



Steel constructions



Bridge railings



BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

ASSESSMENT/APPROVAL



SUPERBOND MORTAR FIS SB

The concrete all - rounder

ADVANTAGES

- Thanks to its high bond strength, Superbond mortar FIS SB achieves a very high load level for safe use in cracked and non-cracked concrete.
- Variable anchorage depths from 4x to 20x anchor rod diameter allows for ideal adaptation to the load being applied, and ensures an optimised installation time and use of materials.
- The Superbond mortar can even be used at extremely high temperatures of up to +150 °C. This opens up new application fields, where no chemical anchor could be used previously.
- The Superbond mortar FIS SB is approved for seismic applications, which ensures safety even under extreme conditions.

APPLICATIONS

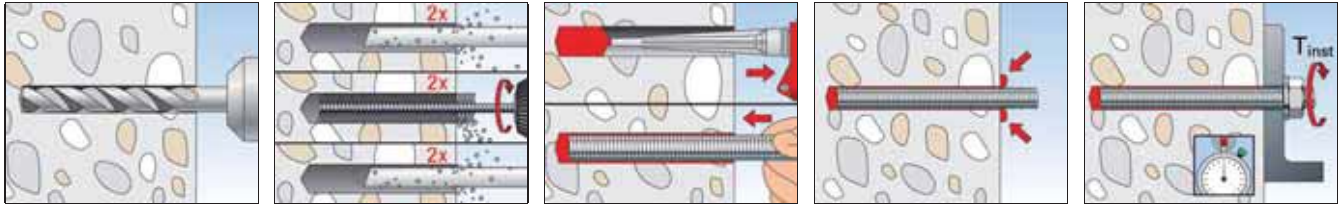
- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Guard rails
- Staircases
- Masts
- Machines

FUNCTIONING

- The injection system, which comprises the Superbond mortar FIS SB, an injection mortar based on a vinyl ester hybrid with hydrosilicon technology, is suitable (in conjunction with the correct threaded rod) for pre-positioned and push-through installation.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection capsule in the static mixer.
- The mortar is injected bubble-free from the drill hole base.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals off the drill hole.
- The anchor rod is set manually by lightly rotating it until it reaches the drill hole base.
- During push-through installation, the annular gap between the anchor rod and attachment is filled with Superbond mortar FIS SB.

SUPERBOND MORTAR FIS SB

INSTALLATION



TECHNICAL DATA



Superbond mortar
FIS SB 390 S



FIS S Mixer nozzle

Item	Art.-No.	Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
		ETA	ICC				[pcs]
FIS SB 390 S	518831	■	▲	GB, E, P	180	1 cartridge 390 ml, 2 x FIS MR	20

GELLING AND CURING TIME

Temperature at anchoring base	Gelling time	Curing time
	FIS SB Standard	FIS SB Standard
> -20°C - -15°C	-	-
> -15°C - -10°C	60 min.	36 hrs
> -10°C - -5°C	30 min.	24 hrs
> -5°C - ±0°C	20 min.	8 hrs
> ±0°C - +5°C	13 min	4 hrs
> +5°C - +10°C	9 min.	120 min
> +10°C - +20°C	5 min.	60 min
> +20°C - +30°C	4 min.	45 min
> +30°C - +40°C	2 min	30 min

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6) 11)}										Minimum spacings while reducing the load					
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance				
							Max. tension load c	Max. shear load c				Max. Load s _{cr}	s _{min} ⁹⁾	c _{min} ⁹⁾	
		h _{min} [mm]	h _{ef} ⁷⁾ [mm]	T _{max} [Nm]	N _{perm} ⁸⁾ [kN]	V _{perm} ⁸⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]				
FIS A M 8	5.8	100	60	10	4,3	5,1	90	105	180	40	40				
		110	80		5,7		105	95	240						
		190	160		9,0		75	80	480						
	8.8	100	60		4,3	8,6	90	185	180			105	170	240	
		110	80		5,7		115	480							
		190	160		11,5		125	180							
	A4-70	100	60		4,3	6,0	90	125	180			105	115	240	
		110	80		5,7		85	90	480						
		190	160		9,9		90	160	180						
	C-70	100	60		4,3	7,4	90	160	180			105	145	240	
		110	80		5,7		105	105	480						
		190	160		11,5		90	185	180						
FIS A M 10	5.8	100	60	20	5,8	8,6	90	185	180	45	45				
		120	90		8,8		130	155	270						
		230	200		13,8		80	110	600						
	8.8	100	60		5,8	11,7	90	255	180			130	250	270	
		120	90		8,8		150	600							
		230	200		19,4		90	195	180						
	A4-70	100	60		5,8	9,2	90	165	270			130	165	270	
		120	90		8,8		95	115	600						
		230	200		15,7		90	250	180						
	C-70	100	60		5,8	11,4	90	250	180			130	215	270	
		120	90		8,8		135	600							
		230	200		19,4		105	255	210						
FIS A M 12	5.8	100	70	40	9,4	12,0	105	255	210	55	55				
		140	110		14,8		155	195	330						
		270	240		20,5		75	135	720						
	8.8	100	70		9,4	18,8	105	420	210			19,4	340	330	
		140	110		14,8		200	720							
		270	240		32,3		105	295	210						
	A4-70	100	70		9,4	13,7	105	230	330			105	150	720	
		140	110		14,8		90	150	720						
		270	240		22,5		105	380	210						
	C-70	100	70		9,4	17,1	105	295	330			130	175	720	
		140	110		14,8		120	445	240						
		270	240		28,1		190	350	375						
FIS A M 16	5.8	120	80	60	12,3	22,3	120	445	240	65	65				
		170	125		22,4		190	350	375						
		360	320		37,6		115	195	960						
	8.8	120	80		12,3	24,5	120	495	240			210	320	960	
		170	125		22,4		190	600	375						
		360	320		57,4		120	495	240						
	A4-70	120	80		12,3	24,5	120	495	240			25,2	190	400	375
		170	125		22,4		135	215	960						
		360	320		42,0		120	495	240						
	C-70	120	80		12,3	24,5	120	495	240			31,4	190	515	375
		170	125		22,4		270	960							
		360	320		52,4		120	495	240						

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6) 11)}										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h _{min} [mm]	h _{ef} ⁷⁾ [mm]	T _{max} [Nm]	N _{perm} ⁸⁾ [kN]	V _{perm} ⁸⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		38,0	34,9	255	455	510		
		450	400		58,6		140	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		38,0	56,0	255	780	510		
		450	400		89,8		320	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	39,4	255	520	510		
		450	400		65,7		170	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	49,1	255	675	510		
		450	400		81,9		265	370	1200		
FIS A M 24	5.8	160	96	150	16,1	32,2	145	545	290	105	105
		270	210		52,2	50,9	315	590	630		
		540	480		84,3		160	330	1440		
	8.8	160	96		16,1	32,2	145	545	290		
		270	210		52,2	80,6	315	1005	630		
		540	480		129,3		450	570	1440		
	A4-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	56,8	315	670	630		
		540	480		94,3		230	360	1440		
	C-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	70,9	315	870	630		
		540	480		117,6		380	480	1440		
FIS A M 27	5.8	170	108	200	19,2	38,5	165	610	325	120	120
		310	250		67,8	65,7	375	695	750		
		600	540		109,5		240	390	1620		
	8.8	170	108		19,2	38,5	165	610	325		
		310	250		67,8	105,1	375	1200	750		
		600	540		152,7		495	700	1620		
	A4-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	73,7	375	795	750		
		600	540		123,0		325	445	1620		
	C-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	92,0	375	1030	750		
		600	540		152,7		495	595	1620		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6) 11)}										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h_{min} [mm]	$h_{ef}^{7)}$ [mm]				Max. tension load c	Max. shear load c			
FIS A M 30	5.8	190	120	300	22,5	45,1	180	665	360	140	140
		350	280		80,3	80,6	420	795	840		
		670	600		133,8		300	440	1800		
	8.8	190	120		22,5	45,1	180	665	360		
		350	280		80,3	128,6	420	1375	840		
		670	600		188,5		600	805	1800		
	A4-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	90,2	420	910	840		
		670	600		150,1		395	510	1800		
	C-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	112,6	420	1180	840		
		670	600		187,1		595	680	1800		

For the design the complete assessment ETA-12/0258 has to be considered. ¹⁰⁾

¹⁾ Also valid for anchor rod RGM in the same property class.

²⁾ Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

³⁾ The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

⁴⁾ The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

⁵⁾ For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

⁶⁾ Drill method hammer drilling.

⁷⁾ For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

⁸⁾ For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

⁹⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

¹⁰⁾ The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

¹¹⁾ A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6)}										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h_{min} [mm]	$h_{ef}^{7)}$ [mm]				Max. tension load c	Max. shear load c			
FIS A M 8	5.8	100	60	10	8,6	5,1	90	70	180	40	40
		110	80		9,0		75		240		
		190	160		9,0		40	60	480		
	8.8	100	60		8,6	8,6	90	130	180		
		110	80		11,5		105	115	240		
		190	160		14,3	50	90	480			
	A4-70	100	60		8,6	6,0	90	85	180		
		110	80		9,9		85	75	240		
		190	160		40		70	480			
	C-70	100	60		8,6	7,4	90	110	180		
		110	80		11,5		105	100	240		
		190	160		12,4		40	80	480		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6)}										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h _{min} [mm]	h _{ef} ⁷⁾ [mm]	T _{max} [Nm]	N _{perm} ⁸⁾ [kN]	V _{perm} ⁸⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 10	5.8	100	60	20	10,8	8,6	95	125	180	45	45
		120	90		13,8		110	105	270		
		230	200		45		85	600			
	8.8	100	60		10,8	13,1	95	200	180		
		120	90		16,2		145	170	270		
		230	200		22,4		60	115	600		
	A4-70	100	60		10,8	9,2	95	135	180		
		120	90		15,7		140	110	270		
		230	200		45		90	600			
	C-70	100	60		10,8	11,4	95	170	180		
		120	90		16,2		145	145	270		
		230	200		19,5		45	105	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	55
		140	110		20,5		165	130	330		
		270	240		55		100	720			
	8.8	100	70		14,1	19,4	145	295	210		
		140	110		23,7		205	230	330		
		270	240		32,4		75	150	720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110		22,5		190	155	330		
		270	240		55		115	720			
	C-70	100	70		14,1	17,1	145	260	210		
		140	110		23,7		205	200	330		
		270	240		28,1		55	135	720		
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		33,6		285	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6		285	405	375		
		360	320		60,0		120	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		65	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,4		70	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		53,3		385	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385		510		
		450	400		93,3		230		290		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,7		85	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385	455	510		
		450	400		81,9		135	260	1200		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A ^{1) 2)}

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) ^{3) 4) 5) 6)}										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h_{min} [mm]	$h_{ef}^{7)}$ [mm]	T_{max} [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		73,2	50,9	475	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		73,2	80,6	475	675	630		
		540	480		134,3		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	56,8	475	445	630		
		540	480		94,3		105	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	70,9	475	580	630		
		540	480		117,6		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	120	120
		310	250		95,1	65,7	565	460	750		
		600	540		109,5		120	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		95,1	105,1	565	805	750		
		600	540		175,2		505	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	73,7	565	530	750		
		600	540		123,0		140	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	92,0	565	690	750		
		600	540		153,3		355	385	1620		
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		112,7	80,6	635	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		112,7	128,6	635	920	840		
		670	600		213,8		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	90,2	635	605	840		
		670	600		150,1		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	112,6	635	785	840		
		670	600		187,1		445	435	1800		

For the design the complete assessment ETA-12/0258 has to be considered. ¹⁰⁾

¹⁾ Also valid for anchor rod RGM in the same property class.

²⁾ Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

³⁾ The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of $\gamma_L = 1.4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

⁴⁾ The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

⁵⁾ For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

⁶⁾ Drill method hammer drilling.

⁷⁾ For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

⁸⁾ For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

⁹⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

¹⁰⁾ The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I ¹⁾

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) ^{2) 3) 4) 5) 9)}										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h_{min} [mm]	h_{ef} [mm]	T_{max} [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
RG M8 I	5.8	120	90	10	8,1	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M10 I	5.8	130	90	20	10,8	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	16,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	26,3	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	41,9	39,4	300	435	600	125	125
	8.8					51,4		595			
	A4-70					39,4		430			

For the design the complete assessment ETA-12/0258 has to be considered. ⁸⁾

¹⁾ Valid for injection mortar FIS SB. F or using the glass capsule RSB see separate table resp. ETA-12/0258.

²⁾ The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

³⁾ The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

⁴⁾ For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

⁵⁾ Drill method hammer drilling.

⁶⁾ For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

⁷⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

⁸⁾ The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

⁹⁾ A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$.

Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I ¹⁾

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) ^{2) 3) 4) 5)}										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h _{min} [mm]	h _{ef} [mm]	T _{max} [Nm]	N _{perm} ⁶⁾ [kN]	V _{perm} ⁶⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	39,4	365	285	600	125	125
	8.8				68,0	51,4	445	395			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-12/0258 has to be considered. ⁸⁾

¹⁾ Valid for injection mortar FIS SB. F or using the glass capsule RSB see separate table resp. ETA-12/0258.

²⁾ The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

³⁾ The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

⁴⁾ For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

⁵⁾ Drill method hammer drilling.

⁶⁾ For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

⁷⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

⁸⁾ The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).