

The powerful injection mortar for rebar connections and cracked concrete



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



ADVANTAGES

- High bond strengths and minor mortar shrinkage allow maximum load application in cracked and non-cracked concrete.
- The internal threaded anchor RG M I allows for surface-flush removal and re-use of the attachment point, thereby providing optimal flexibility.
- The metric internal thread allows for the use of standard screws or threaded rods for the ideal adaptation to suit the intended use.
- FIS EM is also approved for diamond-drilled and water-filled drill holes, thus ensuring more flexibility on the construction site.

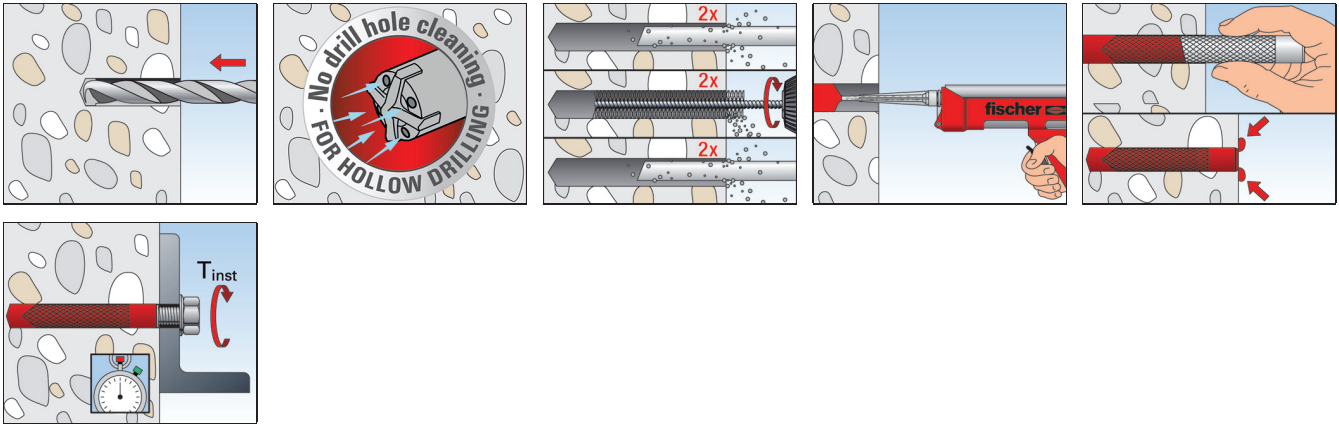
APPLICATIONS

- Removable fixings
- Suspensions of pipes, cable trays and suspended ceilings
- Temporary fixings, e.g. for machines
- Scaffold anchoring

FUNCTIONING

- The injection system, comprising the epoxy resin mortar FIS EM combined with the internal threaded anchor RG M I, is suitable for pre-positioned 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 internal threaded anchor with the drill hole wall and seals off the drill hole.
- The RG M I is set manually by lightly rotating it until it reaches the drill hole base.

INSTALLATION



TECHNICAL DATA



Epoxy mortar **FIS EM 390 S**



Epoxy mortar **FIS EM 585 S**



Epoxy mortar **FIS EM 1500 S**



Static mixer **FIS MR**

| Item | Art.-No. | Approval ETA | Languages on the cartridge | Scale unit | Contents | Sales unit [pcs] |
|----------------------|---------------|-----------------|----------------------------|------------|-------------------------------------------------------------------|---------------------|
| 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

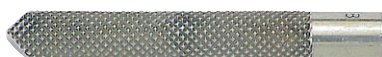
| Item | Art.-No. | Approval ETA | Languages on the cartridge | Contents | Sales unit [pcs] |
|-------------------------------|---------------|-----------------|----------------------------|-----------------------------------|---------------------|
| FIS EM 390 S HWK big | 040038 | ■ | GB, CZ, PL, GR, 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

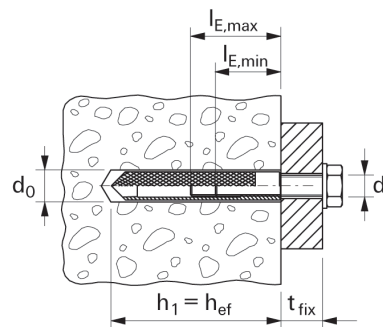
| Cartridge temperature (mortar) | Gelling time | Temperature at anchoring base | Curing time |
|-----------------------------------|--------------|----------------------------------|-------------|
| + 5°C - +10°C | 2 hrs. | + 5°C - +10°C | 40 hrs. |
| +10°C - +20°C | 30 min. | +10°C - +20°C | 18 hrs.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



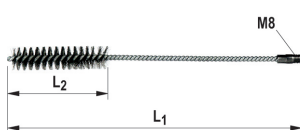
Internal threaded anchor **RG M I**



| Item | zinc-plated steel | stainless steel | Approval ETA | Drill hole diameter d_0 [mm] | Min. bolt penetration $l_{E,min}$ [mm] | Max. bolt penetration $l_{E,max}$ [mm] | Fill quantity [scale units] | Sales unit [pcs] |
|---------------------------|-------------------|-----------------|-----------------|--------------------------------------|----------------------------------------------|----------------------------------------------|--------------------------------|---------------------|
| | Art.-No. | Art.-No. | | | | | | |
| | gvz | A4 | | | | | | |
| RG 8 x 75 M 5 I | 048221 1) | — | — | 10 | 8 | 14 | 3 | 10 |
| RG 10 x 75 M 6 I | 048222 1) | — | — | 12 | 10 | 16 | 3 | 10 |
| RG 12 x 90 M 8 I | 050552 1) | 050565 1) | ■ | 14 | 8 | 18 | 3 | 10 |
| RG 16 x 90 M 10 I | 050553 1) | 050566 1) | ■ | 18 | 10 | 23 | 4 | 10 |
| RG 18 x 125 M 12 I | 050562 1) | 050567 1) | ■ | 20 | 12 | 26 | 6 | 10 |
| RG 22 x 160 M 16 I | 050563 1) | 050568 1) | ■ | 24 | 16 | 35 | 8 | 5 |
| RG 28 x 200 M 20 I | 050564 1) | 050569 1) | ■ | 32 | 20 | 45 | 24 | 5 |

1) Setting tool is included in each package.

ACCESSORIES DRILL HOLE CLEANING



Cleaning brush **BS**



SDS-Adapter **M8**

| Item | Art.-No. | Length L_1 [mm] | Length L_2 [mm] | Brush diameter [mm] | For drill diameter [mm] | Sales unit [pcs] |
|----------------------------|----------|----------------------|----------------------|------------------------|----------------------------|---------------------|
| BS Ø 10 | 078178 | 120 | 50 | 11 | 10 | 1 |
| BS Ø 12 | 078179 | 150 | 80 | 13 | 12 | 1 |
| BS Ø 14 | 078180 | 250 | 80 | 16 | 14 | 1 |
| BS Ø 16/18 | 078181 | 250 | 80 | 20 | 16/18 | 1 |
| BS Ø 24 | 078182 | 300 | 100 | 26 | 24 | 1 |
| BS Ø 28 | 078183 | 350 | 100 | 30 | 28 | 1 |
| BS Ø 35 | 078184 | 400 | 100 | 40 | 30/32/35 | 1 |
| SDS Chuck | 530332 | - | - | - | - | 1 |
| FIS brush extension | 508791 | 410 | - | - | - | 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 |



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 |

LOADS

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

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) ^{1) 2) 3) 7)} | | | | | | | | | | 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 | | | | Max. Load s _{cr} | s _{min} ⁵⁾ |
| | | h _{min} [mm] | h _{ef} [mm] | T _{max} [Nm] | N _{perm} ⁴⁾ [kN] | V _{perm} ⁴⁾ [kN] | [mm] | [mm] | [mm] | [mm] | [mm] | | |
| RG M8 I | 5.8 | 120 | 90 | 10 | 9,0 | 5,3 | 100 | 85 | 270 | 55 | 55 | | |
| | 8.8 | | | | | | | | | | | 135 | 145 |
| | A4-70 | | | | | | | | | | | 115 | 95 |
| RG M10 I | 5.8 | 130 | 90 | 20 | 12,9 | 8,3 | 135 | 135 | 270 | 65 | 65 | | |
| | 8.8 | | | | | | | | | | | 235 | 155 |
| | A4-70 | | | | | | | | | | | 9,3 | 155 |
| RG M12 I | 5.8 | 170 | 125 | 40 | 20,2 | 12,1 | 190 | 165 | 375 | 75 | 75 | | |
| | 8.8 | | | | | | | | | | | 285 | 185 |
| | A4-70 | | | | | | | | | | | 13,5 | 185 |
| RG M16 I | 5.8 | 210 | 160 | 80 | 28,9 | 22,4 | 240 | 275 | 480 | 95 | 95 | | |
| | 8.8 | | | | | | | | | | | 405 | 315 |
| | A4-70 | | | | | | | | | | | 25,1 | 315 |
| RG M20 I | 5.8 | 270 | 200 | 120 | 40,4 | 35,4 | 300 | 380 | 600 | 125 | 125 | | |
| | 8.8 | | | | | | | | | | | 595 | 430 |
| | A4-70 | | | | | | | | | | | 51,4 | 430 |
| | | | | | | 39,4 | | 430 | | | | | |

For the design the complete assessment ETA-10/0012 has to be considered. ⁶⁾

¹⁾ 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.

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

³⁾ Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-10/0012.

⁴⁾ 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.

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

⁶⁾ 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).

⁷⁾ 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

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

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) ^{1) 2) 3)} | | | | | | | | | | 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] | $N_{perm}^{4)}$ [kN] | $V_{perm}^{4)}$ [kN] | [mm] | [mm] | Max. Load s_{cr} [mm] | $s_{min}^{5)}$ [mm] | $c_{min}^{5)}$ [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 | 330 | 180 | 480 | 95 | 95 |
| | 8.8 | | | | 40,6 | 30,9 | 365 | 265 | | | |
| | A4-70 | | | | | 25,1 | | 205 | | | |
| RG M20 I | 5.8 | 270 | 200 | 120 | 56,7 | 35,4 | 245 | 445 | 600 | 125 | 125 |
| | 8.8 | | | | | 51,4 | 395 | | | | |
| | A4-70 | | | | | 39,4 | 285 | | | | |

For the design the complete assessment ETA-10/0012 has to be considered. ⁶⁾

¹⁾ 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.

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3
Chemical fixings