

## DECLARAÇÃO DE DESEMPENHO

### DoP 0294

para fischer Parafuso de concreto ULTRACUT FBS II A4 (Ancoragem metálica para utilização em betão)

PT

1. Código de identificação único do produto-tipo: DoP 0294
2. Utilização(ões) prevista(s): Fixação pós-instalada em betão fissurado ou não fissurado, ver anexos, especialmente anexos B1 - B4.
3. Fabricante: fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Alemanha
4. Representante autorizado: -
5. Sistema(s) de avaliação e verificação da regularidade do desempenho (AVCP): 1
6. Documento de Avaliação Europeu: EAD 330232-00-0601  
Avaliação Técnica Europeia: ETA-17/0740; 2018-10-23  
Organismo de Avaliação Técnica: ETA-Danmark A/S  
Organismo(s) notificado(s): 2873 TU Darmstadt
7. Desempenho(s) declarado(s):  
**Resistência mecânica e estabilidade (BWR 1)**  
**Características de resistência à tração (para acção estática e quase-estática):**  
Resistência à rotura do aço: Anexo C1 E<sub>s</sub>= 210 000 MPa  
Resistência à rotura por arranque: Anexo C1  
Resistência à rotura por cone de betão: Anexo C1  
Robustez: Anexo C1  
Distância mínima ao bordo e espaçamento: Anexo B3  
Distância ao bordo para prevenir rotura por fendilhação: Anexo C1  
  
**Características de resistência ao corte (para acção estática e quase-estática):**  
Resistência à rotura do aço (corte): Anexo C1  
Resistência do betão ao destacamento: Anexo C1  
Resistência do bordo do betão: Anexo C1  
Deslocamentos sobre ações estáticas ou quase-estáticas: Anexo C4  
Durabilidade: Anexos A2, B1  
  
**Resistência característica e Deslocamentos para as categorias de performance sísmica C1 e C2:**  
Resistência à rotura do aço: Anexo C2  
Resistência à rotura por arranque: Anexo C2  
Deformação na ruptura: NPD  
Factor espaço anular: NPD  
Deslocamentos: Anexo C4  
  
**Segurança em caso de incêndio (BWR 2)**  
Reação ao fogo: Classe (A1)  
  
**Resistência ao fogo:**  
Resistência em caso de incêndio, rotura do aço (tração): Anexo C3  
Resistência em caso de incêndio, rotura por arranque (tração): Anexo C3  
Resistência em caso de incêndio, rotura do aço (corte): Anexo C3
8. Documentação Técnica Adequada e/ou Documentação Técnica Específica: -

O desempenho do produto identificado acima está em conformidade com o conjunto de desempenhos declarados. A presente declaração de desempenho é emitida, em conformidade com o Regulamento (UE) n.º 305/2011, sob a exclusiva responsabilidade do fabricante identificado acima.

Assinado por e em nome do fabricante por:



Dr.-Ing. Oliver Geibig, Diretor Administrativo de Unidades de Negócios e Engenharia  
Tumlingen, 2022-01-10

Jürgen Grün, Diretor Administrativo de Química e Qualidade

Este DoP foi preparado em diferentes línguas. Em caso de litígio sobre a interpretação, a versão em inglês prevalecerá sempre.

O Anexo inclui informações voluntárias e complementares em inglês que excedem os requisitos legais (linguisticamente especificados).

## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product and intended use**

#### **Technical description of the product**

fischer concrete screw ULTRACUT FBS II A4 is a concrete screw made of stainless steel. The anchor is installed in a drilled hole and anchored by mechanical interlock.

An illustration of the product is given in Annex A.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex B, Table B2.1. The intended use specifications of the product are detailed in the Annex B1.

### **2 Specification of the intended use in accordance with the applicable EAD**

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

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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 Characteristics of product**

##### **Mechanical resistance and stability (BWR 1):**

The essential characteristics are detailed in the Annex C1, C2 and C4.

##### **Safety in case of fire (BWR 2):**

The essential characteristics are detailed in the Annex C3.

Other Basic Requirements are not relevant.

#### **3.2 Methods of assessment**

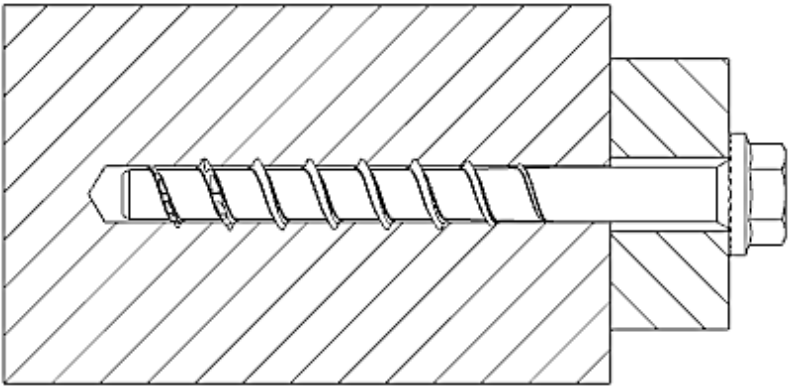
The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirement 1 has been made in accordance with EAD 330232-00-0601; Mechanical fasteners for use in concrete.

## **4 Assessment and verification of constancy of performance (AVCP)**

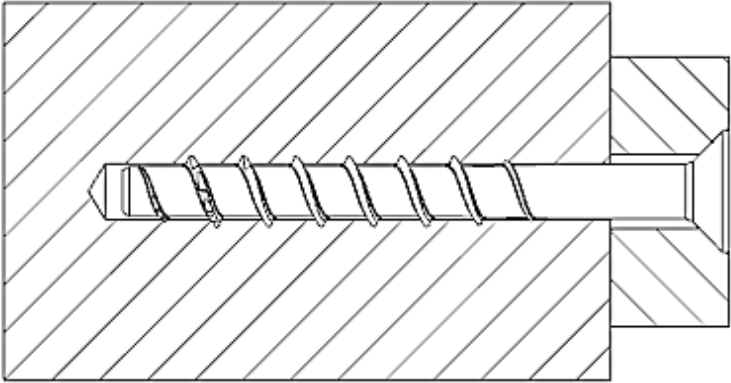
### **4.1 AVCP system**

According to the decision 1996/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 1.

**Product in the installed condition**



FBS II US A4 /  
FBS II US TX A4

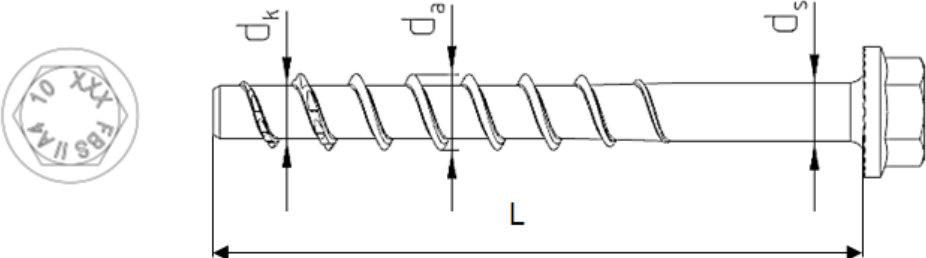
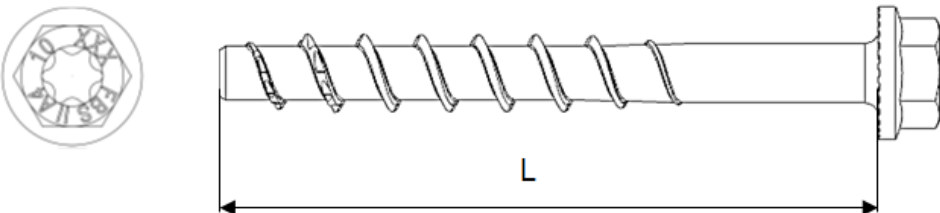
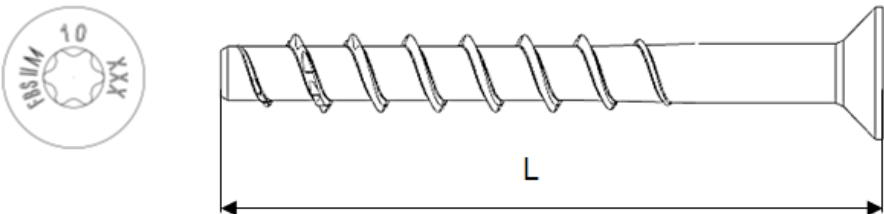


FBS II SK A4

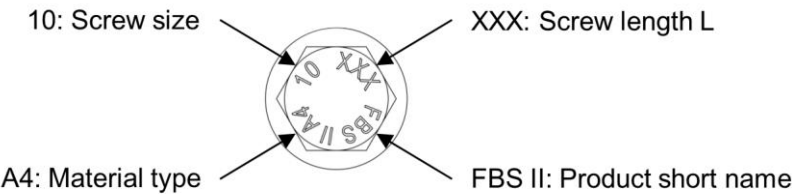
|                                                           |  |                                                                |
|-----------------------------------------------------------|--|----------------------------------------------------------------|
| fischer concrete screw ULTRACUT FBS II A4                 |  | Annex A1<br>of European<br>Technical Assessment<br>ETA-17/0740 |
| Product description<br>Product in the installed condition |  |                                                                |

**Table A2.1: Geometry and material**

| Type of screw / size  |                |      | FBS II A4 US / SK                                       |      |      |
|-----------------------|----------------|------|---------------------------------------------------------|------|------|
|                       |                |      | 8                                                       | 10   | 12   |
| Thread outer diameter | d <sub>a</sub> | [mm] | 10,3                                                    | 12,5 | 14,6 |
| Core diameter         | d <sub>k</sub> |      | 7,5                                                     | 9,4  | 11,1 |
| Shaft diameter        | d <sub>s</sub> |      | 8,0                                                     | 9,9  | 11,7 |
| Material              |                |      | Tip: hardened steel;<br>Shaft and head: stainless steel |      |      |

|                                                               |                                                                                     |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Hexagon head<br>with formed washer<br>(US)                    |   |
| Hexagon head<br>with formed washer and<br>TX-drive<br>(US TX) |   |
| Countersunk Head<br>(SK)                                      |  |

**Head Marking**



|                                              |                                                                |
|----------------------------------------------|----------------------------------------------------------------|
| fischer concrete screw ULTRACUT FBS II A4    | Annex A2<br>of European<br>Technical Assessment<br>ETA-17/0740 |
| Product description<br>Geometry and material |                                                                |

## Specification of intended use:

| Size                                   | FBS II A4 |    |    |    |    |    |    |     |
|----------------------------------------|-----------|----|----|----|----|----|----|-----|
|                                        | 8         |    | 10 |    |    | 12 |    |     |
| Nominal embedment depth [mm]           | 50        | 65 | 55 | 65 | 85 | 60 | 75 | 100 |
| Static and quasi-static loads          | ✓         |    |    |    |    |    |    |     |
| Cracked and uncracked concrete         |           |    |    |    |    |    |    |     |
| Fire exposure                          |           |    |    |    |    |    |    |     |
| Seismic performance category C1 and C2 |           | ✓  |    |    | ✓  |    |    | ✓   |

### Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013
- Strength classes C20/25 to C50/60 according to EN 206:2013
- Uncracked or cracked concrete

### Use conditions (Environmental conditions):

- Structures subjected to dry internal conditions
- Structures subjected to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist.

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere or 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 screw is indicated on the design drawings (e.g. position of the screw relative to reinforcement or to supports, etc.).
- Design of fastenings according to FprEN 1992-4: 2016 and EOTA Technical Report TR 055
- Seismic design according EOTA Technical Report TR 049

### Installation:

- Hammer drilling or diamond drilling or hollow drilling according to Annex B4
- Screw installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: New hole must be drilled at a minimum distance of twice the depth of the aborted hole or closer, if the hole is filled with a high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- Adjustability according to Annex B3
- Cleaning of drill hole is not necessary when using a hollow drill or:
  - If drilling vertically upwards
  - If drilling vertical downwards and the drill hole depth has been increased. It is recommended to increase the drill depth with additional 3 d<sub>o</sub>.
- After correct installation further turning of the screw head should not be possible.
- The head of the screw must be fully engaged on the fixture and show no signs of damage.
- For seismic performance category C2 applications: The gap between screw shaft and fixture must be filled with mortar; mortar compressive strength  $\geq 50 \text{ N/mm}^2$ . (e.g. FIS V, FIS HB, FIS SB or FIS EM Plus)

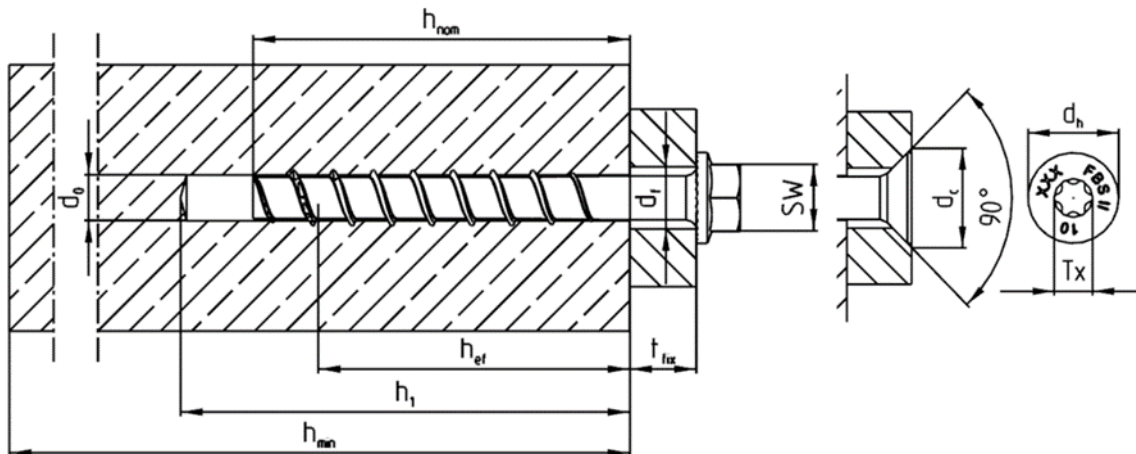
**fischer concrete screw ULTRACUT FBS II A4**

Intended use  
Specification

**Annex B1**  
of European  
Technical Assessment  
ETA-17/0740

**Table B2.1: Installation parameters**

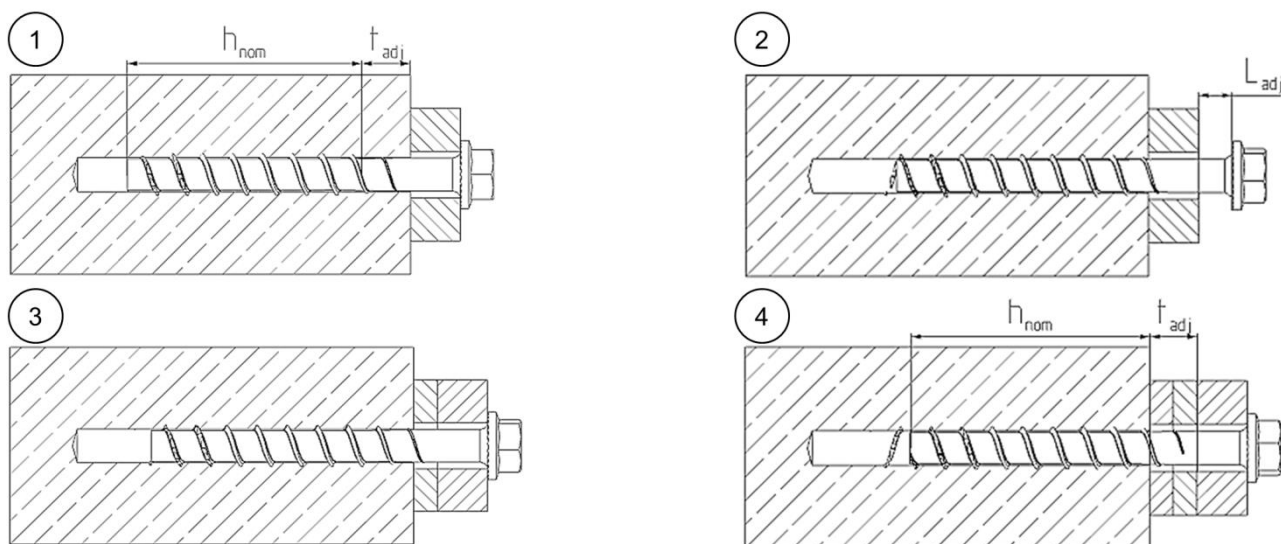
| FBS II A4                                                    |                |      | 8              |               | 10    |             |     | 12    |             |     |
|--------------------------------------------------------------|----------------|------|----------------|---------------|-------|-------------|-----|-------|-------------|-----|
| Nominal embedment depth                                      | $h_{nom}$      | [mm] | 50             | 65            | 55    | 65          | 85  | 60    | 75          | 100 |
| Nominal drill hole diameter                                  | $d_0$          |      | 8              |               | 10    |             |     | 12    |             |     |
| Cutting diameter of drill bits                               | $d_{cut} \leq$ |      | 8,45           |               | 10,45 |             |     | 12,50 |             |     |
| Cutting diameter for diamond drillers                        |                |      | 8,10           |               | 10,30 |             |     | 12,30 |             |     |
| Clearance hole diameter                                      |                |      | $d_f$          | 10,6 – 12,0   |       | 12,8 – 14,0 |     |       | 14,8 – 16,0 |     |
| Wrench size (US,S)                                           | SW             |      | 13             |               | 15    |             |     | 17    |             |     |
| Tx-size                                                      | Tx             | [-]  | 40             |               | 50    |             |     | -     |             |     |
| Countersunk head diameter                                    | $d_h$          | [mm] | 18             |               | 21    |             |     |       |             |     |
| Countersunk diameter in fixture                              | $d_c$          |      | 20             |               | 23    |             |     |       |             |     |
| Drill hole depth                                             | $h_1 \geq$     |      | 60             | 75            | 65    | 75          | 95  | 70    | 85          | 110 |
| Drill hole depth (with adjustable setting)                   |                |      | 70             | 85            | 75    | 85          | 105 | 80    | 95          | 120 |
| Thickness of fixture                                         |                |      | $t_{fix} \leq$ | L - $h_{nom}$ |       |             |     |       |             |     |
| Length of screw                                              | $L_{min} =$    |      | 50             | 65            | 55    | 65          | 85  | 60    | 75          | 100 |
|                                                              | $L_{max} =$    | 400  | 415            | 405           | 415   | 435         | 410 | 425   | 450         |     |
| Torque impact screw driver                                   | $T_{imp,max}$  | [Nm] | 450            |               |       |             |     | 650   |             |     |
| Torque impact screw driver (with adjustable setting process) | $T_{imp,max}$  |      | 300            |               |       |             |     | 450   |             |     |


**fischer concrete screw ULTRACUT FBS II A4**

 Intended use  
Installation parameters

**Annex B2**  
of European  
Technical Assessment  
ETA-17/0740

## Adjustment



It is permissible to untighten the screw up to two times for adjustment purposes.  
Therefore the screw may be untightened to a maximum of  $L_{adj} = 20$  mm to the surface of the initial fixture.  
The total permissible thickness of shims added during the adjustment process is  $t_{adj} = 10$  mm.

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

| FBS II A4                            |           | [mm] | 8   |     | 10  |     |     | 12  |     |     |
|--------------------------------------|-----------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Nominal embedment depth              | $h_{nom}$ |      | 50  | 65  | 55  | 65  | 85  | 60  | 75  | 100 |
| Minimum thickness of concrete member | $h_{min}$ |      | 100 | 120 | 100 | 120 | 140 | 110 | 130 | 150 |
| Minimum spacing                      | $s_{min}$ |      | 35  |     | 40  |     |     | 50  |     |     |
| Minimum edge distance                | $c_{min}$ |      | 35  |     | 40  |     |     | 50  |     |     |

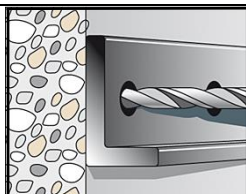
**fischer concrete screw ULTRACUT FBS II A4**

Intended use – Adjustment  
Minimum thickness of members, minimum spacing and edge distance

**Annex B3**  
of European  
Technical Assessment  
ETA-17/0740

# Installation instruction

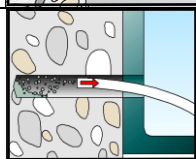
## Installation of fischer concrete screw ULTRACUT FBS II A4



Drill the hole using hammer drill, hollow drill or diamond core drill.

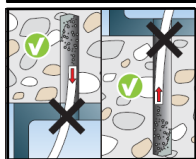
Drill hole diameter  $d_0$  and drill hole depth  $h_1$  according to table B2.1

a)



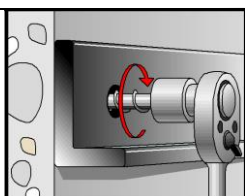
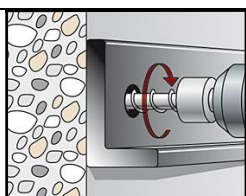
Option a) Clean the drill hole

b)

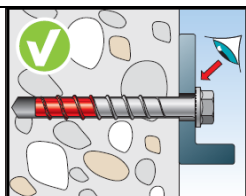


Option b) Cleaning of drill hole is not necessary when using a hollow drill or:

- If drilling vertically upwards or
- If drilling vertically downwards and the drill hole depth has been increased. It is recommended to increase the drill hole depth additional 3 times  $d_0$ .

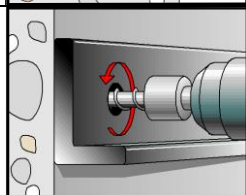


Installation with any torque impact screw driver up to the maximum mentioned torque moment ( $T_{imp,max}$ ). Alternatively, all other tools without an indicated torque moment are allowed (e.g. ratchet spanner). The indicated torque moments for impact screw driver are therefore not decisive.

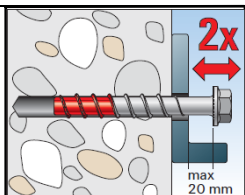


After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and is not damaged.

1.



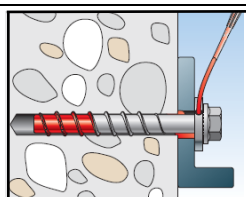
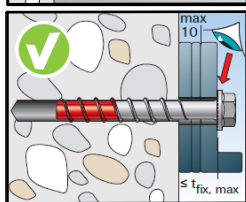
2.



### OPTIONAL:

It is permissible to adjust the screw two times. Therefore, the screw may be untightened to a maximum of  $L_{adj} = 20$  mm off the surface of the initial fixture. The total permissible thickness of shims added during the adjustment process is  $t_{adj} = 10$  mm. If screw is adjusted, only permissible impact screw driver according to table B2.1 is allowed.

3.



For seismic performance category C2 applications:  
The gap between screw shaft and fixture must be filled with mortar;  
mortar compressive strength  $\geq 50$  N/mm<sup>2</sup> (e.g. FIS V, FIS HB, FIS SB or FIS EM Plus)

**fischer concrete screw ULTRACUT FBS II A4**

Installation Instructions

**Annex B4**  
of European  
Technical Assessment  
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**Table C1.1: Characteristic values for static and quasi-static action**

| FBS II A4                                                            |                                   |                   | 8                   |      | 10   |      |                 | 12              |      |                 |                 |
|----------------------------------------------------------------------|-----------------------------------|-------------------|---------------------|------|------|------|-----------------|-----------------|------|-----------------|-----------------|
| Nominal embedment depth                                              | h <sub>nom</sub>                  | [mm]              | 50                  | 65   | 55   | 65   | 85              | 60              | 75   | 100             |                 |
| Steel failure for tension load and shear load                        |                                   |                   |                     |      |      |      |                 |                 |      |                 |                 |
| Characteristic resistance                                            | N <sub>Rk,s</sub>                 | [kN]              | 27,8                |      | 43,8 |      |                 | 67,7            |      |                 |                 |
| Partial factor                                                       | γ <sub>Ms</sub>                   | -                 | 1,5                 |      |      |      |                 |                 |      |                 |                 |
| Characteristic resistance                                            | V <sub>Rk,s</sub>                 | [kN]              | 18,0                | 27,8 | 13,2 | 19,3 | 36,6            | 20,4            | 40,1 | 45,8            |                 |
| Partial factor                                                       | γ <sub>Ms</sub>                   | [-]               | 1,25                |      |      |      |                 |                 |      |                 |                 |
| Factor for ductility                                                 | k <sub>7</sub>                    |                   | 1,0                 |      |      |      |                 |                 |      |                 |                 |
| Characteristic bending resistance                                    | M <sup>0</sup> <sub>Rk,s</sub>    | [Nm]              | 31,3                |      | 68,5 |      |                 | 112,8           |      |                 |                 |
| Pullout failure                                                      |                                   |                   |                     |      |      |      |                 |                 |      |                 |                 |
| Charact. resistance in concrete C20/25                               | uncracked                         | N <sub>Rk,p</sub> | [kN]                | 7,0  | 14,0 | 8,5  | 14,0            | - <sup>1)</sup> | 10,0 | 12,0            | - <sup>1)</sup> |
|                                                                      | cracked                           | N <sub>Rk,p</sub> | [kN]                | 4,0  | 9,0  | 4,5  | 6,0             | 16,0            | 4,5  | 11,0            | - <sup>1)</sup> |
| Increasing factors concrete                                          | C25/30                            | ψ <sub>c</sub>    | [-]                 | 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 failure and splitting failure; concrete pryout failure |                                   |                   |                     |      |      |      |                 |                 |      |                 |                 |
| Effective embedment depth                                            | h <sub>ef</sub>                   | [mm]              | 40                  | 52   | 43   | 51   | 68              | 47              | 60   | 81              |                 |
| Factor for uncracked concrete                                        | k <sub>ucr,N</sub>                | [-]               | 11,0                |      |      |      |                 |                 |      |                 |                 |
| Factor for cracked concrete                                          | k <sub>cr,N</sub>                 |                   | 7,7                 |      |      |      |                 |                 |      |                 |                 |
| Characteristic edge distance                                         | C <sub>cr,N</sub>                 | [mm]              | 1,5 h <sub>ef</sub> |      |      |      |                 |                 |      |                 |                 |
| Characteristic spacing                                               | S <sub>cr,N</sub>                 |                   | 3 h <sub>ef</sub>   |      |      |      |                 |                 |      |                 |                 |
| Char. resistance for splitting                                       | N <sup>0</sup> <sub>Rk,Sp</sub>   | [kN]              | 12,0                | 18,4 | 13,0 | 17,9 | - <sup>1)</sup> | 15,8            | 22,9 | - <sup>1)</sup> |                 |
| Char. edge distance for splitting                                    | C <sub>cr,sp</sub>                | [mm]              | 1,5 h <sub>ef</sub> |      |      |      |                 |                 |      |                 |                 |
| Char. spacing for splitting                                          | S <sub>cr,sp</sub>                |                   | 3 h <sub>ef</sub>   |      |      |      |                 |                 |      |                 |                 |
| Factor for pryout failure                                            | k <sub>8</sub>                    | [-]               | 1,0                 |      |      |      | 2,0             | 1,0             | 2,0  |                 |                 |
| Installation factor                                                  | γ <sub>inst</sub>                 |                   | 1,0                 |      |      |      |                 |                 |      |                 |                 |
| Concrete edge failure                                                |                                   |                   |                     |      |      |      |                 |                 |      |                 |                 |
| Effective length in concrete                                         | l <sub>f</sub> = h <sub>nom</sub> | [mm]              | 50                  | 65   | 55   | 65   | 85              | 60              | 75   | 100             |                 |
| Nominal diameter of screw                                            | d <sub>nom</sub>                  |                   | 8                   |      | 10   |      |                 | 12              |      |                 |                 |
| Adjustment                                                           |                                   |                   |                     |      |      |      |                 |                 |      |                 |                 |
| Maximum thickness of shims                                           | t <sub>adj</sub>                  | [mm]              | 10                  |      |      |      |                 |                 |      |                 |                 |
| Max. number of adjustments                                           | n <sub>a</sub>                    |                   | 2                   |      |      |      |                 |                 |      |                 |                 |

<sup>1)</sup> Pullout failure not decisive.

**fischer concrete screw ULTRACUT FBS II A4**

Characteristic values for static and quasi-static action

**Annex C1**  
of European  
Technical Assessment  
ETA-17/0740

**Table C2.1: Characteristic values for Seismic Performance Category C1**

| FBS II A4                                        |                          |      | 8            | 10   | 12   |
|--------------------------------------------------|--------------------------|------|--------------|------|------|
| Nominal embedment depth                          | $h_{nom}$                | [mm] | 65           | 85   | 100  |
| Steel failure for tension load and shear load C1 |                          |      |              |      |      |
| Characteristic resistance                        | $N_{Rk,s,eq}$            | [kN] | 27,8         | 43,8 | 67,7 |
|                                                  | $V_{Rk,s,eq}$            |      | 18,1         | 29,3 | 36,6 |
| Pullout failure                                  |                          |      |              |      |      |
| Characteristic resistance in cracked concrete    | $N_{Rk,p,eq}$            | [kN] | 9,0          | 16,0 | ..1) |
| Concrete cone failure                            |                          |      |              |      |      |
| Effective embedment depth                        | $h_{ef}$                 | [mm] | 52           | 68   | 81   |
| Concrete cone failure                            | Edge distance $C_{cr,N}$ |      | 1,5 $h_{ef}$ |      |      |
|                                                  | Spacing $S_{cr,N}$       |      | 3 $h_{ef}$   |      |      |
| Installation factor                              | $\gamma_{inst}$          | [-]  | 1,0          |      |      |
| Concrete pryout failure                          |                          |      |              |      |      |
| Factor for pryout failure                        | $k_8$                    | [-]  | 1,0          | 2,0  |      |
| Concrete edge failure                            |                          |      |              |      |      |
| Effective length in concrete                     | $l_f = h_{nom}$          | [mm] | 65           | 85   | 100  |
| Nominal diameter of screw                        | $d_{nom}$                |      | 8            | 10   | 12   |

<sup>1)</sup> Pullout failure not decisive.

**Table C2.2: Characteristic values for Seismic Performance Category C2**

Gap between screw shaft and fixture must be filled with mortar

| FBS II A4                                        |                             |      | 8            | 10   | 12   |
|--------------------------------------------------|-----------------------------|------|--------------|------|------|
| Nominal embedment depth                          | $h_{nom}$                   | [mm] | 65           | 85   | 100  |
| Steel failure for tension load and shear load C2 |                             |      |              |      |      |
| Characteristic resistance                        | $N_{Rk,s,eq}$               | [kN] | 27,8         | 43,8 | 67,7 |
|                                                  | $V_{Rk,s,eq}$               |      | 9,7          | 8,8  | 19,7 |
| Pullout failure                                  |                             |      |              |      |      |
| Characteristic resistance in cracked concrete    | $N_{Rk,p,eq}$               | [kN] | 2,8          | 5,0  | 7,3  |
| Concrete cone failure                            |                             |      |              |      |      |
| Effective embedment depth                        | $h_{ef}$                    | [mm] | 52           | 68   | 81   |
| Concrete cone failure                            | Edge distance<br>$c_{cr,N}$ |      | $1,5 h_{ef}$ |      |      |
|                                                  | Spacing<br>$s_{cr,N}$       |      | $3 h_{ef}$   |      |      |
| Installation factor                              | $\gamma_{inst}$             | [-]  | 1,0          |      |      |
| Concrete pryout failure                          |                             |      |              |      |      |
| Factor for pryout failure                        | $k_8$                       | [-]  | 1,0          | 2,0  |      |
| Concrete edge failure                            |                             |      |              |      |      |
| Effective length in concrete                     | $l_f = h_{nom}$             | [mm] | 65           | 85   | 100  |
| Nominal diameter of screw                        | $d_{nom}$                   |      | 8            | 10   | 12   |

**fischer concrete screw ULTRACUT FBS II A4**

Characteristic values for Seismic Performance Category C1 and C2

**Annex C2**  
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**Table C3.1: Characteristic values for resistance to fire**

| FBS II A4                                                                                                           |                      |                                   |      | 8                    |      | 10  |     |     | 12   |      |      |      |      |
|---------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|------|----------------------|------|-----|-----|-----|------|------|------|------|------|
| Nominal embedment depth                                                                                             |                      | h <sub>nom</sub>                  | [mm] | 50                   | 65   | 55  | 65  | 85  | 60   | 75   | 100  |      |      |
| Steel failure for tension load and shear load (F <sub>Rk,s,fi</sub> = N <sub>Rk,s,fi</sub> = V <sub>Rk,s,fi</sub> ) |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| Characteristic resistance for the head shapes                                                                       | US, US TX            | F <sub>Rk,s,fi</sub>              | R30  | [kN]                 | 2,3  | 6,4 | 3,5 |     | 11,0 |      | 4,6  | 15,2 |      |
|                                                                                                                     |                      |                                   |      |                      | R60  | 1,8 | 4,7 | 2,7 |      | 8,1  |      | 3,7  | 11,2 |
|                                                                                                                     |                      |                                   |      |                      | R90  | 1,3 | 2,9 | 2,0 |      | 5,2  |      | 2,7  | 7,3  |
|                                                                                                                     |                      |                                   |      |                      | R120 | 1,0 | 2,0 | 1,6 |      | 3,8  |      | 2,2  | 5,3  |
|                                                                                                                     | SK                   | F <sub>Rk,s,fi</sub>              | R30  |                      | 2,1  |     | 3,0 |     | -    |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R60  | 1,7 |     | 2,3 |      |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R90  | 1,2 |     | 1,6 |      |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R120 | 1,0 |     | 1,2 |      |      |      |      |      |
|                                                                                                                     | US, US TX            | M <sup>0</sup> <sub>Rk,s,fi</sub> | R30  | [Nm]                 | 2,6  | 7,2 | 7,6 |     | 15,4 |      | 16,8 | 25,3 |      |
|                                                                                                                     |                      |                                   |      |                      | R60  | 2,0 | 5,2 | 6,0 |      | 11,4 |      | 13,3 | 18,7 |
|                                                                                                                     |                      |                                   |      |                      | R90  | 1,5 | 3,3 | 4,4 |      | 7,3  |      | 9,8  | 12,1 |
|                                                                                                                     |                      |                                   |      |                      | R120 | 1,2 | 2,3 | 3,6 |      | 5,3  |      | 8,0  | 8,8  |
|                                                                                                                     | SK                   | M <sup>0</sup> <sub>Rk,s,fi</sub> | R30  |                      | 2,4  |     | 4,2 |     | -    |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R60  | 1,9 |     | 3,2 |      |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R90  | 1,4 |     | 2,2 |      |      |      |      |      |
|                                                                                                                     |                      |                                   |      |                      | R120 | 1,1 |     | 1,7 |      |      |      |      |      |
| Pullout failure                                                                                                     |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| Characteristic resistance                                                                                           | N <sub>Rk,p,fi</sub> | R30                               | [kN] | 1,7                  | 2,4  | 2,1 | 3,5 | 4,3 | 2,5  | 3,0  | 6,3  |      |      |
|                                                                                                                     |                      | R60                               |      |                      |      |     |     |     |      |      |      |      |      |
|                                                                                                                     |                      | R90                               |      |                      |      |     |     |     |      |      |      |      |      |
|                                                                                                                     |                      | R120                              |      |                      |      |     |     |     |      |      |      |      |      |
| Concrete cone failure                                                                                               |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| Characteristic resistance                                                                                           | N <sub>Rk,c,fi</sub> | R30                               | [kN] | 1,6                  | 3,4  | 2,1 | 3,2 | 6,6 | 2,6  | 4,8  | 10,2 |      |      |
|                                                                                                                     |                      | R60                               |      |                      |      |     |     |     |      |      |      |      |      |
|                                                                                                                     |                      | R90                               |      |                      |      |     |     |     |      |      |      |      |      |
|                                                                                                                     |                      | R120                              |      |                      |      |     |     |     |      |      |      |      |      |
| Edge distance                                                                                                       |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| R30 to R120                                                                                                         |                      | C <sub>cr,fi</sub>                | [mm] | 2 h <sub>ef</sub>    |      |     |     |     |      |      |      |      |      |
| In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm                         |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| Spacing                                                                                                             |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| R30 to R120                                                                                                         |                      | S <sub>cr,fi</sub>                | [mm] | 2 C <sub>cr,fi</sub> |      |     |     |     |      |      |      |      |      |
| Concrete pryout failure                                                                                             |                      |                                   |      |                      |      |     |     |     |      |      |      |      |      |
| R30 to R120                                                                                                         |                      | k <sub>8</sub>                    | [-]  | 1,0                  |      |     |     | 2,0 | 1,0  | 2,0  |      |      |      |

The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.

|                                              |                                                                |
|----------------------------------------------|----------------------------------------------------------------|
| fischer concrete screw ULTRACUT FBS II A4    | Annex C3<br>of European<br>Technical Assessment<br>ETA-17/0740 |
| Characteristic values for resistance to fire |                                                                |

| Table C4.1: Displacements due to tension loads (static and quasi-static) |                    |      |     |     |     |     |      |      |      |      |
|--------------------------------------------------------------------------|--------------------|------|-----|-----|-----|-----|------|------|------|------|
| FBS II A4                                                                |                    |      | 8   |     | 10  |     |      | 12   |      |      |
| Nominal embedment depth                                                  | $h_{nom}$          | [mm] | 50  | 65  | 55  | 65  | 85   | 60   | 75   | 100  |
| Tension load in uncracked concrete                                       | N                  | [kN] | 3,5 | 7,1 | 4,2 | 7,0 | 11,9 | 5,0  | 6,0  | 17,1 |
| Displacement in uncracked concrete                                       | $\delta_{N0}$      | [mm] | 0,5 | 0,7 | 0,4 | 0,6 | 0,8  | 1,0  | 0,9  | 1,25 |
|                                                                          | $\delta_{N\infty}$ |      | 0,7 | 0,7 | 0,8 | 0,8 | 0,8  | 1,25 | 1,25 | 1,25 |
| Tension load in cracked concrete                                         | N                  | [kN] | 3,5 | 4,5 | 4,2 | 7,0 | 8,1  | 5,0  | 6,0  | 12,0 |
| Displacement in cracked concrete                                         | $\delta_{N0}$      | [mm] | 0,6 | 0,4 | 0,4 | 0,6 | 0,7  | 0,9  | 0,9  | 1,4  |
|                                                                          | $\delta_{N\infty}$ |      | 1,5 | 1,1 | 1,0 | 1,8 | 1,8  | 1,4  | 1,7  | 1,9  |

| Table C4.2: Displacements due to shear loads (static and quasi-static) |                    |      |      |      |      |      |      |      |      |      |
|------------------------------------------------------------------------|--------------------|------|------|------|------|------|------|------|------|------|
| FBS II A4                                                              |                    |      | 8    |      | 10   |      |      | 12   |      |      |
| Nominal embedment depth                                                | $h_{nom}$          | [mm] | 50   | 65   | 55   | 65   | 85   | 60   | 75   | 100  |
| Shear load in cracked and uncracked concrete                           | V                  | [kN] | 11,0 | 15,9 | 10,4 | 11,9 | 20,9 | 12,7 | 24,9 | 26,2 |
| Displacement (the gap between fastener and fixture is subtracted)      | $\delta_{V0}$      | [mm] | 4,1  | 2,7  | 1,2  | 1,2  | 3,5  | 1,1  | 2,5  | 2,9  |
|                                                                        | $\delta_{V\infty}$ |      | 6,2  | 4,1  | 1,8  | 1,8  | 5,3  | 1,7  | 3,8  | 4,4  |

| Table C4.3: Displacements due to tension loads (Seismic Performance Category C2) |                               |      |     |  |     |  |  |     |  |  |
|----------------------------------------------------------------------------------|-------------------------------|------|-----|--|-----|--|--|-----|--|--|
| FBS II A4                                                                        |                               |      | 8   |  | 10  |  |  | 12  |  |  |
| Nominal embedment depth                                                          | $h_{nom}$                     | [mm] | 65  |  | 85  |  |  | 100 |  |  |
| Displacement DLS                                                                 | $\delta_{N,eq} \text{ (DLS)}$ |      | 0,9 |  | 0,9 |  |  | 1,1 |  |  |
| Displacement ULS                                                                 | $\delta_{N,eq} \text{ (ULS)}$ |      | 2,5 |  | 2,7 |  |  | 3,2 |  |  |

| Table C4.4: Displacements due to shear loads (Seismic Performance Category C2) |                               |      |     |  |     |  |  |     |  |  |
|--------------------------------------------------------------------------------|-------------------------------|------|-----|--|-----|--|--|-----|--|--|
| FBS II A4                                                                      |                               |      | 8   |  | 10  |  |  | 12  |  |  |
| Nominal embedment depth                                                        | $h_{nom}$                     | [mm] | 65  |  | 85  |  |  | 100 |  |  |
| Displacement DLS                                                               | $\delta_{V,eq} \text{ (DLS)}$ |      | 1,6 |  | 1,7 |  |  | 2,6 |  |  |
| Displacement ULS                                                               | $\delta_{V,eq} \text{ (ULS)}$ |      | 5,0 |  | 3,8 |  |  | 6,6 |  |  |

|                                              |                                                                |
|----------------------------------------------|----------------------------------------------------------------|
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| Displacements due to tension and shear loads |                                                                |