

## IZJAVA O LASTNOSTIH

### DoP 0186

za vijajčno sidro fischer FAZ II, FAZ II R, FAZ II HCR (Mehansko sidro za uporabo v betonu)

SL

|                                                                                              |                                                                                    |                |                              |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------|------------------------------|
| 1. <u>Enotna identifikacijska oznaka tipa proizvoda:</u>                                     | DoP 0186                                                                           |                |                              |
| 2. <u>Predvidena uporaba:</u>                                                                | Za vgradnjo v razpokan in nerazpokan beton,<br>Glej dodatek, zlasti priloge B1- B6 |                |                              |
| 3. <u>Proizvajalec:</u>                                                                      | fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Nemčija        |                |                              |
| 4. <u>Pooblaščen zastopnik:</u>                                                              | -                                                                                  |                |                              |
| 5. <u>Sistemi ocenjevanja in preverjanja nespremenljivosti lastnosti:</u>                    | 1                                                                                  |                |                              |
| 6. <u>Evropski ocenjevalni dokument:</u>                                                     | EAD 330232-00-0601                                                                 |                |                              |
| Evropska tehnična ocena:                                                                     | ETA-05/0069; 2020-04-24                                                            |                |                              |
| 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     | E <sub>s</sub> = 210 000 MPa |
|                                                                                              | Odpornost na izvlek:                                                               | Priloge C1     |                              |
|                                                                                              | Odpornost na odpoved v betonski coni:                                              | Priloge C1     |                              |
|                                                                                              | Robusnost:                                                                         | Priloge C1     |                              |
|                                                                                              | Najmanjša razdalja do roba betona in razmik:                                       | Priloge B3, B4 |                              |
|                                                                                              | Razdalja od roba betona za preprečevanje loma pod obremenitvijo:                   | Priloge C1     |                              |
|                                                                                              | Premiki pri statični in kvazistatični obremenitvi:                                 | Priloge C5     |                              |
| Karakteristična odpornost proti strižni obremenitvi (statična in kvazistatična obremenitev): | Odpornost na odpoved jekla (strižna obremenitev):                                  | Priloge C2     |                              |
|                                                                                              | Odpornost na neuspešno odstranitev:                                                | Priloge C2     |                              |
|                                                                                              | Odpornost na odpoved od roba betona:                                               | Priloge C2     |                              |
|                                                                                              | Premiki pri statični in kvazistatični obremenitvi:                                 | Priloge C5     |                              |
|                                                                                              | Trajnost:                                                                          | Priloge A4, B1 |                              |
| Karakteristična odpornost in premiki za kategoriji seizmičnih lastnosti C1 in C2:            | Odpornost pri odpovedi jekla:                                                      | Priloge C4     |                              |
|                                                                                              | Odpornost pri izvleku:                                                             | Priloge C4     |                              |
|                                                                                              | Raztezek pred zlomom:                                                              | >8%            |                              |
|                                                                                              | Faktor reže obroča:                                                                | Priloge C4     |                              |
|                                                                                              | Premiki:                                                                           | Priloge C5     |                              |

### Varnost v primeru požara (BWR 2)

Odzivnost na ogenj:

Odpornost proti ognju:

Razred (A1)

Požarna odpornost pri odpovedi jekla (napetostna)

Požarna odpornost pri izvleku (napetostna)

Požarna odpornost pri odpovedi jekla (strižna)

Priloge C3

Priloge C3

Priloge C3



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, 2020-05-15

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 fischer Bolt Anchor FAZ II is an anchor made of galvanised steel (FAZ II) or made of stainless steel (FAZ II R) or high corrosion resistant steel (FAZ II HCR) which is placed into a drilled hole and anchored by torque-controlled expansion.

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 fastener 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 fastener 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 3, C 1 |
| Characteristic resistance to shear load (static and quasi-static loading)                | See Annex C 2      |
| Displacements (static and quasi-static loading)                                          | See Annex C 5      |
| Characteristic resistance and displacements for seismic performance categories C1 and C2 | See Annex C 4      |
| Durability                                                                               | See Annex B 1      |

#### 3.2 Safety in case of fire (BWR 2)

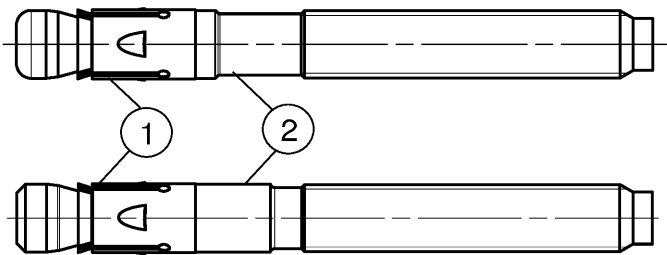
| Essential characteristic | Performance   |
|--------------------------|---------------|
| Reaction to fire         | Class A1      |
| Resistance to fire       | See Annex C 3 |

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

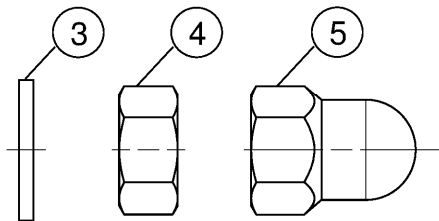
In accordance with the European Assessment Document EAD 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

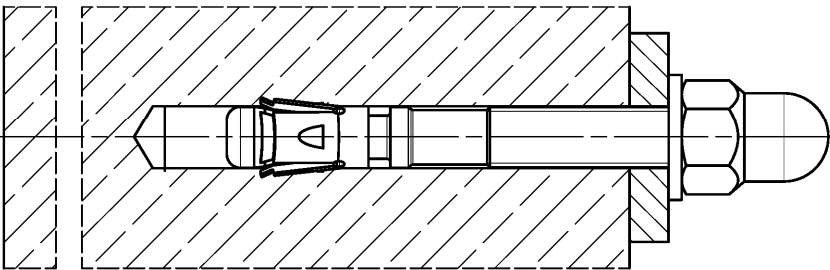
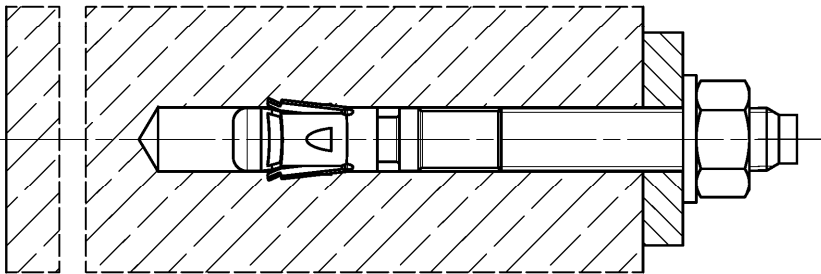
Cone bolt manufactured by cold - forming:



Cone bolt manufactured by turning:



- ① Expansion sleeve
- ② Cone bolt (cold – formed or turned)
- ③ Washer
- ④ Hexagon nut
- ⑤ fischer FAZ II dome nut



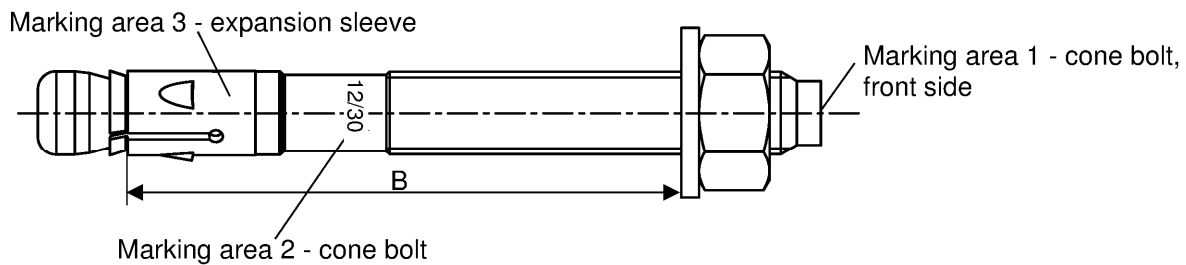
(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Product description**  
Installed condition

**Annex A 1**  
Appendix 2/ 16

## Product label and letter-code:



Product label, example:



Brand | type of fastener  
placed at marking area 2 or marking area 3

Thread size / max. thickness of the fixture ( $t_{fix}$ )  
identification R or HCR placed at marking area 2

FAZ II: carbon steel, galvanized  
FAZ II R: stainless steel  
FAZ II HCR: high corrosion resistant steel

**Table A2.1:** Letter - code at marking area 1:

| Marking              |     | (a) | (b) | (c) | (d) | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (H) | (I) | (K) |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Max. $t_{fix}$       |     | 5   | 10  | 15  | 20  | 5   | 10  | 15  | 20  | 25  | 30  | 35  | 40  | 45  | 50  |
| $B \geq [\text{mm}]$ | M6  | -   |     |     |     | 45  | 50  | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  |
|                      | M8  | 40  | 45  | -   |     | 50  | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  | 95  |
|                      | M10 | 45  | 50  | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  | 95  | 100 | 105 | 110 |
|                      | M12 | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  | 95  | 100 | 105 | 110 | 115 | 120 |
|                      | M16 | 70  | 75  | 80  | 85  | 90  | 95  | 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 |
|                      | M20 | -   |     |     |     | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
|                      | M24 | -   |     |     |     | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 |
| Marking              |     | (L) | (M) | (N) | (O) | (P) | (R) | (S) | (T) | (U) | (V) | (W) | (X) | (Y) | (Z) |
| Max. $t_{fix}$       |     | 60  | 70  | 80  | 90  | 100 | 120 | 140 | 160 | 180 | 200 | 250 | 300 | 350 | 400 |
| $B \geq [\text{mm}]$ | M6  | 100 | 110 | 120 | 130 | 140 | 160 | 180 | 200 | 220 | 240 | 290 | 340 | 390 | 440 |
|                      | M8  | 105 | 115 | 125 | 135 | 145 | 165 | 185 | 205 | 225 | 245 | 295 | 345 | 395 | 445 |
|                      | M10 | 120 | 130 | 140 | 150 | 160 | 180 | 200 | 220 | 240 | 260 | 310 | 360 | 410 | 460 |
|                      | M12 | 130 | 140 | 150 | 160 | 170 | 190 | 210 | 230 | 250 | 270 | 320 | 370 | 420 | 470 |
|                      | M16 | 145 | 155 | 165 | 175 | 185 | 205 | 225 | 245 | 265 | 285 | 335 | 385 | 435 | 485 |
|                      | M20 | 160 | 170 | 180 | 190 | 200 | 220 | 240 | 260 | 280 | 300 | 350 | 400 | 450 | 500 |
|                      | M24 | 185 | 195 | 205 | 215 | 225 | 245 | 265 | 285 | 305 | 325 | 375 | 425 | 475 | 525 |

### Calculation existing $h_{ef}$ for installed fasteners:

$$\text{existing } h_{ef} = B_{(\text{according to table A2.1})} - \text{existing } t_{fix}$$

Thickness of the fixture  $t_{fix}$  including thickness of fastener plate  $t$  and e.g. thickness of grout layer  $t_{grout}$   
or other non-structural layers

(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Product description**  
Product label and letter code

**Annex A 2**  
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Product dimensions

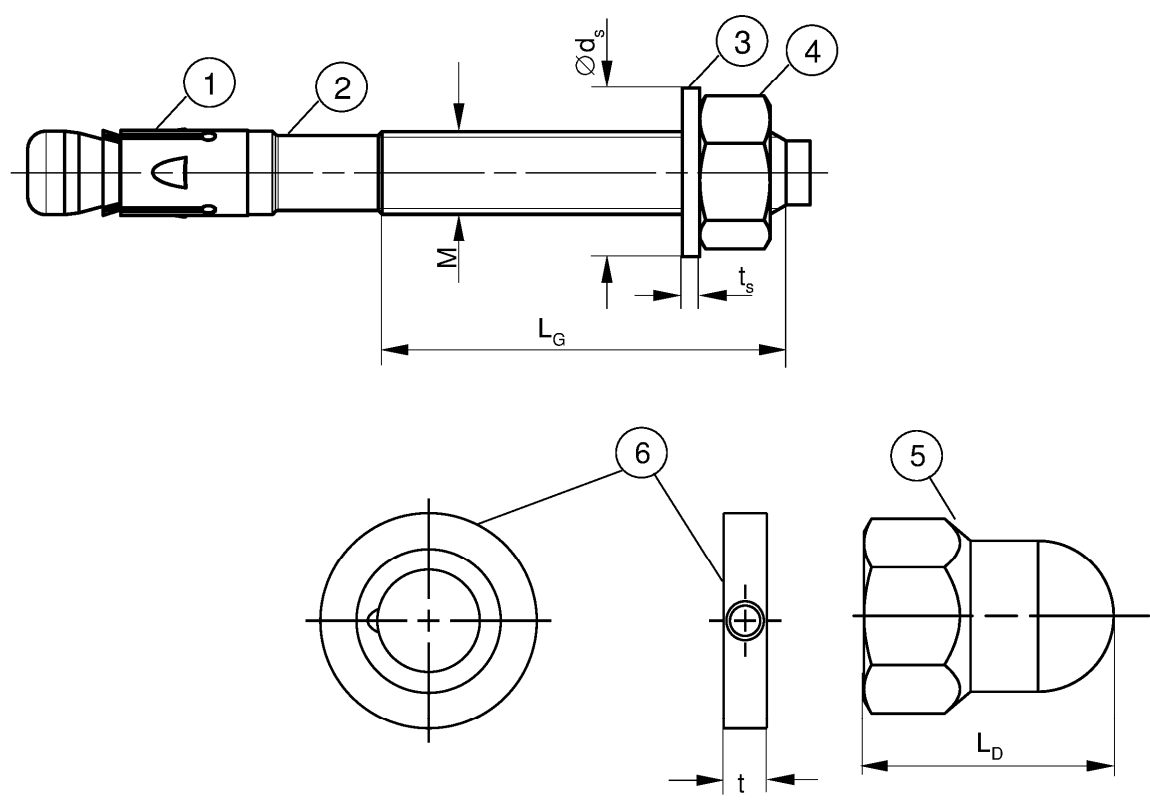


Table A3.1: Dimensions [mm]

| Part  | Designation                           |                  | FAZ II, FAZ II R, FAZ II HCR |     |     |     |     |     |     |
|-------|---------------------------------------|------------------|------------------------------|-----|-----|-----|-----|-----|-----|
|       |                                       |                  | M6                           | M8  | M10 | M12 | M16 | M20 | M24 |
| 1     | Expansion sleeve                      | Sheet thickness  | 0,8                          | 1,3 | 1,4 | 1,6 | 2,4 |     | 3,0 |
| 2     | Cone bolt                             | Thread size M    | 6                            | 8   | 10  | 12  | 16  | 20  | 24  |
|       |                                       | L <sub>G</sub>   | 10                           | 19  | 26  | 31  | 40  | 50  | 57  |
| 3     | Washer                                | t <sub>s</sub>   | 1,4                          | 1,8 | 2,3 | 2,7 | 3,7 | 4,3 | 5,0 |
|       |                                       | Ø d <sub>s</sub> | 11                           | 15  | 19  | 23  | 29  | 36  | 43  |
| 4 & 5 | Hexagon nut / fischer FAZ II dome nut | Wrench size      | 10                           | 13  | 17  | 19  | 24  | 30  | 36  |
| 5     |                                       | L <sub>D</sub>   | -                            |     | 22  | 27  | 33  | -   |     |
| 6     | fischer filling disc FFD              | t                | 6                            |     |     |     | 7   | 8   | 10  |

(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

Product description  
Dimensions

Annex A 3  
Appendix 4/ 16

**Table A4.1: Materials FAZ II (ISO 4042:2018/Zn5/An(A2K))**

| Part | Designation      | Material                                                   |
|------|------------------|------------------------------------------------------------|
| 1    | Expansion sleeve | Cold strip, EN 10139:2016 or stainless steel EN 10088:2014 |
| 2    | Cone bolt        | Cold form steel or free cutting steel                      |
| 3    | Washer           | Cold strip, EN 10139:2016                                  |
| 4    | Hexagon nut      | Steel, property class min. 8, EN ISO 898-2:2012            |

**Table A4.2: Materials FAZ II R**

| Part | Designation      | Material                                                                    |
|------|------------------|-----------------------------------------------------------------------------|
| 1    | Expansion sleeve | Stainless steel EN 10088:2014                                               |
| 2    | Cone bolt        |                                                                             |
| 3    | Washer           |                                                                             |
| 4    | Hexagon nut      | Stainless steel EN 10088:2014;<br>ISO 3506-2:2018; property class – min. 70 |

**Table A4.3: Materials FAZ II HCR**

| Part | Designation      | Material                                                                                   |
|------|------------------|--------------------------------------------------------------------------------------------|
| 1    | Expansion sleeve | Stainless steel EN 10088:2014                                                              |
| 2    | Cone bolt        | High corrosion resistant steel EN 10088:2014                                               |
| 3    | Washer           |                                                                                            |
| 4    | Hexagon nut      | High corrosion resistant steel EN 10088:2014;<br>ISO 3506-2:2018; property class – min. 70 |

(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Product description**  
Materials

**Annex A 4**  
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## Specifications of intended use

### Anchorage subject to:

| Size                           | FAZ II, FAZ II R, FAZ II HCR |    |     |     |     |     |     |
|--------------------------------|------------------------------|----|-----|-----|-----|-----|-----|
|                                | M6                           | M8 | M10 | M12 | M16 | M20 | M24 |
| Static and quasi-static loads  | ✓                            |    |     |     |     |     |     |
| Cracked and uncracked concrete |                              |    |     |     |     |     |     |
| Fire exposure                  |                              |    |     |     |     |     |     |
| Seismic performance category   | C1                           | -  | ✓   |     |     |     |     |
|                                | C2 <sup>1)</sup>             | -  | ✓   |     |     |     |     |

<sup>1)</sup> FAZ II HCR: Only valid for cold-formed version (according to Annex A1)

### Base materials:

- Compacted reinforced and unreinforced normal weight concrete without fibres (cracked and uncracked) according to EN 206-1:2013+A1:2016
- Strength classes C20/25 to C50/60 according to EN 206-1:2013+A1:2016

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (FAZ II, FAZ II R, FAZ II HCR)
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (FAZ II R, FAZ II HCR)
- Structures subject to external atmospheric exposure and permanently damp internal condition, if other particular aggressive conditions exist (FAZ II HCR)

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where deicing materials are used)

### Design:

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work
- 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.)
- Design of fastenings according to EN 1992-4:2018 and EOTA Technical Report TR 055
- For effective embedment depth  $h_{ef} < 40$  mm only statically indeterminate fixings (e.g. light-weight suspended ceilings with internal exposure) are covered by the ETA

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Intended Use**  
Specifications

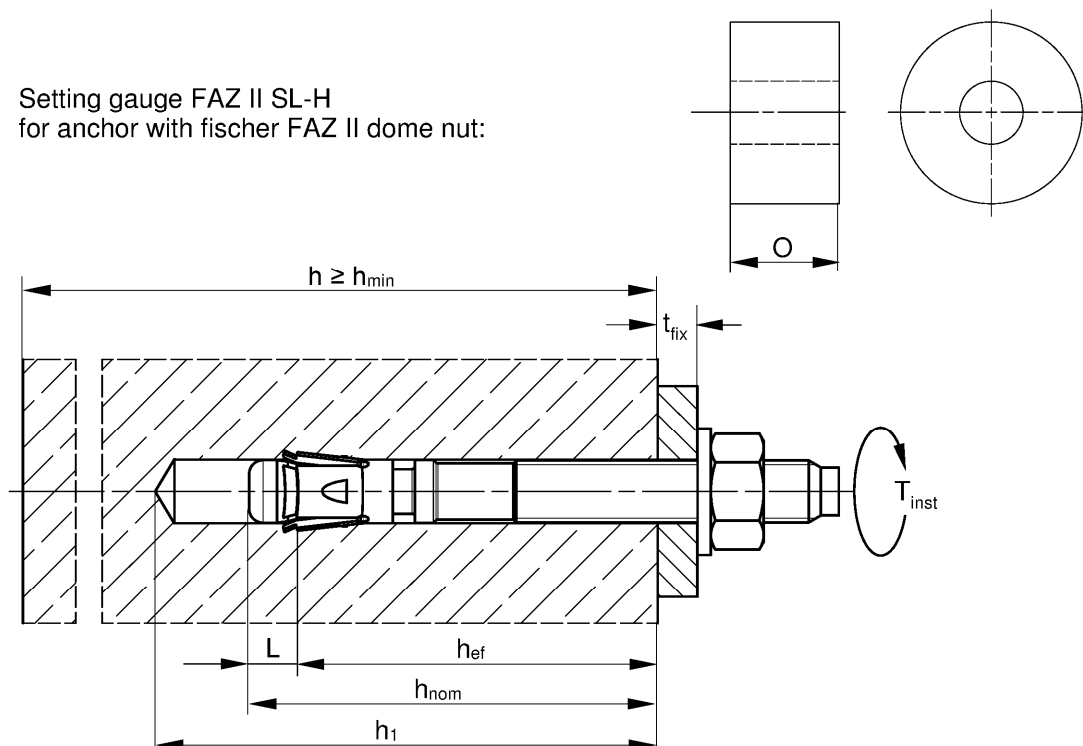
**Annex B 1**  
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**Table B2.1:** Installation parameters

| Size                                                                                                                | FAZ II, FAZ II R, FAZ II HCR |               |              |                |                |                |                 |
|---------------------------------------------------------------------------------------------------------------------|------------------------------|---------------|--------------|----------------|----------------|----------------|-----------------|
|                                                                                                                     | M6                           | M8            | M10          | M12            | M16            | M20            | M24             |
| Nominal drill hole diameter $d_0 =$                                                                                 | 6                            | 8             | 10           | 12             | 16             | 20             | 24              |
| Maximum bit diameter with hammer or hollow drilling $d_{cut,max}$ [mm]                                              | 6,40                         | 8,45          | 10,45        | 12,5           | 16,5           | 20,55          | 24,55           |
| Maximum bit diameter with diamond drilling                                                                          | -                            | 8,15          |              | 12,25          | 16,45          | 20,50          | 24,40           |
| Overall fastener embedment depth in the concrete $h_{nom} \geq (L)$ [mm]                                            | 46,5<br>(6,5)                | 44,5<br>(9,5) | 52,0<br>(12) | 63,5<br>(13,5) | 82,5<br>(17,5) | 120<br>(20)    | 148,5<br>(23,5) |
| Existing $h_{ef} + L = h_{nom}$                                                                                     |                              |               |              |                |                |                |                 |
| Depth of drill hole to deepest point $h_1 \geq$                                                                     | $h_{nom} + 5$                |               |              |                |                | $h_{nom} + 10$ |                 |
| Diameter of clearance hole in the fixture $d_f \leq$ [mm]                                                           | 7                            | 9             | 12           | 14             | 18             | 22             | 26              |
| Required setting torque $T_{inst} =$ [Nm]                                                                           | 8                            | 20            | 45           | 60             | 110            | 200            | 270             |
| Excess length after hammering-in the cone bolt (for fischer dome nut applications according to Annex B6) $O =$ [mm] | -                            |               | 12           | 16             | 20             | -              |                 |

Setting gauge FAZ II SL-H  
for anchor with fischer FAZ II dome nut:



- $h_{ef}$  = Effective embedment depth
- $t_{fix}$  = Thickness of the fixture
- $h_1$  = Depth of drill hole to deepest point
- $h$  = Thickness of the concrete member
- $h_{min}$  = Minimum thickness of concrete member
- $h_{nom}$  = Overall fastener embedment depth in the concrete
- $T_{inst}$  = Required setting torque

(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Intended Use**  
Installation parameters

**Annex B 2**  
Appendix 7/ 16

**Table B3.1:** Minimum thickness of concrete members, minimum spacing and minimum edge distance

| Size                                 |                                                      | FAZ II, FAZ II R, FAZ II HCR                                |    |     |     |                                                                              |     |       |
|--------------------------------------|------------------------------------------------------|-------------------------------------------------------------|----|-----|-----|------------------------------------------------------------------------------|-----|-------|
|                                      |                                                      | M6                                                          | M8 | M10 | M12 | M16                                                                          | M20 | M24   |
| Minimum edge distance                |                                                      |                                                             |    |     |     |                                                                              |     |       |
| Uncracked concrete                   | c <sub>min</sub>                                     | 45                                                          | 40 | 45  | 55  | 65                                                                           | 95  | 135   |
| Cracked concrete                     |                                                      |                                                             |    |     |     |                                                                              | 85  | 100   |
| Corresponding spacing                | s [mm]                                               | according to Annex B4                                       |    |     |     |                                                                              |     |       |
| Minimum thickness of concrete member | h <sub>min</sub>                                     | 80                                                          |    |     | 100 | 140                                                                          | 160 | 200   |
| Thickness of concrete member         | h ≥                                                  | max. {h <sub>min</sub> ; h <sub>1</sub> <sup>1)</sup> + 30} |    |     |     | max. {h <sub>min</sub> ; h <sub>1</sub> <sup>1)</sup> + 2 · d <sub>o</sub> } |     |       |
| Minimum spacing                      |                                                      |                                                             |    |     |     |                                                                              |     |       |
| Uncracked concrete                   | s <sub>min</sub>                                     | 35                                                          | 40 | 40  | 50  | 65                                                                           | 95  | 100   |
| Cracked concrete                     |                                                      |                                                             | 35 |     |     |                                                                              |     |       |
| Corresponding edge distance          | c [mm]                                               | according to Annex B4                                       |    |     |     |                                                                              |     |       |
| Minimum thickness of concrete member | h <sub>min</sub>                                     | 80                                                          |    |     | 100 | 140                                                                          | 160 | 200   |
| Thickness of concrete member         | h ≥                                                  | max. {h <sub>min</sub> ; h <sub>1</sub> <sup>1)</sup> + 30} |    |     |     | max. {h <sub>min</sub> ; h <sub>1</sub> <sup>1)</sup> + 2 · d <sub>o</sub> } |     |       |
| Minimal splitting area               |                                                      |                                                             |    |     |     |                                                                              |     |       |
| Uncracked concrete                   | A <sub>sp,req</sub> [ $\cdot 1000$ mm <sup>2</sup> ] | 5,1                                                         | 18 | 37  | 54  | 67                                                                           | 100 | 117,5 |
| Cracked concrete                     |                                                      | 1,5                                                         | 12 | 27  | 40  | 50                                                                           | 77  | 87,5  |

<sup>1)</sup>  $h_1$  according to Annex B2

**Splitting failure** applied for minimum edge distance and spacing in dependence of the  $h_{ef}$

For the calculation of minimum spacing and minimum edge distance of anchors in combination with different embedment depths and thicknesses of concrete members the following equation shall be fulfilled:

$$A_{sp,req} < A_{sp,ef}$$

$A_{sp,req}$  = required splitting area

$A_{sp,ef}$  = effective splitting area (according to Annex B4)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

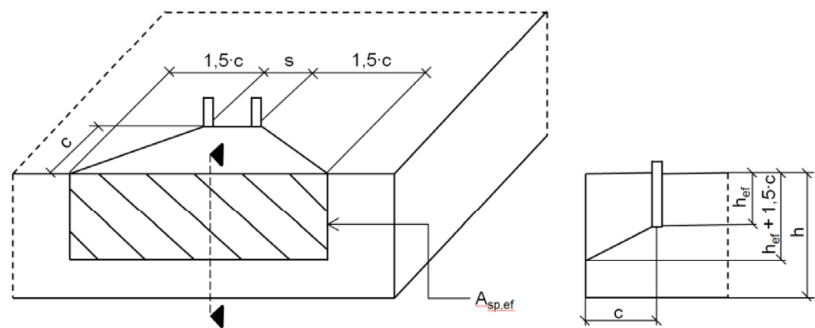
**Intended Use**

Minimum thickness of member, minimum spacing and edge distance

**Annex B 3**

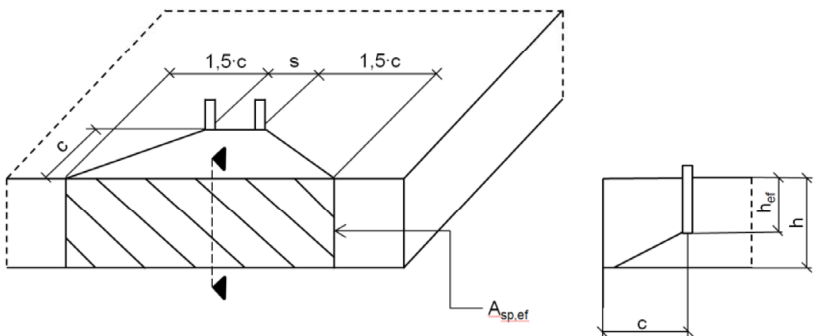
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**Table B4.1:** Effective splitting area  $A_{sp,ef}$  with member thickness  $h > h_{ef} + 1,5 \cdot c$  and  $h \geq h_{min}$



|                                                         |                                                            |                    |                                            |
|---------------------------------------------------------|------------------------------------------------------------|--------------------|--------------------------------------------|
| Single anchor and group of anchors with $s > 3 \cdot c$ | $A_{sp,ef} = (6 \cdot c) \cdot (h_{ef} + 1,5 \cdot c)$     | [mm <sup>2</sup> ] | with $c \geq c_{min}$                      |
| Group of anchors with $s \leq 3 \cdot c$                | $A_{sp,ef} = (3 \cdot c + s) \cdot (h_{ef} + 1,5 \cdot c)$ | [mm <sup>2</sup> ] | with $c \geq c_{min}$ and $s \geq s_{min}$ |

**Table B4.2:** Effective splitting area  $A_{sp,ef}$  with member thickness  $h \leq h_{ef} + 1,5 \cdot c$  and  $h \geq h_{min}$



|                                                         |                                                        |                    |                                            |
|---------------------------------------------------------|--------------------------------------------------------|--------------------|--------------------------------------------|
| Single anchor and group of anchors with $s > 3 \cdot c$ | $A_{sp,ef} = 6 \cdot c \cdot \text{existing } h$       | [mm <sup>2</sup> ] | with $c \geq c_{min}$                      |
| Group of anchors with $s \leq 3 \cdot c$                | $A_{sp,ef} = (3 \cdot c + s) \cdot \text{existing } h$ | [mm <sup>2</sup> ] | with $c \geq c_{min}$ and $s \geq s_{min}$ |

Edge distance and axial spacing shall be rounded to at least 5 mm

(Fig. not to scale)

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

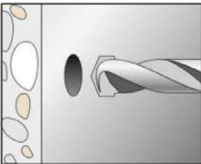
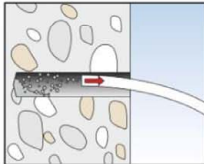
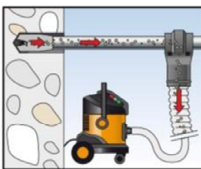
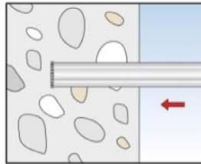
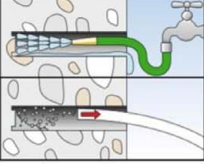
**Intended Use**  
Minimum thickness of member, minimum spacings and edge distances

## Installation instructions:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Use of the anchor only as supplied by the manufacturer without exchanging the components of the anchor  
Exception: fischer FAZ II dome nut.
- Checking before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply
- Check of concrete being well compacted, e.g. without significant voids
- Hammer, hollow or diamond drilling according to Annex B5
- Drill hole created perpendicular  $\pm 5^\circ$  to concrete surface, positioning without damaging the reinforcement
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application
- It must be ensured that in case of fire local spalling of the concrete cover does not occur
- Fastenings in stand-off installation or with a grout layer under seismic action are not covered
- In case of seismic applications the fastener shall be positioned outside of critical regions (e.g. plastic hinges) of the concrete structure

## Installation instructions: Drilling and cleaning the hole

Types of drills and cleaning

|                                                                                   |                                                                                     |                                                                                     |                                                                                      |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Hammer drill                                                                      |    |    |    |
|                                                                                   |                                                                                     | 1: Drill the hole                                                                   | 2: Clean the hole                                                                    |
| Hollow drill                                                                      |  |  | -                                                                                    |
|                                                                                   |                                                                                     | 1: Drill the hole with automatic cleaning                                           |                                                                                      |
| Diamond drill, for non seismic applications only and $\geq$ drill $\varnothing 8$ |  |  |  |
|                                                                                   |                                                                                     | 1: Drill the hole                                                                   | 2: Clean the hole                                                                    |

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

### Intended Use

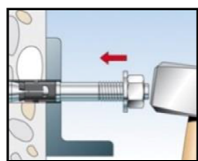
Installation instructions

### Annex B 5

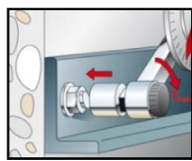
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Installation instructions: Installation of the anchor

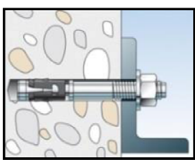
HEXAGON NUT:



3: Set the fastener



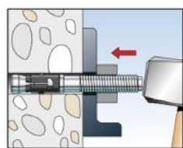
4: Apply  $T_{inst}$



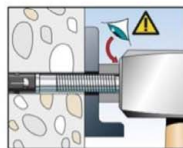
5: Installed fastener

fischer FAZ II DOME NUT:

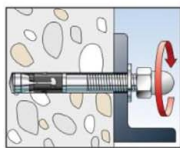
Option 1: Push through installation with setting gauge SL-H:



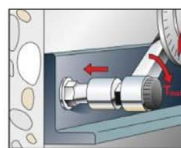
3: Set the fastener  
using setting  
gauge



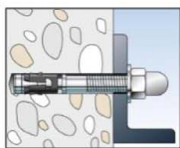
4: Check offset



5: Turn on the  
washer and  
fischer FAZ II  
dome nut

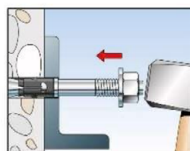


6: Apply  $T_{inst}$

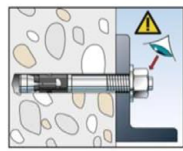


7: Installed fastener

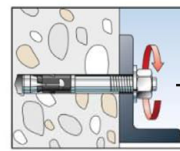
Option 2: Push through installation with hexagon nut:



3: Set the fastener



4: check setting  
position: Visible one  
turn of a thread

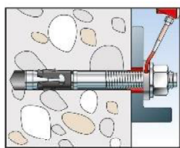
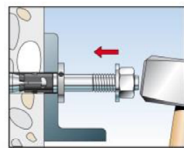


4.1: Remove nut

fischer FILLING DISC FFD optional for seismic C2 application or minimizing the annular gap:

Optional

The gap between bolt and fixture may be filled with mortar (compressive strength  $\geq 50 \text{ N/mm}^2$  e.g. FIS SB) after step 7 (for eliminating the annular gap).  
The filling disc is additional to the standard washer.  
The thickness of the filling disc must be considered for definition of  $t_{fix}$ .  
Countersunk of the filling disc in direction to the anchor plate.



fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Intended Use**  
Installation instructions

**Annex B 6**  
Appendix 11/ 16

**Table C1.1: Characteristic tension resistance under static and quasi-static action**

| Size                                                                        |              |                   |                                 | FAZ II, FAZ II R, FAZ II HCR |                                                                         |                       |                       |                       |                     |                       |                       |      |     |
|-----------------------------------------------------------------------------|--------------|-------------------|---------------------------------|------------------------------|-------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|---------------------|-----------------------|-----------------------|------|-----|
|                                                                             |              |                   |                                 | M6                           |                                                                         | M8                    |                       | M10                   | M12                 | M16                   | M20                   | M24  |     |
| Steel failure                                                               |              |                   |                                 |                              |                                                                         |                       |                       |                       |                     |                       |                       |      |     |
| Characteristic resistance                                                   | FAZ II       | N <sub>Rk,s</sub> | [kN]                            | 7,6                          | 16,6                                                                    |                       | 28,3                  | 43,2                  | 67,0                | 123,3                 | 176,7                 |      |     |
|                                                                             | FAZ II R/HCR |                   |                                 | 11,4                         | 17,0                                                                    |                       | 29,0                  | 44,3                  | 70,6                | 124,9                 | 183,6                 |      |     |
| Partial factor for steel failure                                            |              |                   | γ <sub>Ms</sub> <sup>1)</sup>   | [-]                          |                                                                         | 1,5                   |                       |                       |                     |                       |                       |      |     |
| Pullout failure                                                             |              |                   |                                 |                              |                                                                         |                       |                       |                       |                     |                       |                       |      |     |
| Effective embedment depth for calculation                                   |              |                   | h <sub>ef</sub>                 | [mm]                         |                                                                         | 40                    | 35 -<br>45            | 45                    | 40 -<br>60          | 50 -<br>70            | 65 -<br>85            | 100  | 125 |
| Characteristic resistance in cracked concrete C20/25                        |              |                   | N <sub>Rk,p</sub>               | [kN]                         | 1,5                                                                     | 5,5                   | 8                     | 13                    | 20                  | 27,0                  | 34,4                  | 48,1 |     |
| Characteristic resistance in uncracked concrete C20/25                      |              |                   |                                 |                              | 10,5                                                                    | 14                    |                       | 20                    | 22                  | 38,6                  | 49,2                  | 68,8 |     |
| Increasing factors for N <sub>Rk,p</sub> for cracked and uncracked concrete |              |                   | ψ <sub>c</sub>                  | C25/30                       | 1,12                                                                    |                       |                       |                       |                     |                       |                       |      |     |
|                                                                             |              |                   |                                 | C30/37                       | 1,22                                                                    |                       |                       |                       |                     |                       |                       |      |     |
|                                                                             |              |                   |                                 | C35/45                       | 1,32                                                                    |                       |                       |                       |                     |                       |                       |      |     |
|                                                                             |              |                   |                                 | C40/50                       | 1,41                                                                    |                       |                       |                       |                     |                       |                       |      |     |
|                                                                             |              |                   |                                 | C45/55                       | 1,50                                                                    |                       |                       |                       |                     |                       |                       |      |     |
|                                                                             |              |                   |                                 | C50/60                       | 1,58                                                                    |                       |                       |                       |                     |                       |                       |      |     |
| Installation factor                                                         |              |                   | γ <sub>inst</sub>               | [-]                          |                                                                         | 1,0                   |                       |                       |                     |                       |                       |      |     |
| Concrete cone and splitting failure                                         |              |                   |                                 |                              |                                                                         |                       |                       |                       |                     |                       |                       |      |     |
| Factor for uncracked concrete                                               |              |                   | k <sub>ucr,N</sub>              | [-]                          | 11,0 <sup>2)</sup>                                                      |                       |                       |                       |                     |                       |                       |      |     |
| Factor for cracked concrete                                                 |              |                   | k <sub>cr,N</sub>               |                              | 7,7 <sup>2)</sup>                                                       |                       |                       |                       |                     |                       |                       |      |     |
| Characteristic spacing                                                      |              |                   | S <sub>cr,N</sub>               | [mm]                         | 3 · h <sub>ef</sub>                                                     |                       |                       |                       |                     |                       |                       |      |     |
| Characteristic edge distance                                                |              |                   | C <sub>cr,N</sub>               |                              | 1,5 · h <sub>ef</sub>                                                   |                       |                       |                       |                     |                       |                       |      |     |
| Spacing                                                                     |              |                   | S <sub>cr,sp</sub>              | 2 · C <sub>cr,sp</sub>       |                                                                         |                       |                       |                       |                     |                       |                       |      |     |
| Edge distance for h = 80                                                    |              |                   | C <sub>cr,sp</sub>              | [mm]                         | 40                                                                      | 2,4 · h <sub>ef</sub> | 2 · h <sub>ef</sub>   | -                     | -                   |                       |                       |      |     |
| Edge distance for h = 100                                                   |              |                   |                                 |                              |                                                                         | 2 · h <sub>ef</sub>   | 2,4 · h <sub>ef</sub> | 2 · h <sub>ef</sub>   |                     |                       |                       |      |     |
| Edge distance for h = 120                                                   |              |                   |                                 |                              |                                                                         |                       | 1,9 · h <sub>ef</sub> | 2,1 · h <sub>ef</sub> |                     |                       |                       |      |     |
| Edge distance for h = 140                                                   |              |                   |                                 |                              |                                                                         |                       |                       | 1,5 · h <sub>ef</sub> | 2 · h <sub>ef</sub> | -                     |                       |      |     |
| Edge distance for h = 160                                                   |              |                   |                                 |                              |                                                                         |                       |                       |                       |                     | 2,4 · h <sub>ef</sub> | -                     |      |     |
| Edge distance for h = 200                                                   |              |                   |                                 |                              |                                                                         |                       |                       |                       |                     |                       | 2,2 · h <sub>ef</sub> |      |     |
| Characteristic resistance to splitting                                      |              |                   | N <sup>0</sup> <sub>Rk,sp</sub> | [kN]                         | min {N <sup>0</sup> <sub>Rk,c</sub> ; N <sub>Rk,p</sub> } <sup>3)</sup> |                       |                       |                       |                     |                       |                       |      |     |

1) In absence of other national regulations

2) Based on concrete strength as cylinder strength

3)  $N^0_{Rk,c}$  according to EN 1992-4:2018

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Performances**

Characteristic values of resistance under tension loads

**Annex C 1**

Appendix 12/ 16

**Table C2.1:** Characteristic values of **shear** resistance under static and quasi-static action

| Size                                                     |              |                    | FAZ II, FAZ II R, FAZ II HCR |              |              |              |              |       |       |  |
|----------------------------------------------------------|--------------|--------------------|------------------------------|--------------|--------------|--------------|--------------|-------|-------|--|
|                                                          |              |                    | M6                           | M8           | M10          | M12          | M16          | M20   | M24   |  |
| Steel failure without lever arm                          |              |                    |                              |              |              |              |              |       |       |  |
| Characteristic resistance                                | FAZ II       | $V_{Rk,s}^0$ [kN]  | 5,9                          | 13,6         | 21,4         | 30,6         | 55,0         | 81,4  | 110,1 |  |
|                                                          | FAZ II R/HCR |                    | 8,8                          | 16,8         | 26,5         | 38,3         | 69,8         | 106,3 | 148,5 |  |
| Partial factor for steel failure                         |              | $\gamma_{Ms}^{1)}$ | 1,25                         |              |              |              |              |       |       |  |
| Factor for ductility                                     |              | $k_7$              | 1,0                          |              |              |              |              |       |       |  |
| Steel failure with lever arm and Concrete pryout failure |              |                    |                              |              |              |              |              |       |       |  |
| Effective embedment depth for calculation                |              | $h_{ef}$ [mm]      | 40                           | 45           | 60           | 70           | 85           | 100   | 125   |  |
| Characteristic bending resistance                        | FAZ II       | $M_{Rk,s}^0$ [Nm]  | 11,4                         | 26           | 52           | 92           | 233          | 513   | 865   |  |
|                                                          | FAZ II R/HCR |                    | 10,7                         | 29           | 59           | 100          | 256          | 519   | 898   |  |
| Factor for pryout failure                                |              | $k_8$ [-]          | 2,6                          | 2,8          | 3,2          |              | 3,0          | 2,6   | 2,4   |  |
| Effective embedment depth for calculation                |              | $h_{ef}$ [mm]      | -                            | 35 -<br>< 45 | 40 -<br>< 60 | 50 -<br>< 70 | 65 -<br>< 85 | -     |       |  |
| Characteristic bending resistance                        | FAZ II       | $M_{Rk,s}^0$ [Nm]  |                              | 20           | 44           | 92           | 184          |       |       |  |
|                                                          | FAZ II R/HCR |                    |                              | 21           | 45           | 100          | 193          |       |       |  |
| Factor for pryout failure                                |              | $k_8$ [-]          |                              | 2,5          | 2,6          | 3,1          | 3,2          |       |       |  |
| Partial factor for steel failure                         |              | $\gamma_{Ms}^{1)}$ | 1,25                         |              |              |              |              |       |       |  |
| Factor for ductility                                     |              | $k_7$              | 1,0                          |              |              |              |              |       |       |  |
| Concrete edge failure                                    |              |                    |                              |              |              |              |              |       |       |  |
| Effective embedment depth for calculation                |              | $l_f =$ [mm]       | $h_{ef}$                     |              |              |              |              |       |       |  |
| Outside diameter of a fastener                           |              | $d_{nom}$          | 6                            | 8            | 10           | 12           | 16           | 20    | 24    |  |

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

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

#### Performances

Characteristic values of resistance under shear loads

#### Annex C 2

Appendix 13/ 16

**Table C3.1: Characteristic values of **tension** resistance under **fire exposure****

| Size                                                      |                         | FAZ II, FAZ II R, FAZ II HCR                                                  |           |           |           |           |      |      |
|-----------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|------|------|
|                                                           |                         | M6                                                                            | M8        | M10       | M12       | M16       | M20  | M24  |
| $h_{ef} \geq$ [mm]                                        |                         | 40                                                                            | 35 / 45   | 40 / 60   | 50 / 70   | 65 / 85   | 100  | 125  |
| Characteristic resistance<br><b>steel failure</b>         | $N_{Rk,s,fi}$ R30       | 0,6 <sup>1)</sup> / 0,9 <sup>2)</sup>                                         | 1,4       | 2,8       | 5,0       | 9,4       | 14,7 | 21,1 |
|                                                           | R60                     | 0,4 <sup>1)</sup> / 0,9 <sup>2)</sup>                                         | 1,2       | 2,3       | 4,1       | 7,7       | 12,0 | 17,3 |
|                                                           | R90                     | 0,3 <sup>1)</sup> / 0,9 <sup>2)</sup>                                         | 0,9       | 1,9       | 3,2       | 6,0       | 9,4  | 13,5 |
|                                                           | R120                    | 0,2 <sup>1)</sup> / 0,7 <sup>2)</sup>                                         | 0,8       | 1,6       | 2,8       | 5,2       | 8,1  | 11,6 |
| Characteristic resistance<br><b>Concrete cone failure</b> | $N_{Rk,c,fi}$ R30 - R90 | $7,7 \cdot h_{ef}^{1,5} \cdot (20)^{0,5} \cdot h_{ef} / 200 / 1000$           |           |           |           |           |      |      |
|                                                           | R120                    | $7,7 \cdot h_{ef}^{1,5} \cdot (20)^{0,5} \cdot h_{ef} / 200 / 1000 \cdot 0,8$ |           |           |           |           |      |      |
| Characteristic resistance<br><b>pullout failure</b>       | $N_{Rk,p,fi}$ R30       | 0,4                                                                           | 0,9 / 2,0 | 2,2 / 3,3 | 3,0 / 5,0 | 4,5 / 6,8 | 8,6  | 12,0 |
|                                                           | R60                     |                                                                               | 0,8 / 2,0 |           |           |           |      |      |
|                                                           | R90                     |                                                                               | 0,5 / 2,0 |           |           |           |      |      |
|                                                           | R120                    | 0,3                                                                           | 0,3 / 1,6 | 1,7 / 2,6 | 2,4 / 4,0 | 3,6 / 5,4 | 6,9  | 9,6  |

**Table C3.2: Characteristic values of **shear** resistance under **fire exposure****

| Size<br>FAZ II, FAZ II R, FAZ II HCR |                   |     | R30                                   |                                           | R60                                   |                                            |
|--------------------------------------|-------------------|-----|---------------------------------------|-------------------------------------------|---------------------------------------|--------------------------------------------|
|                                      |                   |     | V <sub>Rk,s,fi,30</sub> [kN]          | M <sup>0</sup> <sub>Rk,s,fi,30</sub> [Nm] | V <sub>Rk,s,fi,60</sub> [kN]          | M <sup>0</sup> <sub>Rk,s,fi,60</sub> [Nm]  |
| M6                                   | h <sub>ef</sub> ≥ | 40  | 0,6 <sup>1)</sup> / 0,9 <sup>2)</sup> | 0,5 <sup>1)</sup> / 0,2 <sup>2)</sup>     | 0,4 <sup>1)</sup> / 0,9 <sup>2)</sup> | 0,3 <sup>1)</sup> / 0,1 <sup>2)</sup>      |
| M8                                   |                   | 35  | 1,8                                   | 1,4                                       | 1,6                                   | 1,2                                        |
| M10                                  |                   | 40  | 3,6                                   |                                           | 2,9                                   | 3,0                                        |
| M12                                  |                   | 50  | 6,3                                   | 7,8                                       | 4,9                                   | 6,4                                        |
| M16                                  |                   | 65  | 11,7                                  | 19,9                                      | 9,1                                   | 16,3                                       |
| M20                                  |                   | 100 | 18,2                                  | 39,0                                      | 14,2                                  | 31,8                                       |
| M24                                  |                   | 125 | 26,3                                  | 67,3                                      | 20,5                                  | 55,0                                       |
|                                      |                   |     |                                       |                                           |                                       |                                            |
| Size<br>FAZ II, FAZ II R, FAZ II HCR |                   |     | R90                                   |                                           | R120                                  |                                            |
|                                      |                   |     | V <sub>Rk,s,fi,90</sub> [kN]          | M <sup>0</sup> <sub>Rk,s,fi,90</sub> [Nm] | V <sub>Rk,s,fi,120</sub> [kN]         | M <sup>0</sup> <sub>Rk,s,fi,120</sub> [Nm] |
| M6                                   | h <sub>ef</sub> ≥ | 40  | 0,3 <sup>1)</sup> / 0,9 <sup>2)</sup> | 0,2 <sup>1)</sup> / 0,1 <sup>2)</sup>     | 0,2 <sup>1)</sup> / 0,7 <sup>2)</sup> | 0,2 <sup>1)</sup> / 0,1 <sup>2)</sup>      |
| M8                                   |                   | 35  | 1,3                                   | 1,0                                       | 1,2                                   | 0,8                                        |
| M10                                  |                   | 40  | 2,2                                   | 2,4                                       | 1,9                                   | 2,1                                        |
| M12                                  |                   | 50  | 3,5                                   | 5,0                                       | 2,8                                   | 4,3                                        |
| M16                                  |                   | 65  | 6,6                                   | 12,6                                      | 5,3                                   | 11,0                                       |
| M20                                  |                   | 100 | 10,3                                  | 24,6                                      | 8,3                                   | 21,4                                       |
| M24                                  |                   | 125 | 14,8                                  | 42,6                                      | 11,9                                  | 37,0                                       |

Concrete pryout failure according to EN 1992-4:2018

**Table C3.3: Minimum spacings and minimum edge distances of anchors under **fire exposure** for **tension** and **shear** load**

| Size          |                | FAZ II, FAZ II R, FAZ II HCR                                                                    |    |     |     |     |     |     |
|---------------|----------------|-------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|
|               |                | M6                                                                                              | M8 | M10 | M12 | M16 | M20 | M24 |
| Spacing       | $s_{min}$      | Annex B3                                                                                        |    |     |     |     |     |     |
| Edge distance | $c_{min}$ [mm] | $c_{min} = 2 \cdot h_{ef}$ ,<br>for fire exposure from more than one side $c_{min} \geq 300$ mm |    |     |     |     |     |     |

1) FAZ II

2) FAZ II R / HCR

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Performances**

Characteristic values of resistance under fire exposure

**Annex C 3**

Appendix 14/ 16



**Table C4.1: Characteristic values of tension and shear resistance under seismic action category C1**

| Size                                                          |                                  | FAZ II, FAZ II R, FAZ II HCR |      |         |         |         |       |       |
|---------------------------------------------------------------|----------------------------------|------------------------------|------|---------|---------|---------|-------|-------|
|                                                               |                                  | M6                           | M8   | M10     | M12     | M16     | M20   | M24   |
| Length of anchor                                              | $L_{\max}$                       | -                            | 167  | 186     | 221     | 285     | 394   | 477   |
| Effective embedment depth                                     | $h_{\text{ef}}$ [mm]             |                              | 45   | 40 - 60 | 50 - 70 | 65 - 85 | 100   | 125   |
| With filling of the annular gap                               | $\alpha_{\text{gap}}$ [-]        | 1,0                          |      |         |         |         |       |       |
| Steel failure                                                 |                                  |                              |      |         |         |         |       |       |
| Characteristic resistance tension load C1                     | $N_{\text{Rk,s,C1}}$ [kN]        | -                            | 16,0 | 27,0    | 41,0    | 66,0    | 111,0 | 150,0 |
| Partial factor for steel failure                              | $\gamma_{\text{Ms,C1}}^{1)}$ [-] |                              | 1,5  |         |         |         |       |       |
| Pullout failure                                               |                                  |                              |      |         |         |         |       |       |
| Characteristic resistance tension load in cracked concrete C1 | $N_{\text{Rk,p,C1}}$ [kN]        | -                            | 4,6  | 8,0     | 16,0    | 28,2    | 36,0  | 50,3  |
| Installation factor                                           | $\gamma_{\text{Inst}}$ [-]       |                              | 1,0  |         |         |         |       |       |
| Steel failure without lever arm                               |                                  |                              |      |         |         |         |       |       |
| Characteristic resistance shear load C1                       | $V_{\text{Rk,s,C1}}$ [kN]        | -                            | 11   | 17      | 27      | 47      | 56    | 69    |
| Partial factor for steel failure                              | $\gamma_{\text{Ms,C1}}^{1)}$ [-] |                              | 1,25 |         |         |         |       |       |

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

**Table C4.2: Characteristic values of tension and shear resistance under seismic action category C2**

| Size                                                          |                                     | FAZ II, FAZ II R, FAZ II HCR <sup>1)</sup> |    |       |       |       |      |     |
|---------------------------------------------------------------|-------------------------------------|--------------------------------------------|----|-------|-------|-------|------|-----|
|                                                               |                                     | M6                                         | M8 | M10   | M12   | M16   | M20  | M24 |
| Length of anchor                                              | L <sub>max</sub> [mm]               | -                                          |    | 186   | 221   | 285   | 394  | -   |
| With filling of the annular gap                               | α <sub>gap</sub> [-]                | 1,0                                        |    |       |       |       |      |     |
| Steel failure                                                 |                                     |                                            |    |       |       |       |      |     |
| Characteristic resistance tension load C2                     | N <sub>Rk,s,C2</sub> [kN]           | -                                          |    | 27    | 41    | 66    | 111  | -   |
| Partial factor for steel failure                              | γ <sub>Ms,C2<sup>2)</sup></sub> [-] |                                            |    | 1,5   |       |       |      |     |
| Pullout failure                                               |                                     |                                            |    |       |       |       |      |     |
| Characteristic resistance tension load in cracked concrete C2 | h <sub>ef</sub> [mm]                | -                                          |    | 60    | 70    | 85    | 100  | -   |
|                                                               | N <sub>Rk,p,C2</sub> [kN]           |                                            |    | 5,1   | 7,4   | 21,5  | 30,7 |     |
|                                                               | h <sub>ef</sub> [mm]                |                                            |    | 40-59 | 50-69 | 65-84 | -    |     |
|                                                               | N <sub>Rk,p,C2</sub> [kN]           |                                            |    | 2,7   | 4,4   | 16,4  |      |     |
| Installation factor                                           | γ <sub>inst</sub> [-]               | 1,0                                        |    |       |       |       |      |     |
| Steel failure without lever arm                               |                                     |                                            |    |       |       |       |      |     |
| Characteristic resistance shear load C2                       | h <sub>ef</sub> [mm]                | -                                          |    | 60    | 70    | 85    | 100  | -   |
|                                                               | V <sub>Rk,s,C2</sub> [kN]           |                                            |    | 10,0  | 17,4  | 27,5  | 39,9 |     |
|                                                               | h <sub>ef</sub> [mm]                |                                            |    | 40-59 | 50-69 | 65-84 | -    |     |
|                                                               | V <sub>Rk,s,C2</sub> [kN]           |                                            |    | 7,0   | 12,7  | 22,0  |      |     |
| Partial factor for steel failure                              | γ <sub>Ms,C2<sup>2)</sup></sub> [-] | 1,25                                       |    |       |       |       |      |     |

<sup>1)</sup> FAZ II HCR: Only valid for cold-formed version (according to Annex A1)

<sup>2)</sup> In absence of other national regulations

|                                                                                                               |                                     |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------|
| fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR                                                              | <b>Annex C 4</b><br>Appendix 15/ 16 |
| <b>Performances</b><br>Characteristic values of resistance under tension and shear loads under seismic action |                                     |

**Table C5.1:** Displacements under static and quasi static **tension** loads

| Size                                                       | FAZ II, FAZ II R, FAZ II HCR |      |      |      |      |      |      |
|------------------------------------------------------------|------------------------------|------|------|------|------|------|------|
|                                                            | M6                           | M8   | M10  | M12  | M16  | M20  | M24  |
| <b>Displacement – factor for tensile load<sup>1)</sup></b> |                              |      |      |      |      |      |      |
| $\delta_{N0}$ - factor in cracked concrete                 | 0,13                         | 0,22 | 0,12 | 0,09 | 0,08 | 0,07 | 0,05 |
| $\delta_{N\infty}$ - factor [mm/kN]                        | 1,00                         | 0,78 | 0,40 | 0,19 | 0,09 |      | 0,07 |
| $\delta_{N0}$ - factor in uncracked concrete               | 0,16                         | 0,07 | 0,05 | 0,06 |      | 0,05 | 0,04 |
| $\delta_{N\infty}$ - factor                                | 0,24                         | 0,29 | 0,21 | 0,14 | 0,10 | 0,06 | 0,05 |

**Table C5.2:** Displacements under static and quasi static **shear** loads

| Size                                                             | FAZ II                      |      |      |      |      |      |      |
|------------------------------------------------------------------|-----------------------------|------|------|------|------|------|------|
|                                                                  | M6                          | M8   | M10  | M12  | M16  | M20  | M24  |
| <b>Displacement – factor for shear load<sup>2)</sup></b>         |                             |      |      |      |      |      |      |
| $\delta_{V0}$ - factor                                           | 0,6                         | 0,35 | 0,37 | 0,27 | 0,10 | 0,09 | 0,07 |
| $\delta_{V\infty}$ - factor                                      | 0,9                         | 0,52 | 0,55 | 0,40 | 0,14 | 0,15 | 0,11 |
| $\delta_{V0}$ - factor in cracked and uncracked concrete [mm/kN] | <b>FAZ II R, FAZ II HCR</b> |      |      |      |      |      |      |
|                                                                  | 0,6                         | 0,23 | 0,19 | 0,18 | 0,10 | 0,11 | 0,07 |
|                                                                  | 0,9                         | 0,27 | 0,22 | 0,16 | 0,11 | 0,05 | 0,09 |

1) Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0} - \text{factor} \cdot N_{ED}$$

$$\delta_{N\infty} = \delta_{N\infty} - \text{factor} \cdot N_{ED}$$

(N<sub>ED</sub>: Design value of the applied tension force)

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<sub>ED</sub>: Design value of the applied shear force)**Table C5.3:** Displacements under **tension** loads for **category C2** for all embedment depths

| Size                                       | FAZ II, FAZ II R, FAZ II HCR |    |      |      |      |      |     |
|--------------------------------------------|------------------------------|----|------|------|------|------|-----|
|                                            | M6                           | M8 | M10  | M12  | M16  | M20  | M24 |
| Displacement DLS $\delta_{N,C2(DLS)}$ [mm] | -                            |    | 2,7  | 4,4  |      | 5,6  | -   |
| Displacement ULS $\delta_{N,C2(ULS)}$      |                              |    | 11,5 | 13,0 | 12,3 | 14,4 |     |

**Table C5.4:** Displacements under **shear** loads for **category C2** for all embedment depths

| Size                                       | FAZ II, FAZ II R, FAZ II HCR |    |     |     |      |      |     |
|--------------------------------------------|------------------------------|----|-----|-----|------|------|-----|
|                                            | M6                           | M8 | M10 | M12 | M16  | M20  | M24 |
| Displacement DLS $\delta_{V,C2(DLS)}$ [mm] | -                            |    | 4,1 | 4,7 | 5,5  | 4,8  | -   |
| Displacement ULS $\delta_{V,C2(ULS)}$      |                              |    | 6,2 | 7,8 | 10,1 | 11,2 |     |

fischer Bolt Anchor FAZ II, FAZ II R, FAZ II HCR

**Performances**

Displacements under tension and shear loads

**Annex C 5**

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