

DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH

DoP 0306

dla kotwa wbijana Upat USA (Kotwy metalowe do stosowania w betonie)

PL

- | | | |
|---|---|-------------------------|
| 1. <u>Niepowtarzalny kod identyfikacyjny typu wyrobu:</u> | DoP 0306 | |
| 2. <u>Zamierzone zastosowanie:</u> | Łącznik wklejany do betonu do wielopunktowych systemów niekonstrukcyjnych, zobacz załącznik, w szczególności aneksu B1-B4. | |
| 3. <u>Producent:</u> | Upat Vertriebs GmbH, Bebelstraße 11, 79108 Freiburg im Breisgau, Niemcy | |
| 4. <u>Upoważniony przedstawiciel:</u> | - | |
| 5. <u>System(-y) oceny i weryfikacji stałości właściwości użytkowych:</u> | 2+ | |
| 6. <u>Europejski dokument oceny:</u> | EAD 330747-00-0601, Editin 06/2018 | |
| Europejska ocena techniczna: | ETA-10/0168; 2022-05-11 | |
| Jednostka ds. oceny technicznej: | DIBt- Deutsches Institut für Bautechnik | |
| Jednostka lub jednostki notyfikowane: | 2873 TU Darmstadt | |
| 7. <u>Deklarowane właściwości użytkowe:</u> | | |
| Bezpieczeństwo użytkowania (BWR 4) | | |
| Nośność charakterystyczna na wrywanie (nośności statyczne i quasi-statyczne): | | |
| Nośność do uszkodzenia stali: | NPD | |
| Nośność na wrywanie: | NPD | |
| Nośność do wyrwania stożka betonu: | NPD | |
| Solidność: | Aneksy C1, C2 | |
| Minimalne odstępki osiowe i krawędziowe: | Aneksy B2, B3, C2 | |
| Odległość od krawędzi zapobiegająca pękaniu pod obciążeniem: | NPD | |
| Nośność charakterystyczna na ścinanie (nośności statyczne i quasi-statyczne): | | |
| Nośność do uszkodzenia stali (obciążenie ścinające): | Aneksy C1, C2 | $V_{Rk,s}=NPD; k_7=NPD$ |
| Nośność do uszkodzenia wyważenia: | NPD | |
| Nośność do zniszczenia krawędzi betonu: | NPD | |
| Nośność charakterystyczna dla wszystkich kierunków obciążenia i rodzajów uszkodzeń dla uproszczonej konstrukcji: | | |
| Nośność charakterystyczna: | Aneksy C1, C2 | |
| Trwałość: | | |
| Trwałość: | Aneksy A3, B1 | |
| Ochrona przeciwpożarowa (BWR 2) | | |
| Reakcja na ogień: | Klasy (A1) | |
| Odporność na działanie ognia: | | |
| Odporność ogniowa do zniszczenia stali (obciążenie rozciągające): | NPD | |
| Odporność ogniowa na wrywanie (obciążenie rozciągające): | NPD | |
| Odporność ogniowa na zniszczenie stali (obciążenie ścinające): | Aneks C3 | |
| Odporność ogniowa dla wszystkich kierunków obciążenia i trybów awaryjnych: | Aneks C3 | |
| 8. <u>Odpowiednia dokumentacja techniczna lub specjalna dokumentacja techniczna:</u> | - | |

Właściwości użytkowe określonego powyżej wyrobu są zgodne z zestawem deklarowanych właściwości użytkowych. Niniejsza deklaracja właściwości użytkowych wydana zostaje zgodnie z rozporządzeniem (UE) nr 305/2011 na wyłączną odpowiedzialność producenta określonego powyżej.

W imieniu producenta podpisał(-a):



Dr.-Ing. Oliver Geibig, Dyrektor Zarządzający ds. Jednostek Biznesowych i Inżynierii
Tumlingen, 2022-05-25



Jürgen Grün, Dyrektor Zarządzający ds. Chemii i Jakości

Niniejsza Deklaracja Właściwości Użytkowych została przygotowana w różnych językach. W razie wątpliwości w interpretacji, wersja angielska jest zawsze miarodajna.

Załącznik zawiera dobrowolne i uzupełniające informacje w języku angielskim (neutralne językowo), a wykraczające poza wymagania prawne.

Specific Part

1 Technical description of the product

The Upat drop-in anchor USA 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)

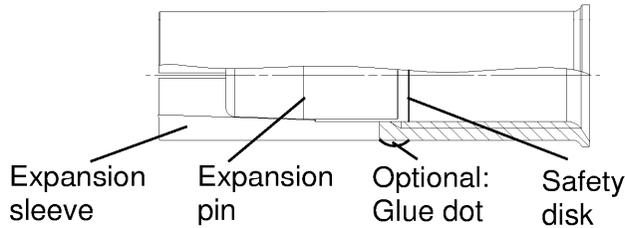
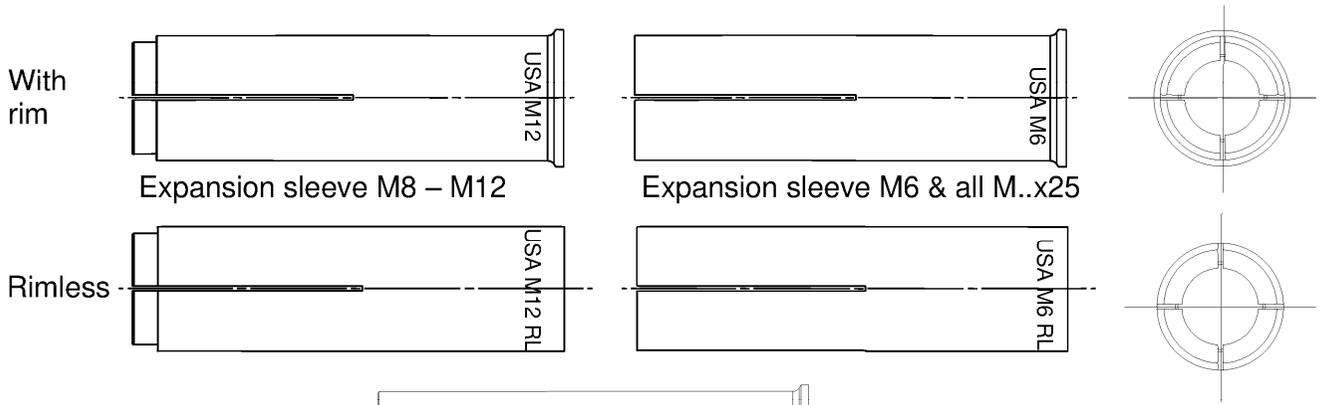
| Essential characteristic | Performance |
|--|-----------------------|
| Characteristic resistance for all load directions and modes of failure for simplified design | See Annex C 1 and C 2 |
| Durability | See Annex B 1 |

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

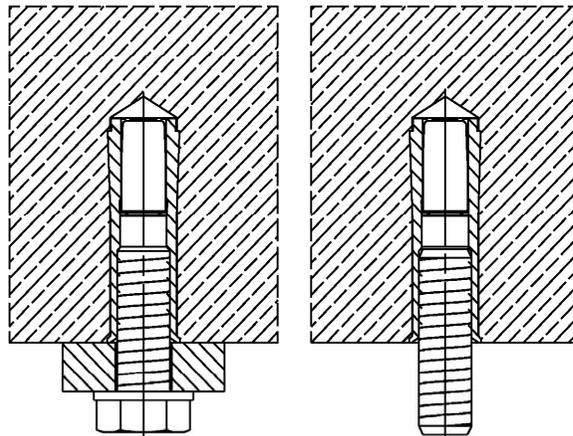
In accordance with European Assessment Document EAD No. 330747-00-0601, the applicable European legal act is: [97/161/EC].

The system to be applied is: 2+

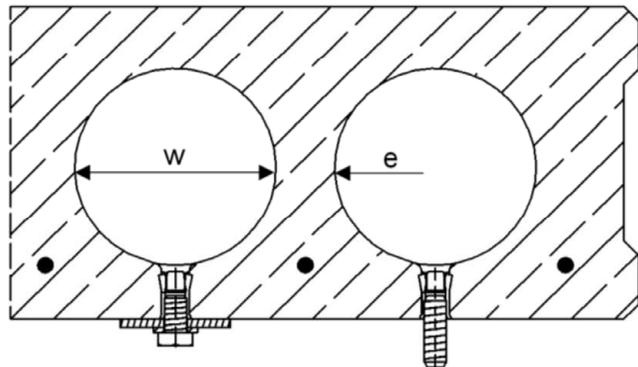
Only for use for redundant non-structural systems according to EN 1992-4:2018



Intended use in concrete



Intended use in precast pre-stressed hollow concrete slabs ($w/e \leq 4,2$) 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)

Upat drop-in anchor USA

Product description
 Installed condition
 Anchor types

Annex A 1

Appendix 2 / 12

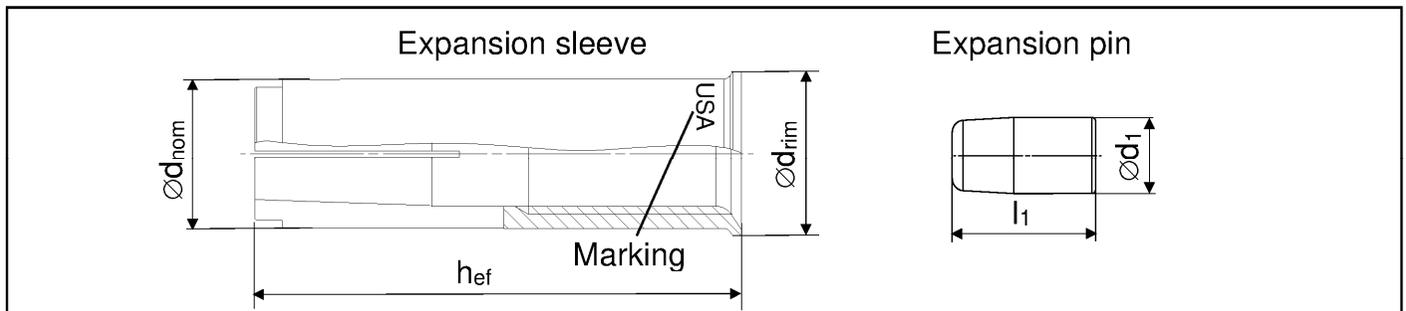


Table A2.1: Anchor size

| Anchor size USA [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 |
| $\varnothing d_{nom}$ | 8 | | 10 | | | 12 | | | 15 | | 16 |
| $\varnothing d_{rim}$ (not applicable for USA RL) | 9,5 | | 11,5 | | | 13,5 | | | 16,5 | | 17,5 |
| $\varnothing d_1$ | 5 | | 6,5 | | | 8,5 | 8 | | 10 | | |
| l_1 | 9 | 14 | 8 | 13,5 | | 9 | 13,5 | 18,5 | 10,5 | 18,5 | |

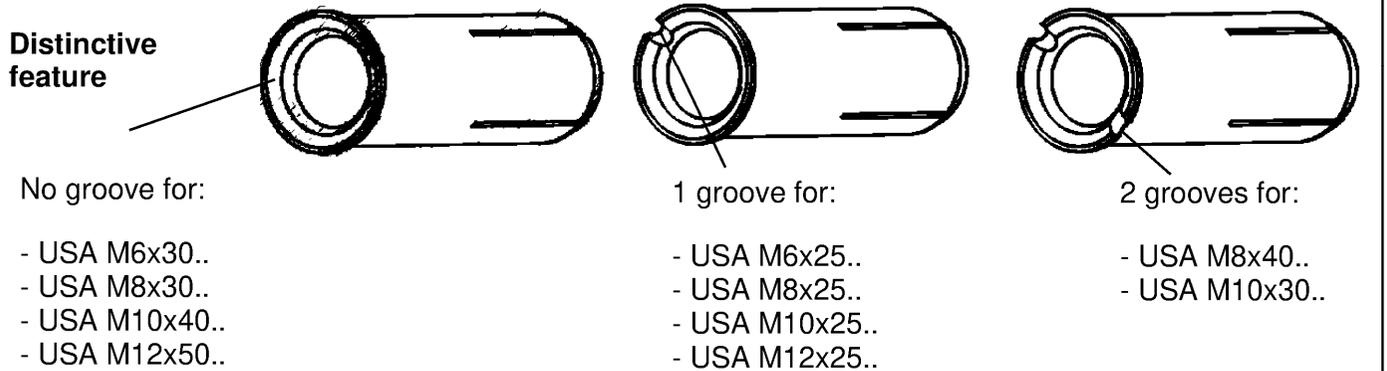


Table A2.2: Marking on anchor body

| galvanised steel (gvz) | | stainless steel (R) | |
|------------------------|-----------------|---------------------|-------------------|
| <i>with rim</i> | <i>rimless</i> | <i>with rim</i> | <i>rimless</i> |
| USA M6x25 | USA M6x25 RL | USA M6x30 R | USA M6x30 RL R |
| USA M6x30 | USA M6x30 RL | USA M8x30 R | USA M8x30 RL R |
| USA M8x25 | USA M8x25 RL | USA M8x40 R | USA M8x40 RL R |
| USA M8x30 | USA M8x30 RL | USA M10x30 R | USA M10x30 RL R |
| USA M8x40 | USA M8x40 RL | USA M10x40 R | USA M10x40 RL R |
| USA M10x25 | USA M10x25 RL | USA M12x50 R | USA M12x50 RL R |
| USA M10x30 | USA M10x30 RL | USA M12x50 D R | USA M12x50 RL D R |
| USA M10x40 | USA M10x40 RL | | |
| USA M12x25 | USA M12x25 RL | | |
| USA M12x50 | USA M12x50 RL | | |
| USA M12x50 D | USA M12x50 RL D | | |

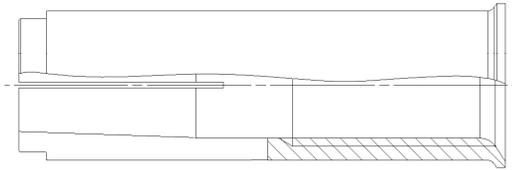
(Fig. not to scale)

Upat drop-in anchor USA

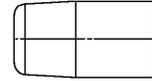
Product description
Anchor types

Annex A 2

Expansion sleeve



Expansion pin

**Table A3.1: Materials**

| Designation | Material | |
|---------------------------------|--|--|
| | galvanised steel ($\geq 5 \mu\text{m}$) | 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 |

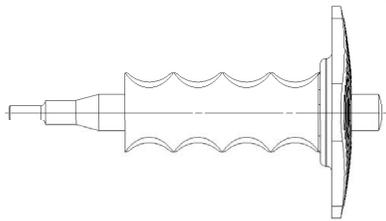
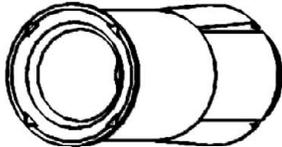
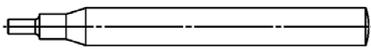
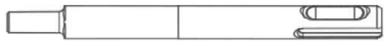
Upat drop-in anchor USA

Product description
Materials

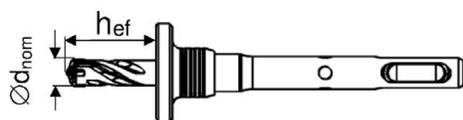
Annex A 3

Appendix 4 / 12

Setting & drilling tools

| Setting tools | Marking | Description | Marking on USA with rim and rimless |
|---|----------------------|-------------------------------------|---|
|  | EHS Plus M..x hef | Manual setting tool with hand guard |  |
|  | EHS M..x hef | Manual setting tool basic format | |
|  | EMS M..x hef | Machine setting tool with SDS Plus | No marking |

Drilling tools



EBB
 $\varnothing d_{nom} \times h_{ef}$

Stop drill

Or other usual drillers

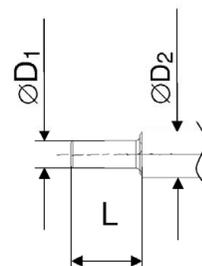


Table A4.1: Corresponding drill bits and parameters of setting tools

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

(Fig. not to scale)

Upat drop-in anchor USA

Intended Use
Setting & Drilling tools

Annex A 4

Appendix 5 / 12

Specifications of intended use

Anchorage subject to:

| Upat drop-in anchor USA (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 $w/e \leq 4,2$ and strength classes C30/37 to C50/60: M6x25, M8x25, M10x25 and M12x25

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: **USA, USA R**
- For all other conditions according to EN 1993-1-4:2006 + A1:2015 corresponding to corrosion resistance class CRC III **USA R with $h_{ef} \geq 30$ 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. UPM 66, UPM 55 or UPM 44) 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

Upat drop-in anchor USA

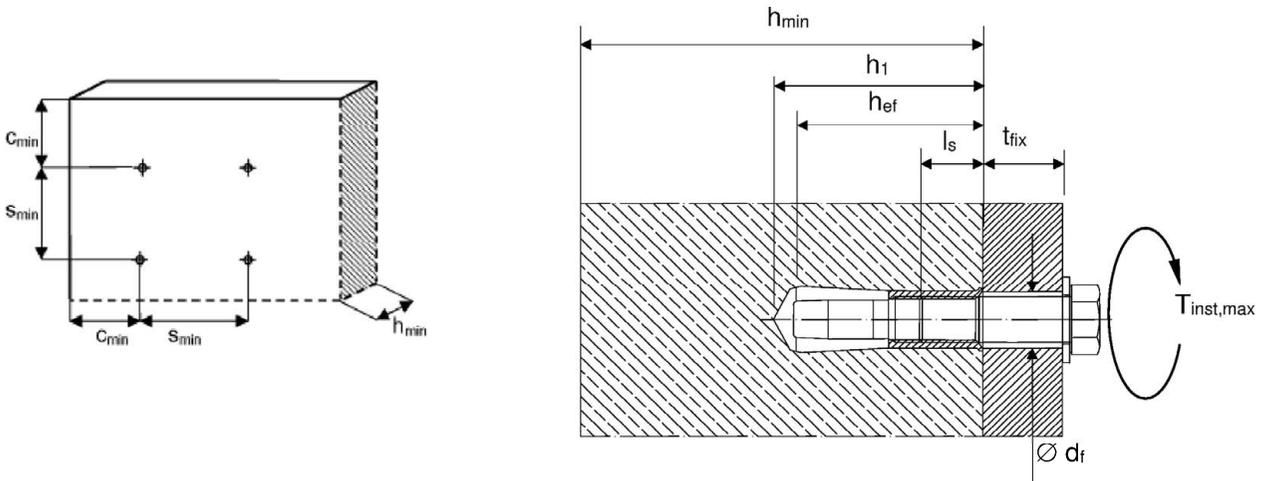
Intended Use
Specifications

Annex B 1

Appendix 6 / 12

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 | | |
| $h_{min} = 80 \text{ mm}$ | | | | | | | | | | | | | |
| 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 | - | - |
| $h_{min} = 100 \text{ mm}$ | | | | | | | | | | | | | |
| 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 | | | |
| $h_{min} = 120 \text{ mm}$ | | | | | | | | | | | | | |
| 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)

Upat drop-in anchor USA

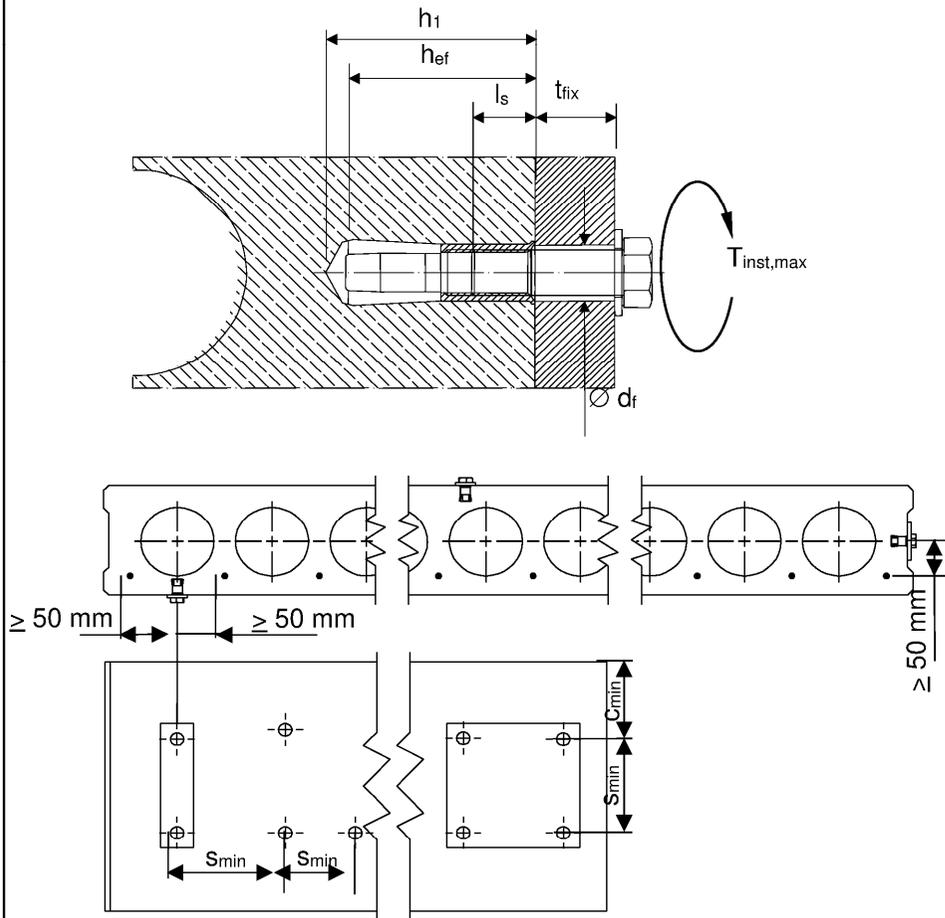
Intended Use
Installation parameters

Annex B 2

Appendix 7 / 12

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)

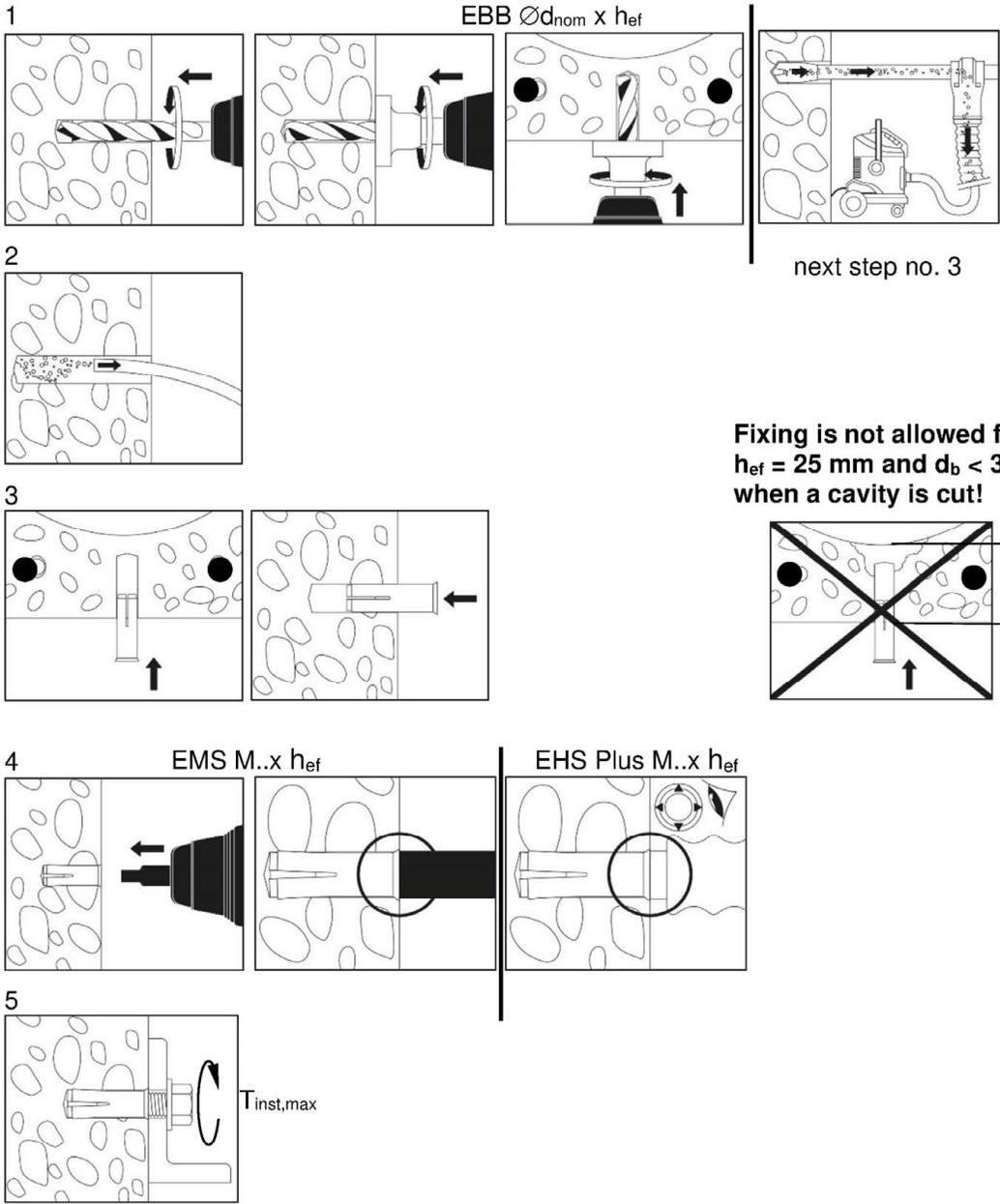
Upat drop-in anchor USA

Intended Use
Installation parameters

Annex B 3

Appendix 8 / 12

Installation instructions



Fixing is not allowed for $h_{\text{ef}} = 25 \text{ mm}$ and $d_b < 35 \text{ mm}$ 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 $T_{\text{inst,max}}$ must not be exceeded |

(Fig. not to scale)

| | |
|--|---|
| Upat drop-in anchor USA | Annex B 4 Appendix 9 / 12 |
| Intended Use Installation instructions | |

Table C1.1: Characteristic resistance of a fixing point¹⁾ 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_{0RK} [kN] | \geq A4-50 | ⁻²⁾ | 2 | ⁻²⁾ | 3 | ⁻²⁾ | 3 | 5 | ⁻²⁾ | 6 | |
| | | \geq steel 4.6 | 1,5 | 2 | 3 | 3 | 5 | 3 | 6 | | | |
| Characteristic resistance C20/25 to C50/60 | F_{0RK} [kN] | \geq A4-50 | ⁻²⁾ | 3 | ⁻²⁾ | 5 | ⁻²⁾ | 5 | 7,5 | ⁻²⁾ | 9 | |
| | | \geq steel 4.6 | 2 | 3 | 5 | 4 | 7,5 | 4 | 9 | | | |
| Installation factor | γ_{inst} [-] | | 1,0 | 1,2 | 1,0 | 1,2 | 1,0 | 1,2 | 1,0 | 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 | $M_{0RK,s}^0$ [Nm] | A4-50 | ⁻²⁾ | 8 | ⁻²⁾ | 19 | ⁻²⁾ | 37 | ⁻²⁾ | 66 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 2,38 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [Nm] | A4-70 | ⁻²⁾ | 11 | ⁻²⁾ | 26 | ⁻²⁾ | 52 | ⁻²⁾ | 92 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 1,56 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [Nm] | A4-80 | ⁻²⁾ | 12 | ⁻²⁾ | 30 | ⁻²⁾ | 60 | ⁻²⁾ | 105 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 1,33 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [Nm] | steel 4.6 | 6,1 | | 15 | | | 30 | | 52 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 1,67 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [Nm] | steel 5.6 | 7,6 | | 19 | | | 37 | | 66 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 1,67 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [Nm] | steel 5.8 | 7,6 | | 19 | | | 37 | | 66 | | |
| Partial factor | $\gamma_{Ms^{(3)}}$ [-] | | 1,25 | | | | | | | | | |
| Characteristic resistance | $M_{0RK,s}^0$ [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

Upat drop-in anchor USA

Performances

Characteristic values for tension loads in concrete according to design method B

Annex C 1

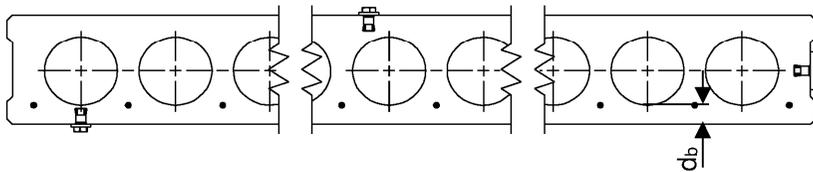
Appendix 10 / 12

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 | γ_{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 | $\gamma_{Ms^{2)}$ [-] | | 1,67 | | | |
| Characteristic resistance | $M^{0}_{RK,s}$ [Nm] | steel 5.6 | 7,6 | 19 | 37 | 66 |
| Partial factor | $\gamma_{Ms^{2)}$ [-] | | 1,67 | | | |
| Characteristic resistance | $M^{0}_{RK,s}$ [Nm] | steel 5.8 | 7,6 | 19 | 37 | 66 |
| Partial factor | $\gamma_{Ms^{2)}$ [-] | | 1,25 | | | |
| Characteristic resistance | $M^{0}_{RK,s}$ [Nm] | steel 8.8 | 12 | 30 | 60 | 105 |
| Partial factor | $\gamma_{Ms^{2)}$ [-] | | 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)

Upat drop-in anchor USA

Performances

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

Annex C 2

Appendix 11 / 12

Table C3.1: Characteristic resistance under fire exposure³⁾ in concrete C20/25 to C50/60

| fire resistance class | USA | property class of the fastening screw or threaded rod | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50/ M12x50D |
|-----------------------|---|---|---|-------|-------|-------|-------|--------|--------|--------|--------|--------------------|
| | | | | | | | | | | | | |
| R 30 | Characteristic resistance C20/25 to C50/60 | F ⁰ _{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 | 0,6 | 2,3 |
| R 60 | | | | 0,5 | 0,6 | 0,9 | 1,5 | | | | | |
| 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 exposure³⁾ for shear load with level arm in concrete C20/25 to C50/60

| fire resistance class | USA | property class of the fastening screw or threaded rod | M6x25 | M6x30 | M8x25 | M8x30 | M8x40 | M10x25 | M10x30 | M10x40 | M12x25 | M12x50/ M12x50D |
|-----------------------|------|---|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------------------|
| | | | | | | | | | | | | |
| 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

Upat drop-in anchor USA

Performances

Characteristic loads for fire resistances

Annex C 3