THREADED BARS

Combined pullout and concrete cone failure in non-cracked concrete C20/25

Size				M8	M10	M12	M16	M20	M24
Characteristic bond resistance in non-cracked concrete									
Characteristic bond resistance dry/wet concrete		τ_{Rk}	[N/mm^2]	11	9.5	10	10	9.0	8.0
Partial safety factor		γ_{Mc}	[-]	1.8					
Factor for concrete	C30/37	ψ_c	[-]	1.04					
	C40/45			1.07					
	C50/60			1.09					

TENSION LOAD CALCULATIONS FOR COMBINED CONCRETE CONE & PULLOUT FAILURE AT VARIOUS EMBEDMENT DEPTHS

using threaded rods in dry / wet, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

Property	Symbol	Unit	Anchor Size					
			M8	M10	M12	M16	M20	M24
Effective Embedment Depth = 8d	d	mm	64	80	96	128	160	192
Characteristic Load (Combined Concrete Cone & Pullout Failure)	τ_{Rk}	kN	17.69	23.88	36.19	64.34	90.48	115.81
Partial Safety Factor	h_{ef}	-	1.80	1.80	1.80	1.80	1.80	1.80
Effective Embedment Depth = 10d	$N^0_{Rk,p}$	mm	80	100	120	160	200	240
Characteristic Load (Combined Concrete Cone & Pullout Failure)	γ_{Mc}	kN	22.12	29.85	45.24	80.42	113.10	144.76
Partial Safety Factor	$S_{cr,sp}$	-	1.80	1.80	1.80	1.80	1.80	1.80
Effective Embedment Depth = STD	$C_{cr,sp}$	mm	80	90	110	128	170	210
Characteristic Load (Combined Concrete Cone & Pullout Failure)	$S_{cr,Np}$	kN	22.12	26.86	41.47	64.34	96.13	126.67
Partial Safety Factor	$C_{cr,Np}$	-	1.80	1.80	1.80	1.80	1.80	1.80
Effective Embedment Depth = 12d	d	mm	96	120	144	192	240	288
Characteristic Load (Combined Concrete Cone & Pullout Failure)	τ_{Rk}	kN	26.54	35.81	54.29	96.51	135.72	173.72
Partial Safety Factor	h_{ef}	-	1.80	1.80	1.80	1.80	1.80	1.80

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperature range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm^2 for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

TENSION LOAD CALCULATIONS FOR COMBINED CONCRETE CONE & PULLOUT FAILURE AT 8D EMBEDMENT DEPTH

using threaded rods in dry / wet, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

Property	Symbol	Unit	Anchor Size					
			M8	M10	M12	M16	M20	M24
Nominal Anchor Diameter	d	mm	8	10	12	16	20	24
Characteristic Bond Strength	τ_{Rk}	N/mm^2	11.00	9.50	10.00	10.00	9.00	8.00
Effective Embedment Depth	h_{ef}	mm	64	80	96	128	160	192
Characteristic Load (Combined Concrete Cone and Pullout Failure)	$N^0_{Rk,p}$	kN	17.69	23.88	36.19	64.34	90.48	115.81
Partial Safety Factor	γ_{Mc}	-	1.80	1.80	1.80	1.80	1.80	1.80
Characteristic Anchor Spacing (Splitting Failure)	$S_{cr,sp}$	mm	192	240	288	384	480	576
Characteristic Edge Distance (Splitting Failure)	$C_{cr,sp}$	mm	96	120	144	192	240	288
Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure)	$S_{cr,Np}$	mm	192	225	277	370	438	496
Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure)	$C_{cr,Np}$	mm	96	113	139	185	219	248

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperature range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm^2 for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Reduction factors for close edge:
Combined concrete cone and pullout failure

Close Edge Distance, C (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
35	0.55					
40	0.58	0.55				
50	0.65	0.60	0.55			
60	0.72	0.66	0.59			
65	0.76	0.69	0.62	0.54		
70	0.79	0.72	0.64	0.56		
80	0.87	0.78	0.69	0.59	0.55	
90	0.95	0.85	0.74	0.63	0.58	
95	0.99	0.88	0.76	0.65	0.60	0.56
96	N/R	0.89	0.77	0.65	0.60	0.57
100		0.91	0.79	0.66	0.61	0.58
110		0.98	0.84	0.70	0.64	0.60
113		N/R	0.86	0.71	0.65	0.61
120			0.90	0.74	0.67	0.63
130			0.95	0.78	0.70	0.65
139			N/R	0.81	0.73	0.68
140				0.82	0.73	0.68
150				0.85	0.76	0.71
160				0.90	0.80	0.74
170				0.94	0.83	0.76
180				0.98	0.86	0.79
185				N/R	0.88	0.81
190					0.90	0.82
200					0.93	0.85
210					0.97	0.88
219					N/R	0.91
220						0.91
230						0.94
240						0.97
248						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance (C_{min}) as defined in the ETA.*

Reduction factors for anchor spacing:
Combined concrete cone and pullout failure

Anchor Spacing Distance, S (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
35	0.65					
40	0.66	0.65				
50	0.69	0.67	0.64			
60	0.71	0.69	0.65			
65	0.72	0.70	0.66	0.61		
70	0.73	0.71	0.67	0.62		
80	0.75	0.73	0.69	0.63	0.61	
90	0.78	0.75	0.70	0.64	0.62	
95	0.79	0.76	0.71	0.65	0.63	0.62
100	0.80	0.77	0.72	0.66	0.64	0.63
120	0.84	0.81	0.75	0.68	0.66	0.65
140	0.89	0.84	0.78	0.71	0.68	0.67
160	0.93	0.88	0.81	0.73	0.70	0.68
180	0.97	0.92	0.85	0.76	0.72	0.70
192	N/R	0.94	0.87	0.77	0.74	0.71
200		0.95	0.88	0.78	0.74	0.72
225		N/R	0.92	0.82	0.77	0.75
250			0.96	0.85	0.80	0.77
277			N/R	0.88	0.83	0.80
300				0.91	0.85	0.82
350				0.98	0.91	0.86
370				N/R	0.93	0.88
400					0.96	0.91
438					N/R	0.95
450						0.96
496						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing (S_{min}) as defined in the ETA.*

TENSION LOAD CALCULATIONS FOR COMBINED CONCRETE CONE & PULLOUT FAILURE AT STD EMBEDMENT DEPTH

using threaded rods in dry / wet, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

Property	Symbol	Unit	Anchor Size					
			M8	M10	M12	M16	M20	M24
Nominal Anchor Diameter	d	mm	8	10	12	16	20	24
Characteristic Bond Strength	τ_{Rk}	N/mm^2	8	10	12	16	20	24
Effective Embedment Depth	h_{ef}	mm	11.00	9.50	10.00	10.00	9.00	8.00
Characteristic Load (Combined Concrete Cone and Pullout Failure)	$N^0_{Rk,p}$	kN	80	90	110	128	170	210
Partial Safety Factor	γ_{Mc}	-	22.12	26.86	41.47	64.34	96.13	126.67
Characteristic Anchor Spacing (Splitting Failure)	$S_{cr,sp}$	mm	1.80	1.80	1.80	1.80	1.80	1.80
Characteristic Edge Distance (Splitting Failure)	$C_{cr,sp}$	mm	240	270	330	384	510	630
Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure)	$S_{cr,Np}$	mm	120	135	165	192	255	315
Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure)	$C_{cr,Np}$	mm	194	225	277	370	438	496

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperature range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm^2 for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Reduction factors for close edge:
Combined concrete cone and pullout failure

Close Edge Distance, C (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
40	0.58					
45	0.61	0.57				
50	0.65	0.60				
55	0.68	0.63	0.57			
60	0.72	0.66	0.59			
65	0.75	0.69	0.62	0.54		
70	0.79	0.72	0.64	0.56		
80	0.87	0.78	0.69	0.59		
85	0.90	0.81	0.71	0.61	0.57	
90	0.94	0.85	0.74	0.63	0.58	
97	N/R	0.89	0.77	0.65	0.60	
100		0.91	0.79	0.66	0.61	
105		0.95	0.82	0.68	0.62	0.59
110		0.98	0.84	0.70	0.64	0.60
113		N/R	0.86	0.71	0.65	0.61
120			0.90	0.74	0.67	0.63
130			0.95	0.78	0.70	0.65
139			N/R	0.81	0.73	0.68
140				0.82	0.73	0.68
150				0.85	0.76	0.71
160				0.90	0.80	0.74
170				0.94	0.83	0.76
180				0.98	0.86	0.79
185				N/R	0.88	0.81
190					0.90	0.82
200					0.93	0.85
210					0.97	0.88
219					N/R	0.91
240						0.97
248						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance (C_{min}) as defined in the ETA.*

Reduction factors for anchor spacing:
Combined concrete cone and pullout failure

Anchor Spacing Distance, S (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
40	0.67					
45	0.68	0.67				
50	0.70	0.68				
55	0.71	0.69	0.65			
60	0.72	0.70	0.66			
65	0.73	0.71	0.67	0.61		
70	0.74	0.72	0.68	0.62		
80	0.76	0.73	0.69	0.63		
85	0.77	0.74	0.70	0.64	0.62	
90	0.78	0.75	0.71	0.64	0.63	
100	0.80	0.77	0.72	0.66	0.64	
105	0.81	0.78	0.73	0.66	0.65	0.64
125	0.86	0.82	0.76	0.69	0.67	0.66
150	0.91	0.87	0.80	0.72	0.69	0.68
175	0.96	0.91	0.84	0.75	0.72	0.70
194	N/R	0.94	0.87	0.78	0.74	0.72
200		0.96	0.88	0.78	0.75	0.73
225		N/R	0.92	0.82	0.77	0.75
250			0.96	0.85	0.80	0.77
277			N/R	0.88	0.83	0.80
300				0.91	0.85	0.82
325				0.94	0.88	0.84
350				0.98	0.91	0.87
370				N/R	0.93	0.89
375					0.93	0.89
400					0.96	0.91
438					N/R	0.95
450						0.96
496						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing (S_{min}) as defined in the ETA.*

TENSION LOAD CALCULATIONS FOR COMBINED CONCRETE CONE & PULLOUT FAILURE AT 12D EMBEDMENT DEPTH

using threaded rods in dry / wet, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

Property	Symbol	Unit	Anchor Size					
			M8	M10	M12	M16	M20	M24
Nominal Anchor Diameter	d	mm	8	10	12	16	20	24
Characteristic Bond Strength	τ_{Rk}	N/mm^2	11.00	9.50	10.00	10.00	9.00	8.00
Effective Embedment Depth	h_{ef}	mm	96	120	144	192	240	288
Characteristic Load (Combined Concrete Cone and Pullout Failure)	$N^0_{Rk,p}$	kN	26.54	35.81	54.29	96.51	135.72	173.72
Partial Safety Factor	γ_{Mc}	-	1.80	1.80	1.80	1.80	1.80	1.80
Characteristic Anchor Spacing (Splitting Failure)	$S_{cr,sp}$	mm	288	360	432	576	720	864
Characteristic Edge Distance (Splitting Failure)	$C_{cr,sp}$	mm	144	180	216	288	360	432
Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure)	$S_{cr,Np}$	mm	194	225	277	370	438	496
Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure)	$C_{cr,Np}$	mm	97	113	139	185	219	248

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperature range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm^2 for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Reduction factors for close edge:
Combined concrete cone and pullout failure

Close Edge Distance, C (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
50	0.65					
60	0.72	0.66				
70	0.79	0.72	0.64			
80	0.87	0.78	0.69			
90	0.94	0.85	0.74			
95	0.98	0.88	0.76	0.65		
97	N/R	0.89	0.77	0.65		
100		0.91	0.79	0.66		
110		0.98	0.84	0.70		
113		N/R	0.86	0.71		
120			0.90	0.74	0.67	
130			0.95	0.78	0.70	
139			N/R	0.81	0.73	
140				0.82	0.73	
145				0.83	0.75	0.69
150				0.85	0.76	0.71
160				0.90	0.80	0.74
170				0.94	0.83	0.76
180				0.98	0.86	0.79
185				N/R	0.88	0.81
190					0.90	0.82
200					0.93	0.85
210					0.97	0.88
219					N/R	0.91
220						0.91
230						0.94
240						0.97
248						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance (C_{min}) as defined in the ETA.*

Reduction factors for anchor spacing:
Combined concrete cone and pullout failure

Anchor Spacing Distance, S (mm)	Anchor Size					
	M8	M10	M12	M16	M20	M24
50	0.70					
60	0.72	0.71				
70	0.75	0.73	0.69			
80	0.77	0.75	0.71			
90	0.79	0.76	0.72			
95	0.80	0.77	0.73	0.68		
100	0.81	0.78	0.74	0.68		
120	0.85	0.82	0.77	0.71	0.68	
140	0.89	0.85	0.80	0.73	0.71	
145	0.90	0.86	0.81	0.74	0.71	0.70
160	0.93	0.89	0.83	0.76	0.73	0.71
180	0.97	0.92	0.86	0.78	0.75	0.73
194	N/R	0.95	0.88	0.80	0.76	0.74
200		0.96	0.89	0.80	0.77	0.74
225		N/R	0.92	0.83	0.79	0.77
250			0.96	0.86	0.82	0.79
277			N/R	0.89	0.84	0.81
300				0.92	0.87	0.83
325				0.95	0.89	0.85
350				0.98	0.91	0.88
370				N/R	0.93	0.89
375					0.94	0.90
400					0.96	0.92
425					0.99	0.94
438					N/R	0.95
450						0.96
475						0.98
496						N/R

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing (S_{min}) as defined in the ETA.*

USING SIKA ANCHORFIX®-2 WITH POST-INSTALLED REBAR CONNECTIONS

Installation parameters

Rebar		Drill Hole (mm)	Cleaning Brush* (mm)	Min. Anchorage Length (mm)	Min. Lap/Splice Length (mm)	Max. Embedment Depth (mm)
Diameter (mm)	$f_{y,k}$ (N/mm2)					
8	500	12 (10)	14	113	200	400
10	500	14 (12)	14	142	200	500
12	500	16	19	170	200	600
14	500	18	22	198	210	700
16	500	20	22	227	240	800
20	500	25	29	284	300	1000
25	500	32	40	354	375	1000
28	500	35	40	397	420	1000
32	500	40	42	454	480	1000

** Values in parenthesis represent alternative drilling diameters.*

DESIGN BOND STRENGTH VALUES

Design values of the ultimate bond resistance f_{bd} in N/mm^2 for rotary hammer drilling and compressed air drilling for good bond conditions.

<table>
<tr><td>Rebar Ø (mm)</td><td colspan="9">Concrete Class</td></tr>
<tr><td></td><td>C12/15</td><td>C16/20</td><td>C20/25</td><td>C25/30</td><td>C30/37</td><td>C35/45</td><td>C40/50</td><td>C45/55</td><td>C50/60</td></tr>
<tr><td>8</td><td rowspan="8">1.6</td><td rowspan="8">2.0</td><td rowspan="8">2.3</td><td rowspan="8">2.7</td><td rowspan="6">3.0</td><td rowspan="6">3.4</td><td rowspan="5">3.7</td><td rowspan="5">4.0</td><td rowspan="4">4.3</td></tr>
<tr><td>10</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td></tr>
<tr><td>16</td><td>4.0</td></tr>
<tr><td>20</td><td colspan="3">3.4</td></tr>
<tr><td>25</td><td colspan="5">2.7</td></tr>
<tr><td>28</td></tr>
<tr><td>32</td></tr>
</table>

Tabulated values for fbd are valid for good bond conditions according to EN 1992-1-1. For all other bond conditions multiply the values for f_{bd} by 0.7.

IMPORTANT NOTES

Use in Porous Substrates

This bonded anchor is not intended for use as a cosmetic or decorative product. When anchoring into porous or reconstituted stone it is recommended that technical assistance is sought. Due to the nature of the product, migration of the monomer in the resin may cause staining in certain materials. If you are still uncertain, it is advisable to test the resin by applying it in a small, discrete area and testing before using the resin on the project.

Important Note

Whilst all reasonable care is taken in compiling technical data on the Company's products, all recommendations or suggestions regarding the use of such products are made without guarantee, since the conditions of use are beyond the control of the Company. It is the customer's responsibility to satisfy himself that each product is fit for the purpose for which he intends to use it, that the actual conditions of use are suitable and that, in the light of our continual research and development programme the information relating to each product has not been superseded.