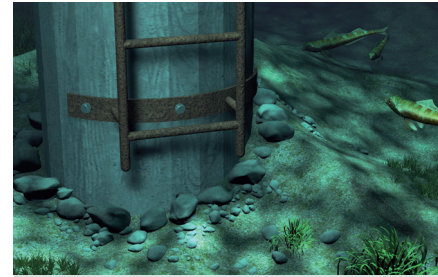


The powerful injection mortar for rebar connections and cracked concrete

3
Chemical fixings



Rail fastenings



Underwater applications

BUILDING MATERIALS

Approved for anchorings in:

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

Also suitable for:

- Natural stone with dense structure

CERTIFICATES

  ETA-10/0012 ETAG 001-5 Option 1 for cracked concrete seismic performance category C1, C2	  ETA-09/0089 ETAG 001-5 Post-installed rebar connection (TR23)
 ESR-1990 See ICC-ES Evaluation Report at www.icc-es.org	 Mit allgemeiner bauaufsichtlicher Zulassung Institut für Massivbau Technische Universität Darmstadt
 Fire resistance classification R 120 Anchor types see test report	 SEISMIC

ADVANTAGES

- High bond strengths and minor mortar shrinkage allow maximum load application in cracked and non-cracked concrete, even with large threaded rod diameters of up to M30.
- Variable anchorage depths from 4x to 20x the threaded rod diameter allow for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- FIS EM is also approved for diamond-drilled and water-filled drill holes, thus ensuring more flexibility on the construction site.
- The Epoxy mortar FIS EM is approved for seismic applications C1, C2, which ensures safety even under extreme conditions.

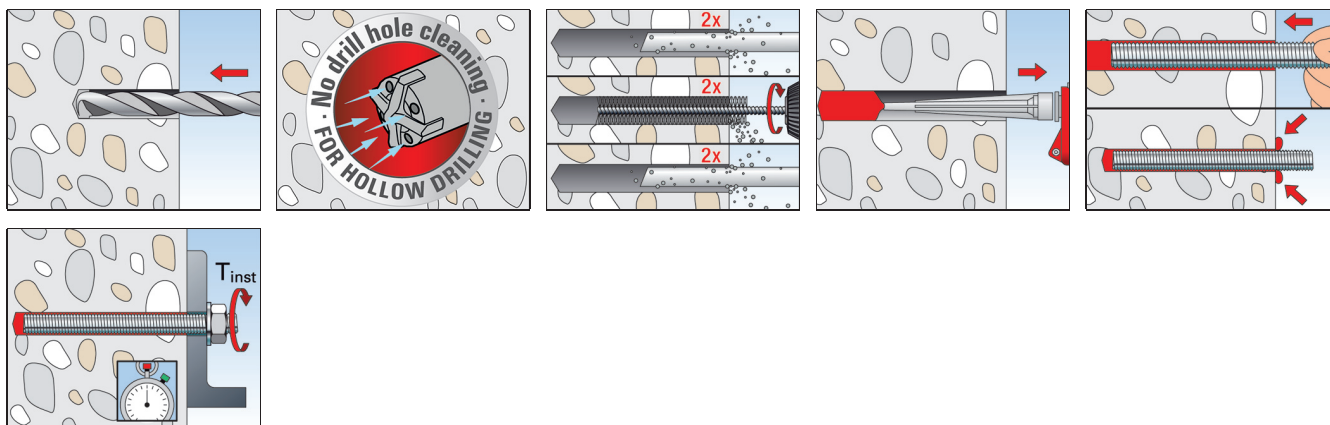
APPLICATIONS

- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Jointers for concrete layers
- Rim beam anchorings
- Anchorings in diamond-drilled drill holes
- Fixings in waterfilled drill holes
- Seismic applications

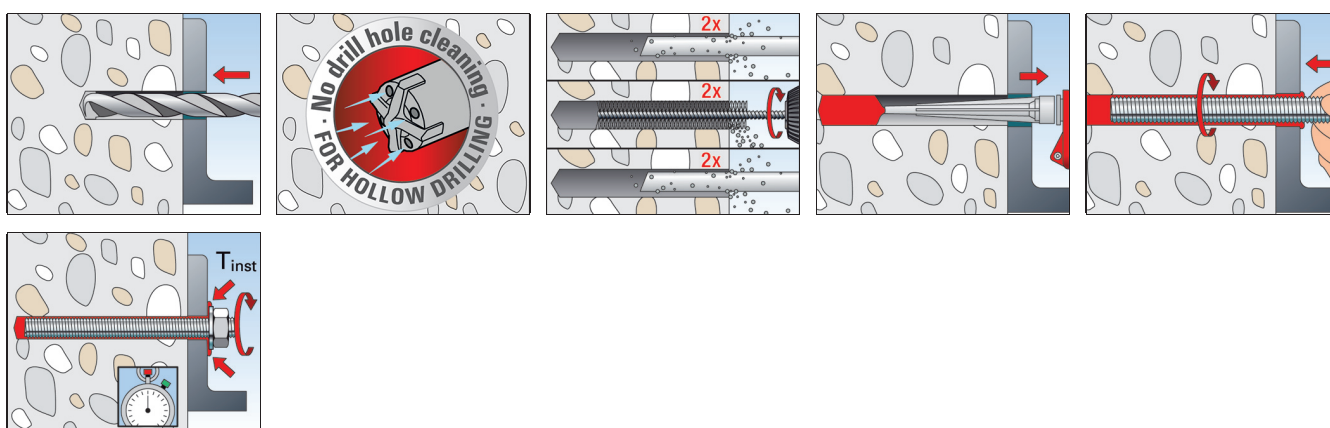
FUNCTIONING

- The injection system, comprising the epoxy resin mortar FIS EM combined with the FIS A or RG M threaded rod, is suitable 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 FIS EM.

PRE-POSITIONED INSTALLATION



PUSH-THROUGH INSTALLATION



TECHNICAL DATA



Epoxy mortar **FIS EM 390 S**



Epoxy mortar **FIS EM 390 S**



Epoxy mortar **FIS EM 1500 S**



Static mixer **FIS MR**

Item	Art.-No.	Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
		ETA	ICC				
FIS EM 390 S	093048	■	▲	D, GB, F, NL, E, P	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS EM 390 S	093049	■	▲	GB, CZ, PL, GR, PRC, ROK	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS EM 390 S	502289	■	▲	LT, LV, EE, UA, RUS, KZ	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS EM 390 S	533268	■	▲	CZ, SK, RO, UAE, F, GB	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS EM 585 S	508831	■	▲	D, GB, F, NL, E, P	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS EM 585 S	509266	■	▲	GB, PRC, RU, ROK, CZ, PL	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS EM 585 S	535514	■	▲	GB, PRC, RU, ROK, CZ, PL	270	1 cartridge 585 ml, 1 x FIS UMR, 1 x extension tube Ø 9x250 mm	6
FIS EM 1500 S	512080	■	▲	D, NL, I, F, CZ, SK	700	1 cartridge 1500 ml, 2 x FIS UMR	4
FIS EM 1500 S	523941	■	▲	GB, E, P, PRC, RU, PL	700	1 cartridge 1500 ml, 2 x FIS UMR	4
FIS MR	096448	-	-	-	-	10 static mixer	10
FIS UMR	520593	-	-	-	-	10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10



FIS EM 390 S HWK big



FIS EM 390 S in bucket

Item	Art.-No.	Approval		Languages on the cartridge	Contents	Sales unit
		ETA	ICC			
FIS EM 390 S HWK big	040038	■	▲	GB, CZ, PL, GR, PRC, ROK	20 cartridges 390 ml, 20 x FIS MR	1
FIS EM 390 S in bucket	521246	■	▲	D, GB, F, NL, E, P	20 cartridges 390 ml, 20 x FIS MR	1
FIS EM 585 S HWK big	518854	■	▲	GB, E, P	12 cartridge 585 ml, 12 x FIS UMR	1

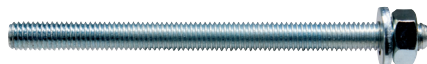
CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
+ 5°C - +10°C	2 hrs.	+ 5°C - +10°C	40 hrs.
+10°C - +20°C	30 min.	+10°C - +20°C	18 hrs.
+20°C - +30°C	14 min.	+20°C - +30°C	10 hrs.
+30°C - +40°C	7 min.	+30°C - +40°C	5 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

TECHNICAL DATA

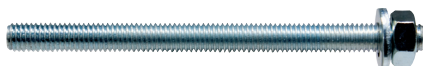


Threaded rod FIS A

Item	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	Approval		Drill hole diame- ter FIS EM [mm]	Min. / max. anchorage depth [mm]	Min. / max. usable length [mm]	Min. / max. filling quantity FIS EM [scale units]	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC					[pcs]
FIS A M 8 x 90	090274	519390	090440	■	▲	12	60 / 78	1 / 19	2 / 3	10
FIS A M 8 x 110	090275	519391	090441	■	▲	12	60 / 98	1 / 39	2 / 3	10
FIS A M 8 x 130	090276	519392	090442	■	▲	12	60 / 118	1 / 59	2 / 4	10
FIS A M 8 x 175	090277	519393	090443	■	▲	12	60 / 160	4 / 104	2 / 5	10
FIS A M 8 x 1000	509214 1)	—	509230 1)	■	▲	12	60 / 160	—	2 / 5	10
FIS A M 10 x 110	090278	—	090444	■	▲	14	60 / 96	1 / 37	3 / 4	10
FIS A M 10 x 130	090279	—	090447	■	▲	14	60 / 116	1 / 57	3 / 5	10
FIS A M 10 x 130	—	524170	—	■	▲	14	60 / 116	1 / 57	3 / 5	10
FIS A M 10 x 150	090281	517935	090448	■	▲	14	60 / 136	1 / 77	3 / 5	10
FIS A M 10 x 170	044969	519395	044973	■	▲	14	60 / 156	1 / 97	3 / 6	10
FIS A M 10 x 190	—	517936	—	■	▲	14	60 / 176	1 / 117	3 / 7	10
FIS A M 10 x 200	090282	519396	090449	■	▲	14	60 / 186	1 / 127	3 / 7	10
FIS A M 10 x 1000	509215 1)	509223 1)	509231 1)	■	▲	14	60 / 200	—	3 / 7	10
FIS A M 12 x 120	044971	519397	044974	■	▲	14	70 / 103	1 / 34	3 / 5	10
FIS A M 12 x 140	090283	519398	090450	■	▲	14	70 / 123	1 / 54	3 / 6	10
FIS A M 12 x 160	090284	517937	090451	■	▲	14	70 / 143	1 / 74	3 / 7	10
FIS A M 12 x 180	090285	519399	090452	■	▲	14	70 / 163	1 / 94	3 / 7	10
FIS A M 12 x 200	—	517938	519421	■	▲	14	70 / 183	1 / 114	3 / 8	10
FIS A M 12 x 210	090286	—	090453	■	▲	14	70 / 193	1 / 124	3 / 9	10
FIS A M 12 x 260	090287	—	090454	■	▲	14	70 / 240	4 / 174	3 / 10	10
FIS A M 12 x 1000	509216 1)	509224 1)	509232 1)	■	▲	14	70 / 240	—	3 / 10	10
FIS A M 16 x 130	044972	519400	044975	■	▲	18	80 / 109	1 / 30	5 / 7	10

1) Order washer and nut separately.

TECHNICAL DATA



Threaded rod FIS A

Item	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	Approval		Drill hole diameter FIS EM d_0 [mm]	Min. / max. anchorage depth [mm]	Min. / max. usable length [mm]	Min. / max. filling quantity FIS EM [scale units]	Sales unit [pcs]
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC					
	gvz	gvz	A4							
FIS A M 16 x 175	090288	519401	090455	■	▲	18	80 / 154	1 / 75	5 / 10	10
FIS A M 16 x 200	090289	517939	090456	■	▲	18	80 / 179	1 / 100	5 / 11	10
FIS A M 16 x 250	090290	517940	090457	■	▲	18	80 / 229	1 / 150	5 / 14	10
FIS A M 16 x 300	090291	519402	090458	■	▲	18	80 / 279	1 / 200	5 / 17	10
FIS A M 16 x 1000	509217 ¹⁾	509225 ¹⁾	509233 ¹⁾	■	▲	18	80 / 320	–	5 / 19	10
FIS A M 20 x 245	090292	519404	090459	■	▲	24	90 / 220	1 / 131	11 / 28	10
FIS A M 20 x 290	090293	519406	090460	■	▲	24	90 / 265	1 / 176	11 / 32	10
FIS A M 20 x 1000	–	519410 ¹⁾	519427 ¹⁾	■	▲	24	90 / 400	–	11 / 48	10
FIS A M 24 x 290	090294	–	090461	■	▲	28	96 / 260	1 / 165	15 / 39	5
FIS A M 24 x 380	090295	–	090462	■	▲	28	96 / 350	1 / 255	15 / 52	5
FIS A M 24 x 1000	533881	–	–	■	▲	28	96 / 480	–	15 / 69	10
FIS A M 30 x 430	090297	–	090464	■	▲	35	120 / 394	1 / 275	28 / 88	5

1) Order washer and nut separately.

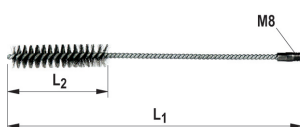
TECHNICAL DATA



Hexagonal nut and washer

Item	zinc plated, steel grade 8.8	stainless steel	Width across nut \circ SW [mm]	Washer (outer diameter x thickness) [mm]	Match	Sales unit [pcs]
	Art.-No.	Art.-No.				
	gvz	A4				
Nut & washer M8	510509	510513	13	16 x 1,6	FIS A M8	50
Nut & washer M10	510510	510514	17	20 x 2	FIS A M10	50
Nut & washer M12	510511	510515	19	24 x 2,5	FIS A M12	25
Nut & washer M16	510512	510516	24	30 x 3	FIS A M16	20
Nut & washer M20	519737	519738	30	37 x 3	FIS A M20	10

ACCESSORIES DRILL HOLE CLEANING



Cleaning brush BS

Item	Art.-No.	Length L ₁	Length L ₂	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
		[mm]	[mm]			
BS \varnothing 12	078179	150	80	13	12	1
BS \varnothing 14	078180	250	80	16	14	1
BS \varnothing 16/18	078181	250	80	20	16/18	1
BS \varnothing 24	078182	300	100	26	24	1
BS \varnothing 25	097806	300	100	27	25	1
BS \varnothing 28	078183	350	100	30	28	1
BS \varnothing 35	078184	400	100	40	30/32/35	1



Cleaning brush with thread M 8



SDS-Adapter M8

Item	Art.-No.	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
BSB for drill-Ø 40 mm	505061	42	40	1
BSB for drill-Ø 45 mm	506254	47	45	1
BSB for drill-Ø 55 mm	505062	58	55	1
FIS brush extension	508791	–	–	1
SDS Chuck	530332	–	–	1



Compressed-air cleaning tool **ABP**

Item	Art.-No.	Match	Sales unit [pcs]
Compressed-air cleaning tool ABP	059456	FIS A M 16 - M 30	1

DISPENSER



Dispenser **FIS DM S**



Dispenser **FIS AM**



Cordless dispenser **FIS DC S**

Item	Art.-No.	Adapted for	Performance data	Sales unit [pcs]
FIS DM S	511118	FIS V 360 S, FIS HB 345 S, FIS HB 150 C, FIS EM 390 S, FIS VS 150 C, FIS P 360 S, FIS P 300 T, FIS SB 390 S, FIS PM 360 S, FIS VL 300 T and 1K-cartridges	–	1
FIS AM	058000	FIS V 360 S, FIS HB 345 S, FIS HB 150 C, FIS EM 390 S, FIS VS 150 C, FIS VW 360 S, FIS P 360 S, FIS P 300 T, FIS SB 390 S, FIS PM 360 S, FIS VL 300 T and 1K-cartridges	–	1
FIS DC S	513423	FIS V 360 S, FIS HB 345 S, FIS EM 390 S, FIS VS 300 T, FIS P 300 T, FIS SB 390 S, FIS PM 360 S, FIS VL 300 T and 1K-cartridges	Feed speed can be set from 120 - 240 mm/min Content: 1 dispenser 1 battery pack 10,8 V // 1,5 Ah // Li-ION 1 charger 10,8 V // 230 V with Euro plug	1
Battery Pack	513425	FIS DC S	Battery pack 10,8 V // 1,5 Ah // Li-ION	1

Chemical fixings 3



Pneumatic dispenser **FIS AP**



Dispenser **FIS DM S-L**



Dispenser **FIS DP S-L**

Item	Art.-No.	Adapted for	Performance data	Sales unit [pcs]
FIS AP	058027	FIS V 360 S, FIS HB 345 S, FIS HB 150 C, FIS EM 390 S, FIS VS 150 C, FIS VW 360 S, FIS P 360 S, FIS P 300 T, FIS SB 390 S, FIS PM 360 S, FIS VL 300 T and 1K-cartridges	Recommended pressure 6 bar air consumption max. 40 l/min	1
FIS DM S-L	510992	FIS EM 585 S / FIS SB 585 S	–	1
FIS DP S-L	511125	FIS EM 585 S / FIS SB 585 S	Recommended pressure 6 bar	1



Pneumatic dispenser **FIS DP S-XL**

Item	Art.-No.	Adapted for	Performance data	Sales unit [pcs]
FIS DP S-XL	512401	FIS SB 1500 S, FIS EM 1500 S	Recommended pressure 6 bar air consumption max. 40 l/min	1

ACCESSORIES



Injection adapter
for drill Ø 12 - 25 mm



Injection adapter
for drill Ø 30 - 55 mm

 Extension tube

Item	Art.-No.	Colour	Length [mm]	Sales unit [pcs]
Injection-adapter (Ø 9) for drill-Ø 12 mm	001497	ecru	-	10
Injection-adapter (Ø 9) for drill-Ø 14 mm	001498	blue	-	10
Injection-adapter (Ø 9) for drill-Ø 16 mm	001499	red	-	10
Injection-adapter (Ø 9) for drill-Ø 18 mm	001483	yellow	-	10
Injection-adapter (Ø 9) for drill-Ø 24 mm	520944	transparent	-	10
Injection-adapter (Ø 15) for drill-Ø 24 mm	520945	transparent	-	10
Injection-adapter (Ø 9) for drill-Ø 25 mm	001507	black	-	10
Injection-adapter (Ø 15) for drill-Ø 25 mm	001509	black	-	10
Injection-adapter (Ø 9) for drill-Ø 28 mm	520946	transparent	-	10
Injection-adapter (Ø 15) for drill-Ø 28 mm	520947	transparent	-	10
Injection-adapter (Ø 9) for drill-Ø 30 mm	090689	grey	-	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	090700	grey	-	10
Injection-adapter (Ø 9) for drill-Ø 35 mm	090699	brown	-	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	090701	brown	-	10
FIS Extension tube	048983	-	1000	10
FIS EXT Ø 15	530800	transparent	10000	1

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ^{2) 3) 4) 9)}										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} ⁵⁾ [mm]	T _{max} [Nm]	N _{perm} ⁶⁾ [kN]	V _{perm} ⁶⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 8	5.8	100	60	10	5,0	5,1	90	105	180	40	40
		110	80		6,7		115	100	240		
		190	160		9,0		65	90	480		
	8.8	100	60		5,0	8,4	90	180	180		
		110	80		6,7		115	170	240		
		190	160		13,4		125	480			
	A4-70	100	60		5,0	5,9	90	180	180		
		110	80		6,7		115	115	240		
		190	160		9,8		75	100	480		
	C-70	100	60		5,0	7,3	90	155	180		
		110	80		6,7		115	150	240		
		190	160		12,2		100	115	480		
FIS A M 10	5.8	100	60	20	6,3	8,6	90	185	180	45	45
		120	90		9,4		135	160	270		
		230	200		13,8		75	125	600		
	8.8	100	60		6,3	12,6	90	280	180		
		120	90		9,4		135	260	270		
		230	200		20,9		140	180	600		
	A4-70	100	60		6,3	9,3	90	200	180		
		120	90		9,4		135	175	270		
		230	200		15,5		90	130	600		
	C-70	100	60		6,3	11,6	90	255	180		
		120	90		9,4		135	220	270		
		230	200		19,3		125	155	600		
FIS A M 12	5.8	100	70	40	8,8	12,0	105	255	210	55	55
		140	110		13,8		165	200	330		
		270	240		20,5		95	150	720		
	8.8	100	70		8,8	17,6	105	390	210		
		140	110		13,8		165	345	330		
		270	240		30,2		235	720			
	A4-70	100	70		8,8	13,5	105	290	210		
		140	110		13,8		165	230	330		
		270	240		22,5		110	165	720		
	C-70	100	70		8,8	16,9	105	370	210		
		140	110		13,8		165	295	330		
		270	240		28,1		150	205	720		
FIS A M 16	5.8	120	80	60	11,5	22,3	120	445	240	65	65
		170	125		18,0		190	350	375		
		360	320		37,6		165	225	960		
	8.8	120	80		11,5	23,0	120	460	240		
		170	125		18,0		190	600	375		
		360	320		46,0		210	380	960		
	A4-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0		190	400	375		
		360	320		42,0		250	960			
	C-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0		190	515	375		
		360	320		46,0		210	325	960		

Chemical fixings 3

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ^{2) 3) 4) 9)}										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]	$h_{ef}^{5)}$ [mm]	T_{max} [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s_{cr} [mm]			$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85		
		220	170		30,5	34,9	255	460	510				
		450	400		58,6		195	300	1200				
	8.8	140	90		14,6	29,3	135	530	270			85	85
		220	170		30,5	56,0	255	790	510				
		450	400		71,8		520	1200					
	A4-70	140	90		14,6	29,3	135	530	270			85	85
		220	170		30,5	39,3	255	525	510				
		450	400		65,5		225	345	1200				
	C-70	140	90		14,6	29,3	135	530	270			85	85
		220	170		30,5	49,0	255	675	510				
		450	400		71,8		450	1200					
FIS A M 24	5.8	160	96	150	13,4	32,2	145	545	290	105	105		
		270	210		43,5	50,9	315	600	630				
		540	480		84,3		275	395	1440				
	8.8	160	96		13,4	32,2	145	545	290			105	105
		270	210		43,5	80,7	315	1020	630				
		540	480		100,5		395	680	1440				
	A4-70	160	96		13,4	32,2	145	545	290			105	105
		270	210		43,5	56,6	315	680	630				
		540	480		94,4		350	450	1440				
	C-70	160	96		13,4	32,2	145	545	290			105	105
		270	210		43,5	70,6	315	875	630				
		540	480		100,5		395	585	1440				
FIS A M 27	5.8	170	108	200	16,0	38,5	165	610	325	120	120		
		310	250		56,5	65,7	715	750					
		600	540		109,5		485	1620					
	8.8	170	108		16,0	38,5	165	610	325			120	120
		310	250		56,5	104,9	375	1225	750				
		600	540		127,2		495	840	1620				
	A4-70	170	108		16,0	38,5	165	610	325			120	120
		310	250		56,5	73,6	375	815	750				
		600	540		122,7		465	555	1620				
	C-70	170	108		16,0	38,5	165	610	325			120	120
		310	250		56,5	91,8	375	1050	750				
		600	540		127,2		495	720	1620				

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ^{2) 3) 4) 9)}										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} ⁵⁾ [mm]	T _{max} [Nm]	N _{perm} ⁶⁾ [kN]	V _{perm} ⁶⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 30	5.8	190	120	300	18,8	45,1	180	665	360	140	140
		350	280		66,9	80,6	420	820	840		
		670	600		133,8		450	555	1800		
	8.8	190	120		18,8	45,1	180	665	360		
		350	280		66,9	128,2	420	1400	840		
		670	600		157,1		600	965	1800		
	A4-70	190	120		18,8	45,1	180	665	360		
		350	280		66,9	89,9	420	930	840		
		670	600		150,0		555	635	1800		
	C-70	190	120		18,8	45,1	180	665	360		
		350	280		66,9	112,2	420	1200	840		
		670	600		157,1		600	825	1800		

For the design the complete assessment ETA-10/0012 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-10/0012 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-10/0012.

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

⁴⁾ Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-10/0012.

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 assessment ETA-10/0012, issue date 12.09.2016. 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 $w_k \sim 0,3\text{mm}$.

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ^{2) 3) 4)}										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} ⁵⁾ [mm]	T _{max} [Nm]	N _{perm} ⁶⁾ [kN]	V _{perm} ⁶⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 8	5.8	100	60	10	9,0	5,1	75	70	180	40	40
		110	80				55		240		
		190	160				40		480		
	8.8	100	60		10,8	8,4	95	125	180		
		110	80		13,9		130	115	240		
		190	160				40	100	480		
	A4-70	100	60		9,8	5,9	85	85	180		
		110	80				70	80	240		
		190	160				40	75	480		
	C-70	100	60		10,8	7,3	95	105	180		
		110	80				105	100	240		
		190	160				40	90	480		

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ²⁾³⁾⁴⁾										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} ⁵⁾ [mm]	T _{max} [Nm]	N _{perm} ⁶⁾ [kN]	V _{perm} ⁶⁾ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 10	5.8	100	60	20	11,2	8,6	100	125	180	45	45
		120	90		13,8		110	105	270		
		230	200		45		95	600			
	8.8	100	60		11,2	13,3	100	200	180		
		120	90		18,8		180	175	270		
		230	200		22,1		45	130	600		
	A4-70	100	60		11,2	9,3	100	135	180		
		120	90		15,5		135	115	270		
		230	200		45		100	600			
	C-70	100	60		11,2	11,6	100	175	180		
		120	90		18,8		180	150	270		
		230	200		19,3		45	120	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	55
		140	110		20,5		165	135	330		
		270	240		55		120	720			
	8.8	100	70		14,1	19,3	145	295	210		
		140	110		27,6		250	235	330		
		270	240		32,1		55	170	720		
	A4-70	100	70		14,1	13,5	145	200	210		
		140	110		22,5		190	155	330		
		270	240		55		130	720			
	C-70	100	70		14,1	16,9	145	255	210		
		140	110		27,6		250	200	330		
		270	240		28,1		55	150	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	175	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6		285	405	375		
		360	320		59,8		120	255	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		65	190	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,3		70	225	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		53,3		385	305	510		
		450	400		58,6		85	230	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385	530	510		
		450	400		93,3		230	350	1200		
	A4-70	140	90		20,5	39,3	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,5		85	255	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385	455	510		
		450	400		81,7		130	300	1200		

LOADS

Injection system FIS EM: Injection mortar FIS EM with Threaded rod FIS A ¹⁾

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) ^{2) 3) 4)}										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]	$h_{ef}^{5)}$ [mm]	T_{max} [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FIS A M 24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		61,0	50,9	475	400	630		
		540	480		84,3		105	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		61,0	80,7	475	685	630		
		540	480		134,5		545	455	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		61,0	56,6	475	455	630		
		540	480		94,4		205	320	1440		
	C-70	160	96		18,8	45,2	170	540	290		
		270	210		61,0	70,6	475	590	630		
		540	480		117,7		410	390	1440		
FIS A M 27	5.8	170	108	200	22,5	54,0	195	605	325	120	120
		310	250		79,2	65,7	565	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		79,2	104,9	565	825	750		
		600	540		174,9		720	560	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		79,2	73,6	565	545	750		
		600	540		122,7		315	380	1620		
	C-70	170	108		22,5	54,0	195	605	325		
		310	250		79,2	91,8	565	705	750		
		600	540		153,0		555	475	1620		
FIS A M 30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		93,9	80,6	635	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		93,9	128,2	635	940	840		
		670	600		213,7		860	645	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		93,9	89,9	635	620	840		
		670	600		150,0		400	430	1800		
	C-70	190	120		26,3	63,2	210	660	360		
		350	280		93,9	112,2	635	805	840		
		670	600		187,0		675	550	1800		

For the design the complete assessment ETA-10/0012 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-10/0012 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-10/0012.

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

⁴⁾ Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-10/0012.

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 assessment ETA-10/0012, issue date 12.09.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).