

Injection system FIS V with threaded rod FIS A

Permissible loads of a single anchor<sup>1)2)</sup> in normal concrete of strength class C20/25.  
For the design the complete current assessment ETA-02/0024 has to be considered.

|            |                                  |                           |                          |                              | Cracked concrete                                                                                                                                     |                         |                        |                        | Non-cracked concrete                                                                                                                                 |                         |                        |                        |
|------------|----------------------------------|---------------------------|--------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|------------------------|
| Type       | Material / surface <sup>3)</sup> | Effective anchorage depth | Minimum member thickness | Maximum instal-lation torque | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ ) with reduced loads |                         |                        |                        | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ ) with reduced loads |                         |                        |                        |
|            |                                  | $h_{ef}$<br>[mm]          | $h_{min}$<br>[mm]        | $T_{inst,max}$<br>[Nm]       | $N_{perm}^{4)}$<br>[kN]                                                                                                                              | $V_{perm}^{4)}$<br>[kN] | $s_{min}^{4)}$<br>[mm] | $c_{min}^{4)}$<br>[mm] | $N_{perm}^{4)}$<br>[kN]                                                                                                                              | $V_{perm}^{4)}$<br>[kN] | $s_{min}^{4)}$<br>[mm] | $c_{min}^{4)}$<br>[mm] |
| FIS A M 8  | 5.8                              | 60                        | 100                      | 10                           | 3.9                                                                                                                                                  | 6.3                     | 40                     | 40                     | 7.9                                                                                                                                                  | 6.3                     | 40                     | 40                     |
|            | 5.8                              | 80                        | 110                      | 10                           | 5.3                                                                                                                                                  | 6.3                     | 40                     | 40                     | 9.0                                                                                                                                                  | 6.3                     | 40                     | 40                     |
|            | 5.8                              | 160                       | 190                      | 10                           | 9.0                                                                                                                                                  | 6.3                     | 40                     | 40                     | 9.0                                                                                                                                                  | 6.3                     | 40                     | 40                     |
|            | R-70                             | 60                        | 100                      | 10                           | 3.9                                                                                                                                                  | 6.0                     | 40                     | 40                     | 7.9                                                                                                                                                  | 6.0                     | 40                     | 40                     |
|            | R-70                             | 80                        | 110                      | 10                           | 5.3                                                                                                                                                  | 6.0                     | 40                     | 40                     | 9.9                                                                                                                                                  | 6.0                     | 40                     | 40                     |
|            | R-70                             | 160                       | 190                      | 10                           | 9.9                                                                                                                                                  | 6.0                     | 40                     | 40                     | 9.9                                                                                                                                                  | 6.0                     | 40                     | 40                     |
| FIS A M 10 | 5.8                              | 60                        | 100                      | 20                           | 5.4                                                                                                                                                  | 9.7                     | 45                     | 45                     | 9.9                                                                                                                                                  | 9.7                     | 45                     | 45                     |
|            | 5.8                              | 90                        | 120                      | 20                           | 8.1                                                                                                                                                  | 9.7                     | 45                     | 45                     | 13.8                                                                                                                                                 | 9.7                     | 45                     | 45                     |
|            | 5.8                              | 200                       | 230                      | 20                           | 13.8                                                                                                                                                 | 9.7                     | 45                     | 45                     | 13.8                                                                                                                                                 | 9.7                     | 45                     | 45                     |
|            | R-70                             | 60                        | 100                      | 20                           | 5.4                                                                                                                                                  | 9.2                     | 45                     | 45                     | 9.9                                                                                                                                                  | 9.2                     | 45                     | 45                     |
|            | R-70                             | 90                        | 120                      | 20                           | 8.1                                                                                                                                                  | 9.2                     | 45                     | 45                     | 14.8                                                                                                                                                 | 9.2                     | 45                     | 45                     |
|            | R-70                             | 200                       | 230                      | 20                           | 15.7                                                                                                                                                 | 9.2                     | 45                     | 45                     | 15.7                                                                                                                                                 | 9.2                     | 45                     | 45                     |
| FIS A M 12 | 5.8                              | 70                        | 100                      | 40                           | 7.5                                                                                                                                                  | 14.3                    | 55                     | 55                     | 13.7                                                                                                                                                 | 14.3                    | 55                     | 55                     |
|            | 5.8                              | 110                       | 140                      | 40                           | 11.8                                                                                                                                                 | 14.3                    | 55                     | 55                     | 20.5                                                                                                                                                 | 14.3                    | 55                     | 55                     |
|            | 5.8                              | 240                       | 270                      | 40                           | 20.5                                                                                                                                                 | 14.3                    | 55                     | 55                     | 20.5                                                                                                                                                 | 14.3                    | 55                     | 55                     |
|            | R-70                             | 70                        | 100                      | 40                           | 7.5                                                                                                                                                  | 13.7                    | 55                     | 55                     | 13.7                                                                                                                                                 | 13.7                    | 55                     | 55                     |
|            | R-70                             | 110                       | 140                      | 40                           | 11.8                                                                                                                                                 | 13.7                    | 55                     | 55                     | 21.7                                                                                                                                                 | 13.7                    | 55                     | 55                     |
|            | R-70                             | 240                       | 270                      | 40                           | 22.5                                                                                                                                                 | 13.7                    | 55                     | 55                     | 22.5                                                                                                                                                 | 13.7                    | 55                     | 55                     |
| FIS A M 16 | 5.8                              | 80                        | 120                      | 60                           | 11.5                                                                                                                                                 | 23.0                    | 65                     | 65                     | 16.8                                                                                                                                                 | 26.9                    | 65                     | 65                     |
|            | 5.8                              | 125                       | 170                      | 60                           | 18.0                                                                                                                                                 | 26.9                    | 65                     | 65                     | 29.9                                                                                                                                                 | 26.9                    | 65                     | 65                     |
|            | 5.8                              | 320                       | 360                      | 60                           | 37.6                                                                                                                                                 | 26.9                    | 65                     | 65                     | 37.6                                                                                                                                                 | 26.9                    | 65                     | 65                     |
|            | R-70                             | 80                        | 120                      | 60                           | 11.5                                                                                                                                                 | 23.0                    | 65                     | 65                     | 16.8                                                                                                                                                 | 25.2                    | 65                     | 65                     |
|            | R-70                             | 125                       | 170                      | 60                           | 18.0                                                                                                                                                 | 25.2                    | 65                     | 65                     | 29.9                                                                                                                                                 | 25.2                    | 65                     | 65                     |
|            | R-70                             | 320                       | 360                      | 60                           | 42.0                                                                                                                                                 | 25.2                    | 65                     | 65                     | 42.0                                                                                                                                                 | 25.2                    | 65                     | 65                     |
| FIS A M 20 | 5.8                              | 90                        | 140                      | 120                          | 14.0                                                                                                                                                 | 28.0                    | 85                     | 85                     | 20.0                                                                                                                                                 | 40.0                    | 85                     | 85                     |
|            | 5.8                              | 170                       | 220                      | 120                          | 28.0                                                                                                                                                 | 42.3                    | 85                     | 85                     | 48.3                                                                                                                                                 | 42.3                    | 85                     | 85                     |
|            | 5.8                              | 400                       | 450                      | 120                          | 58.6                                                                                                                                                 | 42.3                    | 85                     | 85                     | 58.6                                                                                                                                                 | 42.3                    | 85                     | 85                     |
|            | R-70                             | 90                        | 140                      | 120                          | 14.0                                                                                                                                                 | 28.0                    | 85                     | 85                     | 20.0                                                                                                                                                 | 39.4                    | 85                     | 85                     |
|            | R-70                             | 170                       | 220                      | 120                          | 28.0                                                                                                                                                 | 39.4                    | 85                     | 85                     | 48.3                                                                                                                                                 | 39.4                    | 85                     | 85                     |
|            | R-70                             | 400                       | 450                      | 120                          | 65.7                                                                                                                                                 | 39.4                    | 85                     | 85                     | 65.7                                                                                                                                                 | 39.4                    | 85                     | 85                     |
| FIS A M 24 | 5.8                              | 96                        | 160                      | 150                          | 15.4                                                                                                                                                 | 30.8                    | 105                    | 105                    | 22.0                                                                                                                                                 | 44.1                    | 105                    | 105                    |
|            | 5.8                              | 210                       | 270                      | 150                          | 33.9                                                                                                                                                 | 60.6                    | 105                    | 105                    | 67.9                                                                                                                                                 | 60.9                    | 105                    | 105                    |
|            | 5.8                              | 480                       | 540                      | 150                          | 77.6                                                                                                                                                 | 60.6                    | 105                    | 105                    | 84.3                                                                                                                                                 | 60.9                    | 105                    | 105                    |
|            | R-70                             | 96                        | 160                      | 150                          | 15.4                                                                                                                                                 | 30.8                    | 105                    | 105                    | 22.0                                                                                                                                                 | 44.1                    | 105                    | 105                    |
|            | R-70                             | 210                       | 270                      | 150                          | 33.9                                                                                                                                                 | 56.8                    | 105                    | 105                    | 67.9                                                                                                                                                 | 56.8                    | 105                    | 105                    |
|            | R-70                             | 480                       | 540                      | 150                          | 77.6                                                                                                                                                 | 56.8                    | 105                    | 105                    | 94.3                                                                                                                                                 | 56.8                    | 105                    | 105                    |
| FIS A M 30 | 5.8                              | 120                       | 190                      | 300                          | 21.5                                                                                                                                                 | 43.1                    | 140                    | 140                    | 30.8                                                                                                                                                 | 61.6                    | 140                    | 140                    |
|            | 5.8                              | 280                       | 350                      | 300                          | 50.3                                                                                                                                                 | 96.0                    | 140                    | 140                    | 106.8                                                                                                                                                | 96.0                    | 140                    | 140                    |
|            | 5.8                              | 600                       | 670                      | 300                          | 107.7                                                                                                                                                | 96.0                    | 140                    | 140                    | 133.8                                                                                                                                                | 96.0                    | 140                    | 140                    |
|            | R-70                             | 120                       | 190                      | 300                          | 21.5                                                                                                                                                 | 43.1                    | 140                    | 140                    | 30.8                                                                                                                                                 | 61.6                    | 140                    | 140                    |
|            | R-70                             | 280                       | 350                      | 300                          | 50.3                                                                                                                                                 | 90.2                    | 140                    | 140                    | 106.8                                                                                                                                                | 90.2                    | 140                    | 140                    |
|            | R-70                             | 600                       | 670                      | 300                          | 107.7                                                                                                                                                | 90.2                    | 140                    | 140                    | 150.1                                                                                                                                                | 90.2                    | 140                    | 140                    |

<sup>1)</sup> Design according to EN 1992-4:2018 (for static resp. quasi-static loads). The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{gr}$  and an edge distance  $c \geq 1.5 \times h_{gr}$ . Accurate data see ETA.

<sup>2)</sup> The specified loads are valid for anchorages in dry and damp concrete. For temperatures in the anchoring substrate up to 50 °C (resp. short term up to 80 °C). Drill hole cleaning as per specification in the ETA. The factor  $\Psi_{sus}$  for sustained load was taken into account with 1.0.

<sup>3)</sup> Further steel grades, versions and technical data see ETA, e.g. for dry internal conditions, galvanised steel (gvz); for damp interiors and for outdoor use, stainless steel (R).

<sup>4)</sup> In the case of combinations of tension and shear loads, bending moments with reduced or minimum spacing and edge distances (anchor groups), the design must be carried out in accordance with the provisions of the complete ETA and the provisions of the EN 1992-4:2018. We recommend using our anchor design software C-FIX.