# DÉCLARATION DES PERFORMANCES

## DoP 0292

pour cheville à frapper fischer fischer EA II (fixation mécanique pour utilisation dans le béton) FR

| | | |
|---|---|---|
| 1. | Code d'identification unique du type de produit: | **DoP 0292** |
| 2. | Usage(s) prévu(s): | **Fixation dans le béton pour les systèmes redondants non structurels, voir annexes, en particulier les annexes B1-B4.** |
| 3. | Fabricant: | **fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Allemagne** |
| 4. | Mandataire: | **–** |
| 5. | Système(s) d'évaluation et de vérification de la constance des performances: | **2+** |
| 6. | Document d'évaluation européen: | **EAD 330747-00-0601** |
| | Evaluation Technique Européenne: | **ETA-07/0142; 2021-09-24** |
| | Organisme d'évaluation technique: | **DIBt- Deutsches Institut für Bautechnik** |
| | Organisme(s) notifié(s): | **2873 TU Darmstadt** |

7. Performance(s) déclarée(s):

**Sécurité d'utilisation (BWR 4)**

**Résistance caractéristique à la charge de traction (charge statique et quasi-statique):**

| | | |
|---|---|---|
| Résistance à la rupture de l'acier: | NPD | |
| Résistance à l'extraction glissement: | NPD | |
| Résistance à la rupture du cône béton: | NPD | |
| Robustesse: | Annexes C1, C2 | |
| Distance au bord et entraxe mini.: | Annexes B2, C2 | |
| Distance au bord pour éviter la rupture par fendage sous charge: | NPD | |

**Résistance caractéristique à la charge de cisaillement (charge statique et quasi-statique):**

| | | |
|---|---|---|
| Résistance à la rupture de l'acier (charge de cisaillement) : | Annexes C1, C2 | $V_{Rk,s}$=NPD; $k_7$=NPD |
| Résistance à la rupture par effet de levier : | NPD | |
| Résistance à la rupture du béton en bord de dalle: | NPD | |

**Résistance caractéristique pour toutes les directions de charges et modes de ruine pour dimensionnement simplifié:**

| | |
|---|---|
| Résistance caractéristique: | Annexes C1, C2 |

**Durabilité:**

| | |
|---|---|
| Durabilité: | Annexes A3, B1 |

**Sécurité en cas d'incendie (BWR 2)**

| | |
|---|---|
| Réaction au feu: | Classe (A1) |

**Résistance au feu:**

| | |
|---|---|
| Résistance en cas d'incendie, rupture de l'acier (charge de traction) : | Annexe C3 |
| Résistance en cas d'incendie, extraction glissement (charge de traction) : | Annexe C3 |
| Résistance en cas d'incendie, rupture de l'acier (charge de cisaillement) : | Annexe C3 |

8. Documentation technique appropriée et/ou documentation technique spécifique: **–**

Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.

Signé pour le fabricant et en son nom par:

Dr.-Ing. Oliver Geibig, Directeur Général Business Units & Ingénierie

Jürgen Grün, Directeur Général Chimie & Qualité

Tumlingen, 2021-09-30

Cette DoP a été préparée en plusieurs langues. En cas de différend relatif à l'interprétation, la version anglaise prévaudra.

L'annexe comprend des informations volontaires et complémentaires en langue anglaise dépassant les exigences légales (spécifiées de manière neutre).

**Specific Part**

## 1 Technical description of the product

The fischer drop-in anchor EA II is an anchor made of galvanised or stainless steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

The fixture shall be anchored with a fastening screw or threaded rod according to Annex B 5.

The product description is given in Annex A.

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

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

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

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

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

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

### 3.2 Safety and accessibility in use (BWR 4)

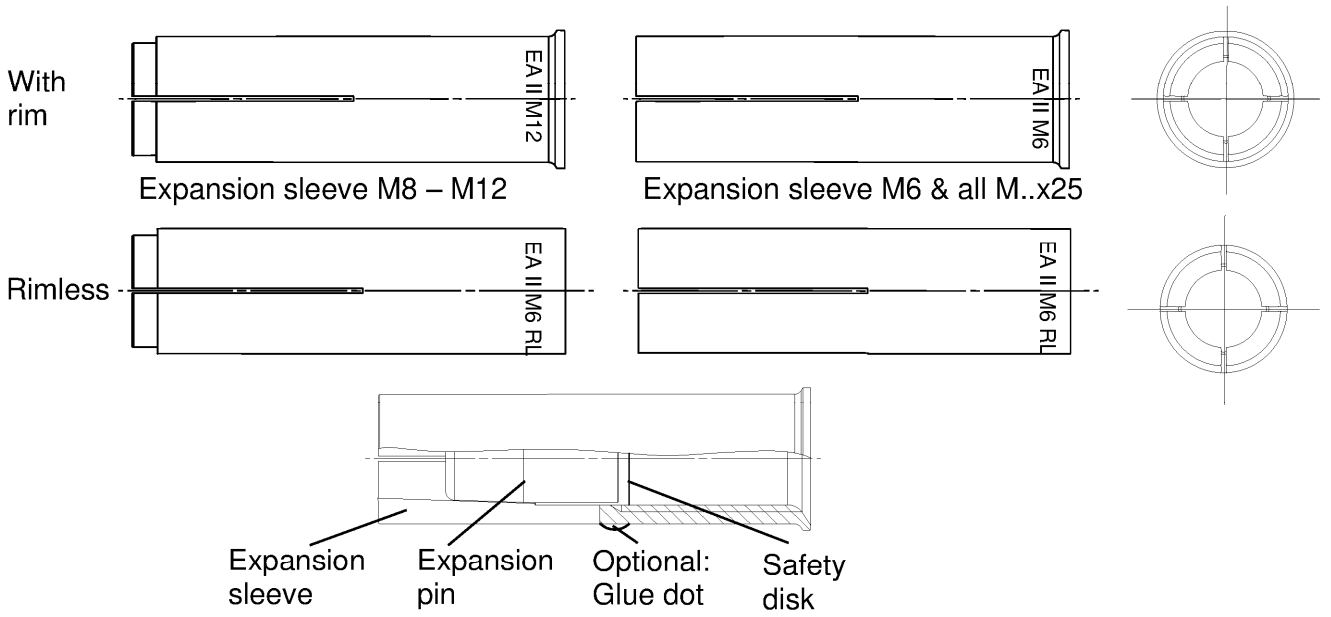
| Essential characteristic | Performance |
|---|---|
| Characteristic resistance for all load directions and modes of failure for simplified design | See Annex C 1 and C 2 |
| Durability | See Annex B 1 |

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

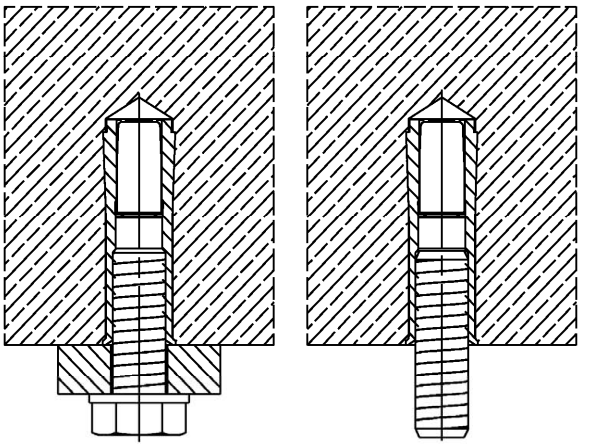
In accordance with European Assessment Document EAD No. 330747-00-0601, the applicable European legal act is: [97/161/EC].

The system to be applied is: 2+

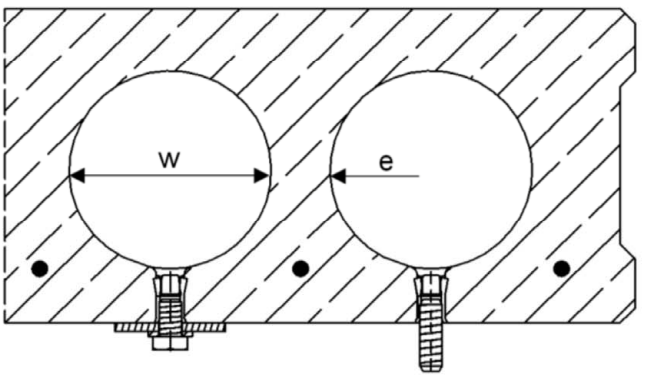
**Only for use for redundant non-structural systems according to EN 1992-4:2018**




**Intended use in concrete**



**Intended use in precast pre-stressed hollow concrete slabs (w/e ≤ 4,2) with a flange thickness $d_b \geq 35$ mm (or 30 mm → see Annex C2) and only for $h_{ef} = 25$ mm**




*(Fig. not to scale)*

fischer drop-in anchor EA II

**Product description**
Installed condition
Anchor types

**Annex A 1**

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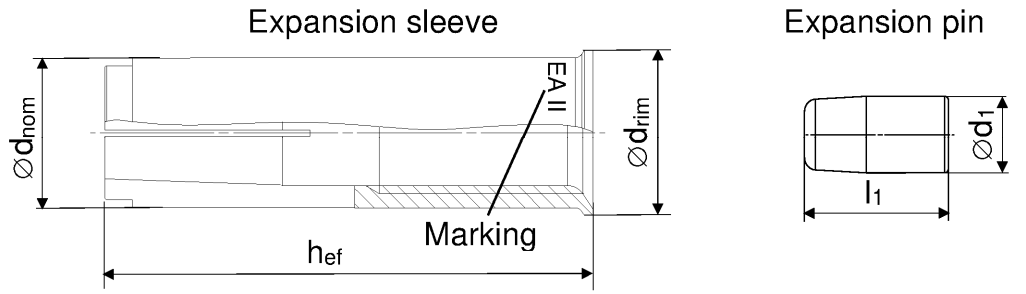
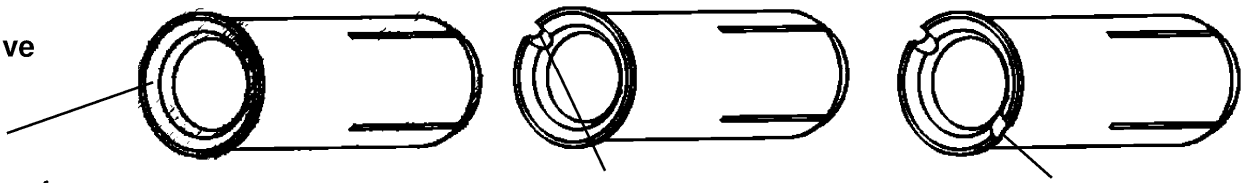



**Table A2.1:** Anchor size

| Anchor size EA II [mm] | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50 | M12 D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h_{ef}$ | 25 | 30 | 25 | 30 | 40 | 25 | 30 | 40 | 25 | 50 | 50 |
| ∅ $d_{nom}$ | 8 | | 10 | | | 12 | | | 15 | | 16 |
| ∅ $d_{rim}$ (not applicable for EA II RL) | 9,5 | | 11,5 | | | 13,5 | | | 16,5 | | 17,5 |
| ∅ $d_1$ | 5 | | 6,5 | | | 8,5 | 8 | | 10 | | |
| $l_1$ | 9 | 14 | 8 | 13,5 | | 9 | 13,5 | 18,5 | 10,5 | 18,5 | |

**Distinctive feature**



No groove for:

- EA II M6x30..
- EA II M8x30..
- EA II M10x40..
- EA II M12x50..

1 groove for:

- EA II M6x25..
- EA II M8x25..
- EA II M10x25..
- EA II M12x25..

2 grooves for:

- EA II M8x40..
- EA II M10x30..

**Table A2.2:** Marking on anchor body

| galvanised steel (gvz) | | stainless steel (R) | |
|---|---|---|---|
| *with rim* | *rimless* | *with rim* | *rimless* |
| EA II M6x25 | EA II M6x25 RL | EA II M6x30 R | EA II M6x30 RL R |
| EA II M6x30 | EA II M6x30 RL | EA II M8x30 R | EA II M8x30 RL R |
| EA II M8x25 | EA II M8x25 RL | EA II M8x40 R | EA II M8x40 RL R |
| EA II M8x30 | EA II M8x30 RL | EA II M10x30 R | EA II M10x30 RL R |
| EA II M8x40 | EA II M8x40 RL | EA II M10x40 R | EA II M10x40 RL R |
| EA II M10x25 | EA II M10x25 RL | EA II M12x50 R | EA II M12x50 RL R |
| EA II M10x30 | EA II M10x30 RL | EA II M12x50 D R | EA II M12x50 RL D R |
| EA II M10x40 | EA II M10x40 RL | | |
| EA II M12x25 | EA II M12x25 RL | | |
| EA II M12x50 | EA II M12x50 RL | | |
| EA II M12x50 D | EA II M12x50 RL D | | |

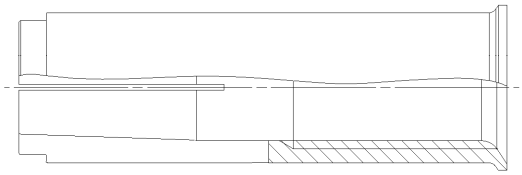
*(Fig. not to scale)*

fischer drop-in anchor EA II

**Product description**
Anchor types

**Annex A 2**

Expansion sleeve



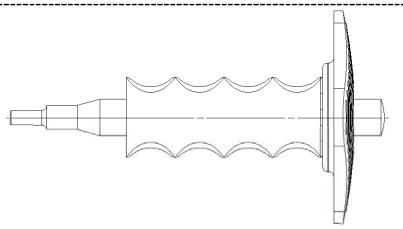
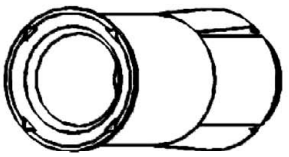
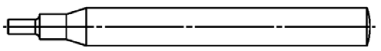
Expansion pin



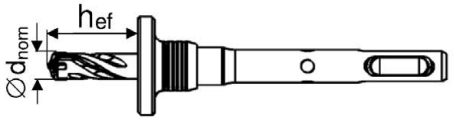
**Table A3.1:** Materials

| | Material | |
|---|---|---|
| Designation | galvanised steel (≥ 5 µm) | stainless steel (R) |
| Expansion sleeve | EN 10277:2018 or EN 10084:2008 or EN 10111:2008 or EN 10263:2018 or EN 10087:1999 or ASTM A29/A29M | EN 10088:2014 |
| Expansion pin | | |
| Fastening screw or threaded rod | steel, property class 4.6, 5.6, 5.8 or 8.8 according to EN ISO 898-1:2013 | property class 50, 70 or 80 according EN ISO 3506:2020 |

## Setting & drilling tools

| Setting tools | Marking | Description | Marking on EA II with rim and rimless |
|---|---|---|---|
|  | EHS Plus<br>M..x $h_{ef}$ | Manual setting tool with hand guard |  |
|  | EHS<br>M..x $h_{ef}$ | Manual setting tool basic format | |
|  | EMS<br>M..x $h_{ef}$ | Machine setting tool with SDS Plus | No marking |

Drilling tools

| | | |
|---|---|---|
|  | EBB<br>$\varnothing d_{nom}$ x $h_{ef}$ | Stop drill |
| Or other usual drillers | | |

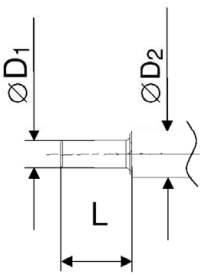



**Table A4.1:** Corresponding drill bits and parameters of setting tools

| Manual setting tool | Machine setting tool | Stop drill | For anchor size | ∅ D1 [mm] | ∅ D2 [mm] | L [mm] |
|---|---|---|---|---|---|---|
| EHS (Plus) M6x25/30 | EMS M6x25/30 | EBB 8x25<br>EBB 8x30 | EA II M6x25<br>EA II M6x30 | 4,8 | 9,0 | 17,0 |
| EHS (Plus) M8x25/30 | EMS M8x25/30 | EBB 10x25<br>EBB 10x30 | EA II M8x25<br>EA II M8x30 | 6,4 | 11,0 | 18,0 |
| EHS (Plus) M8x40 | EMS M8x40 | EBB 10x40 | EA II M8x40 | | | 28,0 |
| EHS (Plus) M10x25/30 | EMS M10x25/30 | EBB 12x25<br>EBB 12x30 | EA II M10x25<br>EA II M10x30 | 7,9 | 13,0 | 18,0 |
| EHS (Plus) M10x40 | EMS M10x40 | EBB 12x40 | EA II M10x40 | | | 24,0 |
| EHS (Plus) M12x25 | EMS M12x25 | EBB 15x25 | EA II M12x25 | 10,2 | 16,5 | 15,2 |
| EHS (Plus) M12x50 | EMS M12x50 | EBB 15x50 | EA II M12x50 | 10,2 | 16,5 | 30,0 |
| EHS (Plus) M12x50 | EMS M12x50 | EBB 16x50 | EA II M12x50 D | | | |

*(Fig. not to scale)*

# Specifications of intended use

**Anchorages subject to:**

| fischer drop-in anchor EA II (all versions) | | | M6 | M8 | M10 | M12 |
|---|---|---|---|---|---|---|
| Hammer drilling with standard drill bit  | | | All types | | | |
| Hammer drilling with hollow drill bit with automatic cleaning  | | | | | | |
| Material | Steel | Zinc plated | ✓ | | | |
| | Stainless steel | R | | | | |
| Static and quasi-static loads | | | | | | |
| Cracked and uncracked concrete | | | | | | |
| Fire exposure in concrete C12/15 to C50/60 | | | | | | |
| Fire exposure in prestressed hollow concrete slabs | | | No performance assessed | | | |

**Base materials:**

- Compacted reinforced and unreinforced normal weight concrete without fibres (cracked and uncracked) according to EN 206:2013+A1:2016
- Strength classes C12/15 to C50/60 according to EN 206:2013+A1:2016
- Precast prestressed hollow concrete slabs with w/e ≤ 4,2 and strength classes C30/37 to C50/60: M6x25, M8x25, M10x25 and M12x25

**Use conditions (Environmental conditions):**

- Structures subject to dry internal conditions: **EA II, EA II R**
- For all other conditions according to EN 1993-1-4:2006 + A1:2015 corresponding to corrosion resistance class CRC III **EA II R with $h_{ef}$ ≥ 30 mm**

**Design:**

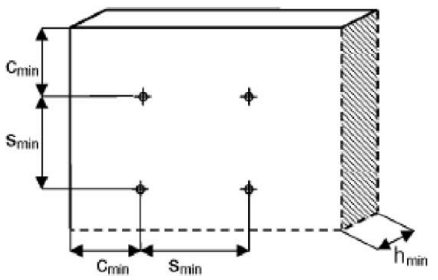
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.)
- Only for use for redundant non-structural system according to EN 1992-4:2018, Chapter 7.3. Design Method B according to EN 1992-4:2018.
- Anchorages under fire exposure are designed according to EN 1992-4:2018 Annex D

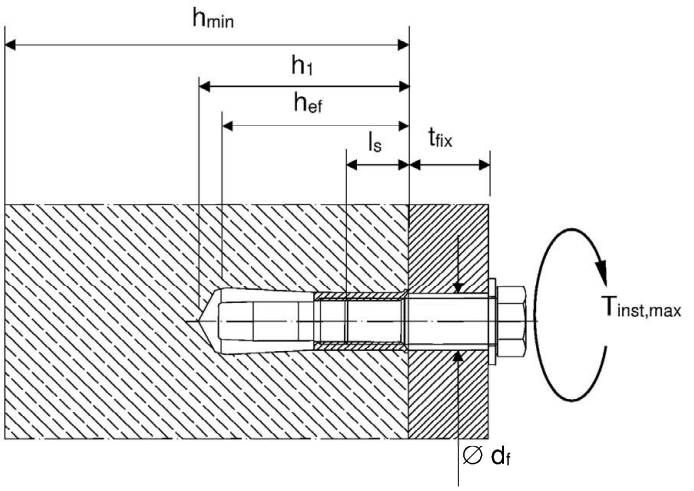
**Installation:**

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Create drill hole with hammer drill or with hollow drill and vacuum cleaner
- The anchor may only be used once
- 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 (e.g. FIS EM Plus, FIS SB or FIS V Plus) and only if the hole is not in the direction of the oblique tensile or shear load
- Anchor expansion by impact using the setting tools given in Annex A 4. The anchor is properly set, if the stop of the setting tool reaches the expansion sleeve. The manual setting tool with installation control leaves a visible mark on the sleeve, as illustrated in Annex A 4 and B 4

**Table B2.1:** Installation parameters for concrete C12/15 to C50/60

| **Anchor size (all versions)** | | | **M6** | | **M8** | | | **M10** | | | **M12** | | **M12D** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal drill hole diameter | $d_0$ | [mm] | 8 | | 10 | | | 12 | | | 15 | | 16 |
| Effective anchorage depth | $h_{ef}$ | [mm] | 25 | 30 | 25 | 30 | 40 | 25 | 30 | 40 | 25 | 50 | 50 |
| Maximum installation torque | $T_{inst,max}$ | [Nm] | 4 | | 8 | | | 15 | | | 35 | | |
| Minimum drill hole depth | $h_1$ | [mm] | 27 | 32 | 27 | 33 | 43 | 27 | 33 | 43 | 27 | 54 | 54 |
| Minimum screw-in depth | $l_{s,min}$ | [mm] | 6 | | 8 | | | 10 | | | 12 | | |
| Maximum screw-in depth | $l_{s,max}$ | [mm] | 14 | | 14 | | | 14 | 15 | 17 | 14 | 22 | |
| Clearance hole diameter | $\varnothing d_f \leq$ | [mm] | 7 | | 9 | | | 12 | | | 14 | | |
| **$h_{min}$ = 80 mm** | | | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 30 | 70 | 70 | 110 | 200 | 80 | 200 | | 100 | - | - |
| Minimum edge distance | $c_{min}$ | [mm] | 60 | 150 | 100 | 150 | | 120 | 150 | | 130 | - | - |
| **$h_{min}$ = 100 mm** | | | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 30 | 65 | 50 | 70 | | 60 | 90 | 150 | 100 | 200 | |
| Minimum edge distance | $c_{min}$ | [mm] | 60 | 115 | 100 | 115 | | 100 | 160 | 180 | 110 | | |
| **$h_{min}$ = 120 mm** | | | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 30 | 65 | 50 | 70 | | 60 | 85 | 95 | 100 | 145 | |
| Minimum edge distance | $c_{min}$ | [mm] | 60 | 115 | 100 | 115 | | 100 | 140 | 150 | 110 | 200 | |



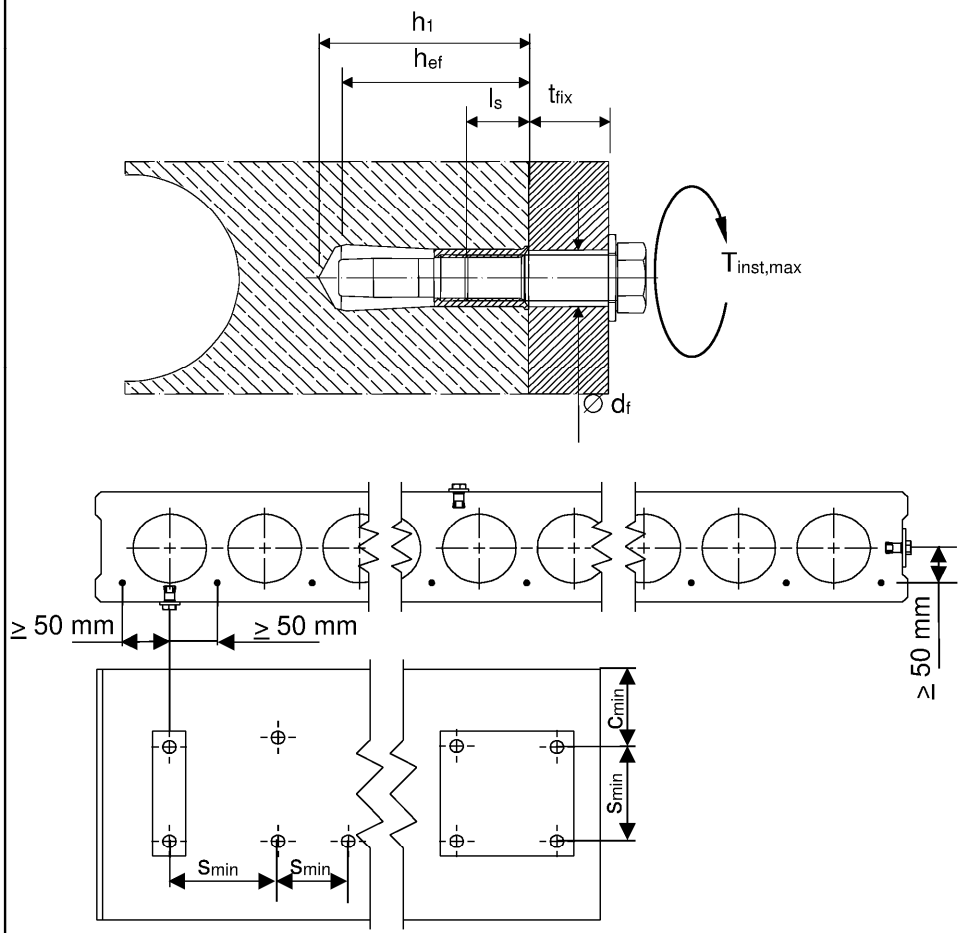

Fastening screw or threaded rod:

- Minimum property class and materials according to table A3.1
- The length of the fastening screw or threaded rod shall be determined depending on thickness of fixture $t_{fix}$, admissible tolerances and maximum screw-in depth $l_{s,max}$ as well as minimum screw-in depth $l_{s,min}$.

*(Fig. not to scale)*

**Table B3.1:** Installation parameters for precast pre-stressed hollow concrete slabs

| **Anchor size (all versions)** | | | **M6** | **M8** | **M10** | **M12** |
|---|---|---|---|---|---|---|
| Nominal drill hole diameter | $d_0$ | [mm] | 8 | 10 | 12 | 15 |
| Effective anchorage depth | $h_{ef}$ | [mm] | 25 | | | |
| Maximum installation torque | $T_{inst,max}$ | [Nm] | 4 | 8 | 15 | 35 |
| Minimum drill hole depth | $h_1$ | [mm] | 27 | | | |
| Minimum screw-in depth | $l_{s,min}$ | [mm] | 6 | 8 | 10 | 12 |
| Maximum screw-in depth | $l_{s,max}$ | [mm] | 14 | | | |
| Clearance hole diameter | $\varnothing d_f$ | [mm] | 7 | 9 | 12 | 14 |
| Minimum spacing | $s_{min} = s_{cr}$ | [mm] | 200 | | | |
| Minimum edge distance | $c_{min} = c_{cr}$ | [mm] | 150 | | | |

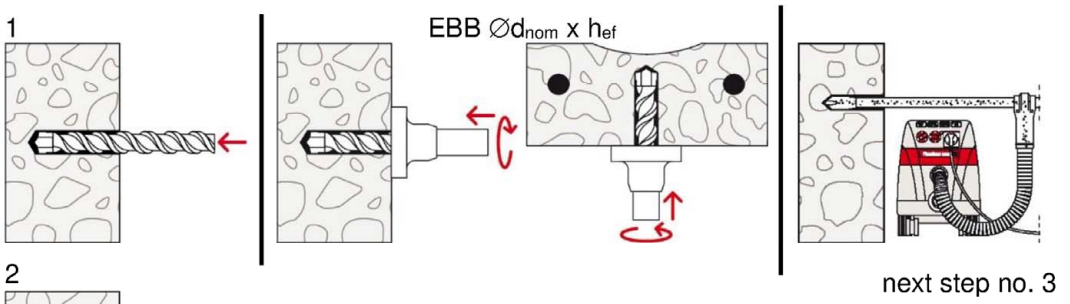



Fastening screw or threaded rod:

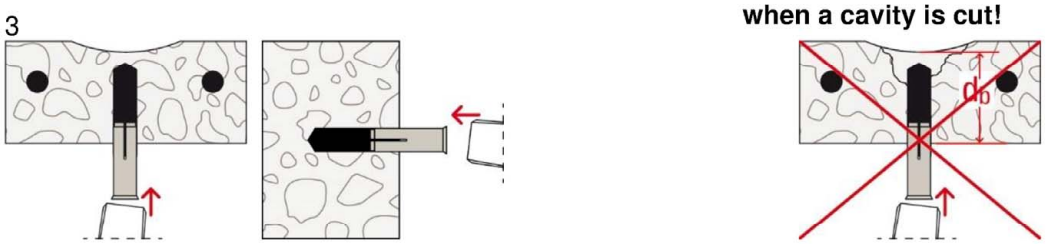
- Minimum property class and materials according to table A3.1
- The length of the fastening screw or threaded rod shall be determined depending on thickness of fixture $t_{fix}$, admissible tolerances and maximum screw-in depth $l_{s,max}$ as well as minimum screw-in depth $l_{s,min}$.

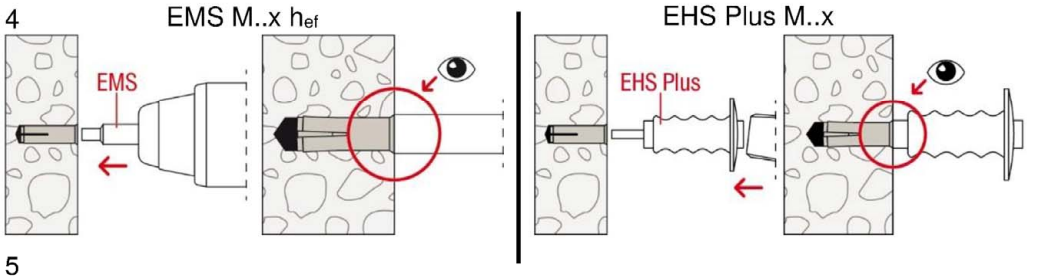
*(Fig. not to scale)*

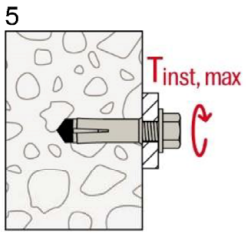
## Installation instructions




**Fixing is not allowed for $h_{ef}$ = 25 mm and $d_b$ < 35 mm when a cavity is cut!**




| No. | Description |
|---|---|
| 1 | Create drill hole with hammer drill or stop drill or with hollow drill and vacuum cleaner |
| 2 | Clean from drill-dust |
| 3 | Set anchor till anchor is flush with surface of concrete |
| 4 | Expand the sleeve by driving the pin with the corresponding setting tool into the sleeve and control the correct setting |
| 5 | Fixation of fixture. Maximum installation torque $T_{inst,max}$ must not be exceeded |

*(Fig. not to scale)*

**Table C1.1:** Characteristic resistance of a fixing point[1] for all load directions

| **Anchor size** | | property class of the fastening screw or threaded rod | **M6** | | **M8** | | | **M10** | | | **M12/ M12D** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effective anchorage depth | $h_{ef}$ [mm] | | 25 | 30 | 25 | 30 | 40 | 25 | 30 | 40 | 25 | 50 |
| **All load directions** | | | | | | | | | | | | |
| Characteristic resistance C12/15 | $F^0_{RK}$ [kN] | ≥ A4-50 | -[2] | 2 | -[2] | 3 | | -[2] | 3 | 5 | -[2] | 6 |
| | | ≥ steel 4.6 | 1,5 | | 2 | | | 3 | | | 3 | |
| Characteristic resistance C20/25 to C50/60 | $F^0_{RK}$ [kN] | ≥ A4-50 | -[2] | 3 | -[2] | 5 | | -[2] | 5 | 7,5 | -[2] | 9 |
| | | ≥ steel 4.6 | 2 | | 3 | | | 4 | | | 4 | |
| Installation factor | $\gamma_{inst}$ [-] | | 1,0 | 1,2 | 1,0 | 1,2 | | 1,0 | 1,2 | | 1,0 | |
| Characteristic spacing | $s_{cr}$ [mm] | | 75 | 90 | 75 | 90 | 120 | 75 | 90 | 200 | 75 | 300 |
| Characteristic edge distance | $c_{cr}$ [mm] | | 38 | 45 | 38 | 45 | 60 | 38 | 45 | 100 | 38 | 150 |
| **Steel failure with lever arm** | | | | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-50 | -[2] | 8 | -[2] | 19 | | -[2] | 37 | | -[2] | 66 |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 2,38 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-70 | -[2] | 11 | -[2] | 26 | | -[2] | 52 | | -[2] | 92 |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,56 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-80 | -[2] | 12 | -[2] | 30 | | -[2] | 60 | | -[2] | 105 |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,33 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 4.6 | 6,1 | | 15 | | | 30 | | | 52 | |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,67 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 5.6 | 7,6 | | 19 | | | 37 | | | 66 | |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,67 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 5.8 | 7,6 | | 19 | | | 37 | | | 66 | |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,25 | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 8.8 | 12 | | 30 | | | 60 | | | 105 | |
| Partial factor | $\gamma_{Ms}$[3] [-] | | 1,25 | | | | | | | | | |

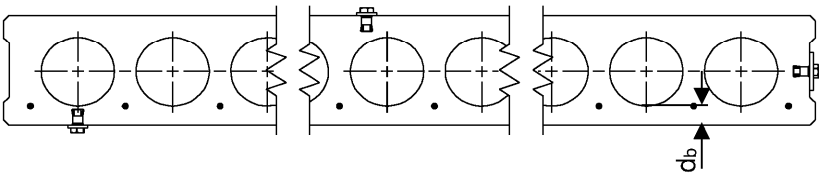
[1] For definition see EN 1992-4:2018, Picture 3.4
[2] No performance assessed
[3] In absence of other national regulations

**Table C2.1:** Characteristic values for $h_{ef}$ = 25 mm in precast pre-stressed hollow concrete slabs according to design method C with C30/37 to C50/60

| **Anchor size** | | property class of the fastening screw or threaded rod | **M6** | **M8** | **M10** | **M12** |
|---|---|---|---|---|---|---|
| Effective anchorage depth | $h_{ef}$ [mm] | | 25 | | | |
| **All Load directions** | | | galvanised steel; with rim | | | |
| Flange thickness | $d_b$ [mm] | | ≥ 35 (or 30[1)]) | | | |
| Characteristic resistance C30/37 to C50/60 | $F^0_{RK}$ [kN] | | 2 | 3 | 4 | |
| Installation factor | $\gamma_{inst}$ [-] | | 1,0 | | | |
| Characteristic spacing | $s_{cr} = s_{min}$ [mm] | | 200 | | | |
| Characteristic edge distance | $c_{cr} = c_{min}$ [mm] | | 150 | | | |
| **Steel failure with lever arm** | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 4.6 | 6,1 | 15 | 30 | 52 |
| Partial factor | $\gamma_{Ms}$[2)] [-] | steel 4.6 | 1,67 | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 5.6 | 7,6 | 19 | 37 | 66 |
| Partial factor | $\gamma_{Ms}$[2)] [-] | steel 5.6 | 1,67 | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 5.8 | 7,6 | 19 | 37 | 66 |
| Partial factor | $\gamma_{Ms}$[2)] [-] | steel 5.8 | 1,25 | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | steel 8.8 | 12 | 30 | 60 | 105 |
| Partial factor | $\gamma_{Ms}$[2)] [-] | steel 8.8 | 1,25 | | | |

[1)] The anchor may be used in a flange thickness $d_b$ of minimum 30 mm with the same characteristic resistance, but the drill hole is not allowed to cut a cavity (see Annex B 4 Point 3). The use of the fischer stop drill EBB is recommended

[2)] In absence of other national regulations




*(Fig. not to scale)*

fischer drop-in anchor EA II

**Performances**
Characteristic values for tension loads in hollow core slabs according to design method C with C30/37 to C50/60

**Annex C 2**

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**Table C3.1:** Characteristic resistance under fire exposure[3] in concrete C20/25 to C50/60

| fire resistance class | EA II | property class of the fastening screw or threaded rod | | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50/ M12x50D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **All load directions** | | | | | | | | | | | | | |
| R 30 | Characteristic resistance C20/25 to C50/60 | $F_{Rk,fi}$[1] [kN] | steel ≥ 4.6 or ≥ A4-50[2] | 0,5 | 0,6 | | 0,9 | 1,3 | 0,6 | 0,9 | 1,8 | | 2,3 |
| R 60 | | | | 0,5 | | 0,6 | 0,9 | | | | 1,5 | 0,6 | |
| R 90 | | | | 0,4 | 0,6 | | | | | 0,9 | | | 2,0 |
| R 120 | | | | 0,3 | 0,5 | | | | | 0,6 | | 0,5 | 1,3 |
| R 30 – R 120 | Characteristic spacing | $s_{cr,fi}$ [mm] | | 100 | 120 | 100 | 120 | 160 | 100 | 120 | 160 | 100 | 200 |
| | Characteristic edge distance | $c_{cr,fi}$ [mm] | | 50 | 115 | 50 | 140 | 140 | 50 | 140 | 160 | 50 | |

[1] In absence of other national regulations, a partial factor for the resistance of $\gamma_{m,fi}$ = 1,0 under fire impact is recommended.
[2] Not for M..x25
[3] Not valid for precast pre-stressed hollow core slabs

**Table C3.2:** Characteristic resistance under fire exposure[3] for shear load with level arm in concrete C20/25 to C50/60

| fire resistance class | EA II | property class of the fastening screw or threaded rod | | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50/ M12x50D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R 30 | Characteristic resistance | $M^0_{RK,s,fi}$[1] [Nm] | steel ≥ 4.6 or ≥ A4-5[2] | 0,65 | 0,5 | 1,30 | 1,7 | 1,7 | 2,4 | 4,4 | 4,4 | 7,1 | 9,5 |
| R 60 | | | | 0,50 | 0,4 | 0,95 | 1,3 | 1,3 | 1,7 | 3,2 | 3,2 | 5,0 | 6,7 |
| R 90 | | | | 0,35 | 0,3 | 0,60 | 0,8 | 0,8 | 1,0 | 1,9 | 1,9 | 2,9 | 3,9 |
| R 120 | | | | 0,30 | 0,2 | 0,45 | 0,6 | 0,6 | 0,7 | 1,3 | 1,3 | 1,8 | 2,4 |

[1] In absence of other national regulations, a partial factor for the resistance of $\gamma_{m,fi}$ = 1,0 under fire impact is recommended.
[2] Not for M..x25
[3] Not valid for precast pre-stressed hollow core slabs

In case of fire attack from more than one side, the edge distance shall be $c_{fi,min} \geq 300$ mm