

## IZJAVA O LASTNOSTIH

### DoP 0191

za fischer sistem za vbrzganje Superbond (pritrjen pritrdilni element za uporabo v betonu)

SL

|                                                                                              |                                                                                       |                          |                       |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------|-----------------------|
| 1. <u>Enotna identifikacijska oznaka tipa proizvoda:</u>                                     | DoP 0191                                                                              |                          |                       |
| 2. <u>Predvidena uporaba:</u>                                                                | Za vgradnjo v razpokan in nerazpokan beton,<br>Glej dodatek, zlasti priloge           |                          |                       |
| 3. <u>Proizvajalec:</u>                                                                      | B1- B15<br>fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Nemčija |                          |                       |
| 4. <u>Pooblaščen zastopnik:</u>                                                              | -                                                                                     |                          |                       |
| 5. <u>Sistemi ocenjevanja in preverjanja nespremenljivosti lastnosti:</u>                    | 1                                                                                     |                          |                       |
| 6. <u>Evropski ocenjevalni dokument:</u>                                                     | EAD 330499-01-0601                                                                    |                          |                       |
| Evropska tehnična ocena:                                                                     | ETA-12/0258; 2020-06-17                                                               |                          |                       |
| Organ za tehnično ocenjevanje:                                                               | DIBt- Deutsches Institut für Bautechnik                                               |                          |                       |
| Priglašeni organi:                                                                           | 1343 MPA Darmstadt / 2873 TU Darmstadt                                                |                          |                       |
| 7. <u>Navedene lastnosti:</u>                                                                |                                                                                       |                          |                       |
| <b>Mehanska odpornost in stabilnost (BWR 1)</b>                                              |                                                                                       |                          |                       |
| Karakteristična odpornost na napetostno obremenitev (statična in kvazistatična obremenitev): | Odpornost pri odpovedi jekla:                                                         | Priloge C1- C3           | $\tau_{Rk,100}$ = NPD |
|                                                                                              | Odpor na kombinirani izvlek in odpoved betonskega stožca:                             | Priloge C4- C10          |                       |
|                                                                                              | Odpornost na odpoved v betonski coni:                                                 | Priloge C4               |                       |
|                                                                                              | Razdalja od roba betona za preprečevanje loma pod obremenitvijo:                      | Priloge C4               |                       |
|                                                                                              | Robusnost:                                                                            | Priloge C4-C10, C15, C16 |                       |
|                                                                                              | Največji zatezni navor:                                                               | Priloge B4- B8           |                       |
|                                                                                              | Najmanjša razdalja do roba betona in razmik:                                          | Priloge B4- B8           |                       |
| Karakteristična odpornost proti strižni obremenitvi (statična in kvazistatična obremenitev): | Odpornost na odpoved jekla:                                                           | Priloge C1- C3           |                       |
|                                                                                              | Odpornost na neuspešno odstranitev:                                                   | Priloge C4               |                       |
|                                                                                              | Odpornost na odpoved od roba betona:                                                  | Priloge C4               |                       |
| Karakteristična odpornost in premiki za kategoriji seizmičnih lastnosti C1 in C2:            | Odpornost na napetost, premiki, kategorija C1:                                        | Priloge C13, C14, C15    |                       |
|                                                                                              | Odpornost na napetost, premiki, kategorija C2:                                        | Priloge C13, C14, C16    |                       |
|                                                                                              | Odpornost na strižno obremenitev, premiki, kategorija C1:                             | Priloge C13, C14         |                       |
|                                                                                              | Odpornost na strižno obremenitev, premiki, kategorija C2:                             | Priloge C13, C14, C16    |                       |
|                                                                                              | Faktor reže obroča:                                                                   | Priloge C13              |                       |
| Zamenjave pri kratkoročnem in dolgoročnem nalaganju:                                         | Zamenjave pri kratkoročnem in dolgoročnem nalaganju:                                  | Priloge C11- C12         |                       |
| <b>Higiena, zdravje in okolje (BWR 3)</b>                                                    |                                                                                       |                          |                       |
| Vsečina, emisije in / ali sproščanje nevarnih snovi:                                         | NPA                                                                                   |                          |                       |



8. Ustrezna tehnična dokumentacija in/ali specifična  
tehnična dokumentacija:

Lastnosti proizvoda, navedenega zgoraj, so v skladu z navedenimi lastnostmi. Za izdajo te izjave o lastnostih je v skladu z Uredbo (EU) št. 305/2011 odgovoren izključno proizvajalec, naveden zgoraj.

Podpisal za in v imenu proizvajalca:

Thilo Pregartner, Dr.-Ing.  
Tumlingen, 2020-07-01

Peter Schillinger, Dipl.-Ing.

Ta izjava o lastnostih je bila pripravljena v različnih jezikih. V primeru nerazumevanja, se vedno upošteva angleška različica.

Priloga vsebuje informacije v angleškem jeziku, ki presegajo zakonske zahteve.

## Specific Part

### 1 Technical description of the product

The injection system fischer Superbond is a bonded anchor for use in concrete consisting of a cartridge with injection mortar fischer FIS SB or a resin capsule fischer RSB and a steel element according to Annex A 5.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The resin capsule is placed into the hole and the steel element is driven by machine with simultaneous hammering and turning. The anchor rod is anchored via the bond between steel element, chemical mortar and concrete

The product description is given in Annex A.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and references to the methods used for its assessment

#### 3.1 Mechanical resistance and stability (BWR 1)

| Essential characteristic                                                                 | Performance                       |
|------------------------------------------------------------------------------------------|-----------------------------------|
| Characteristic resistance to tension load (static and quasi-static loading)              | See Annex B 4 to B 8, C 1 to C 10 |
| Characteristic resistance to shear load (static and quasi-static loading)                | See Annex C 1 to C 4              |
| Displacements under short-term and long-term loading                                     | See Annex C 11 and C 12           |
| Characteristic resistance and displacements for seismic performance categories C1 and C2 | See Annex C 13 to C 16            |

#### 3.2 Hygiene, health and the environment (BWR 3)

| Essential characteristic                                 | Performance             |
|----------------------------------------------------------|-------------------------|
| Content, emission and/or release of dangerous substances | No performance assessed |

**Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

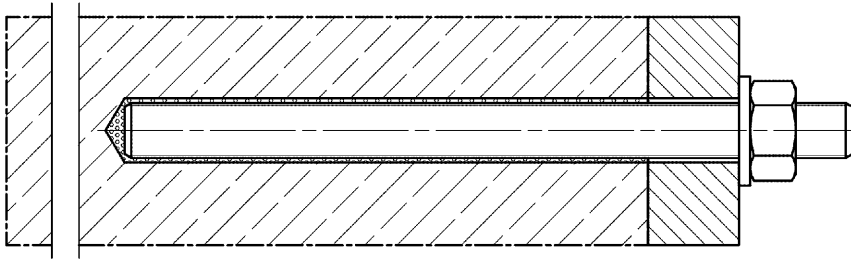
In accordance with the European Assessment Document EAD 330499-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

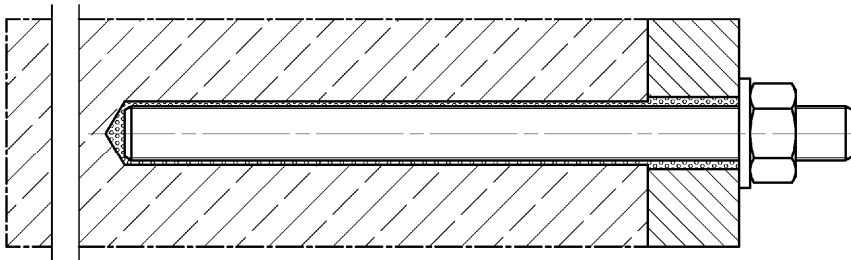
## Installation conditions part 1

anchor rod or fischer anchor rod RG M with fischer injection system FIS SB

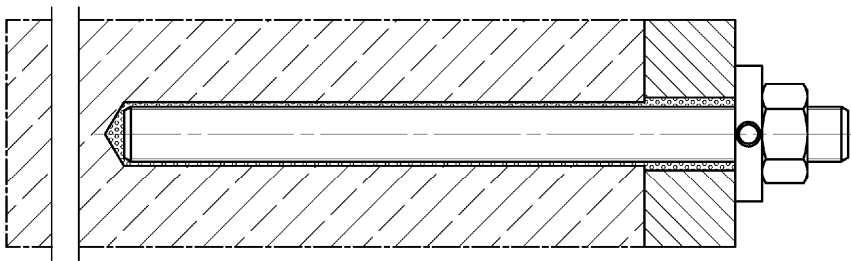
**Pre-positioned installation**



**Push through installation** (annular gap filled with mortar)



**Pre-positioned or push through installation with subsequently injected fischer filling disc**  
(annular gap filled with mortar)



Figures not to scale

fischer Superbond

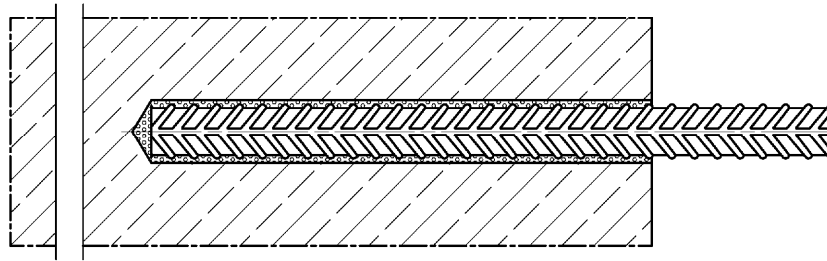
**Product description**  
Installation conditions part 1

**Annex A 1**

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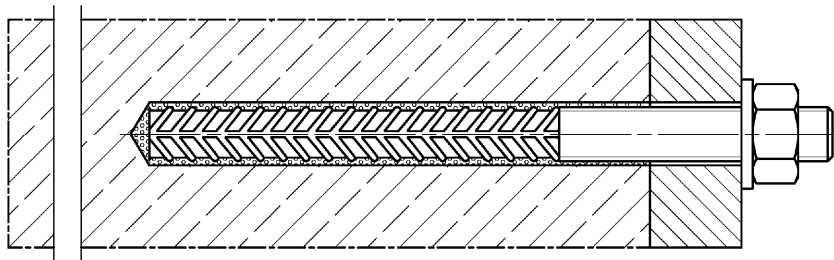
## Installation conditions part 2

### Reinforcing bar with fischer injection system FIS SB

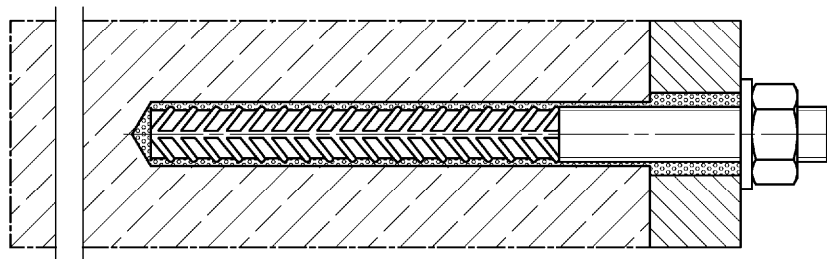


### fischer rebar anchor FRA with fischer injection system FIS SB

#### Pre-positioned installation



#### Push through installation (annular gap filled with mortar)



Figures not to scale

fischer Superbond

**Product description**  
Installation conditions part 2

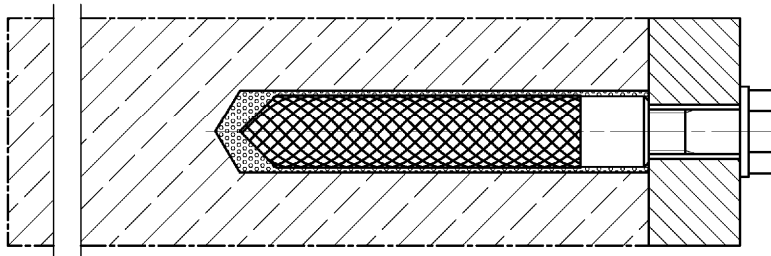
**Annex A 2**

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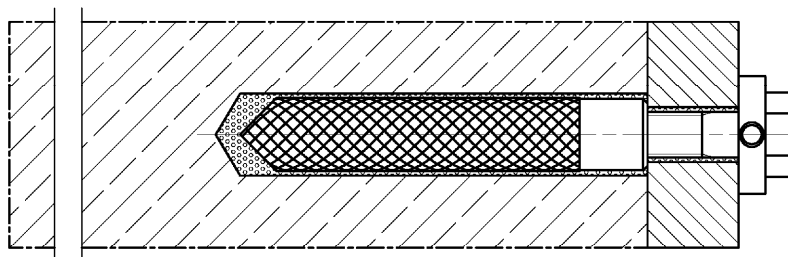
### Installation conditions part 3

fischer internal threaded anchor RG MI with fischer resin capsule system RSB or fischer injection system FIS SB

Pre-positioned installation

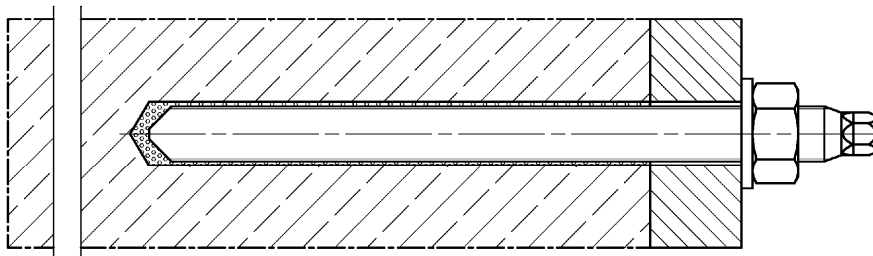


Pre-positioned installation with subsequently injected fischer filling disc (annular gap filled with mortar)

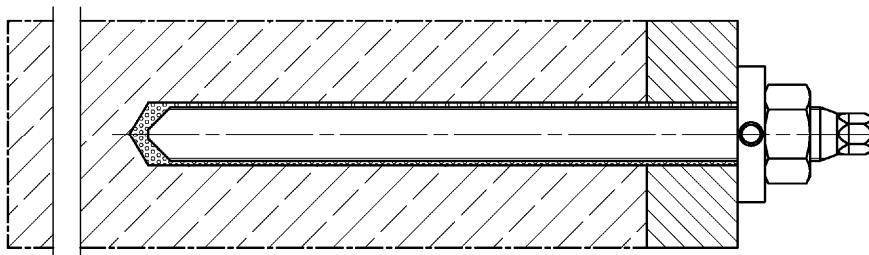


fischer anchor rod RG M with fischer resin capsule system RSB

Pre-positioned installation



Pre-positioned installation with subsequently injected fischer filling disc (annular gap filled with mortar)



Figures not to scale

fischer Superbond

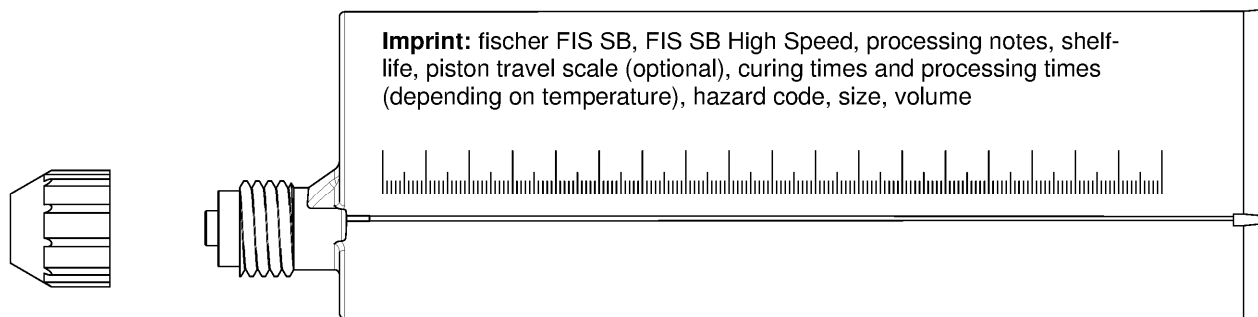
**Product description**  
Installation conditions part 3

**Annex A 3**

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## Overview system components Part 1

**Mortar cartridge (shuttle cartridge) with sealing cap; Sizes: 390 ml, 585 ml, 1100 ml, 1500 ml**

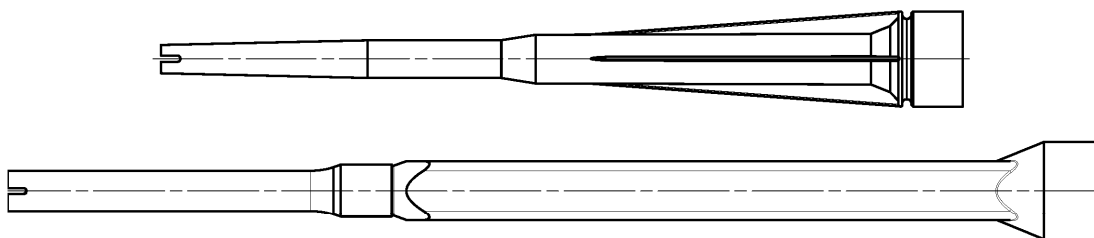


### Resin capsule

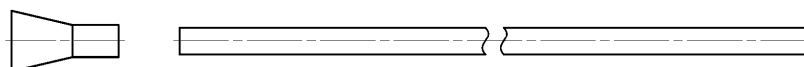
Sizes: 8, 10 mini, 10, 12 mini, 12, 16 mini, 16, 16 E, 20, 20 E / 24, 30



### Static mixer FIS MR Plus or UMR



### Injection adapter / extension tube for static mixer



Figures not to scale

fischer Superbond

#### Product description

Overview system components part 1;  
cartridges / capsule / static mixer / injection adapter

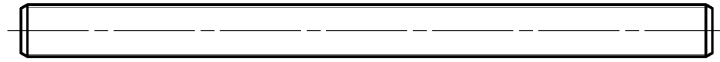
**Annex A 4**

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## Overview system components Part 2

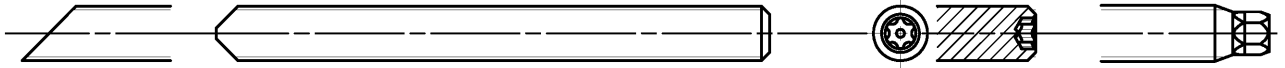
### anchor rod

Sizes: M8, M10, M12, M16, M20, M24, M27, M30



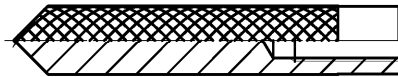
### fischer anchor rod RG M

Sizes: M8, M10, M12, M16, M20, M24, M30

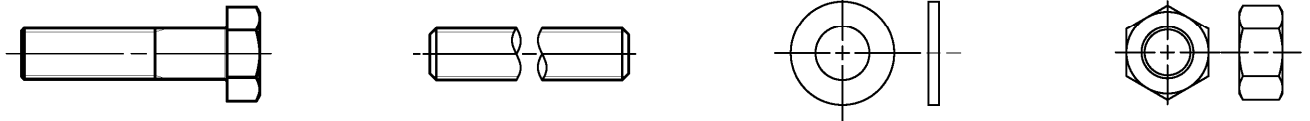


### fischer internal threaded anchor RG MI

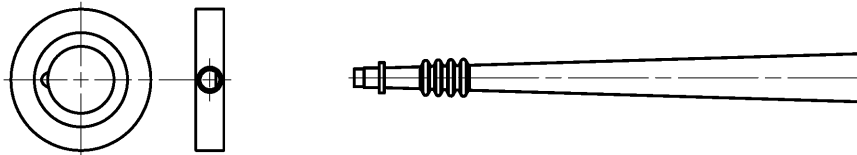
Size: M8, M10, M12, M16, M20



### Screw / threaded rod / washer / hexagon nut



### fischer filling disc with injection adapter



### Reinforcing bar

Nominal diameters:  $\phi 8$ ,  $\phi 10$ ,  $\phi 12$ ,  $\phi 14$ ,  $\phi 16$ ,  $\phi 20$ ,  $\phi 25$ ,  $\phi 28$ ,  $\phi 32$



### fischer rebar anchor FRA

Sizes: M12, M16, M20, M24



Figures not to scale

fischer Superbond

#### Product description

Overview system components part 2;  
steel components

**Annex A 5**

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Overview system components Part 3

Cleaning brush BS / BSB



Blow-out pump ABG or ABP with cleaning nozzle



Figures not to scale

fischer Superbond

**Product description**  
Overview system components part 3;  
cleaning brush / blow-out pump / injection adapter

**Table A7.1: Materials**

| Part | Designation                                                                                      | Material                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Injection cartridge                                                                              | Mortar, hardener, filler                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|      | Steel grade                                                                                      | Steel                                                                                                                                                                                                                                                                   | Stainless steel R                                                                                                                                                                                                                                                                                                             | High corrosion resistant steel HCR <sup>2)</sup>                                                                                                                                                                              |
|      |                                                                                                  | zinc plated                                                                                                                                                                                                                                                             | acc. to EN 10088-1:2014<br>Corrosion resistance class CRC III<br>acc. to EN 1993-1-4:2015                                                                                                                                                                                                                                     | acc. to EN 10088-1:2014<br>Corrosion resistance class CRC V<br>acc. to EN 1993-1-4:2015                                                                                                                                       |
| 2    | Anchor rod                                                                                       | Property class 4.8, 5.8 or 8.8;<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K)<br>or hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12\%$<br>fracture elongation | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>1.4062, 1.4662, 1.4462;<br>EN 10088-1:2014<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12\%$<br>fracture elongation                                                                                             | Property class 50 or 80<br>EN ISO 3506-1:2009<br>or property class 70 with<br>$f_{yk} = 560 \text{ N/mm}^2$<br>1.4565; 1.4529;<br>EN 10088-1:2014<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12\%$<br>fracture elongation |
|      |                                                                                                  | Fracture elongation $A_5 > 8\%$ , for applications without requirements for seismic performance category C2                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
| 3    | Washer<br>ISO 7089:2000                                                                          | zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K)<br>or hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004                                                                                                                                     | 1.4401; 1.4404;<br>1.4578; 1.4571;<br>1.4439; 1.4362;<br>EN 10088-1:2014                                                                                                                                                                                                                                                      | 1.4565; 1.4529;<br>EN 10088-1:2014                                                                                                                                                                                            |
| 4    | Hexagon nut                                                                                      | Property class 5 or 8;<br>EN ISO 898-2:2012<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K)<br>or hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004                                                                                      | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014                                                                                                                                                                                                    | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014                                                                                                                                        |
| 5    | fischer<br>internal threaded anchor<br>RG MI                                                     | Property class 5.8<br>ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K)                                                                                                                                                                 | Property class 70<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014                                                                                                                                                                                                              | Property class 70<br>EN ISO 3506-1:2009<br>1.4565; 1.4529;<br>EN 10088-1:2014                                                                                                                                                 |
| 6    | Commercial standard<br>screw or threaded rod<br>for fischer internal<br>threaded anchor<br>RG MI | Property class 5.8 or 8.8;<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K),<br>$A_5 > 8\%$<br>fracture elongation                                                                                                               | Property class 70<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014<br>$A_5 > 8\%$ fracture elongation                                                                                                                                                                           | Property class 70<br>EN ISO 3506-1:2009<br>1.4565; 1.4529;<br>EN 10088-1:2014<br>$A_5 > 8\%$<br>fracture elongation                                                                                                           |
| 7    | fischer filling disc<br>similar to DIN 6319-G                                                    | zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:2018/Zn5/An(A2K)<br>or hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004                                                                                                                                     | 1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014                                                                                                                                                                                                                                                         | 1.4565; 1.4529;<br>EN 10088-1:2014                                                                                                                                                                                            |
| 8    | Reinforcing bar<br>EN 1992-1-1:2004 and<br>AC:2010, Annex C                                      | Bars and de-coiled rods, class B or C with<br>$f_{yk}$ and $k$ according to NDP or NCL according to EN 1992-1-1/NA<br>$f_{uk} = f_{tk} = k \cdot f_{yk}$                                                                                                                |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
| 9    | fischer<br>rebar anchor FRA                                                                      | Rebar part:<br>Bars and de-coiled rods class B or C with $f_{yk}$<br>and $k$ according to NDP or NCL of EN<br>1992-1-1:2004+AC:2010<br>$f_{uk} = f_{tk} = k \cdot f_{yk}$                                                                                               | Threaded part: Property class 70 or 80<br>EN ISO 3506-1:2009<br>1.4401, 1.4404, 1.4571, 1.4578, 1.4439,<br>1.4362, 1.4062 acc. to EN 10088-1:2014<br>Corrosion resistance class CRC III<br>acc. to EN 1993-1-4:2015<br>1.4565; 1.4529 acc. to EN 10088-1:2014<br>Corrosion resistance class CRC V<br>acc. to EN 1993-1-4:2015 |                                                                                                                                                                                                                               |

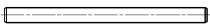
fischer Superbond

**Product description**  
 Materials
**Annex A 7**

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# Specifications of intended use (part 1)

**Table B1.1:** Overview use and performance categories, **injection mortar system FIS SB**

| Anchorages subject to                                                                                                                                                                                                                        |                        | FIS SB with ...                                                                                                                                     |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------|
|                                                                                                                                                                                                                                              |                        | anchor rod<br>                                                     |                                          | fischer internal threaded anchor RG MI<br> |                                          | Reinforcing bar<br> |                                          | fischer rebar anchor FRA<br> |                                           |
| Hammer drilling with standard drill bit<br>                                                                                                                 |                        | all sizes                                                                                                                                           |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Hammer drilling with hollow drill bit (fischer “FHD”, Heller “Duster Expert”; Bosch „Speed Clean“; Hilti "TE-CD, TE-YD", DreBo „D-Plus“, DreBo „D-Max“)<br> |                        | Nominal drill bit diameter (d <sub>0</sub> )<br>12 mm to 35 mm                                                                                      |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Diamond drilling<br>                                                                                                                                        |                        | not permitted                                                                                                                                       |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Static and quasi static load, in                                                                                                                                                                                                             | uncracked concrete     | all sizes                                                                                                                                           | Tables:<br>C1.1<br>C4.1<br>C5.1<br>C11.1 | all sizes                                                                                                                   | Tables:<br>C2.1<br>C4.1<br>C7.1<br>C11.2 | all sizes                                                                                             | Tables:<br>C3.1<br>C4.1<br>C9.1<br>C12.1 | all sizes                                                                                                       | Tables:<br>C3.2<br>C4.1<br>C10.1<br>C12.2 |
|                                                                                                                                                                                                                                              | cracked concrete       |                                                                                                                                                     |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Seismic performance category (only hammer drilling with standard / hollow drill bits)                                                                                                                                                        | C1                     | all sizes                                                                                                                                           | Tables:<br>C13.1<br>C14.2<br>C15.1       | _1)                                                                                                                         |                                          | all sizes                                                                                             | Tables:<br>C14.1<br>C14.2<br>C15.2       |                                                                                                                 | _1)                                       |
|                                                                                                                                                                                                                                              | C2                     | M12<br>M16<br>M20<br>M24                                                                                                                            | Tables:<br>C13.1<br>C14.2<br>C16.1       |                                                                                                                             |                                          |                                                                                                       | _1)                                      |                                                                                                                 |                                           |
| Use category                                                                                                                                                                                                                                 | I1 dry or wet concrete | all sizes                                                                                                                                           |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
|                                                                                                                                                                                                                                              | I2 water filled hole   | not permitted                                                                                                                                       |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Installation direction                                                                                                                                                                                                                       |                        | D3 (downward and horizontal and upwards (overhead) installation)                                                                                    |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Installation method                                                                                                                                                                                                                          |                        | pre-positioned or push through installation                                                                                                         |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| Installation temperature                                                                                                                                                                                                                     |                        | FIS SB: T <sub>i,min</sub> = -15 °C to T <sub>i,max</sub> = +40 °C<br>FIS SB High Speed: T <sub>i,min</sub> = -20 °C to T <sub>i,max</sub> = +40 °C |                                          |                                                                                                                             |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
| In-service temperature                                                                                                                                                                                                                       | Temperature range I    | -40 °C to +40 °C                                                                                                                                    |                                          | T <sub>st</sub> = +40 °C / T <sub>lt</sub> = +24 °C                                                                         |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
|                                                                                                                                                                                                                                              | Temperature range II   | -40 °C to +80 °C                                                                                                                                    |                                          | T <sub>st</sub> = +80 °C / T <sub>lt</sub> = +50 °C                                                                         |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
|                                                                                                                                                                                                                                              | Temperature range III  | -40 °C to +120 °C                                                                                                                                   |                                          | T <sub>st</sub> = +120 °C / T <sub>lt</sub> = +72 °C                                                                        |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |
|                                                                                                                                                                                                                                              | Temperature range IV   | -40 °C to +150 °C                                                                                                                                   |                                          | T <sub>st</sub> = +150 °C / T <sub>lt</sub> = +90 °C                                                                        |                                          |                                                                                                       |                                          |                                                                                                                 |                                           |

<sup>1)</sup> No performance assessed

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**Intended use**  
Specifications (part 1), fischer injection mortar system FIS SB

**Annex B 1**

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## Specifications of intended use (part 2)

**Table B2.1:** Overview use and performance categories, **resin capsule system RSB**

| Anchorages subject to                                                                                                                                                                                                                        |                        | RSB with ...                                                                                                 |                                                                                                                               |                         |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------|
|                                                                                                                                                                                                                                              |                        | fischer anchor rod RG M<br> | fischer internal threaded anchor RG MI<br> |                         |                                          |
| Hammer drilling with standard drill bit<br>                                                                                                                 |                        | all sizes                                                                                                    |                                                                                                                               |                         |                                          |
| Hammer drilling with hollow drill bit (fischer "FHD", Heller "Duster Expert"; Bosch „Speed Clean“; Hilti "TE-CD, TE-YD", DreBo „D-Plus“, DreBo „D-Max“)<br> |                        | Nominal drill bit diameter (d <sub>0</sub> )<br>12 mm to 35 mm                                               |                                                                                                                               | all sizes               |                                          |
| Diamond drilling<br>                                                                                                                                        |                        | all sizes <sup>1)</sup>                                                                                      |                                                                                                                               |                         |                                          |
| Static and quasi static load, in                                                                                                                                                                                                             | uncracked concrete     | all sizes                                                                                                    | Tables:<br>C1.1<br>C4.1<br>C6.1<br>C11.1                                                                                      | all sizes               | Tables:<br>C2.1<br>C4.1<br>C8.1<br>C11.2 |
|                                                                                                                                                                                                                                              | cracked concrete       | all sizes <sup>1)</sup>                                                                                      |                                                                                                                               | all sizes <sup>1)</sup> |                                          |
| Seismic performance category (only hammer drilling with standard / hollow drill bits)                                                                                                                                                        | C1                     | all sizes                                                                                                    | Tables:<br>C13.1<br>C14.2<br>C15.1                                                                                            | _2)                     |                                          |
|                                                                                                                                                                                                                                              | C2                     | _2)                                                                                                          |                                                                                                                               |                         |                                          |
| Use category                                                                                                                                                                                                                                 | I1 dry or wet concrete | all sizes                                                                                                    |                                                                                                                               |                         |                                          |
|                                                                                                                                                                                                                                              | I2 water filled hole   | all sizes                                                                                                    |                                                                                                                               |                         |                                          |
| Installation direction                                                                                                                                                                                                                       |                        | D3 (downward and horizontal and upwards (overhead) installation)                                             |                                                                                                                               |                         |                                          |
| Installation method                                                                                                                                                                                                                          |                        | only pre-positioned installation                                                                             |                                                                                                                               |                         |                                          |
| Installation temperature                                                                                                                                                                                                                     |                        | T <sub>i,min</sub> = -30 °C to T <sub>i,max</sub> = +40 °C                                                   |                                                                                                                               |                         |                                          |
| In-service temperature                                                                                                                                                                                                                       | Temperature range I    | -40 °C to +40 °C                                                                                             | T <sub>st</sub> = +40 °C / T <sub>lt</sub> = +24 °C                                                                           |                         |                                          |
|                                                                                                                                                                                                                                              | Temperature range II   | -40 °C to +80 °C                                                                                             | T <sub>st</sub> = +80 °C / T <sub>lt</sub> = +50 °C                                                                           |                         |                                          |
|                                                                                                                                                                                                                                              | Temperature range III  | -40 °C to +120 °C                                                                                            | T <sub>st</sub> = +120 °C / T <sub>lt</sub> = +72 °C                                                                          |                         |                                          |
|                                                                                                                                                                                                                                              | Temperature range IV   | -40 °C to +150 °C                                                                                            | T <sub>st</sub> = +150 °C / T <sub>lt</sub> = +90 °C                                                                          |                         |                                          |
| <sup>1)</sup> For diamond drilling in cracked concrete only nominal drill bit diameters (d <sub>0</sub> ) ≥ 18 mm are permitted<br><sup>2)</sup> No performance assessed                                                                     |                        |                                                                                                              |                                                                                                                               |                         |                                          |
| fischer Superbond                                                                                                                                                                                                                            |                        |                                                                                                              |                                                                                                                               |                         | <b>Annex B 2</b><br><br>Appendix 11/ 40  |
| <b>Intended use</b><br>Specifications (part 2), fischer resin capsule system RSB                                                                                                                                                             |                        |                                                                                                              |                                                                                                                               |                         |                                          |

## Specifications of intended use (part 3)

### Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel or high corrosion resistant steel).
- For all other conditions according to EN1993-1-4:2015 corresponding to corrosion resistance classes to Annex A 7 table A7.1.

### Design:

- Anchorages have to be designed by a responsible engineer with experience of concrete anchor design.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed in accordance with:  
EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.

### Installation:

- Anchor installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- In case of aborted hole: The hole shall be filled with mortar
- Anchorage depth should be marked and adhered to on installation
- Overhead installation is allowed

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**Intended use**  
Specifications (part 3)

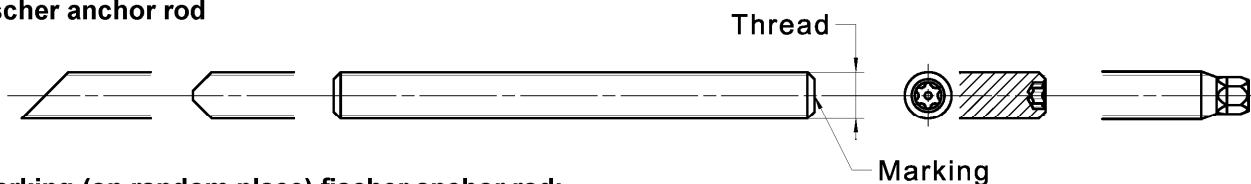
**Annex B 3**

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**Table B4.1: Installation parameters for anchor rods in combination with injection mortar system FIS SB**

| Anchor rods                                   |                                      | Thread | M8                             | M10 | M12 | M16 | M20             | M24 | M27 | M30 |
|-----------------------------------------------|--------------------------------------|--------|--------------------------------|-----|-----|-----|-----------------|-----|-----|-----|
| Width across flats                            | SW                                   | [mm]   | 13                             | 17  | 19  | 24  | 30              | 36  | 41  | 46  |
| Nominal drill hole diameter                   | $d_0$                                |        | 10                             | 12  | 14  | 18  | 24              | 28  | 30  | 35  |
| Drill hole depth                              | $h_0$                                |        | $h_0 = h_{ef}$                 |     |     |     |                 |     |     |     |
| Effective embedment depth                     | $h_{ef, min}$                        |        | 60                             | 60  | 70  | 80  | 90              | 96  | 108 | 120 |
|                                               | $h_{ef, max}$                        |        | 160                            | 200 | 240 | 320 | 400             | 480 | 540 | 600 |
| Minimum spacing and minimum edge distance     | $s_{min} = c_{min}$                  |        | 40                             | 45  | 55  | 65  | 85              | 105 | 120 | 140 |
| Diameter of the clearance hole of the fixture | pre-positioned installation<br>$d_f$ |        | 9                              | 12  | 14  | 18  | 22              | 26  | 30  | 33  |
|                                               | push through installation<br>$d_f$   |        | 11                             | 14  | 16  | 20  | 26              | 30  | 33  | 40  |
| Min. thickness of concrete member             | $h_{min}$                            |        | $h_{ef} + 30 \quad (\geq 100)$ |     |     |     | $h_{ef} + 2d_0$ |     |     |     |
| Maximum setting torque                        | $\max T_{inst}$                      | [Nm]   | 10                             | 20  | 40  | 60  | 120             | 150 | 200 | 300 |

**fischer anchor rod**



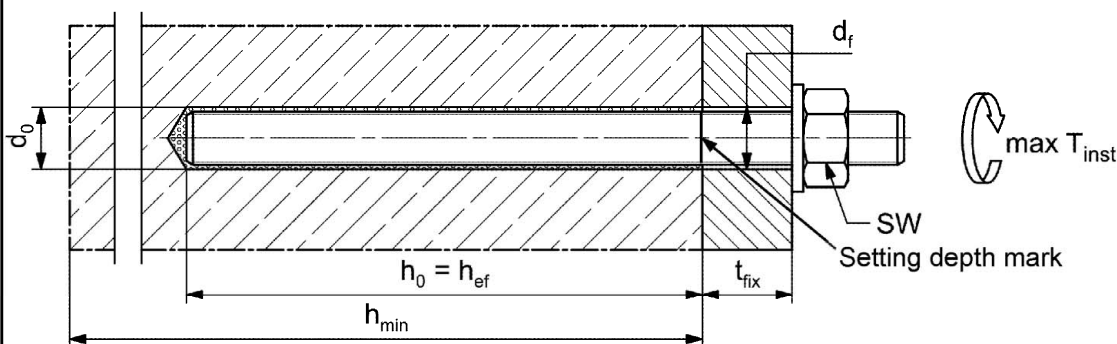
**Marking (on random place) fischer anchor rod:**

|                                                        |        |                                                        |   |
|--------------------------------------------------------|--------|--------------------------------------------------------|---|
| Steel zinc plated PC <sup>1)</sup> 8.8                 | • or + | Steel hot-dip PC <sup>1)</sup> 8.8                     | • |
| High corrosion resistant steel HCR PC <sup>1)</sup> 50 | •      | High corrosion resistant steel HCR PC <sup>1)</sup> 70 | - |
| High corrosion resistant steel HCR PC <sup>1)</sup> 80 | (      | Stainless steel R property class 50                    | ~ |
| Stainless steel R property class 80                    | *      |                                                        |   |

Alternatively: Colour coding according to DIN 976-1:2016

<sup>1)</sup> PC = property class

**Installation conditions:**



**Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:**

- Materials, dimensions and mechanical properties according to Annex A 7, Table A7.1
- Inspection certificate 3.1 according to EN 10204:2004, the documents have to be stored
- Setting depth is marked

Figures not to scale

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**Intended use**

Installation parameters for anchor rods in combination with injection mortar system FIS SB

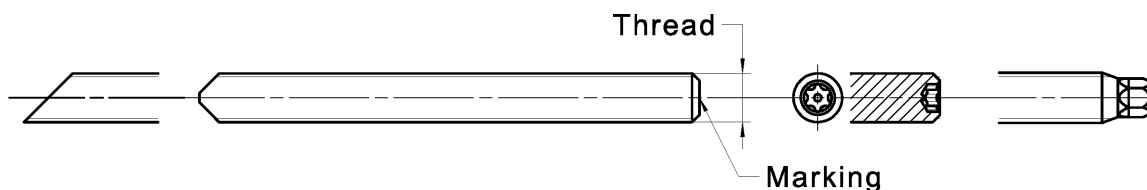
**Annex B 4**

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**Table B5.1: Installation parameters for fischer anchor rods RG M in combination with resin capsule system RSB**

| Anchor rod RG M                                              |                     | Thread | M8                              | M10 | M12 | M16             | M20 | M24 | M30 |
|--------------------------------------------------------------|---------------------|--------|---------------------------------|-----|-----|-----------------|-----|-----|-----|
| Width across flats                                           | SW                  | [mm]   | 13                              | 17  | 19  | 24              | 30  | 36  | 46  |
| Nominal drill hole diameter                                  | $d_0$               |        | 10                              | 12  | 14  | 18              | 25  | 28  | 35  |
| Drill hole depth                                             | $h_0$               |        | $h_0 = h_{ef}$                  |     |     |                 |     |     |     |
| Effective embedment depth                                    | $h_{ef,1}$          |        | ---                             | 75  | 75  | 95              | --- | --- | --- |
|                                                              | $h_{ef,2}$          |        | 80                              | 90  | 110 | 125             | 170 | 210 | 280 |
|                                                              | $h_{ef,3}$          |        | ---                             | 150 | 150 | 190             | 210 | --- | --- |
| Minimum spacing and minimum edge distance                    | $s_{min} = c_{min}$ |        | 40                              | 45  | 55  | 65              | 85  | 105 | 140 |
| Diameter of the pre-positioned clearance hole of the fixture | $d_f$               |        | 9                               | 12  | 14  | 18              | 22  | 26  | 33  |
| Min. thickness of concrete member                            | $h_{min}$           |        | $h_{ef} + 30$<br>( $\geq 100$ ) |     |     | $h_{ef} + 2d_0$ |     |     |     |
| Maximum setting torque                                       | $\max T_{inst}$     | [Nm]   | 10                              | 20  | 40  | 60              | 120 | 150 | 300 |

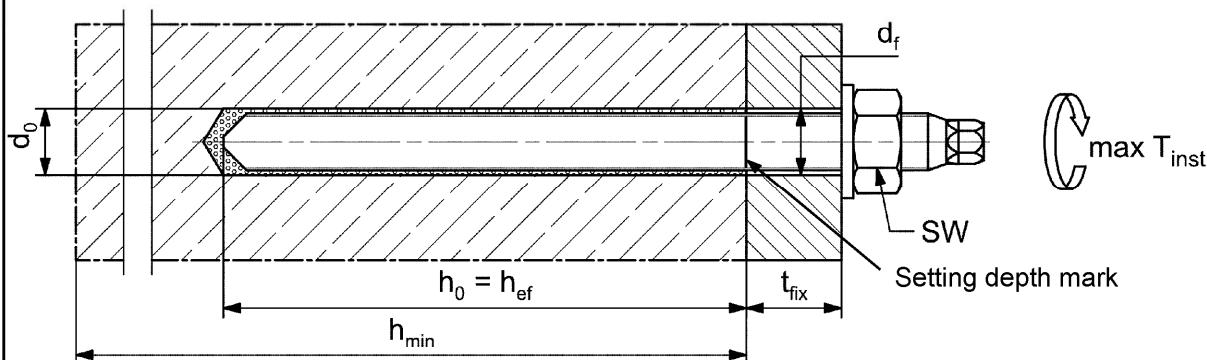
**fischer anchor rod RG M**



**Marking (on random place) fischer anchor rod RG M:**

|                                                          |        |                                                        |   |
|----------------------------------------------------------|--------|--------------------------------------------------------|---|
| Steel zinc plated PC <sup>1)</sup> 8.8                   | • or + | Steel hot-dip PC <sup>1)</sup> 8.8                     | • |
| High corrosion resistant steel HCR PC <sup>1)</sup> 50   | •      | High corrosion resistant steel HCR PC <sup>1)</sup> 70 | - |
| High corrosion resistant steel HCR PC <sup>1)</sup> 80   | (      | Stainless steel R property class 50                    | ~ |
| Stainless steel R property class 80                      | *      |                                                        |   |
| Alternatively: Colour coding according to DIN 976-1:2016 |        | <sup>1)</sup> PC = property class                      |   |

**Installation conditions:**



Figures not to scale

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**Intended use**

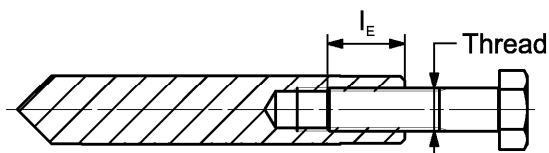
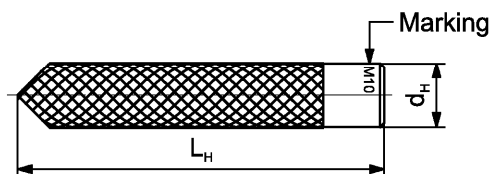
Installation parameters for fischer anchor rods RG M in combination with resin capsule system RSB

**Annex B 5**

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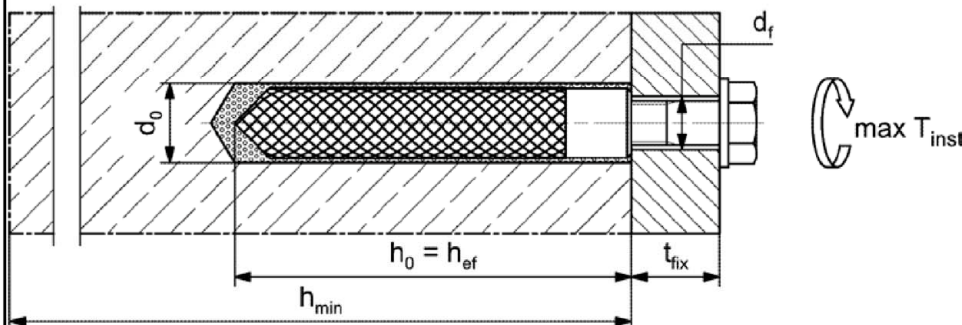
**Table B6.1:** Installation parameters for **fischer internal threaded anchors RG MI**

| Internal threaded anchor RG MI                  |                             | Thread | M8                   | M10 | M12 | M16 | M20 |
|-------------------------------------------------|-----------------------------|--------|----------------------|-----|-----|-----|-----|
| Sleeve diameter                                 | $d = d_H$                   | [mm]   | 12                   | 16  | 18  | 22  | 28  |
| Nominal drill hole diameter                     | $d_0$                       |        | 14                   | 18  | 20  | 24  | 32  |
| Drill hole depth                                | $h_0$                       |        | $h_0 = h_{ef} = L_H$ |     |     |     |     |
| Effective embedment depth<br>( $h_{ef} = L_H$ ) | $h_{ef}$                    |        | 90                   | 90  | 125 | 160 | 200 |
| Minimum spacing and minimum<br>edge distance    | $s_{min}$<br>=<br>$c_{min}$ |        | 55                   | 65  | 75  | 95  | 125 |
| Diameter of clearance hole in the<br>fixture    | $d_f$                       |        | 9                    | 12  | 14  | 18  | 22  |
| Minimum thickness of concrete<br>member         | $h_{min}$                   |        | 120                  | 125 | 165 | 205 | 260 |
| Maximum screw-in depth                          | $l_{E,max}$                 |        | 18                   | 23  | 26  | 35  | 45  |
| Minimum screw-in depth                          | $l_{E,min}$                 |        | 8                    | 10  | 12  | 16  | 20  |
| Maximum installation torque                     | $\max T_{inst}$             | [Nm]   | 10                   | 20  | 40  | 80  | 120 |

**fischer internal threaded anchor RG MI**

**Marking:** Anchor size e. g.: **M10**  
 Stainless steel → additional R; e.g.: **M10 R**  
 High corrosion resistant steel R → additional C; e.g.: **M10 HCR**

Retaining bolt or threaded rods (including nut and washer) must comply with the appropriate material and strength class of Annex A 7, Table A7.1

**Installation conditions:**

Figures not to scale

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**Intended use**

Installation parameters for fischer internal threaded anchors RG MI

**Annex B 6**

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**Table B7.1:** Installation parameters for **reinforcing bars**

| Nominal diameter of the bar               |                                           | $\phi$ | 8 <sup>1)</sup>                  |     | 10 <sup>1)</sup> |     | 12 <sup>1)</sup> |                                   | 14 | 16  | 20  | 25  | 28  | 32  |
|-------------------------------------------|-------------------------------------------|--------|----------------------------------|-----|------------------|-----|------------------|-----------------------------------|----|-----|-----|-----|-----|-----|
| Nominal drill hole diameter               | d <sub>0</sub>                            | [mm]   | 10                               | 12  | 12               | 14  | 14               | 16                                | 18 | 20  | 25  | 30  | 35  | 40  |
| Drill hole depth                          | h <sub>0</sub>                            |        | h <sub>0</sub> = h <sub>ef</sub> |     |                  |     |                  |                                   |    |     |     |     |     |     |
| Effective embedment depth                 | h <sub>ef,min</sub>                       |        | 60                               | 60  |                  | 70  |                  | 75                                |    | 80  | 90  | 100 | 112 | 128 |
|                                           | h <sub>ef,max</sub>                       |        | 160                              | 200 |                  | 240 |                  | 280                               |    | 320 | 400 | 500 | 560 | 640 |
| Minimum spacing and minimum edge distance | S <sub>min</sub><br>=<br>C <sub>min</sub> |        | 40                               | 45  |                  | 55  |                  | 60                                |    | 65  | 85  | 110 | 130 | 160 |
| Minimum thickness of concrete member      | h <sub>min</sub>                          |        | h <sub>ef</sub> + 30<br>(≥ 100)  |     |                  |     |                  | h <sub>ef</sub> + 2d <sub>0</sub> |    |     |     |     |     |     |

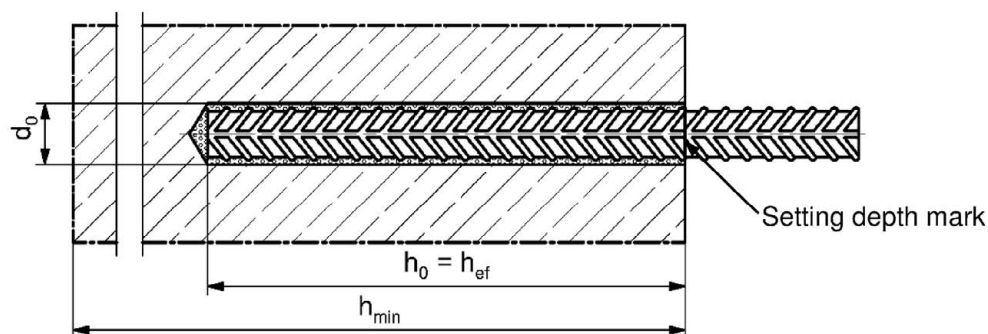
<sup>1)</sup> Both drill hole diameters can be used

### Reinforcing bar



- The minimum value of related rib area  $f_{R,min}$  must fulfil the requirements of EN 1992-1-1:2004+AC:2010
- The rib height must be within the range:  $0,05 \cdot \phi \leq h_{rib} \leq 0,07 \cdot \phi$   
( $\phi$  = Nominal diameter of the bar,  $h_{rib}$  = rib height)

### Installation conditions:



Figures not to scale

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**Intended use**  
Installation parameters reinforcing bars

**Annex B 7**

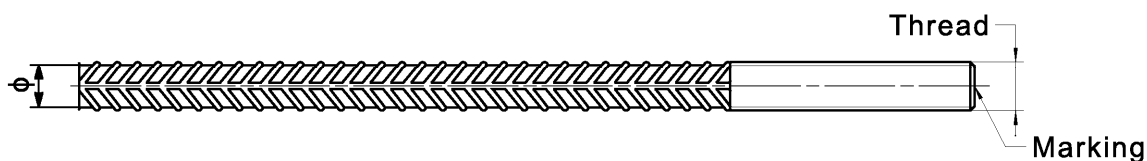
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**Table B8.1:** Installation parameters for **fischer rebar anchor FRA**

| Rebar anchor FRA                          |                                     | Thread | M12 <sup>1)</sup> |              | M16 | M20 | M24 |
|-------------------------------------------|-------------------------------------|--------|-------------------|--------------|-----|-----|-----|
| Nominal diameter of the bar               | $\phi$                              | [mm]   | 12                |              | 16  | 20  | 25  |
| Width across flats                        | SW                                  |        | 19                |              | 24  | 30  | 36  |
| Nominal drill hole diameter               | $d_0$                               |        | 14                | 16           | 20  | 25  | 30  |
| Drill hole depth                          | $h_0$                               |        | $h_{ef} + l_e$    |              |     |     |     |
| Effective embedment depth                 | $h_{ef,min}$                        |        | 70                |              | 80  | 90  | 96  |
|                                           | $h_{ef,max}$                        |        | 140               |              | 220 | 300 | 380 |
| Distance concrete surface to welded joint | $l_e$                               |        | 100               |              |     |     |     |
| Minimum spacing and minimum edge distance | $s_{min}$<br>=                      |        | 55                |              | 65  | 85  | 105 |
|                                           | $c_{min}$                           |        |                   |              |     |     |     |
| Diameter of clearance hole in the fixture | pre-positioned anchorage $\leq d_f$ |        | 14                |              | 18  | 22  | 26  |
|                                           | push through anchorage $\leq d_f$   |        | 18                |              | 22  | 26  | 32  |
| Minimum thickness of concrete member      | $h_{min}$                           |        | $h_0 + 30$        | $h_0 + 2d_0$ |     |     |     |
| Maximum installation torque               | $\max T_{inst}$                     | [Nm]   | 40                |              | 60  | 120 | 150 |

<sup>1)</sup> Both drill hole diameters can be used

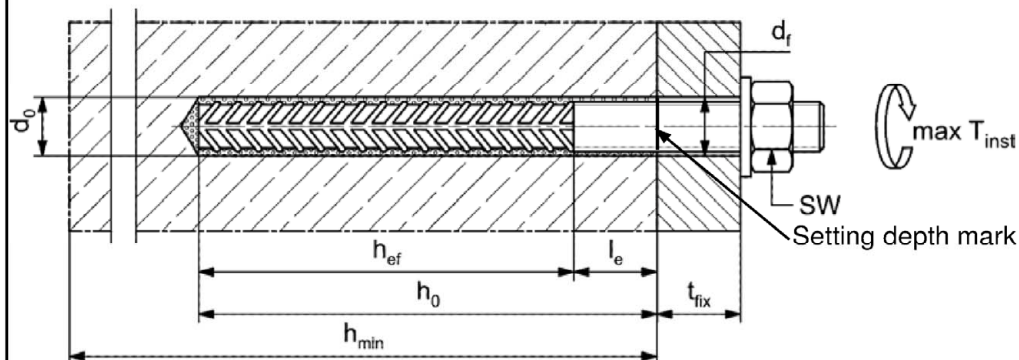
#### fischer rebar anchor FRA



Marking frontal e. g:

- FRA (for stainless steel);
- FRA HCR (for high corrosion resistant steel)

#### Installation conditions:



Figures not to scale

fischer Superbond

#### Intended use

Installation parameters rebar anchor FRA

**Annex B 8**

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**Table B9.1:** Dimension of **resin capsule RSB**

| Resin capsule RSB |                | RSB 8 | RSB 10 mini | RSB 10 | RSB 12 mini | RSB 12 | RSB 16 mini | RSB 16 | RSB 16 E | RSB 20 | RSB 20 E / 24 | RSB 30 |
|-------------------|----------------|-------|-------------|--------|-------------|--------|-------------|--------|----------|--------|---------------|--------|
| Capsule diameter  | d <sub>P</sub> | 9,0   | 10,5        |        | 12,5        |        | 16,5        |        |          | 23,0   |               | 27,5   |
| Capsule length    | L <sub>P</sub> |       |             |        |             |        |             |        |          |        |               |        |
|                   | [mm]           | 85    | 72          | 90     | 72          | 97     | 72          | 95     | 123      | 160    | 190           | 260    |

**Table B9.2:** Assignment of **resin capsule RSB** to **fischer anchor rod RG M**

| Anchor rod RG M           |                         | M8  | M10         | M12         | M16         | M20       | M24       | M30 |
|---------------------------|-------------------------|-----|-------------|-------------|-------------|-----------|-----------|-----|
| Effective embedment depth | h <sub>ef, 1</sub> [mm] | --- | 75          | 75          | 95          | ---       | ---       | --- |
| Related capsule RSB       | [-]                     | --- | 10 mini     | 12 mini     | 16 mini     | ---       | ---       | --- |
| Effective embedment depth | h <sub>ef, 2</sub> [mm] | 80  | 90          | 110         | 125         | 170       | 210       | 280 |
| Related capsule RSB       | [-]                     | 8   | 10          | 12          | 16          | 20        | 20 E / 24 | 30  |
| Effective embedment depth | h <sub>ef, 3</sub> [mm] | --- | 150         | 150         | 190         | 210       | ---       | --- |
| Related capsule RSB       | [-]                     | --- | 2 x 10 mini | 2 x 12 mini | 2 x 16 mini | 20 E / 24 | ---       | --- |

**Table B9.3:** Assignment of **resin capsule RSB** to **fischer internal threaded anchor RG MI**

| Internal threaded anchor RG MI |                      | M8 | M10 | M12 | M16  | M20       |
|--------------------------------|----------------------|----|-----|-----|------|-----------|
| Effective embedment depth      | h <sub>ef</sub> [mm] | 90 | 90  | 125 | 160  | 200       |
| Related capsule RSB            | [-]                  | 10 | 12  | 16  | 16 E | 20 E / 24 |

Figures not to scale

fischer Superbond

**Intended use**

Dimensions of the capsules; Assignment of the capsule to the fischer anchor rod RG M and fischer internal threaded anchor RG MI

**Annex B 9**

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**Table B10.1:** Parameters of the cleaning brush BS / BSB (steel brush with steel bristles)

The size of the cleaning brush refers to the drill hole diameter

|                             |       |      |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------------------------|-------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Nominal drill hole diameter | $d_0$ |      | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 25 | 28 | 30 | 32 | 35 | 40 |
| Steel brush diameter BS     | $d_b$ | [mm] | 11 | 14 | 16 | 20 |    | 25 | 26 | 27 | 30 | 40 |    |    | -  |
| Steel brush diameter BSB    | $d_b$ |      | -  | -  | -  | -  |    | -  | -  | -  | -  | -  |    |    | 42 |



**Table B10.2:** Maximum **processing time** of the mortar and minimum **curing time**  
 (During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature. Minimal cartridge temperature +5 °C; minimal resin capsule temperature -15 °C)

| Temperature at anchoring base [°C] | Maximum processing time<br>$t_{work}$ |                   | Minimum curing time<br>$t_{cure}$ |                   |        |
|------------------------------------|---------------------------------------|-------------------|-----------------------------------|-------------------|--------|
|                                    | FIS SB                                | FIS SB High Speed | FIS SB                            | FIS SB High Speed | RSB    |
| -30 to -20                         | ---                                   | ---               | ---                               | ---               | 120 h  |
| > -20 to -15                       | ---                                   | 60 min            | ---                               | 24 h              | 48 h   |
| > -15 to -10                       | 60 min                                | 30 min            | 36 h                              | 8 h               | 30 h   |
| > -10 to -5                        | 30 min                                | 15 min            | 24 h                              | 3 h               | 16 h   |
| > -5 to 0                          | 20 min                                | 10 min            | 8 h                               | 2 h               | 10 h   |
| > 0 to 5                           | 13 min                                | 5 min             | 4 h                               | 1 h               | 45 min |
| > 5 to 10                          | 9 min                                 | 3 min             | 2 h                               | 45 min            | 30 min |
| > 10 to 20                         | 5 min                                 | 2 min             | 1 h                               | 30 min            | 20 min |
| > 20 to 30                         | 4 min                                 | 1 min             | 45 min                            | 15 min            | 5 min  |
| > 30 to 40                         | 2 min                                 | ---               | 30 min                            | ---               | 3 min  |

Figures not to scale

fischer Superbond

**Intended use**

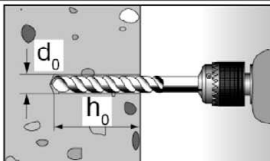
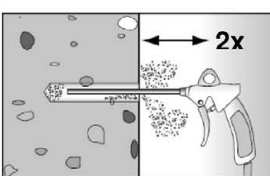
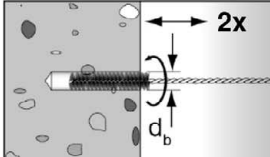
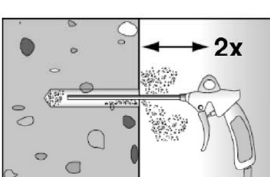
Cleaning brush (steel brush)  
Processing time and curing time

**Annex B 10**

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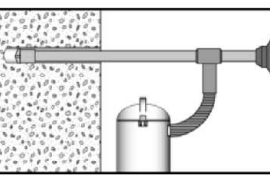
## Installation instructions part 1; Injection mortar system FIS SB

### Drilling and cleaning the hole (hammer drilling with standard drill bit)

|   |                                                                                   |                                                                                                                                                                                                                                                                                                        |
|---|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | <p>Drill the hole.<br/>Nominal drill hole diameter <math>d_0</math> and drill hole depth <math>h_0</math><br/>see <b>tables B4.1, B6.1, B7.1, B8.1</b></p>                                                                                                                                             |
| 2 |  | <p>Clean the drill hole:<br/>Blow out the drill hole twice, with oil free compressed air (<math>p \geq 6</math> bar)<br/>In uncracked concrete the use of the manual blow-out pump ABG is possible<br/>(Installation parameters:<br/><math>d_0 &lt; 18</math> mm and <math>h_{ef} &lt; 10d</math>)</p> |
| 3 |  | <p>Brush the drill hole twice. For drill hole diameter <math>\geq 30</math> mm use a power drill.<br/>For deep holes use an extension. Corresponding brushes see <b>table B10.1</b></p>                                                                                                                |
| 4 |  | <p>Clean the drill hole:<br/>Blow out the drill hole twice, with oil free compressed air (<math>p \geq 6</math> bar)<br/>In uncracked concrete the use of the manual blow-out pump ABG is possible<br/>(Installation parameters:<br/><math>d_0 &lt; 18</math> mm and <math>h_{ef} &lt; 10d</math>)</p> |

Go to step 5 (Annex B 12)

### Drilling and cleaning the hole (hammer drilling with hollow drill bit)

|   |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | <p>Check a suitable hollow drill (see <b>table B1.1</b>)<br/>for correct operation of the dust extraction</p>                                                                                                                                                                                                                                                                                                                                                  |
| 2 |  | <p>Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.</p> <p>Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter <math>d_0</math> and drill hole depth <math>h_0</math><br/>see <b>tables B4.1, B6.1, B7.1, B8.1</b></p> |

Go to step 5 (Annex B 12)

fischer Superbond

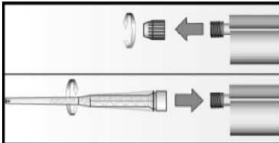
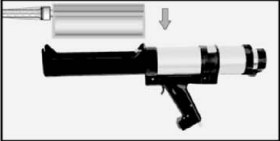
**Intended use**  
Installation instructions part 1; injection mortar system FIS SB

**Annex B 11**

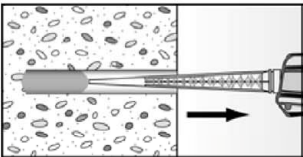
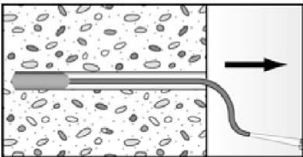
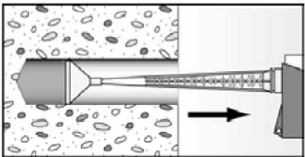
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## Installation instructions part 2; injection mortar system FIS SB

### Preparing the cartridge

|   |                                                                                   |                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 |  | <p>Remove the sealing cap</p> <p>Screw on the static mixer<br/>(the spiral in the static mixer must be clearly visible)</p>                                                                                                 |
| 6 |  |  <p>Place the cartridge into the dispenser</p>                                                                                             |
| 7 |  |  <p>Extrude approximately 10 cm of material out until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey</p> |

### Injection of the mortar

|   |                                                                                                                                                                                                           |                                                                                                                                                              |                                                                                                                                                                                                                                               |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 |  <p>Fill approximately 2/3 of the drill hole with mortar. Always begin from the bottom of the hole and avoid bubbles</p> |  <p>For drill hole depth <math>\geq 150</math> mm use an extension tube</p> |  <p>For overhead installation, deep holes (<math>h_0 &gt; 250</math> mm) or drill hole diameter (<math>d_0 \geq 40</math> mm) use an injection-adapter</p> |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Go to step 9 (Annex B 13)

fischer Superbond

#### Intended use

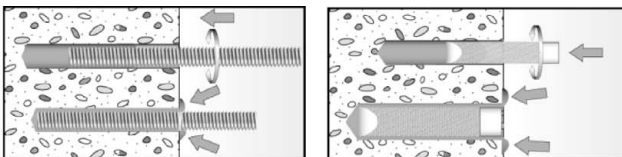
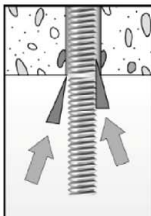
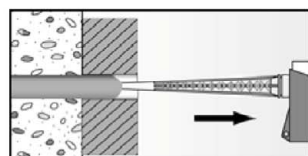
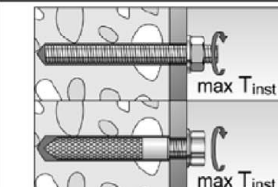
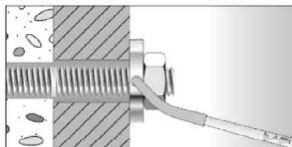
Installation instructions part 2; injection mortar system FIS SB

**Annex B 12**

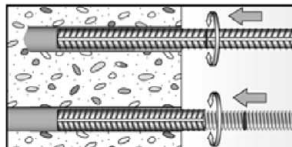
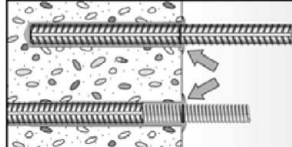
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## Installation instructions part 3; injection mortar system FIS SB

### Installation of anchor rods or fischer internal threaded anchors RG MI

|        |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9      |                                                                                                         | <p>Only use clean and oil-free metal part. Mark the setting depth of the metal part. Push the anchor rod or fischer internal threaded RG MI anchor down to the bottom of the hole, turning it slightly while doing so. After inserting the metal part, excess mortar must be emerged around the anchor element. If not, pull out the metal part immediately and reinject mortar.</p>                          |
|        |  <p>For overhead installations support the metal part with wedges. (e. g. fischer centering wedges)</p> |  <p>For push through installation fill the annular gap with mortar</p>                                                                                                                                                                                                                                                      |
| 11     |  <p>Wait for the specified curing time <math>t_{cure}</math> see <b>table B10.2</b></p>                 | <p>12</p>  <p>Mounting the fixture <math>\max T_{inst}</math> see <b>tables B4.1 and B6.1</b></p>                                                                                                                                                                                                                           |
| Option |                                                                                                        | <p>After the minimum curing time is reached, the gap between metal part and fixture (annular clearance) may be filled with mortar via the fischer filling disc. Compressive strength <math>\geq 50 \text{ N/mm}^2</math> (e.g. fischer injection mortars FIS HB, FIS SB, FIS V, FIS EM Plus)<br/> <b>ATTENTION:</b> Using fischer filling disc reduces <math>t_{fix}</math> (usable length of the anchor)</p> |

### Installation reinforcing bars and fischer rebar anchor FRA

|    |                                                                                                                                                                            |                                                                                                                                                                                                                       |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 |                                                                                         | <p>Only use clean and oil-free reinforcing bars or fischer FRA. Mark the setting depth. Turn while using force to push the reinforcement bar or the fischer FRA into the filled hole up to the setting depth mark</p> |
|    |                                                                                         | <p>When the setting depth mark is reached, excess mortar must be emerged from the mouth of the drill hole. If not, pull out the anchor element immediately and reinject mortar.</p>                                   |
| 11 |  <p>Wait for the specified curing time <math>t_{cure}</math> see <b>table B10.2</b></p> | <p>12</p>  <p>Mounting the fixture <math>\max T_{inst}</math> see <b>table B8.1</b></p>                                           |

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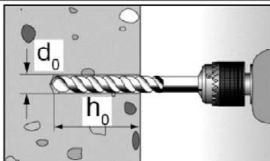
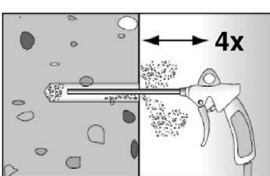
**Intended use**  
 Installation instructions part 3; injection mortar system FIS SB

**Annex B 13**

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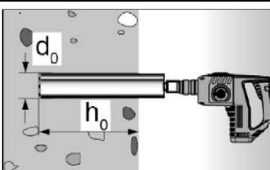
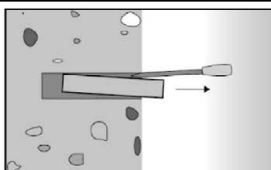
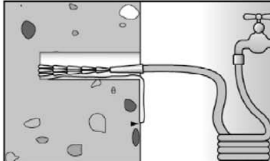
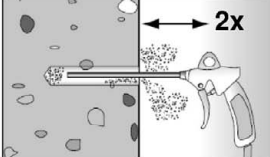
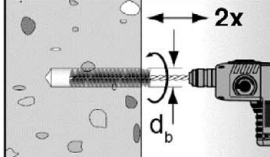
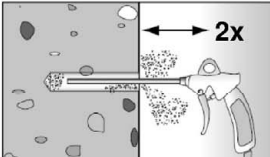
## Installation instructions part 4; resin capsule RSB

### Drilling and cleaning the hole (hammer drilling with standard drill bit)

|   |                                                                                   |                                                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | Drill the hole.<br>Nominal drill hole diameter $d_0$ and drill hole depth $h_0$<br>see <b>tables B5.1</b> and <b>B6.1</b>                                                                                                                                   |
| 2 |  | Clean the drill hole:<br>Blow out the drill hole four times, with oil free compressed air ( $p \geq 6$ bar)<br>In uncracked concrete the use of the manual blow-out pump ABG is possible<br>(Installation parameters:<br>$d_0 < 18$ mm and $h_{ef} < 10d$ ) |

Go to step 6 (Annex B 15)

### Drilling and cleaning the hole (wet drilling with diamond drill bit)

|   |                                                                                     |                                                                                                                   |                                                                                                                          |
|---|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 1 |    | Drill the hole.<br>Drill hole diameter $d_0$ and drill hole depth $h_0$<br>see <b>tables B5.1</b> and <b>B6.1</b> | <br>Break the drill core and remove it |
| 2 |   | Flush the drill hole with clean water until it flows clear                                                        |                                                                                                                          |
| 3 |  | Blow out the drill hole twice, using oil-free compressed air ( $p > 6$ bar)                                       |                                                                                                                          |
| 4 |  | Brush the drill hole twice using a power drill. Corresponding brushes see <b>table B10.1</b>                      |                                                                                                                          |
| 5 |  | Blow out the drill hole twice, using oil-free compressed air ( $p > 6$ bar)                                       |                                                                                                                          |

Go to step 6 (Annex B 15)

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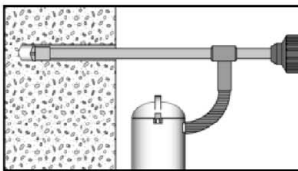
**Intended use**  
Installation instructions part 4; resin capsule RSB

**Annex B 14**

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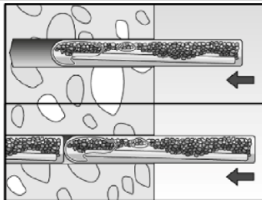
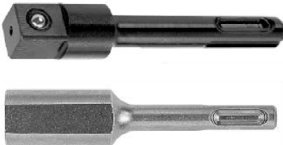
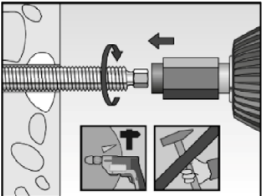
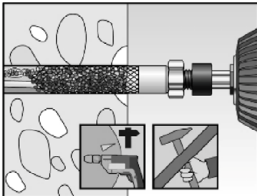
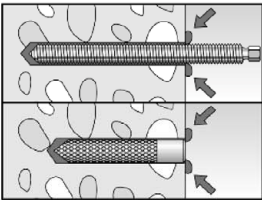
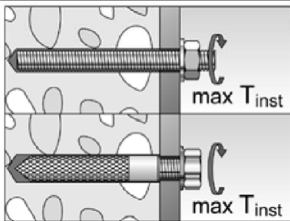
## Installation instructions part 5; resin capsule RSB

### Drilling and cleaning the hole (hammer drilling with hollow drill bit)

|   |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | Check a suitable hollow drill (see <b>table B2.1</b> ) for correct operation of the dust extraction                                                                                                                                                                                                                                                                                                                                                      |
| 2 |  | <p>Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.</p> <p>Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter <math>d_0</math> and drill hole depth <math>h_0</math> see <b>tables B5.1</b> and <b>B6.1</b></p> |

Go to step 6 (Annex B 15)

### Installation fischer anchor rod RG M or fischer internal threaded anchor RG MI

|   |                                                                                     |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                             |                                                                                      |
|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 6 |    | Insert the resin capsule into the drill hole by hand.<br>Suitable resin capsule RSB or RSB mini see <b>table B9.2.</b>                                                                                                                                              |                                                                                                                                                                                                                                           | Depending on the metal part being installed, use a suitable setting tool             |
| 7 |  |                                                                                                                                                                                  | Only use clean and grease-free metal parts. Using a suitable adapter, drive the fischer anchor rod RG M or the fischer internal threaded anchor RG MI into the capsule using a hammer drill set on rotary hammer action. Stop when the metal parts reaches the bottom of the hole and is set to the correct embedment depth |                                                                                      |
| 8 |  | When reaching the correct embedment depth, excess mortar must emerge from the mouth of the drill hole. If not, the metal parts must be pulled out directly and a second resin capsule must be pushed into the drill hole. Setting process must be repeated (Step 7) |                                                                                                                                                                                                                                                                                                                             |                                                                                      |
| 9 |  | Wait for the specified curing time, $t_{cure}$ see <b>table B10.2</b>                                                                                                                                                                                               | 10                                                                                                                                                                                                                                                                                                                          |  |

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#### Intended use

Installation instructions part 5; resin capsule RSB

#### Annex B 15

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**Table C1.1:** Characteristic values for **steel failure** under tension / shear load of **fischer anchor rods** and **standard threaded rods**

| Anchor rod / standard threaded rod                               |                                                          |                |     | M8   | M10                       | M12    | M16 | M20 | M24 | M27 | M30  |      |
|------------------------------------------------------------------|----------------------------------------------------------|----------------|-----|------|---------------------------|--------|-----|-----|-----|-----|------|------|
| Bearing capacity under tension load, steel failure <sup>3)</sup> |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| Characteristic resistance $N_{Rk,s}$                             | Steel zinc plated                                        | Property class | 4.8 | [kN] | 15(13)                    | 23(21) | 33  | 63  | 98  | 141 | 184  | 224  |
|                                                                  |                                                          |                | 5.8 |      | 19(17)                    | 29(27) | 43  | 79  | 123 | 177 | 230  | 281  |
|                                                                  |                                                          |                | 8.8 |      | 29(27)                    | 47(43) | 68  | 126 | 196 | 282 | 368  | 449  |
|                                                                  | Stainless steel R and high corrosion resistant steel HCR |                | 50  |      | 19                        | 29     | 43  | 79  | 123 | 177 | 230  | 281  |
|                                                                  |                                                          |                | 70  |      | 26                        | 41     | 59  | 110 | 172 | 247 | 322  | 393  |
|                                                                  |                                                          |                | 80  |      | 30                        | 47     | 68  | 126 | 196 | 282 | 368  | 449  |
| Partial factors <sup>1)</sup>                                    |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| Partial factor $\gamma_{Ms,N}$                                   | Steel zinc plated                                        | Property class | 4.8 | [-]  | 1,50                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 5.8 |      | 1,50                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 8.8 |      | 1,50                      |        |     |     |     |     |      |      |
|                                                                  | Stainless steel R and high corrosion resistant steel HCR |                | 50  |      | 2,86                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 70  |      | 1,50 <sup>2)</sup> / 1,87 |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 80  |      | 1,60                      |        |     |     |     |     |      |      |
| Bearing capacity under shear load, steel failure <sup>3)</sup>   |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| without lever arm                                                |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| Characteristic resistance $V_{Rk,s}$                             | Steel zinc plated                                        | Property class | 4.8 | [kN] | 9(8)                      | 14(13) | 20  | 38  | 59  | 85  | 110  | 135  |
|                                                                  |                                                          |                | 5.8 |      | 11(10)                    | 17(16) | 25  | 47  | 74  | 106 | 138  | 168  |
|                                                                  |                                                          |                | 8.8 |      | 15(13)                    | 23(21) | 34  | 63  | 98  | 141 | 184  | 225  |
|                                                                  | Stainless steel R and high corrosion resistant steel HCR |                | 50  |      | 9                         | 15     | 21  | 39  | 61  | 89  | 115  | 141  |
|                                                                  |                                                          |                | 70  |      | 13                        | 20     | 30  | 55  | 86  | 124 | 161  | 197  |
|                                                                  |                                                          |                | 80  |      | 15                        | 23     | 34  | 63  | 98  | 141 | 184  | 225  |
| Ductility factor                                                 |                                                          | k <sub>7</sub> | [-] | 1,0  |                           |        |     |     |     |     |      |      |
| with lever arm                                                   |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| Characteristic resistance $M_{Rk,s}^0$                           | Steel zinc plated                                        | Property class | 4.8 | [Nm] | 15(13)                    | 30(27) | 52  | 133 | 259 | 448 | 665  | 899  |
|                                                                  |                                                          |                | 5.8 |      | 19(16)                    | 37(33) | 65  | 166 | 324 | 560 | 833  | 1123 |
|                                                                  |                                                          |                | 8.8 |      | 30(26)                    | 60(53) | 105 | 266 | 519 | 896 | 1333 | 1797 |
|                                                                  | Stainless steel R and high corrosion resistant steel HCR |                | 50  |      | 19                        | 37     | 65  | 166 | 324 | 560 | 833  | 1123 |
|                                                                  |                                                          |                | 70  |      | 26                        | 52     | 92  | 232 | 454 | 784 | 1167 | 1573 |
|                                                                  |                                                          |                | 80  |      | 30                        | 60     | 105 | 266 | 519 | 896 | 1333 | 1797 |
| Partial factors <sup>1)</sup>                                    |                                                          |                |     |      |                           |        |     |     |     |     |      |      |
| Partial factor $\gamma_{Ms,V}$                                   | Steel zinc plated                                        | Property class | 4.8 | [-]  | 1.25                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 5.8 |      | 1.25                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 8.8 |      | 1.25                      |        |     |     |     |     |      |      |
|                                                                  | Stainless steel R and high corrosion resistant steel HCR |                | 50  |      | 2.38                      |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 70  |      | 1.25 <sup>2)</sup> / 1.56 |        |     |     |     |     |      |      |
|                                                                  |                                                          |                | 80  |      | 1.33                      |        |     |     |     |     |      |      |

<sup>1)</sup> In absence of other national regulations

<sup>2)</sup> Only admissible for high corrosion resistant steel C, with  $f_{yk} / f_{uk} \geq 0,8$  and  $A_s > 12 \%$  (e.g. fischer anchor rods)

<sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area  $A_s$  for hotdip galvanized standard threaded rods according to EN ISO 10684:2004+AC:2009

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#### Performances

Characteristic values for steel failure capacity of fischer anchor rods and standard threaded rods

**Annex C 1**

Appendix 25/ 40

**Table C2.1:** Characteristic values for **steel failure** under tension / shear load of **fischer internal threaded anchors RG MI**

| fischer internal threaded anchors RG MI            |                                |                   |                | M8   | M10  | M12  | M16  | M20  |      |
|----------------------------------------------------|--------------------------------|-------------------|----------------|------|------|------|------|------|------|
| Bearing capacity under tension load, steel failure |                                |                   |                |      |      |      |      |      |      |
| Charact.<br>resistance with<br>screw               | N <sub>Rk,s</sub>              | Property class    | 5.8            | [kN] | 19   | 29   | 43   | 79   | 123  |
|                                                    |                                |                   | 8.8            |      | 29   | 47   | 68   | 108  | 179  |
|                                                    |                                | Property class 70 | R              |      | 26   | 41   | 59   | 110  | 172  |
|                                                    |                                |                   | HCR            |      | 26   | 41   | 59   | 110  | 172  |
| Partial factors <sup>1)</sup>                      |                                |                   |                |      |      |      |      |      |      |
| Partial factors                                    | γ <sub>Ms,N</sub>              | Property class    | 5.8            | [-]  | 1,50 |      |      |      |      |
|                                                    |                                |                   | 8.8            |      | 1,50 |      |      |      |      |
|                                                    |                                | Property class 70 | R              |      | 1,87 |      |      |      |      |
|                                                    |                                |                   | HCR            |      | 1,87 |      |      |      |      |
| Bearing capacity under shear load, steel failure   |                                |                   |                |      |      |      |      |      |      |
| Without lever arm                                  |                                |                   |                |      |      |      |      |      |      |
| Charact.<br>resistance with<br>screw               | V <sup>0</sup> <sub>Rk,s</sub> | Property class    | 5.8            | [kN] | 9,2  | 14,5 | 21,1 | 39,2 | 62,0 |
|                                                    |                                |                   | 8.8            |      | 14,6 | 23,2 | 33,7 | 54,0 | 90,0 |
|                                                    |                                | Property class 70 | R              |      | 12,8 | 20,3 | 29,5 | 54,8 | 86,0 |
|                                                    |                                |                   | HCR            |      | 12,8 | 20,3 | 29,5 | 54,8 | 86,0 |
| Ductility factor                                   |                                |                   | k <sub>7</sub> | [-]  | 1,0  |      |      |      |      |
| With lever arm                                     |                                |                   |                |      |      |      |      |      |      |
| Charact.<br>resistance with<br>screw               | M <sup>0</sup> <sub>Rk,s</sub> | Property class    | 5.8            | [Nm] | 20   | 39   | 68   | 173  | 337  |
|                                                    |                                |                   | 8.8            |      | 30   | 60   | 105  | 266  | 519  |
|                                                    |                                | Property class 70 | R              |      | 26   | 52   | 92   | 232  | 454  |
|                                                    |                                |                   | HCR            |      | 26   | 52   | 92   | 232  | 454  |
| Partial factors <sup>1)</sup>                      |                                |                   |                |      |      |      |      |      |      |
| Partial factors                                    | γ <sub>Ms,V</sub>              | Property class    | 5.8            | [-]  | 1,25 |      |      |      |      |
|                                                    |                                |                   | 8.8            |      | 1,25 |      |      |      |      |
|                                                    |                                | Property class 70 | R              |      | 1,56 |      |      |      |      |
|                                                    |                                |                   | HCR            |      | 1,56 |      |      |      |      |

<sup>1)</sup> In absence of other national regulations

fischer Superbond

#### Performances

Characteristic values for steel failure under tension / shear load  
fischer internal threaded anchor RG MI

**Annex C 2**

Appendix 26/ 40

**Table C3.1:** Characteristic values for **steel failure** under tension / shear load of **reinforcing bars**

| Nominal diameter of the bar                        |              | $\phi$ | 8                                    | 10 | 12 | 14 | 16 | 20 | 25 | 28 | 32 |
|----------------------------------------------------|--------------|--------|--------------------------------------|----|----|----|----|----|----|----|----|
| Bearing capacity under tension load, steel failure |              |        |                                      |    |    |    |    |    |    |    |    |
| Characteristic resistance                          | $N_{Rk,s}$   | [kN]   | $A_s \cdot f_{uk}^{1)}$              |    |    |    |    |    |    |    |    |
| Bearing capacity under shear load, steel failure   |              |        |                                      |    |    |    |    |    |    |    |    |
| Without lever arm                                  |              |        |                                      |    |    |    |    |    |    |    |    |
| Characteristic resistance                          | $V_{Rk,s}$   | [kN]   | $0,5 \cdot A_s \cdot f_{uk}^{1)}$    |    |    |    |    |    |    |    |    |
| Ductility factor                                   | $k_7$        | [-]    | 1,0                                  |    |    |    |    |    |    |    |    |
| With lever arm                                     |              |        |                                      |    |    |    |    |    |    |    |    |
| Characteristic resistance                          | $M^0_{Rk,s}$ | [Nm]   | $1,2 \cdot W_{el} \cdot f_{uk}^{1)}$ |    |    |    |    |    |    |    |    |

<sup>1)</sup>  $f_{uk}$  or  $f_{yk}$  respectively must be taken from the specifications of the reinforcing bar

**Table C3.2:** Characteristic values for **steel failure** under tension / shear load of **fischer rebar anchors FRA**

| fischer rebar anchor FRA                           |                                |      | M12  | M16 | M20 | M24 |
|----------------------------------------------------|--------------------------------|------|------|-----|-----|-----|
| Bearing capacity under tension load, steel failure |                                |      |      |     |     |     |
| Characteristic resistance                          | N <sub>Rk,s</sub>              | [kN] | 63   | 111 | 173 | 270 |
| Partial factor <sup>1)</sup>                       |                                |      |      |     |     |     |
| Partial factor                                     | γ <sub>Ms,N</sub>              | [-]  | 1,4  |     |     |     |
| Bearing capacity under shear load, steel failure   |                                |      |      |     |     |     |
| Without lever arm                                  |                                |      |      |     |     |     |
| Characteristic resistance                          | V <sub>Rk,s</sub>              | [kN] | 30   | 55  | 86  | 124 |
| Ductility factor                                   | k <sub>7</sub>                 | [-]  | 1,0  |     |     |     |
| With lever arm                                     |                                |      |      |     |     |     |
| Characteristic resistance                          | M <sup>0</sup> <sub>Rk,s</sub> | [Nm] | 92   | 233 | 454 | 785 |
| Partial factor <sup>1)</sup>                       |                                |      |      |     |     |     |
| Partial factor                                     | γ <sub>Ms,V</sub>              | [-]  | 1,56 |     |     |     |

<sup>1)</sup> In absence of other national regulations

fischer Superbond

**Performances**

Characteristic values for steel failure under tension / shear load of reinforcing bars and fischer rebar anchors FRA

**Annex C 3**

Appendix 27/ 40

**Table C4.1:** Characteristic values for **concrete failure** under tension / shear load

| Size                                                                                         |                                 |                        | All sizes             |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
|----------------------------------------------------------------------------------------------|---------------------------------|------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|----------------|------|-----------------|-------------------------------------|-----------------|----|----|
| Tension load                                                                                 |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Installation factor                                                                          |                                 | $\gamma_{\text{inst}}$ | [-]                   | See annex C 5 to C 10 and C 15 to C16                                                                                                                                                  |                 |                |                |      |                 |                                     |                 |    |    |
| Factors for the compressive strength of concrete > C20/25                                    |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Increasing factor for $\tau_{\text{Rk}}$                                                     | C25/30                          | $\Psi_c$               | [-]                   | 1,02                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | C30/37                          |                        |                       | 1,04                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | C35/45                          |                        |                       | 1,07                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | C40/50                          |                        |                       | 1,08                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | C45/55                          |                        |                       | 1,09                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | C50/60                          |                        |                       | 1,10                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
| Splitting failure                                                                            |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Edge distance                                                                                | $h / h_{\text{ef}} \geq 2,0$    | $C_{\text{cr,sp}}$     | [mm]                  | 1,0 $h_{\text{ef}}$                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | $2,0 > h / h_{\text{ef}} > 1,3$ |                        |                       | 4,6 $h_{\text{ef}}$ - 1,8 h                                                                                                                                                            |                 |                |                |      |                 |                                     |                 |    |    |
|                                                                                              | $h / h_{\text{ef}} \leq 1,3$    |                        |                       | 2,26 $h_{\text{ef}}$                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
| Spacing                                                                                      |                                 | $S_{\text{cr,sp}}$     |                       | 2 $C_{\text{cr,sp}}$                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
| Concrete cone failure                                                                        |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Uncracked concrete                                                                           |                                 | $k_{\text{ucr,N}}$     | [-]                   | 11,0                                                                                                                                                                                   |                 |                |                |      |                 |                                     |                 |    |    |
| Cracked concrete                                                                             |                                 | $k_{\text{cr,N}}$      |                       | 7,7                                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
| Edge distance                                                                                |                                 | $C_{\text{cr,N}}$      | [mm]                  | 1,5 $h_{\text{ef}}$                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
| Spacing                                                                                      |                                 | $S_{\text{cr,N}}$      |                       | 2 $C_{\text{cr,N}}$                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
| Factors for sustained tension load                                                           |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Temperature range                                                                            |                                 |                        | [-]                   | 24 °C / 40 °C                                                                                                                                                                          | 50 °C / 80 °C   | 72 °C / 120 °C | 90 °C / 150 °C |      |                 |                                     |                 |    |    |
| Factor                                                                                       |                                 |                        | $\Psi^0_{\text{sus}}$ | [-]                                                                                                                                                                                    | 0,84            | 0,86           | 0,84           | 0,91 |                 |                                     |                 |    |    |
| Shear load                                                                                   |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Installation factor                                                                          |                                 | $\gamma_{\text{inst}}$ | [-]                   | 1,0                                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
| Concrete pry-out failure                                                                     |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Factor for pry-out failure                                                                   |                                 | $k_8$                  | [-]                   | 2,0                                                                                                                                                                                    |                 |                |                |      |                 |                                     |                 |    |    |
| Concrete edge failure                                                                        |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Effective length of fastener in shear loading                                                |                                 | $l_f$                  | [mm]                  | for $d_{\text{nom}} \leq 24 \text{ mm}$ : min ( $h_{\text{ef}}$ ; 12 $d_{\text{nom}}$ )<br>for $d_{\text{nom}} > 24 \text{ mm}$ : min ( $h_{\text{ef}}$ ; 8 $d_{\text{nom}}$ ; 300 mm) |                 |                |                |      |                 |                                     |                 |    |    |
| Calculation diameters                                                                        |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| Size                                                                                         |                                 |                        |                       | M8                                                                                                                                                                                     | M10             | M12            | M16            | M20  | M24             | M27                                 | M30             |    |    |
| fischer anchor rods and standard threaded rods                                               |                                 | $d_{\text{nom}}$       | [mm]                  | 8                                                                                                                                                                                      | 10              | 12             | 16             | 20   | 24              | 27                                  | 30              |    |    |
| fischer internal threaded anchors RG MI                                                      |                                 | $d_{\text{nom}}$       |                       | 12                                                                                                                                                                                     | 16              | 18             | 22             | 28   | - <sup>1)</sup> | - <sup>1)</sup>                     | - <sup>1)</sup> |    |    |
| fischer rebar anchor FRA                                                                     |                                 | $d_{\text{nom}}$       |                       | - <sup>1)</sup>                                                                                                                                                                        | - <sup>1)</sup> | 12             | 16             | 20   | 25              | - <sup>1)</sup>                     | - <sup>1)</sup> |    |    |
| Size (nominal diameter of the bar)                                                           |                                 |                        | $\phi$                | 8                                                                                                                                                                                      | 10              | 12             | 14             | 16   | 20              | 25                                  | 28              | 32 |    |
| Reinforcing bar                                                                              |                                 |                        | $d_{\text{nom}}$      | [mm]                                                                                                                                                                                   | 8               | 10             | 12             | 14   | 16              | 20                                  | 25              | 28 | 32 |
| <sup>1)</sup> Anchor type not part of the ETA                                                |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |
| fischer Superbond                                                                            |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 | <b>Annex C 4</b><br>Appendix 28/ 40 |                 |    |    |
| <b>Performances</b><br>Characteristic values for concrete failure under tension / shear load |                                 |                        |                       |                                                                                                                                                                                        |                 |                |                |      |                 |                                     |                 |    |    |

|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Table C5.1:</b> Characteristic values for combined pull-out and concrete failure for <b>fischer anchor rods</b> and <b>standard threaded rods</b> in hammer drilled holes in combination with <b>injection mortar FIS SB; uncracked or cracked concrete</b> |                     |                 |         |     |     |     |     |     |     |     |     |
| Anchor rod / standard threaded rod                                                                                                                                                                                                                             |                     |                 | M8      | M10 | M12 | M16 | M20 | M24 | M27 | M30 |     |
| Combined pullout and concrete cone failure                                                                                                                                                                                                                     |                     |                 |         |     |     |     |     |     |     |     |     |
| Thread diameter                                                                                                                                                                                                                                                |                     | d               | [mm]    | 8   | 10  | 12  | 16  | 20  | 24  | 27  | 30  |
| Uncracked concrete                                                                                                                                                                                                                                             |                     |                 |         |     |     |     |     |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25                                                                                                                                                                                                    |                     |                 |         |     |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)                                                                                                                                                                              |                     |                 |         |     |     |     |     |     |     |     |     |
| Temperature range                                                                                                                                                                                                                                              | I: 24 °C / 40 °C    | $\tau_{Rk,ucr}$ | [N/mm²] | 12  | 13  | 13  | 13  | 13  | 12  | 10  | 10  |
|                                                                                                                                                                                                                                                                | II: 50 °C / 80 °C   |                 |         | 12  | 12  | 12  | 13  | 13  | 12  | 10  | 10  |
|                                                                                                                                                                                                                                                                | III: 72 °C / 120 °C |                 |         | 10  | 11  | 11  | 11  | 11  | 11  | 9,0 | 9,0 |
|                                                                                                                                                                                                                                                                | IV: 90 °C / 150 °C  |                 |         | 10  | 10  | 10  | 11  | 10  | 10  | 8,0 | 8,0 |
| Installation factors                                                                                                                                                                                                                                           |                     |                 |         |     |     |     |     |     |     |     |     |
| Dry or wet concrete                                                                                                                                                                                                                                            |                     | $\gamma_{inst}$ | [-]     | 1,0 |     |     |     |     |     |     |     |
| Cracked concrete                                                                                                                                                                                                                                               |                     |                 |         |     |     |     |     |     |     |     |     |
| Characteristic bond resistance in cracked concrete C20/25                                                                                                                                                                                                      |                     |                 |         |     |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)                                                                                                                                                                              |                     |                 |         |     |     |     |     |     |     |     |     |
| Temperature range                                                                                                                                                                                                                                              | I: 24 °C / 40 °C    | $\tau_{Rk,cr}$  | [N/mm²] | 6,5 | 7,0 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
|                                                                                                                                                                                                                                                                | II: 50 °C / 80 °C   |                 |         | 6,0 | 6,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,0 | 7,0 |
|                                                                                                                                                                                                                                                                | III: 72 °C / 120 °C |                 |         | 5,5 | 6,0 | 6,5 | 6,5 | 6,5 | 6,5 | 6,0 | 6,0 |
|                                                                                                                                                                                                                                                                | IV: 90 °C / 150 °C  |                 |         | 5,0 | 5,5 | 6,0 | 6,0 | 6,0 | 6,0 | 5,5 | 5,5 |
| Installation factors                                                                                                                                                                                                                                           |                     |                 |         |     |     |     |     |     |     |     |     |
| Dry or wet concrete                                                                                                                                                                                                                                            |                     | $\gamma_{inst}$ | [-]     | 1,0 |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                |                     |                 |         |     |     |     |     |     |     |     |     |
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**Table C6.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer anchor rods RG M** in hammer or diamond drilled holes in combination with **resin capsule RSB; uncracked or cracked concrete**

| Anchor rod RG M                                                                                                |                     |                 |                 | M8      | M10 | M12 | M16 | M20 | M24 | M30 |     |
|----------------------------------------------------------------------------------------------------------------|---------------------|-----------------|-----------------|---------|-----|-----|-----|-----|-----|-----|-----|
| Combined pullout and concrete cone failure                                                                     |                     |                 |                 |         |     |     |     |     |     |     |     |
| Thread diameter                                                                                                |                     | d               | [mm]            | 8       | 10  | 12  | 16  | 20  | 24  | 30  |     |
| Uncracked concrete                                                                                             |                     |                 |                 |         |     |     |     |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25                                                    |                     |                 |                 |         |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete as well as water filled hole) |                     |                 |                 |         |     |     |     |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,ucr}$ | [N/mm²] | 12  | 13  | 13  | 13  | 13  | 12  | 10  |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                 |         | 12  | 12  | 12  | 13  | 13  | 12  | 10  |
|                                                                                                                | III: 72 °C / 120 °C |                 |                 |         | 10  | 11  | 11  | 11  | 11  | 11  | 9,0 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                 |         | 10  | 10  | 10  | 11  | 10  | 10  | 8,0 |
| Diamond-drilling (dry or wet concrete as well as water filled hole)                                            |                     |                 |                 |         |     |     |     |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,ucr}$ | [N/mm²] | 13  | 13  | 14  | 14  | 14  | 13  | 11  |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                 |         | 12  | 13  | 13  | 14  | 13  | 13  | 10  |
|                                                                                                                | III: 72 °C / 120 °C |                 |                 |         | 11  | 12  | 12  | 12  | 12  | 11  | 9,5 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                 |         | 10  | 11  | 11  | 11  | 11  | 10  | 8,5 |
| Installation factors                                                                                           |                     |                 |                 |         |     |     |     |     |     |     |     |
| Dry or wet concrete                                                                                            |                     | $\gamma_{inst}$ | [-]             | 1,0     |     |     |     |     |     |     |     |
| Water filled hole                                                                                              |                     |                 |                 | 1,2     |     | 1,0 |     |     |     |     |     |
| Cracked concrete                                                                                               |                     |                 |                 |         |     |     |     |     |     |     |     |
| Characteristic bond resistance in cracked concrete C20/25                                                      |                     |                 |                 |         |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete as well as water filled hole) |                     |                 |                 |         |     |     |     |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,cr}$  | [N/mm²] | 6,5 | 7,0 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                 |         | 6,0 | 6,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,0 |
|                                                                                                                | III: 72 °C / 120 °C |                 |                 |         | 5,5 | 6,0 | 6,5 | 6,5 | 6,5 | 6,5 | 6,0 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                 |         | 5,0 | 5,5 | 6,0 | 6,0 | 6,0 | 6,0 | 5,5 |
| Diamond-drilling (dry or wet concrete as well as water filled hole)                                            |                     |                 |                 |         |     |     |     |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,cr}$  | [N/mm²] | -1) | -1) | -1) | 7,5 | 7,5 | 7,5 | 7,5 |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                 |         | -1) | -1) | -1) | 7,5 | 7,5 | 7,5 | 7,0 |
|                                                                                                                | III: 72 °C / 120 °C |                 |                 |         | -1) | -1) | -1) | 6,5 | 6,5 | 6,5 | 6,5 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                 |         | -1) | -1) | -1) | 6,0 | 6,0 | 6,0 | 6,0 |
| Installation factors                                                                                           |                     |                 |                 |         |     |     |     |     |     |     |     |
| Dry or wet concrete                                                                                            |                     | $\gamma_{inst}$ | [-]             | 1,0     |     |     |     |     |     |     |     |
| Water filled hole                                                                                              |                     |                 |                 | 1,2     |     | 1,0 |     |     |     |     |     |

<sup>1)</sup> No performance assessed

fischer Superbond

## Performances

Characteristic values for combined pull-out and concrete failure for  
fischer anchor rod RG M with resin capsule RSB

## Annex C 6

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**Table C7.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer internal threaded anchors RG MI** in hammer drilled holes in combination with **injection mortar FIS SB; uncracked or cracked concrete**

| Internal threaded anchor RG MI             |        | M8 | M10 | M12 | M16 | M20 |
|--------------------------------------------|--------|----|-----|-----|-----|-----|
| Combined pullout and concrete cone failure |        |    |     |     |     |     |
| Sleeve diameter                            | d [mm] | 12 | 16  | 18  | 22  | 28  |

## Uncracked concrete

Characteristic bond resistance in uncracked concrete C20/25

Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)

|                   |                     |                 |                      |    |     |     |     |     |
|-------------------|---------------------|-----------------|----------------------|----|-----|-----|-----|-----|
| Temperature range | I: 24 °C / 40 °C    | $\tau_{Rk,ucr}$ | [N/mm <sup>2</sup> ] | 12 | 12  | 11  | 11  | 9,5 |
|                   | II: 50 °C / 80 °C   |                 |                      | 12 | 11  | 11  | 10  | 9,0 |
|                   | III: 72 °C / 120 °C |                 |                      | 11 | 10  | 10  | 9,0 | 8,0 |
|                   | IV: 90 °C / 150 °C  |                 |                      | 10 | 9,5 | 9,0 | 8,5 | 7,5 |

## Installation factors

|                     |                 |     |     |
|---------------------|-----------------|-----|-----|
| Dry or wet concrete | $\gamma_{inst}$ | [-] | 1,0 |
|---------------------|-----------------|-----|-----|

### Cracked concrete

### Characteristic bond resistance in cracked concrete C20/25

Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)

|                           |                     |                 |                      |     |
|---------------------------|---------------------|-----------------|----------------------|-----|
| Tem-<br>perature<br>range | I: 24 °C / 40 °C    | $\tau_{Rik,cr}$ | [N/mm <sup>2</sup> ] | 5,0 |
|                           | II: 50 °C / 80 °C   |                 |                      | 5,0 |
|                           | III: 72 °C / 120 °C |                 |                      | 4,5 |
|                           | IV: 90 °C / 150 °C  |                 |                      | 4,0 |

## Installation factors

|                     |                        |     |     |
|---------------------|------------------------|-----|-----|
| Dry or wet concrete | $\gamma_{\text{inst}}$ | [-] | 1,0 |
|---------------------|------------------------|-----|-----|

fischer Superbond

## Performances

Characteristic values for combined pull-out and concrete failure for fischer internal threaded anchor RG MI with injection mortar FIS SB

## Annex C 7

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**Table C8.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer internal threaded anchors RG MI** in hammer or diamond drilled holes in combination with **resin capsule RSB; uncracked or cracked concrete**

| Internal threaded anchor RG MI                                                                                 |                     |                 | M8                                   | M10             | M12 | M16 | M20 |     |
|----------------------------------------------------------------------------------------------------------------|---------------------|-----------------|--------------------------------------|-----------------|-----|-----|-----|-----|
| Combined pullout and concrete cone failure                                                                     |                     |                 |                                      |                 |     |     |     |     |
| Sleeve diameter                                                                                                |                     | d               | [mm]                                 | 12              | 16  | 18  | 22  | 28  |
| Uncracked concrete                                                                                             |                     |                 |                                      |                 |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25                                                    |                     |                 |                                      |                 |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete as well as water filled hole) |                     |                 |                                      |                 |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,ucr}$ [N/mm <sup>2</sup> ] | 12              | 12  | 11  | 11  | 9,5 |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                                      | 12              | 11  | 11  | 10  | 9,0 |
|                                                                                                                | III: 72 °C / 120 °C |                 |                                      | 11              | 10  | 10  | 9,0 | 8,0 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                                      | 10              | 9,5 | 9,0 | 8,5 | 7,5 |
| Diamond-drilling (dry or wet concrete as well as water filled hole)                                            |                     |                 |                                      |                 |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,ucr}$ [N/mm <sup>2</sup> ] | 13              | 12  | 12  | 11  | 10  |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                                      | 13              | 12  | 12  | 11  | 9,5 |
|                                                                                                                | III: 72 °C / 120 °C |                 |                                      | 11              | 11  | 10  | 9,5 | 8,5 |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                                      | 10              | 10  | 9,5 | 9,0 | 8,0 |
| Installation factors                                                                                           |                     |                 |                                      |                 |     |     |     |     |
| Dry or wet concrete                                                                                            |                     | $\gamma_{inst}$ | [-]                                  | 1,0             |     |     |     |     |
| Water filled hole                                                                                              |                     |                 |                                      | 1,2             | 1,0 |     |     |     |
| Cracked concrete                                                                                               |                     |                 |                                      |                 |     |     |     |     |
| Characteristic bond resistance in cracked concrete C20/25                                                      |                     |                 |                                      |                 |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete as well as water filled hole) |                     |                 |                                      |                 |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]  | 5,0             |     |     |     |     |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                                      | 5,0             |     |     |     |     |
|                                                                                                                | III: 72 °C / 120 °C |                 |                                      | 4,5             |     |     |     |     |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                                      | 4,0             |     |     |     |     |
| Diamond-drilling (dry or wet concrete as well as water filled hole)                                            |                     |                 |                                      |                 |     |     |     |     |
| Temperature range                                                                                              | I: 24 °C / 40 °C    |                 | $\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]  | - <sup>1)</sup> | 5,0 |     |     |     |
|                                                                                                                | II: 50 °C / 80 °C   |                 |                                      | - <sup>1)</sup> | 5,0 |     |     |     |
|                                                                                                                | III: 72 °C / 120 °C |                 |                                      | - <sup>1)</sup> | 4,5 |     |     |     |
|                                                                                                                | IV: 90 °C / 150 °C  |                 |                                      | - <sup>1)</sup> | 4,0 |     |     |     |
| Installation factors                                                                                           |                     |                 |                                      |                 |     |     |     |     |
| Dry or wet concrete                                                                                            |                     | $\gamma_{inst}$ | [-]                                  | 1,0             |     |     |     |     |
| Water filled hole                                                                                              |                     |                 |                                      | 1,2             | 1,0 |     |     |     |

<sup>1)</sup> No performance assessed

fischer Superbond

## Performances

Characteristic values for combined pull-out and concrete failure for fischer internal threaded anchor RG MI with resin capsule RSB

## Annex C 8

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**Table C9.1:** Characteristic values for **combined pull-out** and concrete failure for **reinforcing bars** in hammer drilled holes in combination with **injection mortar FIS SB: uncracked or cracked concrete**

| Nominal diameter of the bar $\phi$                                                |                     |                 | 8                    | 10  | 12  | 14  | 16  | 20  | 25  | 28  | 32  |     |
|-----------------------------------------------------------------------------------|---------------------|-----------------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Combined pullout and concrete cone failure                                        |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Bar diameter                                                                      |                     | d               | [mm]                 | 8   | 10  | 12  | 14  | 16  | 20  | 25  | 28  | 32  |
| Uncracked concrete                                                                |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25                       |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Temperature range                                                                 | I: 24 °C / 40 °C    | $\tau_{Rk,ucr}$ | [N/mm <sup>2</sup> ] | 8,0 | 8,5 | 9,0 | 9,5 | 9,5 | 10  | 9,5 | 9,0 | 7,5 |
|                                                                                   | II: 50 °C / 80 °C   |                 |                      | 8,0 | 8,5 | 9,0 | 9,0 | 9,5 | 9,5 | 9,0 | 8,5 | 7,5 |
|                                                                                   | III: 72 °C / 120 °C |                 |                      | 7,0 | 7,5 | 8,0 | 8,0 | 8,5 | 8,5 | 8,0 | 7,5 | 6,5 |
|                                                                                   | IV: 90 °C / 150 °C  |                 |                      | 6,5 | 7,0 | 7,0 | 7,5 | 7,5 | 8,0 | 7,5 | 7,0 | 6,0 |
| Installation factors                                                              |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Dry or wet concrete                                                               |                     | $\gamma_{inst}$ | [-]                  | 1,0 |     |     |     |     |     |     |     |     |
| Cracked concrete                                                                  |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Characteristic bond resistance in cracked concrete C20/25                         |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Temperature range                                                                 | I: 24 °C / 40 °C    | $\tau_{Rk,cr}$  | [N/mm <sup>2</sup> ] | 4,5 | 6,0 | 6,0 | 6,0 | 7,0 | 6,0 | 6,0 | 6,0 | 6,0 |
|                                                                                   | II: 50 °C / 80 °C   |                 |                      | 4,5 | 5,5 | 5,5 | 5,5 | 6,5 | 6,0 | 6,0 | 6,0 | 6,0 |
|                                                                                   | III: 72 °C / 120 °C |                 |                      | 4,0 | 5,0 | 5,0 | 5,0 | 6,0 | 5,5 | 5,5 | 5,5 | 5,5 |
|                                                                                   | IV: 90 °C / 150 °C  |                 |                      | 3,5 | 4,5 | 4,5 | 4,5 | 5,5 | 5,0 | 5,0 | 5,0 | 5,0 |
| Installation factors                                                              |                     |                 |                      |     |     |     |     |     |     |     |     |     |
| Dry or wet concrete                                                               |                     | $\gamma_{inst}$ | [-]                  | 1,0 |     |     |     |     |     |     |     |     |

fischer Superbond

## Performances

Characteristic values for combined pull-out and concrete failure for reinforcing bars with injection mortar FIS SB

## Annex C 9

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**Table C10.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer rebar anchors FRA** in hammer drilled holes in combination with **injection mortar FIS SB: uncracked or cracked concrete**

| fischer rebar anchor FRA                                                          |                     |                 | M12                  | M16 | M20 | M24 |     |
|-----------------------------------------------------------------------------------|---------------------|-----------------|----------------------|-----|-----|-----|-----|
| Combined pullout and concrete cone failure                                        |                     |                 |                      |     |     |     |     |
| Bar diameter                                                                      |                     | d               | [mm]                 | 12  | 16  | 20  | 25  |
| Uncracked concrete                                                                |                     |                 |                      |     |     |     |     |
| Characteristic bond resistance in uncracked concrete C20/25                       |                     |                 |                      |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                 |                      |     |     |     |     |
| Temperature range                                                                 | I: 24 °C / 40 °C    | $\tau_{Rk,ucr}$ | [N/mm <sup>2</sup> ] | 9,0 | 9,5 | 10  | 9,5 |
|                                                                                   | II: 50 °C / 80 °C   |                 |                      | 9,0 | 9,5 | 9,5 | 9,0 |
|                                                                                   | III: 72 °C / 120 °C |                 |                      | 8,0 | 8,5 | 8,5 | 8,0 |
|                                                                                   | IV: 90 °C / 150 °C  |                 |                      | 7,0 | 7,5 | 8,0 | 7,5 |
| Installation factors                                                              |                     |                 |                      |     |     |     |     |
| Dry or wet concrete                                                               |                     | $\gamma_{inst}$ | [-]                  | 1,0 |     |     |     |
| Cracked concrete                                                                  |                     |                 |                      |     |     |     |     |
| Characteristic bond resistance in cracked concrete C20/25                         |                     |                 |                      |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                 |                      |     |     |     |     |
| Temperature range                                                                 | I: 24 °C / 40 °C    | $\tau_{Rk,cr}$  | [N/mm <sup>2</sup> ] | 6,0 | 7,0 | 6,0 | 6,0 |
|                                                                                   | II: 50 °C / 80 °C   |                 |                      | 5,5 | 6,5 | 6,0 | 6,0 |
|                                                                                   | III: 72 °C / 120 °C |                 |                      | 5,0 | 6,0 | 5,5 | 5,5 |
|                                                                                   | IV: 90 °C / 150 °C  |                 |                      | 4,5 | 5,5 | 5,0 | 5,0 |
| Installation factors                                                              |                     |                 |                      |     |     |     |     |
| Dry or wet concrete                                                               |                     | $\gamma_{inst}$ | [-]                  | 1,0 |     |     |     |

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## Performances

Characteristic values for combined pull-out and concrete failure for fischer rebar anchors  
FRA with injection mortar FIS SB

## Annex C 10

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**Table C11.1: Displacements for anchor rods**

| Anchor rod                                                      |                           | M8   | M10  | M12  | M16  | M20  | M24  | M27  | M30  |
|-----------------------------------------------------------------|---------------------------|------|------|------|------|------|------|------|------|
| Displacement-Factors for tension load <sup>1)</sup>             |                           |      |      |      |      |      |      |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV |                           |      |      |      |      |      |      |      |      |
| δ <sub>N0</sub> -Factor                                         | [mm/(N/mm <sup>2</sup> )] | 0,07 | 0,08 | 0,09 | 0,10 | 0,11 | 0,12 | 0,12 | 0,13 |
| δ <sub>N∞</sub> -Factor                                         |                           | 0,13 | 0,14 | 0,15 | 0,17 | 0,17 | 0,18 | 0,19 | 0,19 |
| Displacement-Factors for shear load <sup>2)</sup>               |                           |      |      |      |      |      |      |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV |                           |      |      |      |      |      |      |      |      |
| δ <sub>V0</sub> -Factor                                         | [mm/kN]                   | 0,18 | 0,15 | 0,12 | 0,09 | 0,07 | 0,06 | 0,05 | 0,05 |
| δ <sub>V∞</sub> -Factor                                         |                           | 0,27 | 0,22 | 0,18 | 0,14 | 0,11 | 0,09 | 0,08 | 0,07 |

1) Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0}\text{-Factor} \cdot \tau_{Ed}$$

$$\delta_{N\infty} = \delta_{N\infty}\text{-Factor} \cdot \tau_{Ed}$$

 $(\tau_{Ed}$ : Design value of the applied tensile stress)

2) Calculation of effective displacement:

$$\delta_{V0} = \delta_{V0}\text{-Factor} \cdot V_{Ed}$$

$$\delta_{V\infty} = \delta_{V\infty}\text{-Factor} \cdot V_{Ed}$$

 $(V_{Ed}$ : Design value of the applied shear force)
**Table C11.2: Displacements for fischer internal threaded anchors RG MI**

| Internal threaded anchor RG MI                                  |                           | M8   | M10  | M12  | M16  | M20  |
|-----------------------------------------------------------------|---------------------------|------|------|------|------|------|
| Displacement-Factors for tension load <sup>1)</sup>             |                           |      |      |      |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV |                           |      |      |      |      |      |
| δ <sub>N0</sub> -Factor                                         | [mm/(N/mm <sup>2</sup> )] | 0,09 | 0,10 | 0,10 | 0,11 | 0,19 |
| δ <sub>N∞</sub> -Factor                                         |                           | 0,13 | 0,15 | 0,15 | 0,17 | 0,19 |
| Displacement-Factors for shear load <sup>2)</sup>               |                           |      |      |      |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV |                           |      |      |      |      |      |
| δ <sub>V0</sub> -Factor                                         | [mm/kN]                   | 0,12 | 0,09 | 0,08 | 0,07 | 0,05 |
| δ <sub>V∞</sub> -Factor                                         |                           | 0,18 | 0,14 | 0,12 | 0,10 | 0,08 |

1) Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0}\text{-Factor} \cdot \tau_{Ed}$$

$$\delta_{N\infty} = \delta_{N\infty}\text{-Factor} \cdot \tau_{Ed}$$

 $(\tau_{Ed}$ : Design value of the applied tensile stress)

2) Calculation of effective displacement:

$$\delta_{V0} = \delta_{V0}\text{-Factor} \cdot V_{Ed}$$

$$\delta_{V\infty} = \delta_{V\infty}\text{-Factor} \cdot V_{Ed}$$

 $(V_{Ed}$ : Design value of the applied shear force)

fischer Superbond

**Performances**

Displacements for anchor rods and fischer internal threaded anchors RG MI

**Annex C 11**

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# Table C12.1: Displacements for reinforcing bars

| Nominal diameter of the bar                                                                                                                                                                                                                  |                           | $\phi$ | 8    | 10   | 12   | 14                                                                                                                                                                                                                               | 16   | 20   | 25   | 28   | 32 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------|------|------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|----|
| Displacement-Factors for tension load <sup>1)</sup>                                                                                                                                                                                          |                           |        |      |      |      |                                                                                                                                                                                                                                  |      |      |      |      |    |
| Uncracked or cracked concrete; Temperature range I, II, III, IV                                                                                                                                                                              |                           |        |      |      |      |                                                                                                                                                                                                                                  |      |      |      |      |    |
| $\delta_{N0}$ -Factor                                                                                                                                                                                                                        | [mm/(N/mm <sup>2</sup> )] | 0,07   | 0,08 | 0,09 | 0,09 | 0,10                                                                                                                                                                                                                             | 0,11 | 0,12 | 0,13 | 0,13 |    |
| $\delta_{N\infty}$ -Factor                                                                                                                                                                                                                   |                           | 0,11   | 0,13 | 0,13 | 0,15 | 0,16                                                                                                                                                                                                                             | 0,16 | 0,18 | 0,20 | 0,20 |    |
| Displacement-Factors for shear load <sup>2)</sup>                                                                                                                                                                                            |                           |        |      |      |      |                                                                                                                                                                                                                                  |      |      |      |      |    |
| Uncracked or cracked concrete; Temperature range I, II, III, IV                                                                                                                                                                              |                           |        |      |      |      |                                                                                                                                                                                                                                  |      |      |      |      |    |
| $\delta_{V0}$ -Factor                                                                                                                                                                                                                        | [mm/kN]                   | 0,18   | 0,15 | 0,12 | 0,10 | 0,09                                                                                                                                                                                                                             | 0,07 | 0,06 | 0,05 | 0,05 |    |
| $\delta_{V\infty}$ -Factor                                                                                                                                                                                                                   |                           | 0,27   | 0,22 | 0,18 | 0,16 | 0,14                                                                                                                                                                                                                             | 0,11 | 0,09 | 0,08 | 0,06 |    |
| 1) Calculation of effective displacement:<br>$\delta_{N0} = \delta_{N0}\text{-Factor} \cdot \tau_{Ed}$<br>$\delta_{N\infty} = \delta_{N\infty}\text{-Factor} \cdot \tau_{Ed}$<br>( $\tau_{Ed}$ : Design value of the applied tensile stress) |                           |        |      |      |      | 2) Calculation of effective displacement:<br>$\delta_{V0} = \delta_{V0}\text{-Factor} \cdot V_{Ed}$<br>$\delta_{V\infty} = \delta_{V\infty}\text{-Factor} \cdot V_{Ed}$<br>( $V_{Ed}$ : Design value of the applied shear force) |      |      |      |      |    |

# Table C12.2: Displacements for fischer rebar anchors FRA

| fischer rebar anchor<br>FRA                                                                                                                                                                                                                           |                           | M12  | M16                                                                                                                                                                                                                                                | M20  | M24  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|
| Displacement-Factors for tension load <sup>1)</sup>                                                                                                                                                                                                   |                           |      |                                                                                                                                                                                                                                                    |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV                                                                                                                                                                                       |                           |      |                                                                                                                                                                                                                                                    |      |      |
| δ <sub>N0</sub> -Factor                                                                                                                                                                                                                               | [mm/(N/mm <sup>2</sup> )] | 0,09 | 0,10                                                                                                                                                                                                                                               | 0,11 | 0,12 |
| δ <sub>N∞</sub> -Factor                                                                                                                                                                                                                               |                           | 0,13 | 0,15                                                                                                                                                                                                                                               | 0,16 | 0,18 |
| Displacement-Factors for shear load <sup>2)</sup>                                                                                                                                                                                                     |                           |      |                                                                                                                                                                                                                                                    |      |      |
| Uncracked or cracked concrete; Temperature range I, II, III, IV                                                                                                                                                                                       |                           |      |                                                                                                                                                                                                                                                    |      |      |
| δ <sub>V0</sub> -Factor                                                                                                                                                                                                                               | [mm/kN]                   | 0,12 | 0,09                                                                                                                                                                                                                                               | 0,07 | 0,06 |
| δ <sub>V∞</sub> -Factor                                                                                                                                                                                                                               |                           | 0,18 | 0,14                                                                                                                                                                                                                                               | 0,11 | 0,09 |
| 1) Calculation of effective displacement:<br><br>δ <sub>N0</sub> = δ <sub>N0</sub> -Factor · τ <sub>Ed</sub><br><br>δ <sub>N∞</sub> = δ <sub>N∞</sub> -Factor · τ <sub>Ed</sub><br><br>(τ <sub>Ed</sub> : Design value of the applied tensile stress) |                           |      | 2) Calculation of effective displacement:<br><br>δ <sub>V0</sub> = δ <sub>V0</sub> -Factor · V <sub>Ed</sub><br><br>δ <sub>V∞</sub> = δ <sub>V∞</sub> -Factor · V <sub>Ed</sub><br><br>(V <sub>Ed</sub> : Design value of the applied shear force) |      |      |

|                                                                                         |                               |
|-----------------------------------------------------------------------------------------|-------------------------------|
| fischer Superbond                                                                       | Annex C 12<br>Appendix 36/ 40 |
| <b>Performances</b><br>Displacements for reinforcing bars and fischer rebar anchors FRA |                               |

**Table C13.1:** Characteristic values for **steel failure** under tension / shear load of **fischer anchor rods** and **standard threaded rods** under seismic action performance category **C1** or **C2**

| Anchor rod / standard threaded rod                                                    |                                                          |                |     | M8                      | M10             | M12             | M16 | M20 | M24 | M27 | M30             |                 |
|---------------------------------------------------------------------------------------|----------------------------------------------------------|----------------|-----|-------------------------|-----------------|-----------------|-----|-----|-----|-----|-----------------|-----------------|
| Bearing capacity under tension load, steel failure <sup>1)</sup>                      |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| fischer anchor rods and standard threaded rods, performance category C1 <sup>2)</sup> |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| Characteristic resistance<br>$N_{Rk,s,C1}$                                            | Steel zinc plated                                        | Property class | 5.8 | [kN]                    | 19(17)          | 29(27)          | 43  | 79  | 123 | 177 | 230             | 281             |
|                                                                                       |                                                          |                | 8.8 |                         | 29(27)          | 47(43)          | 68  | 126 | 196 | 282 | 368             | 449             |
|                                                                                       | Stainless steel R and high corrosion resistant steel HCR |                | 50  |                         | 19              | 29              | 43  | 79  | 123 | 177 | 230             | 281             |
|                                                                                       |                                                          |                | 70  |                         | 26              | 41              | 59  | 110 | 172 | 247 | 322             | 393             |
|                                                                                       |                                                          |                | 80  |                         | 30              | 47              | 68  | 126 | 196 | 282 | 368             | 449             |
| fischer anchor rods and standard threaded rods, performance category C2 <sup>2)</sup> |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| Characteristic resistance<br>$N_{Rk,s,C2}$                                            | Steel zinc plated                                        | Property class | 5.8 | [-]                     | - <sup>4)</sup> | - <sup>4)</sup> | 39  | 72  | 108 | 177 | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 8.8 |                         | - <sup>4)</sup> | - <sup>4)</sup> | 61  | 116 | 173 | 282 | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       | Stainless steel R and high corrosion resistant steel HCR |                | 50  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 39  | 72  | 108 | 177 | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 70  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 53  | 101 | 152 | 247 | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 80  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 61  | 116 | 173 | 282 | - <sup>4)</sup> | - <sup>4)</sup> |
| Bearing capacity under shear load, steel failure without lever arm <sup>1)</sup>      |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| fischer anchor rods, performance category C1 <sup>2)</sup>                            |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| Characteristic resistance<br>$V_{Rk,s,C1}$                                            | Steel zinc plated                                        | Property class | 5.8 | [kN]                    | 11(10)          | 17(16)          | 25  | 47  | 74  | 106 | 138             | 168             |
|                                                                                       |                                                          |                | 8.8 |                         | 15(13)          | 23(21)          | 34  | 63  | 98  | 141 | 184             | 225             |
|                                                                                       | Stainless steel R and high corrosion resistant steel HCR |                | 50  |                         | 9               | 15              | 21  | 39  | 61  | 89  | 115             | 141             |
|                                                                                       |                                                          |                | 70  |                         | 13              | 20              | 30  | 55  | 86  | 124 | 161             | 197             |
|                                                                                       |                                                          |                | 80  |                         | 15              | 23              | 34  | 63  | 98  | 141 | 184             | 225             |
| Standard threaded rods, performance category C1 <sup>2)</sup>                         |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| Characteristic resistance<br>$V_{Rk,s,C1}$                                            | Steel zinc plated                                        | Property class | 5.8 | [kN]                    | 8(7)            | 12(11)          | 17  | 33  | 52  | 74  | 97              | 118             |
|                                                                                       |                                                          |                | 8.8 |                         | 11              | 16(14)          | 24  | 44  | 69  | 99  | 129             | 158             |
|                                                                                       | Stainless steel R and high corrosion resistant steel HCR |                | 50  |                         | 6               | 11              | 15  | 27  | 43  | 62  | 81              | 99              |
|                                                                                       |                                                          |                | 70  |                         | 9               | 14              | 21  | 39  | 60  | 87  | 113             | 138             |
|                                                                                       |                                                          |                | 80  |                         | 11              | 16              | 24  | 44  | 69  | 99  | 129             | 158             |
| fischer anchor rods and standard threaded rods, performance category C2               |                                                          |                |     |                         |                 |                 |     |     |     |     |                 |                 |
| Characteristic resistance<br>$V_{Rk,s,C2}$                                            | Steel zinc plated                                        | Property class | 5.8 | [-]                     | - <sup>4)</sup> | - <sup>4)</sup> | 14  | 27  | 43  | 62  | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 8.8 |                         | - <sup>4)</sup> | - <sup>4)</sup> | 22  | 44  | 69  | 99  | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       | Stainless steel R and high corrosion resistant steel HCR |                | 50  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 14  | 27  | 43  | 62  | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 70  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 20  | 39  | 60  | 87  | - <sup>4)</sup> | - <sup>4)</sup> |
|                                                                                       |                                                          |                | 80  |                         | - <sup>4)</sup> | - <sup>4)</sup> | 22  | 44  | 69  | 99  | - <sup>4)</sup> | - <sup>4)</sup> |
| Factor for the annular gap                                                            |                                                          | $\alpha_{gap}$ | [-] | 0,5 (1,0) <sup>3)</sup> |                 |                 |     |     |     |     |                 |                 |

1) Partial factors for performance category C1 or C2 see table C14.2;

for fischer anchor rods FIS A / RG M the factor for steel ductility is 1,0

2) Values in brackets are valid for undersized threaded rods with smaller stress area  $A_s$  for hot dip galvanised standard threaded rods according to EN ISO 10684:2004+AC:2009.

3) Values in brackets are valid for filled annular gaps between the anchor rod and the through-hole in the attachment. It is necessary to use the fischer filling disc according to Annex A 1 and A 3

4) No performance assessed

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### Performances

Characteristic values for steel failure under tension / shear load for fischer anchor rods and standard threaded rods under seismic action (performance category C1 / C2)

**Annex C 13**

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**Table C14.1:** Characteristic values for **steel failure** under tension / shear load for of **reinforcing bars (B500B)** under seismic action performance category **C1**

| Nominal diameter of the bar                                                      | $\phi$        | 8    | 10 | 12 | 14 | 16 | 20  | 25  | 28  | 32  |     |
|----------------------------------------------------------------------------------|---------------|------|----|----|----|----|-----|-----|-----|-----|-----|
| Bearing capacity under tension load, steel failure <sup>1)</sup>                 |               |      |    |    |    |    |     |     |     |     |     |
| Reinforcing bar B500B acc. to DIN 488-2:2009-08, performance category C1         |               |      |    |    |    |    |     |     |     |     |     |
| Characteristic resistance                                                        | $N_{Rk,s,C1}$ | [kN] | 28 | 44 | 63 | 85 | 111 | 173 | 270 | 339 | 443 |
| Bearing capacity under shear load, steel failure without lever arm <sup>1)</sup> |               |      |    |    |    |    |     |     |     |     |     |
| Reinforcing bar B500B acc. to DIN 488-2:2009-08, performance category C1         |               |      |    |    |    |    |     |     |     |     |     |
| Characteristic resistance                                                        | $V_{Rk,s,C1}$ | [kN] | 10 | 15 | 22 | 30 | 39  | 61  | 95  | 119 | 155 |

<sup>1)</sup> Partial factors for performance category C1 see table C14.2

**Table C14.2:** Partial factors for **fischer anchor rods, standard threaded rods and reinforcing bars (B500B)** under seismic action performance category **C1 or C2**

| Anchor rod / standard threaded rod | M8 | M10 | M12 | M16 | M20 | M24 | M27 | M30 |    |
|------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|----|
| Nominal diameter of the bar $\phi$ | 8  | 10  | 12  | 14  | 16  | 20  | 25  | 28  | 32 |

| Tension load, steel failure <sup>1)</sup> |                                                          |                |     |     |                           |
|-------------------------------------------|----------------------------------------------------------|----------------|-----|-----|---------------------------|
| Partial factor $\gamma_{Ms,N}$            | Steel zinc plated                                        | Property class | 5.8 | [-] | 1,50                      |
|                                           |                                                          |                | 8.8 |     | 1,50                      |
|                                           | Stainless steel R and high corrosion resistant steel HCR |                | 50  |     | 2,86                      |
|                                           |                                                          |                | 70  |     | 1,50 <sup>2)</sup> / 1,87 |
|                                           |                                                          |                | 80  |     | 1,60                      |
|                                           | Reinforcing bar                                          | B500B          |     |     | 1,40                      |

| Shear load, steel failure <sup>1)</sup> |                                                          |                |     |     |                           |
|-----------------------------------------|----------------------------------------------------------|----------------|-----|-----|---------------------------|
| Partial factor $\gamma_{Ms,V}$          | Steel zinc plated                                        | Property class | 5.8 | [-] | 1,25                      |
|                                         |                                                          |                | 8.8 |     | 1,25                      |
|                                         | Stainless steel R and high corrosion resistant steel HCR |                | 50  |     | 2,38                      |
|                                         |                                                          |                | 70  |     | 1,25 <sup>2)</sup> / 1,56 |
|                                         |                                                          |                | 80  |     | 1,33                      |
|                                         | Reinforcing bar                                          | B500B          |     |     | 1,50                      |

<sup>1)</sup> In absence of other national regulations

<sup>2)</sup> Only admissible for high corrosion resistant steel HCR, with  $f_{yk} / f_{uk} \geq 0,8$  and  $A_5 > 12\%$  (e.g. fischer anchor rods)

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#### Performances

Characteristic values for steel failure under tension / shear load for reinforcing bars under seismic action (performance category C1); partial factors (performance category C1 / C2)

#### Annex C 14

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**Table C15.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer anchor rods** and **standard threaded rods** in hammer drilled holes with **injection mortar FIS SB** or **resin capsule RSB** under seismic action performance category **C1**

| Anchor rod / standard threaded rod                                                                                                       |                     |                | M8                   | M10 | M12 | M16 | M20 | M24 | M27 <sup>1)</sup> | M30 |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------|----------------------|-----|-----|-----|-----|-----|-------------------|-----|
| Characteristic bond resistance, combined pullout and concrete cone failure                                                               |                     |                |                      |     |     |     |     |     |                   |     |
| Hammer-drilling with standard drill bit or hollow drill bit<br>(dry or wet concrete; resin capsule RSB additional in water filled holes) |                     |                |                      |     |     |     |     |     |                   |     |
| Tem-<br>perature<br>range                                                                                                                | I: 24 °C / 40 °C    | $\tau_{Rk,C1}$ | [N/mm <sup>2</sup> ] | 4,6 | 5,0 | 5,6 | 5,6 | 5,6 | 5,6               | 6,4 |
|                                                                                                                                          | II: 50 °C / 80 °C   |                |                      | 4,3 | 4,6 | 5,6 | 5,6 | 5,6 | 5,3               | 6,0 |
|                                                                                                                                          | III: 72 °C / 120 °C |                |                      | 3,9 | 4,3 | 4,9 | 4,9 | 4,9 | 4,5               | 5,1 |
|                                                                                                                                          | IV: 90 °C / 150 °C  |                |                      | 3,6 | 3,9 | 4,5 | 4,5 | 4,5 | 4,1               | 4,7 |

#### Installation factors

|                     |                 |     |                   |  |                   |  |  |  |  |
|---------------------|-----------------|-----|-------------------|--|-------------------|--|--|--|--|
| Dry or wet concrete | $\gamma_{inst}$ | [-] | 1,0               |  |                   |  |  |  |  |
| Water filled hole   |                 |     | 1,2 <sup>2)</sup> |  | 1,0 <sup>2)</sup> |  |  |  |  |

<sup>1)</sup> Only use with injection mortar FIS SB

<sup>2)</sup> Only use with resin capsule RSB in water filled hole

**Table C15.2:** Characteristic values for **combined pull-out** and concrete failure for **reinforcing bars** in hammer drilled holes with **injection mortar FIS SB** under seismic action performance category **C1**

| Nominal diameter of the bar                                                       |                     | $\phi$         | 8                    | 10  | 12  | 14  | 16  | 20  | 25  | 28  | 32  |     |
|-----------------------------------------------------------------------------------|---------------------|----------------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Characteristic bond resistance, combined pullout and concrete cone failure        |                     |                |                      |     |     |     |     |     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                |                      |     |     |     |     |     |     |     |     |     |
| Tem-<br>perature<br>range                                                         | I: 24 °C / 40 °C    | $\tau_{Rk,C1}$ | [N/mm <sup>2</sup> ] | 3,2 | 4,3 | 4,5 | 4,5 | 5,3 | 4,5 | 4,5 | 4,5 | 5,1 |
|                                                                                   | II: 50 °C / 80 °C   |                |                      | 3,2 | 3,9 | 4,1 | 4,1 | 4,9 | 4,5 | 4,5 | 4,5 | 5,1 |
|                                                                                   | III: 72 °C / 120 °C |                |                      | 2,8 | 3,6 | 3,8 | 3,8 | 4,5 | 4,1 | 4,1 | 4,1 | 4,7 |
|                                                                                   | IV: 90 °C / 150 °C  |                |                      | 2,5 | 3,2 | 3,4 | 3,4 | 4,1 | 3,8 | 3,8 | 3,8 | 4,3 |

#### Installation factors

|                     |                 |     |     |  |  |  |  |  |  |  |
|---------------------|-----------------|-----|-----|--|--|--|--|--|--|--|
| Dry or wet concrete | $\gamma_{inst}$ | [-] | 1,0 |  |  |  |  |  |  |  |
|---------------------|-----------------|-----|-----|--|--|--|--|--|--|--|

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#### Performances

Characteristic values for combined pull-out and concrete failure under seismic action (performance category C1) for fischer anchor rods, standard threaded rods and reinf. bars

#### Annex C 15

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**Table C16.1:** Characteristic values for **combined pull-out** and concrete failure for **fischer anchor rods** and **standard threaded rods** in hammer drilled holes with **injection mortar FIS SB** under seismic action performance category **C2**

| Anchor rod / standard threaded rod                                                |                     | M12                                 | M16 | M20 | M24 |     |
|-----------------------------------------------------------------------------------|---------------------|-------------------------------------|-----|-----|-----|-----|
| Characteristic bond resistance, combined pullout and concrete cone failure        |                     |                                     |     |     |     |     |
| Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete) |                     |                                     |     |     |     |     |
| Tem-<br>perature<br>range                                                         | I: 24 °C / 40 °C    | $\tau_{Rk,C2}$ [N/mm <sup>2</sup> ] | 4,5 | 3,2 | 2,6 | 3,0 |
|                                                                                   | II: 50 °C / 80 °C   |                                     | 4,5 | 3,2 | 2,6 | 3,0 |
|                                                                                   | III: 72 °C / 120 °C |                                     | 3,9 | 2,7 | 2,3 | 2,6 |
|                                                                                   | IV: 90 °C / 150 °C  |                                     | 3,6 | 2,5 | 2,1 | 2,4 |

#### Installation factors

|                     |                 |     |     |  |  |
|---------------------|-----------------|-----|-----|--|--|
| Dry or wet concrete | $\gamma_{inst}$ | [-] | 1,0 |  |  |
|---------------------|-----------------|-----|-----|--|--|

#### Displacement-Factors for tension load<sup>1)</sup>

|                              |                           |      |      |      |      |
|------------------------------|---------------------------|------|------|------|------|
| $\delta_{N,C2}$ (DLS)-Factor | [mm/(N/mm <sup>2</sup> )] | 0,09 | 0,10 | 0,11 | 0,12 |
| $\delta_{N,C2}$ (ULS)-Factor |                           | 0,15 | 0,17 | 0,17 | 0,18 |

#### Displacement-Factors for shear load<sup>2)</sup>

|                              |         |      |      |      |      |
|------------------------------|---------|------|------|------|------|
| $\delta_{V,C2}$ (DLS)-Factor | [mm/kN] | 0,18 | 0,10 | 0,07 | 0,06 |
| $\delta_{V,C2}$ (ULS)-Factor |         | 0,25 | 0,14 | 0,11 | 0,09 |

<sup>1)</sup> Calculation of effective displacement:

$$\delta_{N,C2} (DLS) = \delta_{N,C2} (DLS)\text{-Factor} \cdot \tau_{Ed}$$

$$\delta_{N,C2} (ULS) = \delta_{N,C2} (ULS)\text{-Factor} \cdot \tau_{Ed}$$

( $\tau_{Ed}$ : Design value of the applied tensile stress)

<sup>2)</sup> Calculation of effective displacement:

$$\delta_{V,C2} (DLS) = \delta_{V,C2} (DLS)\text{-Factor} \cdot V_{Ed}$$

$$\delta_{V,C2} (ULS) = \delta_{V,C2} (ULS)\text{-Factor} \cdot V_{Ed}$$

( $V_{Ed}$ : Design value of the applied shear force)

fischer Superbond

#### Performances

Characteristic values for combined pull-out and concrete failure under seismic action (performance category C2) for fischer anchor rods and standard threaded rods

**Annex C 16**

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