Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M8	5.8	100	60	10	3,6	5,1	90	105	180	40	40
		110	80		4,8		100	100	240		
		190	160		9,0		90	90	480		
	8.8	100	60		3,6	7,2		155	180		
		110	80		4,8	8,6	100	170	240		
		190	160		9,6			115	480		
	A4-70	100	60		3,6	6,0	90	125	180		
		110	80		4,8		100	115	240		
		190	160		9,6			90	480		
FIS A M10	5.8	100	60	20	4,5	8,6	90	185	180	45	45
		120	90		6,7		115	160	270		
		230	200		13,8		105	125	600		
	8.8	100	60		4,5	9,0	90	190	180		
		120	90		6,7	13,1	115	250	270		
		230	200		15,0			150	600		
	A4-70	100	60		4,5	9,0	90	190	180		
		120	90		6,7	9,2	115	165	270		
		230	200		15,0			115	600		
FIS A M12	5.8	100	70	40	6,3	12,0	105	255	210	55	55
		140	110		9,9		140	200	330		
		270	240		20,5		130	150	720		
	8.8	100	70		6,3	12,6	105	270	210		
		140	110		9,9	19,4	140	340	330		
		270	240		21,5			200	720		
	A4-70	100	70		6,3	12,6	105	270	210		
		140	110		9,9	13,7	140	230	330		
		270	240		21,5			150	720		
FIS A M14	5.8	110	75	50	7,9	15,7	115	325	225	60	60
		160	120		12,6	16,6	155	265	360		
		320	280		27,6		145	185	840		
	8.8	110	75		7,9	15,7	115	325	225		
		160	120		12,6	25,1	155	420	360		
		320	280		29,3	26,3		250	840		
	A4-70	110	75		7,9	15,7	115	325	225		
		160	120		12,6	18,3	155	295	360		
		320	280		29,3			175	840		
FIS A M16	5.8	120	80	60	7,7	15,3	120	295	240	65	65
		170	125		12,0	22,3	175	350	375		
		360	320		30,6			225	960		
	8.8	120	80		7,7	15,3	120	295	240		
		170	125		12,0	23,9	175	380	375		
		360	320		30,6	36,0		320	960		
	A4-70	120	80		7,7	15,3	120	295	240		
		170	125		12,0	23,9	175	380	375		
		360	320		30,6	25,2		215	960		

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M20	5.8	140	90	120	10,8	21,5	135	375	270	85	85
		220	170		20,3	34,9	210	460	510		
		450	400		47,9			300	1200		
	8.8	140	90		10,8	21,5	135	375	270		
		220	170		20,3	40,7	210	540	510		
		450	400		47,9	56,0		435	1200		
	A4-70	140	90		10,8	21,5	135	375	270		
		220	170		20,3	39,4	210	520	510		
		450	400		47,9			285	1200		
FIS A M24	5.8	160	96	150	13,4	32,2	145	545	290	105	105
		270	210		31,4	50,9	250	600	630		
		540	480		71,8			395	1440		
	8.8	160	96		13,4	32,2	145	545	290		
		270	210		31,4	75,4	250	930	630		
		540	480		71,8	80,6		570	1440		
	A4-70	160	96		13,4	32,2	145	545	290		
		270	210		31,4	56,8	250	670	630		
		540	480		71,8			360	1440		
FIS A M27	5.8	170	108	200	16,0	38,5	165	610	325	120	120
		310	250		42,1	65,7	270	715	750		
		600	540		90,9			485	1620		
	8.8	170	108		16,0	38,5	165	610	325		
		310	250		42,1	101,0	270	1150	750		
		600	540		90,9	105,1		700	1620		
	A4-70	170	108		16,0	38,5	165	610	325		
		310	250		42,1	73,7	270	795	750		
		600	540		90,9			445	1620		
FIS A M30	5.8	190	120	300	18,8	45,1	180	665	360	140	140
		350	280		52,4	80,6	300	820	840		
		670	600		112,2		305	555	1800		
	8.8	190	120		18,8	45,1	180	665	360		
		350	280		52,4	125,7	300	1340	840		
		670	600		112,2	128,6	305	805	1800		
	A4-70	190	120		18,8	45,1	180	665	360		
		350	280		52,4	90,2	300	910	840		
		670	600		112,2		305	510	1800		

For the design the complete assessment ETA-15/0440 has to be considered. [8)]

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

[2)] The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of γ_L = 1,4 bare 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-15/0440.

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

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

[5)] 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.

[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-15/0440, issue date 06/07/2015. 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 $w_k \sim 0,3$ mm.

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
		110	80		9,0		80		240		
		190	160				40		480		
	8.8	100	60		7,9	8,6	90	130	180		
		110	80		10,5		100	115	240		
		190	160		13,8		50	90	480		
	A4-70	100	60		7,9	6,0	90	85	180		
		110	80		9,9			75	240		
		190	160				40	70	480		
FIS A M10	5.8	100	60	20	9,0	8,6	90	125	180	45	45
		120	90		13,5		115	105	270		
		230	200		13,8		45	95	600		
	8.8	100	60		9,0	13,1	90	200	180		
		120	90		13,5		115	170	270		
		230	200		22,4		80	115	600		
	A4-70	100	60		9,0	9,2	90	135	180		
		120	90		13,5		115	110	270		
		230	200		15,7		45	90	600		
FIS A M12	5.8	100	70	40	12,6	12,0	125	175	210	55	55
		140	110		19,7		155	135	330		
		270	240		20,5		55	120	720		
	8.8	100	70		12,6	19,4	125	295	210		
		140	110		19,7		155	230	330		
		270	240		32,4		95	150	720		
	A4-70	100	70		12,6	13,7	125	200	210		
		140	110		19,7		155	155	330		
		270	240		22,5		55	115	720		
FIS A M14	5.8	110	75	50	14,1	16,6	135	235	225	60	60
		160	120		22,6		170	180	360		
		320	280		27,6		60	145	840		
	8.8	110	75		14,1	26,3	135	390	225		
		160	120		22,6		170	300	360		
		320	280		43,8		120	180	840		
	A4-70	110	75		14,1	18,3	135	260	225		
		160	120		22,6		170	195	360		
		320	280		30,9		65	135	840		
FIS A M16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		26,9		210	235	375		
		360	320		37,6		65	175	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		26,9	36,0	210	405	375		
		360	320		60,0		150	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		26,9		210	270	375		
		360	320		42,0		80	165	960		

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		40,7		265	305	510		
		450	400		58,6		95	230	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		40,7	56,0	265		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		40,7		265	350	510		
		450	400		65,7		120	215	1200		
FIS A M24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		50,3	50,9	370	400	630		
		540	480		84,3		160	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		50,3	80,6	370	675	630		
		540	480		114,9		385	365	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		50,3	56,8	370	445	630		
		540	480		94,3		205	270	1440		
FIS A M27	5.8	170	108	200	22,5	54,0	195	605	325	120	120
		310	250		63,1	65,7	415	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		63,1	105,1	415	805	750		
		600	540		136,3		425	450	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		63,1	73,7	415	530	750		
		600	540		123,0		315	320	1620		
FIS A M30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		78,5	80,6	500	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		78,5	128,6	500	920	840		
		670	600		168,3		540	515	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		78,5	90,2	500	605	840		
		670	600		150,1		400	365	1800		

For the design the complete assessment ETA-15/0440 has to be considered. [8)]

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

[2)] The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of γ_L = 1,4 bare 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-15/0440.

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

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

[5)] 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.

[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-15/0440, issue date 06/07/2015. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).