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

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 5) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [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} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 10	5.8	100	60	20	5,4	8,6	90	185	180	45	45
		120	90		8,1		125	155	270		
		230	200		13,8		85	110	600		
	8.8	100	60		5,4	10,8	90	235	180		
		120	90		8,1	13,3	125	255	270		
		230	200		18,0			150	600		
	A4-70	100	60		5,4	9,3	90	200	180		
		120	90		8,1		125	170	270		
		230	200		15,5		100	115	600		
	C-70	100	60		5,4	10,8	90	235	180		
		120	90		8,1	11,6	125	220	270		
		230	200		18,0			140	600		
FIS A M 12	5.8	100	70	40	7,5	12,0	105	255	210	55	55
		140	110		11,8		145	195	330		
		270	240		20,5		110	135	720		
	8.8	100	70		7,5	15,1	105	330	210		
		140	110		11,8	19,3	145	340	330		
		270	240		25,9			200	720		
	A4-70	100	70		7,5	13,5	105	290	210		
		140	110		11,8		145	225	330		
		270	240		22,5		125	145	720		
	C-70	100	70		7,5	15,1	105	330	210		
		140	110		11,8	16,9	145	290	330		
		270	240		25,9			175	720		
FIS A M 16	5.8	120	80	60	11,5	22,3	120	445	240	65	65
		170	125		18,0		185	350	375		
		360	320		37,6		145	195	960		
	8.8	120	80		11,5	23,0	120	460	240		
		170	125		18,0	35,9	185	600	375		
		360	320		46,0			320	960		
	A4-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0	25,2	185	400	375		
		360	320		42,0		165	215	960		
	C-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0	31,4	185	515	375		
		360	320		46,0			270	960		
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		28,0	34,9	225	455	510		
		450	400		58,6		195	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		28,0	56,0	225	780	510		
		450	400		65,8			435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0	39,3	225	520	510		
		450	400		65,5			285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0	49,0	225	670	510		
		450	400		65,8			370	1200		

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

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 5) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [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} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 24	5.8	160	96	150	15,5	31,0	145	520	290	105	105
		270	210		33,9	50,9	265	590	630		
		540	480		77,6			330	1440		
	8.8	160	96		15,5	31,0	145	520	290		
		270	210		33,9	67,9	265	825	630		
		540	480		77,6	80,7		570	1440		
	A4-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9	56,6	265	670	630		
		540	480		77,6			360	1440		
	C-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9	67,9	265	825	630		
		540	480		77,6	70,6		480	1440		
FIS A M 27	5.8	170	108	200	17,4	34,9	165	545	325	125	125
		310	250		40,4	65,7	290	695	750		
		600	540		87,2			390	1620		
	8.8	170	108		17,4	34,9	165	545	325		
		310	250		40,4	80,8	290	885	750		
		600	540		87,2	104,9		700	1620		
	A4-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4	73,6	290	795	750		
		600	540		87,2			440	1620		
	C-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4	80,8	290	885	750		
		600	540		87,2	91,8		590	1620		
FIS A M 30	5.8	190	120	300	21,5	43,1	180	630	360	140	140
		350	280		50,3	80,6	320	795	840		
		670	600		107,7			440	1800		
	8.8	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	128,2		805	1800		
	A4-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	89,9	320	905	840		
		670	600		107,7			505	1800		
	C-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	112,2		675	1800		

For the design the complete assessment ETA-02/0024 has to be considered. [10)]

[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-02/0024 as well as a partial safety factor for load actions of γ_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-02/0024.

[3)] The given loads are valid for injection mortar FIS V 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-02/0024.

[4)] For higher concrete strength classes up t o C50/60 higher per missible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[6)] For the sizes M10 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[10)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. 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.

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

zinc plated steel / stainless steel / high corrosion resistant steel

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	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [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} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 6	5.8	100	50	5	4,0	2,9	65	50	150	40	40
			60		4,8				180		
		110	72				50	45	220		
	8.8	100	50		4,0	4,6	65	70	150		
			60		4,8			65	180		
		110	72		5,8				220		
	A4-70	100	50		4,0	3,2		55	150		
			60		4,8			50	180		
		110	72		5,4		60		220		
FIS A M 8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
		110	80		9,0		80		240		
		190	160				40	60	480		
	8.8	100	60		7,9	8,4	90	125	180		
		110	80		10,5		100	115	240		
		190	160		13,9		55	90	480		
	A4-70	100	60		7,9	5,9	90	85	180		
		110	80		9,8			75	240		
		190	160				40	70	480		
	C-70	100	60		7,9	7,3	90	105	180		
		110	80		10,5		100	95	240		
		190	160		12,2		40	80	480		
FIS A M 10	5.8	100	60	20	9,9	8,6	90	125	180	45	45
		120	90		13,8		115	105	270		
		230	200				45	85	600		
	8.8	100	60		9,9	13,3	90	200	180		
		120	90		14,8		125	170	270		
		230	200		22,1		70	115	600		
	A4-70	100	60		9,9	9,3	90	135	180		
		120	90		14,8		125	115	270		
		230	200		15,5		45	90	600		
	C-70	100	60		9,9	11,6	90	175	180		
		120	90		14,8		125	150	270		
		230	200		19,3		55	105	600		
FIS A M 12	5.8	100	70	40	13,8	12,0	140	175	210	55	55
		140	110		20,5		165	130	330		
		270	240				55	100	720		
	8.8	100	70		13,8	19,3	140	295	210		
		140	110		21,7		180	230	330		
		270	240		32,1		85	150	720		
	A4-70	100	70		13,8	13,5	140	200	210		
		140	110		21,7		180	150	330		
		270	240		22,5		55	110	720		
	C-70	100	70		13,8	16,9	140	255	210		
		140	110		21,7		180	195	330		
		270	240		28,1		65	135	720		

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

zinc plated steel / stainless steel / high corrosion resistant steel

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	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [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} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		29,9		245	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		29,9	35,9	245	405	375		
		360	320		59,8		135	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		29,9		245	270	375		
		360	320		42,0		70	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		29,9		245	350	375		
		360	320		52,3		105	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		48,3		340	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		48,3	56,0	340		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,3	170	500	270		
		220	170		48,3		340	345	510		
		450	400		65,5		95	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		48,3	49,0	340	450	510		
		450	400		81,7		140	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		67,9	50,9	435	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		67,9	80,7	435	675	630		
		540	480		134,5		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9	56,6	435	445	630		
		540	480		94,4		120	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9	70,6	435	580	630		
		540	480		117,7		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	125	125
		310	250		85,8	65,7	495	460	750		
		600	540		109,5		125	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		85,8	104,9	495	805	750		
		600	540		174,9		500	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8	73,6	495	530	750		
		600	540		122,7		155	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8	91,8	495	690	750		
		600	540		153,0		355	385	1620		

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

zinc plated steel / stainless steel / high corrosion resistant steel

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	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [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} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		106,8	80,6	595	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		106,8	128,2	595	920	840		
		670	600		213,7		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	89,9	595	600	840		
		670	600		150,0		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	112,2	595	785	840		
		670	600		187,0		445	435	1800		

For the design the complete assessment ETA-02/0024 has to be considered. [10)]

[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-02/0024 as well as a partial safety factor for load actions of γ_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-02/0024.

[3)] The given loads are valid for injection mortar FIS V 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-02/0024.

[4)] For higher concrete strength classes up t o C50/60 higher per missible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[6)] For the sizes M6 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[10)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

Injection system FIS V: Injection mortar FIS V with Internal threaded anchor RG M I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [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} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
RG M 8 I	5.8	120	90	10	9,0	5,3	70	65	270	55	55
	8.8				13,8	8,3	130	95			
	A4-70				9,9	5,9	80	70			
RG M 10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				19,0	13,3	175	155			
	A4-70				15,7	9,3	130	100			
RG M 12 I	5.8	170	125	40	20,5	12,1	155	110	375	75	75
	8.8				23,8	19,3	190	190			
	A4-70				22,5	13,5	175	125			
RG M 16 I	5.8	210	160	80	35,7	22,4	240	180	480	95	95
	8.8					35,8		320			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	54,8	35,4	335	245	600	125	125
	8.8					42,9		315			
	A4-70					39,4		285			

For the design the complete assessment ETA-02/0024 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-02/0024 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-02/0024.

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

[3)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[7)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS V with threaded rod FIS A [4]

Highest permissible loads[1] [5] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type	Compressive brick strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6] (L x W x H) [mm]	Min. effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance [2] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M6	≥ 10	≥ 1,8	240x115x71 (NF)	50	115	4	1,14	0,71	240	75	240 / 75	100
M8				50		10	1,14	0,71				100
M10				50		10	1,00	1,14				100
M10				80		10	1,43	1,14				100
M10				200		10	3,42	2,43				150
M12				50		10	0,86	1,14				100
M12				80		10	1,57	1,14				100
M12				200		10	2,29	3,29				150
M6	≥ 20			50		4	1,57	1,14				100
M8				50		10	1,57	1,14				100
M10				50		10	1,43	1,71				100
M10				80		10	2,00	1,71				100
M10				200		10	3,42	3,43				150
M12				50		10	1,29	1,57				100
M12				80		10	2,29	1,57				100
M12				200		10	3,29	3,43				150
Solid brick Mz, 2DF acc. to EN 771-1												
M6	≥ 10	≥ 1,8	240x115x113 (2DF)	50	115	4	0,86	0,71	240	115	120 / 115	60
M8				50		10	0,86	0,86				
M10				100		10	1,29	1,00				
M12				100		10	1,57	1,00				
M16				100		10	1,57	0,86				
M6	≥ 16			50		4	1,29	1,14				
M8				50		10	1,29	1,43				
M10				100		10	2,14	1,57				
M12				100		10	2,29	1,57				
M16				100		10	2,29	1,43				
Solid sand-lime brick KS acc. to EN 771												
M6	≥ 10	≥ 2,0	250x240x240	50	240	4	1,43	0,71	250	240	80 / 80	60
M8						10	2,00	1,29				
M10						10	2,00	1,29				
M12						10	2,00	1,29				
M16						10	1,57	1,29				
M6	≥ 20					4	2,14	1,14				
M8						10	2,57	1,86				
M10						10	2,57	1,86				
M12						10	2,57	1,86				
M16						10	2,14	1,86				
M6	≥ 28					4	2,43	1,43				
M8						10	2,57	2,57				
M10						10	2,57	2,57				
M12						10	2,57	2,57				
M16						10	2,57	2,57				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[5] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[6] Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1] [6] for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with anchor rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6] (L x W x H) [mm]	Min. effective anchorage depth[4] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr}\parallel$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr}\perp$ [mm]	Min. spacing [2] $s_{min}\parallel$ / $s_{min}\perp$ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, 2DF acc. to EN 771-1												
16x85 M8	≥ 10	≥ 1,8	240x115x113 (2DF)	85	115	10	0,86	0,86	240	115	120 / 115	60
16x85 M10							0,86	1,00				
16x85 M8	≥ 16						1,29	1,43				
16x85 M10							1,29	1,57				
Solid sand-lime brick KS acc. to EN 771												
16x85 M8/M10	≥ 10	≥ 2,0	250x240x240	85	240	10	2,29	1,29	250	240	80 / 80	60
16x85 M8/M10	≥ 20						2,57	1,86				
16x85 M8/M10	≥ 28						2,57	2,57				
Lightweight concrete block Vbl acc. to EN 771-3												
12x85 M6	≥ 4	≥ 1,6	250x240x239	85	240	4	1,00	0,57	250	250	250 / 250	130
12x50 M8				50			0,57	0,86				
12x85 M8				85			1,00	0,86				
16x85 M10				85			1,14	1,00				
20x85 M12				85			1,43	1,29				
12x85 M6	≥ 6			85			1,43	0,86				
12x50 M8				50			0,86	1,29				
12x85 M8				85			1,43	1,29				
16x85 M8 / M10				85			1,86	1,57				
20x85 M12 / M16				85			2,14	1,86				
12x85 M6	≥ 8			85			2,00	1,14				
12x50 M8				50			1,14	1,71				
12x85 M8				85			2,00	1,71				
16x85 M8 / M10				85			2,43	2,00				
20x85 M12 / M16				85			2,57	2,43				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

[5] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[6] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[7] Hole patterns see assessment.

Injection system FIS V with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with anchor rod	Compressive brick strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions[7)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr}\parallel$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr}\perp$ [mm]	Min. spacing[2)] $s_{min}\parallel$ / $s_{min}\perp$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, shape B acc. to EN 771-1												
12x50 M6/M8	≥ 4	≥ 1,0	500x175x237 or 370x240x237	50	175	2,0	0,11	0,14	500 resp. 370	240	100 / 100	100
16x85 M8/M10	≥ 4			85			0,26	0,14				
20x130 M12/M16	≥ 4			130			0,34	0,17				
12x50 M6/M8	≥ 8			50			0,21	0,26				
16x85 M8/M10	≥ 8			85			0,57	0,26				
20x130 M12/M16	≥ 8			130			0,71	0,34				
12x50 M6/M8	≥ 12			50			0,34	0,43				
16x85 M8/M10	≥ 12			85			0,86	0,43				
20x130 M12/M16	≥ 12			130			1,14	0,57				
Vertically perforated brick Hlz, acc. to EN 771-1												
12x50 M6	≥ 6	≥ 1,4	240x115x113 (2DF)	50	115	2,0	0,21	0,34	240	115	240 / 115	80
12x85 M8	≥ 6			85			0,34	0,57				
16x85 M8/M10	≥ 6			85			0,21	0,43				
20x85 M12/M16	≥ 6			85			0,26	0,71				
12x50 M6	≥ 16			50			0,57	0,86				
12x85 M8	≥ 16			85			0,86	1,57				
16x85 M8/M10	≥ 16			85			0,57	1,00				
20x85 M12/M16	≥ 16			85			0,71	1,57				
12x50 M6	≥ 28			50			1,00	1,43				
12x85 M8	≥ 28			85			1,57	1,57				
16x85 M8/M10	≥ 28			85			1,00	1,57				
20x85 M12/M16	≥ 28			85			1,29	1,57				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x50 M6/M8	≥ 12	≥ 1,4	240x175x113	50	175	2,0	0,71	0,71	240	115	100 / 115	60
16x85 M8/M10	≥ 12			85			0,86	1,29				80
20x85 M12	≥ 12			85			1,00	1,29				
12x50 M6/M8	≥ 20			50			1,29	1,14				60
16x85 M8/M10	≥ 20			85			1,43	2,14				80
20x85 M12	≥ 20			85			1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x50 M6/M8	≥ 2	≥ 1,0	362x240x240	50	240	2,0	0,34	0,26	362	240	100 / 240	60
16x85 M8/M10	≥ 2			85			0,43	0,26				
20x200 M12/M16	≥ 2			180			0,71	0,26				
12x50 M6/M8	≥ 4			50			0,71	0,57				
16x85 M8/M10	≥ 4			85			0,86	0,57				
20x200 M12/M16	≥ 4			180			1,57	0,57				

1) The required partial safety factors for material resistance as well as a par tial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[5] and push-through anchor sleeve FIS H..K

Highest permissible loads[1] [6] for a single anchor in perforated brick masonry (with push-through anchor sleeve) for push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with anchor rod	Compressive brick strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [7] (L x W x H) [mm]	Min. effevtive anchorage depth[4] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr}\parallel$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr}\perp$ [mm]	Min. spacing [2] $s_{min}\parallel$ / $s_{min}\perp$ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, shape B acc. to EN 771-1												
18x130/200 M10/M12	≥ 4	≥ 0,7	500x200x300	130	200	2	0,34	0,17	500	300	100 / 300	80
22x130/200 M16	≥ 4						0,43	0,17				
18x130/200 M10/M12	≥ 6						0,57	0,26				
22x130/200 M16	≥ 6						0,71	0,26				
18x130/200 M10/M12	≥ 8						0,71	0,34				
22x130/200 M16	≥ 8						0,86	0,34				
18x130/200 M10/M12	≥ 10						0,86	0,43				
22x130/200 M16	≥ 10						1,14	0,43				
Perforated sand-lime brick KSL acc. to EN 771-2												
18x130/200 M10/M12	≥ 8	≥ 1,4	240x175x113	130	175	2	0,71	0,86	240	115	100 / 115	80
22x130/200 M16	≥ 8						0,71	0,71				
18x130/200 M10/M12	≥ 12						1,00	1,29				
22x130/200 M16	≥ 12						1,00	1,14				
18x130/200 M10/M12	≥ 16						1,29	1,71				
22x130/200 M16	≥ 16						1,29	1,57				
18x130/200 M10/M12	≥ 20						1,71	1,71				
22x130/200 M16	≥ 20						1,71	1,71				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
18x130/200 M10/M12	≥ 2	≥ 1,0	362x240x240	130	240	2	0,43	0,26	365	240	100 / 240	60
and 22x130/200 M16	≥ 4						0,86	0,57				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] The maximum anchorage depth is corresponding with the relevant push-through anchor sleeves FIS H18.. K and FIS H22.. K (see technical data).

[5] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[6] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[7] Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[4)]

Highest permissible loads[1) 5)] for a single anchor in aerated concrete.
For the design the complete assessment ETA-10/0383 has to be considered.

Type anchor rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8[6)]	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100
M10[6)]						2	0,54	0,43				
M12[6)]						2	0,71	0,54				
M16[6)]						2	0,71	0,43				
M8[6)]	≥ 4	≥ 0,50				1	0,71	0,89				
M10[6)]						2	1,07	0,71				
M12[6)]						2	0,89	0,89				
M16[6)]						2	0,71	0,71				
M8[6)]	≥ 6	≥ 0,65				1	1,25	1,07				
M10[6)]						2	1,79	1,07				
M12[6)]						2	1,79	1,25				
M16[6)]						2	1,07	1,61				
M8, M10, M12[7)]	≥ 2	≥ 0,35		75	105	2	0,71	0,89	240	240	240	120
M8, M10, M12[7)]	≥ 4	≥ 0,50					1,07	1,61				
M8, M10, M12[7)]	≥ 6	≥ 0,65					1,43	2,14				
M8, M10, M12[7)]	≥ 2	≥ 0,35		95	125		0,89	0,89	300	250	300 / 250	150
M8, M10, M12[7)]	≥ 4	≥ 0,50					1,25	1,61				
M8, M10, M12[7)]	≥ 6	≥ 0,65					1,61	2,14				

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.

[2)] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4)] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[5)] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[6)] Cylindrical drill hole. Pre-positioned and push-through installation possible.

[7)] Drill hole to be made with cone drill bit PBB. Pre-positioned installation only.