

## DECLARATION OF PERFORMANCE

### DoP 0193

for fischer Bolt Anchor FXA, FXA R (Mechanical anchor for use in concrete)

EN

|   |  |                |                             |
|---|--|----------------|-----------------------------|
| 1. <u>Unique identification code of the product-type:</u>                                 | <b>DoP 0193</b>  |                |                             |
| 2. <u>Intended use/es:</u>  | <b>Post-installed fastening in uncracked concrete.</b>   |                |                             |
| 3. <u>Manufacturer:</u>   | <b>See appendix, especially annexes B1- B3<br/>fischerwerke GmbH &amp; Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Germany</b> |                |                             |
| 4. <u>Authorised representative:</u>  | -  |                |                             |
| 5. <u>System/s of AVCP:</u>   | 1  |                |                             |
| 6. <u>European Assessment Document:</u>   | <b>EAD 330232-01-0601, (Edition 12/ 2019)</b>  |                |                             |
| European Technical Assessment:  | <b>ETA-13/0772; 2020-07-14</b>   |                |                             |
| Technical Assessment Body:  | <b>DIBt- Deutsches Institut für Bautechnik</b>   |                |                             |
| Notified body/ies:  | <b>1343 MPA Darmstadt / 2873 TU Darmstadt</b>  |                |                             |
| 7. <u>Declared performance/s:</u>   |  |                |                             |
| <b>Mechanical resistance and stability (BWR 1)</b>  |  |                |                             |
| Characteristic resistance to tension load (static and quasi-static loading):              | Resistance to steel failure:   | Annex C1       | $E_s = 210\,000\text{ MPa}$ |
|   | Resistance to pull- out failure:   | Annex C1       |                             |
|   | Resistance to concrete cone failure:   | Annex C1       | $k_{cr,N} = \text{NPD}$     |
|   | Robustness:  | Annex C1       |                             |
|   | Minimum edge distance and spacing:   | Annex C2       |                             |
|   | Edge distance to prevent splitting under load:   | Annex C1       |                             |
| Characteristic resistance to shear load (static and quasi-static loading), Method A:      | Resistance to steel failure (shear load):  | Annex C2       |                             |
|   | Resistance to pry-out failure:   | Annex C2       |                             |
| Characteristic resistance and displacements for seismic performance categories C1 and C2: | Resistance to tension load, displacements, category C1:  | NPD            |                             |
|   | Resistance to tension load, displacements, category C2:  | NPD            |                             |
|   | Resistance to shear load, displacements, category C1:  | NPD            |                             |
|   | Resistance to shear load, displacements, category C2:  | NPD            |                             |
|   | Factor for annular gap:  | NPD            |                             |
| Characteristic Resistance for simplified design:  | Method B:  | NPD            |                             |
|   | Method C:  | NPD            |                             |
| Displacements and durability:   | Displacements under static and quasi-static loading:   | Annex C2       |                             |
|   | Durability:  | Annexes A3, B1 |                             |
| <b>Safety in case of fire (BWR 2)</b>   |  |                |                             |
| Reaction to fire:   | Class (A1)   |                |                             |
| Resistance to fire:   | Fire resistance to steel failure (tension load):   | NPD            |                             |
|   | Fire resistance to pull-out failure (tension load):  | NPD            |                             |
|   | Fire resistance to steel failure (shear load):   | NPD            |                             |



8. Appropriate Technical Documentation and/or Specific –  
Technical Documentation:

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Thilo Pregartner, Dr.-Ing.  
Tumlingen, 2020-07-28

Peter Schillinger, Dipl.-Ing.

This DoP has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.

The Appendix includes voluntary and complementary information in English language exceeding the (language-neutrally specified) legal requirements.

## Specific Part

### 1 Technical description of the product

The Fischer Bolt anchor FXA and FXA R is an anchor made of zinc plate or stainless steel 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 C 1 and C 2   |
| Characteristic resistance to shear load (static and quasi-static loading)                | See Annex C 2           |
| Displacements (static and quasi-static loading)  | See Annex C 2           |
| Characteristic resistance and displacements for seismic performance categories C1 and C2 | No performance assessed |
| Durability   | See Annex B 1           |

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

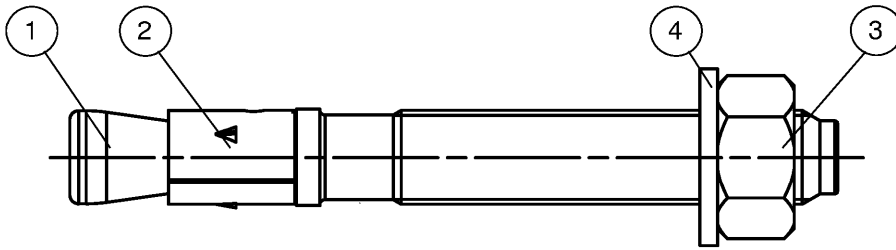
| Essential characteristic | Performance             |
|--------------------------|-------------------------|
| Reaction to fire         | Class A1                |
| Resistance to fire       | No performance assessed |

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

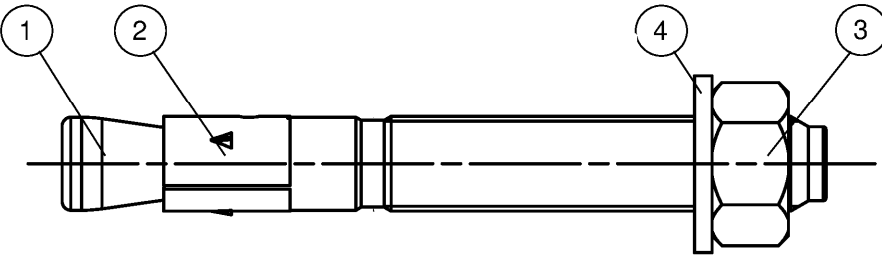
In accordance with the European Assessment Document EAD 330232-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

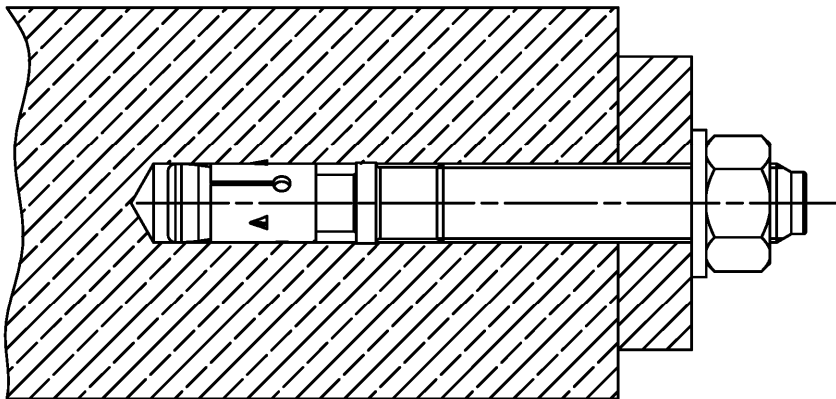
Cone bolt manufactured by cold - forming:



Cone bolt manufactured by turning:



- ① Cone bolt (cold – formed or turned)
- ② Expansion sleeve
- ③ Hexagon nut
- ④ Washer



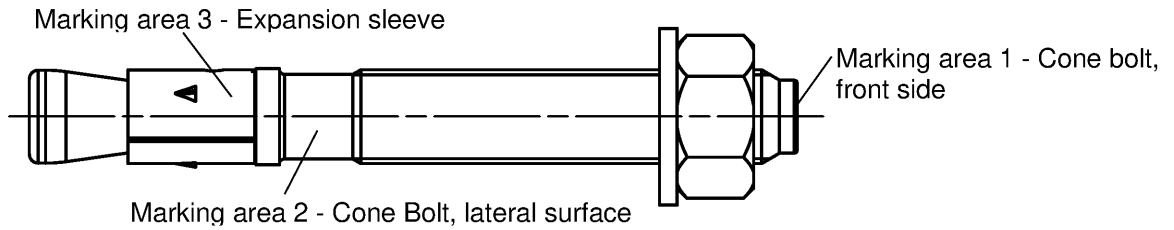
*(Fig. not to scale)*

fischer Bolt Anchor FXA, FXA R

**Product description**  
Installed condition

**Annex A 1**

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Product label, example:

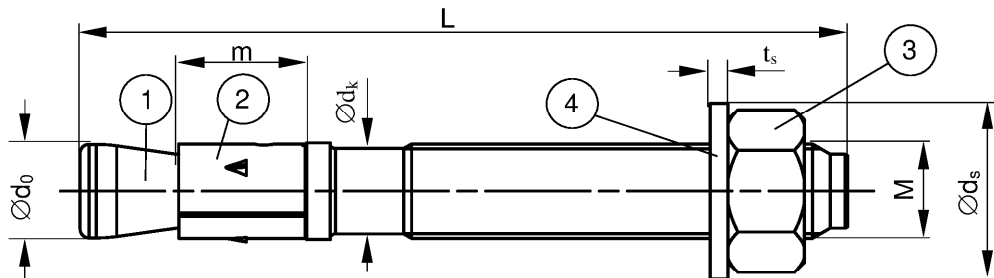
FXA 12/10 R

Brand | type of anchor  
placed on marking area 2 or marking area 3

thread size / thickness of fixture ( $t_{fix}$ )  
identification R  
placed on marking area 2

**Table A2.1:** Letter-code on marking area 1 and maximum thickness of fixture  $t_{fix}$ :

| Marking        | A | B  | C  | D  | E  | F  | G  | H  | I  | K  | L  | M  | N  | O  | P   | R   | S   | T   | U   | V   | W   | X   | Y   | Z   |
|----------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Max. $t_{fix}$ | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 | 250 | 300 | 350 | 400 |



**Table A2.2:** Anchor dimensions [mm]

| Part                 | Designation      | FXA, FXA R        |      |      |      |      |
|----------------------|------------------|-------------------|------|------|------|------|
|                      |                  | M8                | M10  | M12  | M16  |      |
| 1                    | Cone bolt        | M                 | 8    | 10   | 12   | 16   |
|                      |                  | $\varnothing d_0$ | 7,9  | 9,9  | 11,9 | 15,9 |
|                      |                  | $\varnothing d_k$ | 7,1  | 8,9  | 10,8 | 14,5 |
| 2                    | Expansion sleeve | m                 | 11,5 | 13,5 | 16,5 | 21,5 |
| 3                    | Hexagon nut      | SW                | 13   | 17   | 19   | 24   |
| 4                    | Washer           | $t_s$             | 1,4  | 1,8  | 2,3  | 2,7  |
|                      |                  | $\varnothing d_s$ | 15   | 19   | 23   | 29   |
| Thickness of fixture |                  | $t_{fix}$         | 0    |      |      |      |
| Length of anchor     | $L_{min}$        | =                 | 56   | 71   | 86   | 120  |
|                      | $L_{max}$        | =                 | 261  | 316  | 396  | 520  |

(Fig. not to scale)

fischer Bolt Anchor FXA, FXA R

**Product description**  
Product label and letter code and anchor dimensions

**Annex A 2**

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**Table A3.1: Materials FXA (zinc plated  $\geq 5\mu\text{m}$ , DIN EN ISO 4042:2018)**

| Part | Designation      | Material  |
|------|------------------|---|
| 1    | Cone bolt        | Cold form steel or free cutting steel           |
| 2    | Expansion sleeve | Cold strip, EN 10139:2016 <sup>1)</sup>         |
| 3    | Hexagon nut      | Steel, property class min. 8, EN ISO 898-2:2012 |
| 4    | Washer           | Cold strip, EN 10139:2013                       |

<sup>1)</sup> Optional stainless steel EN 10088:2014

**Table A3.2: Materials FXA R**

| Part | Designation      | Material  |
|------|------------------|---|
| 1    | Cone bolt        | Stainless steel EN 10088:2014   |
| 2    | Expansion sleeve |   |
| 3    | Hexagon nut      | Stainless steel EN 10088:2014<br>ISO 3506-2: 2009; property class min. 70 |
| 4    | Washer           | Stainless steel EN 10088:2014   |

fischer Bolt Anchor FXA, FXA R

**Product description**  
Materials

**Annex A 3**

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## Specifications of intended use

|                                |                 |             |     |     |
|--------------------------------|-----------------|-------------|-----|-----|
| fischer Bolt Anchor FXA, FXA R | M8              | M10         | M12 | M16 |
| Material                       | Steel           | Zinc plated | ✓   |     |
|                                | Stainless steel | R           |     |     |
| Static and quasi-static loads  |                 |             |     |     |
| Uncracked concrete             |                 |             |     |     |

**Base materials:**

- Reinforced or unreinforced normal 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: **FXA**
- For all other conditions according to EN 1993-1-4:2015-10 corresponding to corrosion resistance class CRC III **FXA R**

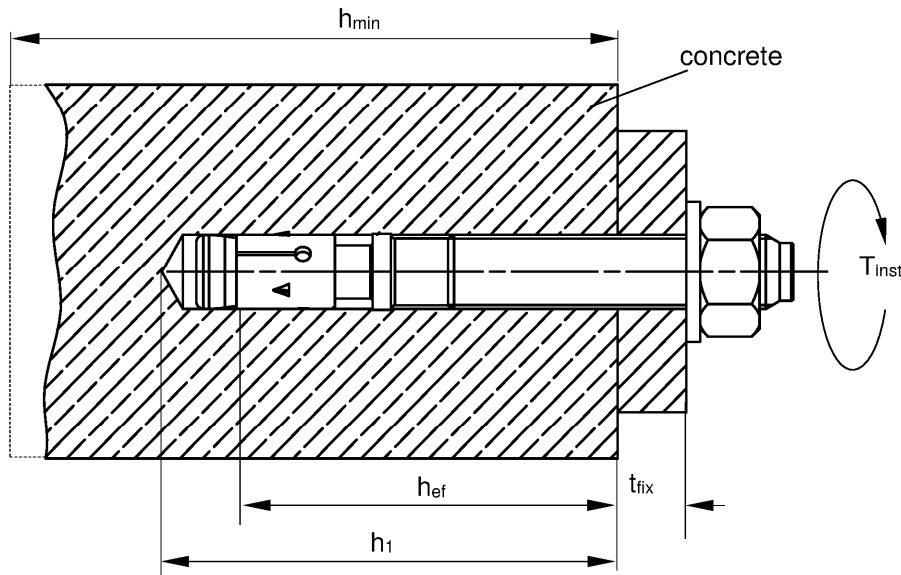
**Design:**

- 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 TR 055

|                                       |                                       |
|---------------------------------------|---------------------------------------|
| fischer Bolt Anchor FXA, FXA R        | <b>Annex B 1</b><br><br>Appendix 5/ 9 |
| <b>Intended Use</b><br>Specifications |                                       |

**Table B2.1: Installation parameters**

| Type of anchor / size                     |                   | FXA, FXA R |       |      |      |
|---|-------------------|------------|-------|------|------|
|   |                   | M8         | M10   | M12  | M16  |
| Nominal drill hole diameter               | $d_0 =$           | 8          | 10    | 12   | 16   |
| Cutting diameter of drill bit             | $d_{cut} \leq$    | 8,45       | 10,45 | 12,5 | 16,5 |
| Effective anchorage depth                 | $h_{ef} =$ [mm]   | 40         | 50    | 65   | 80   |
| Depth of drill hole in concrete           | $h_1 \geq$        | 56         | 68    | 85   | 104  |
| Diameter of clearance hole in the fixture | $d_f \leq$        | 9          | 12    | 14   | 18   |
| Required torque moment FXA (zinc plated)  | $T_{inst} =$ [Nm] | 15         | 30    | 50   | 100  |
| Required torque moment FXA R              |                   | 10         | 20    | 35   | 80   |



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

(Fig. not to scale)

fischer Bolt Anchor FXA, FXA R

**Intended Use**  
Installation parameters

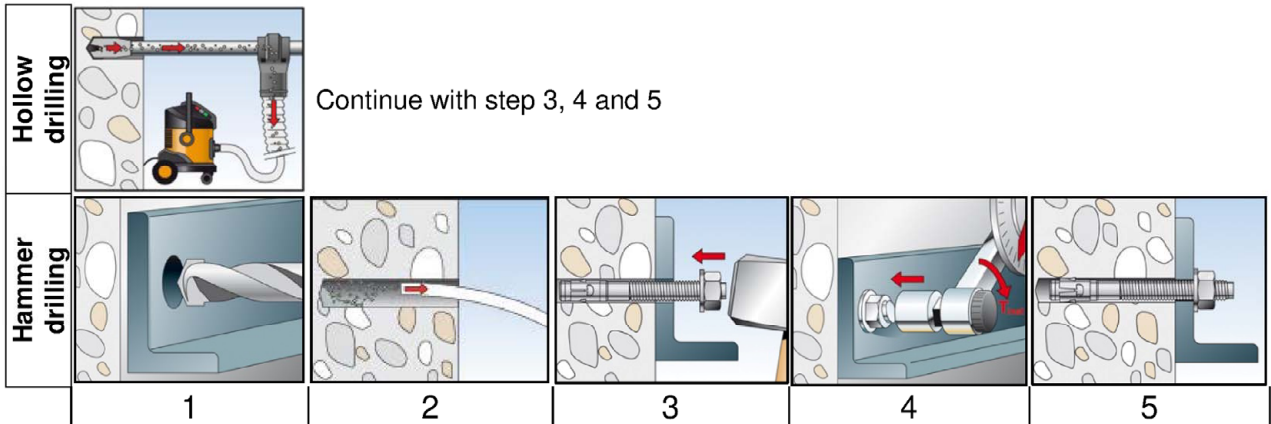
**Annex B 2**

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## Installation instructions

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener
- Checking before placing the fastener to ensure that the strength class of the concrete in which the fastener 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 or hollow drilling
- Drill hole created perpendicular +/- 5° 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



| No. | Description  |  |
|-----|--|--|
| 1   | Create drill hole with hammer drill                          | Create drill hole with hollow drill and vacuum cleaner |
| 2   | Clean bore hole  | -  |
| 3   | Set anchor   |  |
| 4   | Expand anchor with prescribed installation torque $T_{inst}$ |  |
| 5   | Finished installation  |  |

### Types of drills

Hammer drill



Hollow drill



fischer Bolt Anchor FXA, FXA R

**Intended Use**  
Installation instructions

**Annex B 3**

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

| Type of anchor / size                      |                    |        | FXA, FXA R                           |     |     |     |
|--|--------------------|--------|--------------------------------------|-----|-----|-----|
|  |                    |        | M8                                   | M10 | M12 | M16 |
| <b>Steel failure</b>                       |                    |        |                                      |     |     |     |
| Characteristic resistance                  | $N_{Rk,s}$         | [kN]   | 16                                   | 25  | 36  | 67  |
| Partial factor                             | $\gamma_{Ms}^{1)}$ | [-]    | 1,4                                  |     |     | 1,5 |
| <b>Pullout failure</b>                     |                    |        |                                      |     |     |     |
| Characteristic resistance C20/25           | $N_{Rk,p}$         | [kN]   | 12                                   | 16  | 25  | 35  |
| Increasing factors for $N_{Rk,p}$          | $\psi_c$           | C25/30 | 1,12                                 |     |     |     |
|  |                    | C30/37 | 1,23                                 |     |     |     |
|  |                    | C35/45 | 1,32                                 |     |     |     |
|  |                    | C40/50 | 1,41                                 |     |     |     |
|  |                    | C45/55 | 1,50                                 |     |     |     |
|  |                    | C50/60 | 1,58                                 |     |     |     |
| Installation sensitivity factor            | $\gamma_{inst}$    | [-]    | 1,2                                  |     |     | 1,0 |
| <b>Concrete cone and splitting failure</b> |                    |        |                                      |     |     |     |
| Effective anchorage depth                  | $h_{ef}$           | [mm]   | 40                                   | 50  | 65  | 80  |
| Factor for uncracked concrete              | $k_{ucr,N}$        | [-]    | 11,0 <sup>2)</sup>                   |     |     |     |
| Characteristic spacing                     | $s_{cr,N}$         | [mm]   | 3 $h_{ef}$                           |     |     |     |
| Characteristic edge distance               | $c_{cr,N}$         |        | 1,5 $h_{ef}$                         |     |     |     |
| Spacing (splitting failure)                | $s_{cr,sp}$        |        | 190                                  | 200 | 290 | 350 |
| Edge distance (splitting failure)          | $c_{cr,sp}$        |        | 95                                   | 100 | 145 | 175 |
| Characteristic resistance to splitting     | $N^0_{Rk,sp}$      | [kN]   | $\min \{N^0_{Rk,c}, N_{Rk,p}\}^{3)}$ |     |     |     |

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

<sup>2)</sup> Based on concrete strength as cylinder strength

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

fischer Bolt Anchor FXA, FXA R

**Performances**

Characteristic values of tension resistance

**Annex C 1**

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

| Type of anchor / size   |                        | FXA, FXA R |     |     |     |
|---|------------------------|------------|-----|-----|-----|
|   |                        | M8         | M10 | M12 | M16 |
| Installation factor   | $\gamma_{inst}$ [-]    | 1,2        |     |     | 1,0 |
| <b>Steel failure without lever arm</b>                          |                        |            |     |     |     |
| Characteristic resistance                                       | $V_{RK,s}^0$ [kN]      | 11         | 17  | 25  | 47  |
| Partial factor for steel failure                                | $\gamma_{Ms}^{1)}$ [-] | 1,25       |     |     |     |
| <b>Steel failure with lever arm and concrete pryout failure</b> |                        |            |     |     |     |
| Characteristic bending moment                                   | $M_{RK,s}^0$ [Nm]      | 23         | 45  | 79  | 200 |
| Partial factor for steel failure                                | $\gamma_{Ms}^{1)}$     | 1,25       |     |     |     |
| Factor for ductility  | $k_7$ [-]              | 1,0        |     |     |     |
| Factor for pryout   | $k_8$                  | 1          |     | 2   |     |
| <b>Concrete edge failure</b>                                    |                        |            |     |     |     |
| Effective length of anchor                                      | $l_f$ [mm]             | 40         | 50  | 65  | 80  |
| Effective diameter of anchor                                    | $d_{nom}$              | 8          | 10  | 12  | 16  |

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

**Table C2.2:** Minimum thickness of concrete members, minimum spacing and minimum edge distances

| Type of anchor / size       |                | FXA, FXA R |     |     |     |
|-----------------------------|----------------|------------|-----|-----|-----|
|                             |                | M8         | M10 | M12 | M16 |
| Minimum thickness of member | $h_{min}$      | 100        |     | 120 | 160 |
| Minimum spacing             | $s_{min}$ [mm] | 40         | 70  |     | 120 |
| Minimum edge distance       | $c_{min}$      | 45         | 55  | 70  | 90  |

**Table C2.3:** Displacements under static and quasi static **tension** loads

| Type of anchor / size |   | FXA, FXA R |     |     |      |
|-----------------------|---|------------|-----|-----|------|
|                       |   | M8         | M10 | M12 | M16  |
| Tension load          | $N$ [kN]                                    | 4,7        | 6,3 | 9,9 | 16,5 |
| Displacements         | $\frac{\delta_{N0}}{\delta_{N\infty}}$ [mm] | 0,6        | 0,9 | 1,9 | 1,8  |
|                       |   | 3,1        |     |     |      |

**Table C2.4:** Displacements under static and quasi static **shear** loads

| Type of anchor / size |   | FXA, FXA R |     |      |      |
|-----------------------|---|------------|-----|------|------|
|                       |   | M8         | M10 | M12  | M16  |
| Shear load            | $V$ [kN]                                    | 6,3        | 9,5 | 14,3 | 26,8 |
| Displacements         | $\frac{\delta_{V0}}{\delta_{V\infty}}$ [mm] | 1,8        | 2,4 |      | 2,6  |
|                       |   | 2,7        | 3,6 |      | 3,9  |

fischer Bolt Anchor FXA, FXA R

**Performances**

Characteristic values of shear resistance, Minimum thickness of concrete members, minimum spacing and edge distance, Displacements due to tension and shear loads

**Annex C 2**

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