

The concrete all-rounder



Steel constructions



Bridge railings

VERSIONS

- Zinc-plated steel
- Stainless steel

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



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.
- Beside the standard version the Superbond mortar is also available as fast curing FIS SB HIGH SPEED e.g. for installations at extreme minus temperatures (from -20 °C).
- Variable anchorage depths from 4x to 20x anchor rod diameter allow for ideal adaptation to the load to be applied, and ensure 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 so far.
- The Superbond mortar FIS SB is approved for seismic applications, which ensures safety even under extreme conditions.

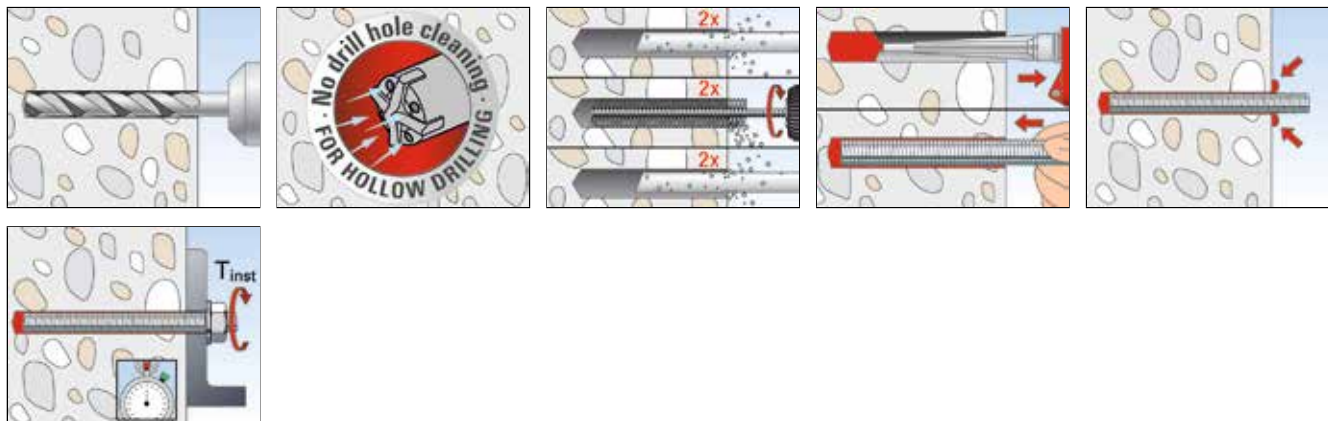
APPLICATIONS

- 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 anchor rod FIS A, 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.
- FIS SB HIGH SPEED is a fast curing version.
- 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.

INSTALLATION



TECHNICAL DATA



Superbond mortar
FIS SB 390 S



Static mixer **FIS MR**

Item	Art.-No.	ETA	Approval	Art.-No.	Languages on the cartridge	Scale unit	Contents	Sales unit
								[pcs]
FIS SB 390 S	519451	■	▲		D, F, NL	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	520557	■	▲		D, SLO, SRB, BG	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	518831	■	▲		GB, E, P	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	519450	■	▲		I, GB, D	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	520559	■	▲		DK, SE, NO, FIN	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	520555	■	▲		CZ, SK, RO	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 390 S	520595	■	▲		PL, RUS, H	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS SB 585 S	519452	■	▲		GB, E, P	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS SB 585 S	520526	■	▲		I, GB, D	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS SB 1500 S	519453	■	▲		D, GB, F, NL, E, P	700	1 cartridge 1500 ml, 2 x FIS UMR	4
FIS SB 1500 S	520528	■	▲		I, PL, RUS, CZ, SK, GB	700	1 cartridge 1500 ml, 2 x FIS UMR	4
FIS SB HIGH SPEED 390 S	523303	■	—		PL, RUS, HU	180	1 cartridge 390 ml, 2 x FIS MR	6
FIS MR	096448	—	—		—	—	10 static mixer	10
FIS UMR	520593	—	—		—	—	10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10

GELLING AND CURING TIME

Temperature at anchoring base	Gelling time		Curing time	
	FIS SB Standard	FIS SB HIGH SPEED	FIS SB Standard	FIS SB HIGH SPEED
> -20°C - -15°C	—	60 min.	—	24 hrs.
> -15°C - -10°C	60 min.	30 min.	36 hrs.	8 hrs.
> -10°C - -5°C	30 min.	15 min.	24 hrs.	180 min.
> -5°C - ±0°C	20 min.	10 min.	8 hrs.	120 min.
> ±0°C - +5°C	13 min.	5 min.	4 hrs.	60 min.
> +5°C - +10°C	9 min.	3 min.	120 min.	45 min.
> +10°C - +20°C	5 min.	2 min.	60 min.	30 min.
> +20°C - +30°C	4 min.	1 min.	45 min.	15 min.
> +30°C - +40°C	2 min.	—	30 min.	—

DISPENSER



Dispenser **FIS DM S**



Pneumatic dispenser **FIS AP**



Cordless dispenser **FIS DD 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 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 DD S	543629	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		1
Battery Pack	513425	FIS DD S	Battery pack 7,2 V - Li-ION	1



Dispenser **FIS AM**



Pneumatic dispenser **FIS DP-XL**

Item	Art.-No.	Adapted for	Sales unit [pcs]
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 DP S-XL	512401	FIS SB 1500 S, FIS EM 1500 S	1



Dispenser **FIS DM S-L**



Dispenser **FIS DP S-L**

Item	Art.-No.	Adapted for	Performance data	Sales unit [pcs]
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

TECHNICAL DATA



Threaded rod FIS A

	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	Approval		Drill hole diameter d ₀ [mm]	Min. / max. anchorage depth [mm]	Min. / max. usable length [mm]	min. / max. filling quantity FIS SB [scale units]	Sales unit [pcs]
	Art.-No.	Art.-No.	Art.-No.	ETA						
Item	gvz	gvz	A4							
FIS A M 8 x 90	090274 ¹⁾	519390 ¹⁾	090440 ¹⁾	■	▲	10	60 / 78	1 / 19	2 / 3	10
FIS A M 8 x 110	090275 ¹⁾	519391 ¹⁾	090441 ¹⁾	■	▲	10	60 / 98	1 / 39	2 / 3	10
FIS A M 8 x 130	090276 ¹⁾	519392 ¹⁾	090442 ¹⁾	■	▲	10	60 / 118	1 / 59	2 / 4	10
FIS A M 8 x 175	090277 ¹⁾	519393 ¹⁾	090443 ¹⁾	■	▲	10	60 / 160	4 / 104	2 / 5	10
FIS A M 8 x 1000	509214 ^{1) 2)}	—	509230 ^{1) 2)}	■	▲	10	60 / 160	—	2 / 5	10
FIS A M 10 x 110	090278	—	090444	■	▲	12	60 / 96	1 / 37	3 / 4	10
FIS A M 10 x 130	090279	524170	090447	■	▲	12	60 / 116	1 / 57	3 / 5	10
FIS A M 10 x 150	090281	517935	090448	■	▲	12	60 / 136	1 / 77	3 / 5	10
FIS A M 10 x 170	044969	519395	044973	■	▲	12	60 / 156	1 / 97	3 / 6	10
FIS A M 10 x 190	—	517936	—	■	▲	12	60 / 176	1 / 117	3 / 7	10
FIS A M 10 x 200	090282	519396	090449	■	▲	12	60 / 186	1 / 127	3 / 7	10
FIS A M 10 x 1000	509215 ²⁾	509223 ²⁾	509231 ²⁾	■	▲	12	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 ²⁾	509224 ²⁾	509232 ²⁾	■	▲	14	70 / 240	—	3 / 10	10
FIS A M 16 x 130	044972	519400	044975	■	▲	18	80 / 109	1 / 30	5 / 7	10
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 ²⁾	509225 ²⁾	509233 ²⁾	■	▲	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 ²⁾	519427 ²⁾	■	▲	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	90 / 480	—	15 / 69	10
FIS A M 30 x 430	090297	—	090464	■	▲	35	120 / 394	1 / 275	28 / 88	5

1) Not approved for cracked concrete.

2) Order washer and nut separately.

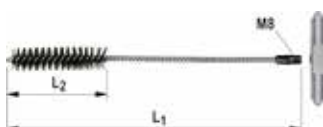
TECHNICAL DATA



Hexagonal nut and washer

	zinc plated, steel grade 8.8 Art.-No.	stainless steel Art.-No.	Width across nut ○SW [mm]	Washer (outer diameter x thickness) [mm]	Match	Sales unit [pcs]
Item	gvz	A4				
Nut & washer M8	510509	510513	13	16 x 1,6	FIS A M 8	50
Nut & washer M10	510510	510514	17	20 x 2	FIS A M 10	50
Nut & washer M12	510511	510515	19	24 x 2,5	FIS A M 12	25
Nut & washer M16	510512	510516	24	30 x 3	FIS A M 16	20
Nut & washer M20	519737	519738	30	37 x 3	FIS A M 20	10

ACCESSORIES DRILL HOLE CLEANING



Cleaning brush **BS**



SDS-Adapter M8

Item	Art.-No.	Length L1 [mm]	Length L2 [mm]	Brush diameter [mm]	For drill diameter [mm]	Match	Sales unit [pcs]
BS ø 10	078178	120	50	11	10	FIS A M 8 / RG M5 I	1
BS ø 12	078179	150	80	13	12	FIS A M 10 / RG M6 I	1
BS ø 14	078180	250	80	16	14	FIS A M 12 / RG M8 I	1
BS ø 16/18	078181	250	80	20	16/18	FIS A M 16 / RG M10 I	1
BS ø 24	078182	300	100	26	24	FIS A M 20 / RG M 16 I	1
BS ø 28	078183	350	100	30	28	FIS A M 24	1
BS ø 35	078184	400	100	40	30/32/35	FIS A M 30 / RG M 20 I	1
SDS Chuck	530332	-	-	-	-	-	1
FIS brush extension	508791	-	-	-	-	-	1



Compressed-air cleaning tool



Blow-out pump **ABG**



Centring wedge

Item	Art.-No.	Contents	Total length [mm]
Compressed-air cleaning tool	093286	—	—
Blow-out pump ABG	089300	—	370
Centring wedge	093076	10 wedges for overhead installation, from M16	—

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 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 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

Superbond Injection mortar FIS SB with threaded rod FIS A⁷⁾ (property class 8.8)

Highest permissible loads for a single anchor^{1) 6)} in concrete C20/25⁴⁾

For the design the complete approval ETA - 12/0258 has to be considered.

Typ	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness h_{min} [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Cracked concrete				Non-cracked concrete			
					Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M8 (8.8)	60		100	10,0	4,3	8,6	40	40	8,6	8,6	40	40
		160	190	10,0	11,5	8,6	40	40	14,3	8,6	40	40
FIS A M10 (8.8)	60		100	20,0	5,8	11,7	45	45	10,8	13,1	45	45
		200	230	20,0	19,4	13,1	45	45	22,4	13,1	45	45
FIS A M12 (8.8)	70		100	40,0	9,4	18,8	55	55	14,1	19,4	55	55
		240	270	40,0	32,3	19,4	55	55	32,4	19,4	55	55
FIS A M16 (8.8)	80		116	60,0	12,3	24,5	65	65	17,2	34,4	65	65
		320	356	60,0	57,4	36,0	65	65	60,0	36,0	65	65
FIS A M20 (8.8)	90		138	120,0	14,6	29,3	85	85	20,5	41,1	85	85
		400	448	120,0	89,8	56,0	85	85	93,3	56,0	85	85
FIS A M24 (8.8)	96		152	150,0	16,1	32,2	105	105	22,6	45,2	105	105
		480	536	150,0	129,3	80,6	105	105	134,3	80,6	105	105
FIS A M27 (8.8)	108		168	200,0	19,2	38,5	120	120	27,0	54,0	120	120
		540	600	200,0	152,7	105,1	120	120	175,2	105,1	120	120
FIS A M30 (8.8)	120		190	300,0	22,5	45,1	140	140	31,6	63,2	140	140
		600	670	300,0	188,5	128,6	140	140	213,8	128,6	140	140

¹⁾ The partial safety factors for material resistance as regulated in the approval 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 $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1,5 \times h_{ef}$.

²⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

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

⁶⁾ The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

⁷⁾ The given values apply as well to the threaded rod RGM in the same property class.

LOADS

Superbond Injection mortar FIS SB with threaded rod FIS A A4⁷⁾ (property class A4-70)

Highest permissible loads for a single anchor^{1) 6)} in concrete C20/25⁴⁾

For the design the complete approval ETA - 12/0258 has to be considered.

Typ	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness h_{min} [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Cracked concrete				Non-cracked concrete			
					Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M8 (A4-70)	60		100	10,0	4,3	6,0	40	40	8,6	6,0	40	40
		160	190	10,0	9,9	6,0	40	40	9,9	6,0	40	40
FIS A M10 (A4-70)	60		100	20,0	5,8	9,2	45	45	10,8	9,2	45	45
		200	230	20,0	15,7	9,2	45	45	15,7	9,2	45	45
FIS A M12 (A4-70)	70		100	40,0	9,4	13,7	55	55	14,1	13,7	55	55
		240	270	40,0	22,5	13,7	55	55	22,5	13,7	55	55
FIS A M16 (A4-70)	80		116	60,0	12,3	24,5	65	65	17,2	25,2	65	65
		320	356	60,0	42,0	25,2	65	65	42,0	25,2	65	65
FIS A M20 (A4-70)	90		138	120,0	14,6	29,3	85	85	20,5	39,4	85	85
		400	448	120,0	65,7	39,4	85	85	65,7	39,4	85	85
FIS A M24 (A4-70)	96		152	150,0	16,1	32,2	105	105	22,6	45,2	105	105
		480	536	150,0	94,3	56,8	105	105	94,3	56,8	105	105
FIS A M27 (A4-70)	108		168	200,0	19,2	38,5	120	120	27,0	54,0	120	120
		540	600	200,0	123,0	73,7	120	120	123,0	73,7	120	120
FIS A M30 (A4-70)	120		190	300,0	22,5	45,1	140	140	31,6	63,2	140	140
		600	670	300,0	150,1	90,2	140	140	150,1	90,2	140	140

¹⁾ The partial safety factors for material resistance as regulated in the approval 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 $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1,5 \times h_{ef}$.

²⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

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

⁶⁾ The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

⁷⁾ The given values apply as well to the threaded rod RGM in the same property class.

LOADS

Superbond Injection mortar FIS SB with threaded rod FIS A C⁷⁾ (property class C-70)

Highest permissible loads for a single anchor^{1) 6)} in concrete C20/25⁴⁾

For the design the complete approval ETA - 12/0258 has to be considered.

Typ	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness h_{min} [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Cracked concrete				Non-cracked concrete			
					Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permis- sible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M8 (C-70)	60		100	10,0	4,3	7,4	40	40	8,6	7,4	40	40
		160	190	10,0	11,5	7,4	40	40	12,4	7,4	40	40
FIS A M10 (C-70)	60		100	20,0	5,8	11,4	45	45	10,8	11,4	45	45
		200	230	20,0	19,4	11,4	45	45	19,5	11,4	45	45
FIS A M12 (C-70)	70		100	40,0	9,4	17,1	55	55	14,1	17,1	55	55
		240	270	40,0	28,1	17,1	55	55	28,1	17,1	55	55
FIS A M16 (C-70)	80		116	60,0	12,3	24,5	65	65	17,2	31,4	65	65
		320	356	60,0	52,4	31,4	65	65	52,4	31,4	65	65
FIS A M20 (C-70)	90		138	120,0	14,6	29,3	85	85	20,5	41,1	85	85
		400	448	120,0	81,9	49,1	85	85	81,9	49,1	85	85
FIS A M24 (C-70)	96		152	150,0	16,1	32,2	105	105	22,6	45,2	105	105
		480	536	150,0	117,6	70,9	105	105	117,6	70,9	105	105
FIS A M27 (C-70)	108		168	200,0	19,2	38,5	120	120	27,0	54,0	120	120
		540	600	200,0	152,7	92,0	120	120	153,3	92,0	120	120
FIS A M30 (C-70)	120		190	300,0	22,5	45,1	140	140	31,6	63,2	140	140
		600	670	300,0	187,1	112,6	140	140	187,1	112,6	140	140

¹⁾ The partial safety factors for material resistance as regulated in the approval 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 $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1,5 \times h_{ef}$.

²⁾ Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

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

⁶⁾ The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

⁷⁾ The given values apply as well to the threaded rod RGM in the same property class.