# DECLARATION OF PERFORMANCE

**DoP 0264**

for Upat Drop-in anchor USA (Mechanical fastener for use in concrete)                                                     EN

1. Unique identification code of the product-type:          **DoP 0264**

2. Intended use/es:          **Post-installed fastening for use in non-cracked concrete, see appendix, especially annexes B1 - B4.**

3. Manufacturer:          **Upat Vertriebs GmbH, Bebelstraße 11, 79108 Freiburg im Breisgau, Germany**

4. Authorised representative:          **–**

5. System/s of AVCP:          **1**

6. European Assessment Document:          **EAD 330232-00-0601**
   European Technical Assessment:          **ETA-10/0172; 2017-04-25**
   Technical Assessment Body:          **DIBt- Deutsches Institut für Bautechnik**
   Notified body/ies:          **2873 TU Darmstadt**

7. Declared performance/s:
   **Mechanical resistance and stability (BWR 1)**
      **Characteristic resistance to tension load (static and quasi-static loading):**
      Resistance to steel failure: Annex C1          $E_S$= 210 000 MPa
      Resistance to pull-out failure: Annex C1
      Resistance to concrete cone failure: Annex C1
      Robustness: Annex C1
      Minimum edge distance and spacing: Annex B2
      Edge distance to prevent splitting under load: Annex C1          $N^0_{Rk,sp}$=NPD

      **Characteristic resistance to shear load (static and quasi-static loading):**
      Resistance to steel failure (shear load): Annex C2
      Resistance to pry-out failure: Annex C3
      Resistance to concrete edge failure: Annex C3
      Displacements under static and quasi-static loading: Annex C4
      Durability: Annexes A3, B1

      **Characteristic resistance and displacements for seismic performance categories C1 and C2:**
      Resistance to steel failure: NPD
      Resistance to pull-out failure: NPD
      Fracture elongation: NPD
      Factor annular gap: NPD
      Displacements: NPD

   **Safety in case of fire (BWR 2)**
      Reaction to fire: Class (A1)

      **Resistance to fire:**
      Fire resistance to steel failure (tension load): NPD
      Fire resistance to pull-out failure (tension load): NPD
      Fire resistance to steel failure (shear load): NPD

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

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

Signed for and on behalf of the manufacturer by:

Dr.-Ing. Oliver Geibig, Managing Director Business Units & Engineering          Jürgen Grün, Managing Director Chemistry & Quality
Tumlingen, 2021-01-12

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

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

**Specific Part**

**1      Technical description of the product**

The Upat Drop-in Anchor USA is an anchor made of galvanized 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.

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      Mechanical resistance and stability (BWR 1)**

| Essential characteristic | Performance |
|---|---|
| Characteristic resistance for static and quasi-static loading, displacements | See Annex C 1 to C 4 |

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

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Anchorages satisfy requirements for Class A1 |
| Resistance to fire | No performance assessed |

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

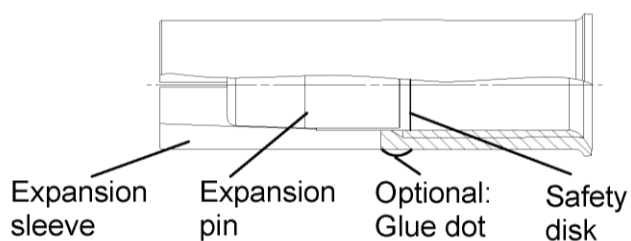In accordance with European Assessment Documents EAD No. 330232-00-0601 the applicable European legal act is: [96/582/EC].
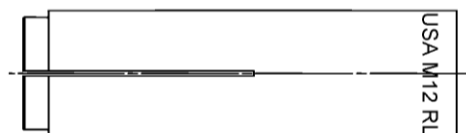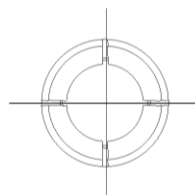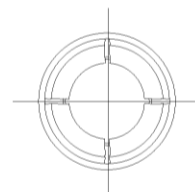
The system to be applied is: 1

Expansion sleeve M8 - M20

Expansion sleeve M6

Expansion sleeve

Expansion pin

Optional: Glue dot

Safety disk
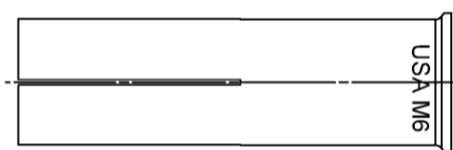
**Intended use in concrete**
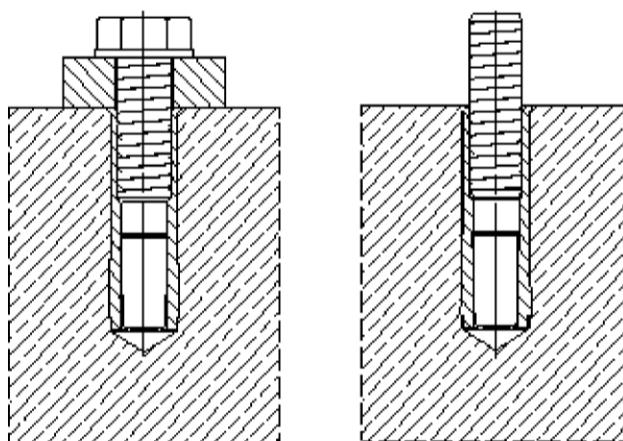
Upat Drop-in Anchor USA

**Product description**
Anchor types
Installed condition

**Annex A 1**

Appendix 2 / 12

## Expansion sleeve



## Expansion pin
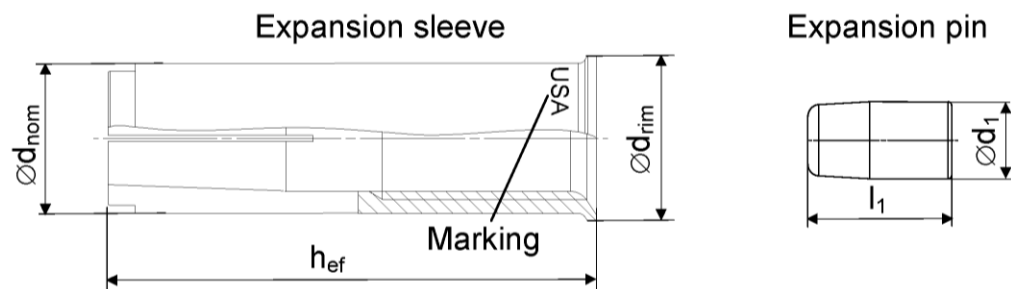


| Anchor size USA | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|
| $h_{ef}$ [mm] | 30 | 30 | 40 | 30 | 40 | 50 | 50 | 65 | 80 |
| $\varnothing\, d_{nom}$ [mm] | 8 | 10 | 10 | 12 | 12 | 15 | 16 | 20 | 25 |
| $\varnothing\, d_{rim}$ [mm] | 9,5 | 11,5 | 11,5 | 13,5 | 13,5 | 16,5 | 17,5 | 21,5 | 27,0 |
| $\varnothing\, d_1$ [mm] | 5 | 6,5 | 6,5 | 8 | 8 | 10 | 10 | 13,5 | 17,5 |
| $l_1$ [mm] | 14 | 13,5 | 13,5 | 13 | 18 | 18 | 18 | 25 | 26 |

## Distinctive feature
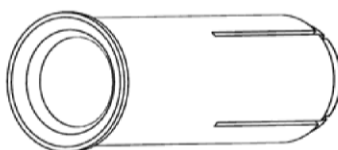


0× groove for:

- USA M6x30..
- USA M8x30..
- USA M10x40..
- USA M12x50..
- USA M16x65..
- USA M20x80..
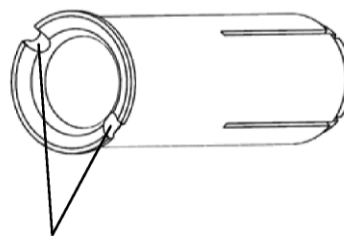


2× groove for:

- USA M8x40..
- USA M10x30..

## Marking on anchor body

| galvanized steel (gvz) | | stainless steel (A4) | |
|---|---|---|---|
| *with rim* | *rimless* | *with rim* | *rimless* |
| USA M6x30 | USA M6x30 RL | USA M6x30 A4 | USA M6x30 RL A4 |
| USA M8x30 | USA M8x30 RL | USA M8x30 A4 | USA M8x30 RL A4 |
| USA M8x40 | USA M8x40 RL | USA M8x40 A4 | USA M8x40 RL A4 |
| USA M10x30 | USA M10x30 RL | USA M10x30 A4 | USA M10x30 RL A4 |
| USA M10x40 | USA M10x40 RL | USA M10x40 A4 | USA M10x40 RL A4 |
| USA M12x50 | USA M12x50 RL | USA M12x50 A4 | USA M12x50 RL A4 |
| USA M12x50 D | USA M12x50 RL D | USA M12x50 D A4 | USA M12x50 RL D A4 |
| USA M16x65 | USA M16x65 RL | USA M16x65 A4 | USA M16x65 RL A4 |
| USA M20x80 | USA M20x80 RL | USA M20x80 A4 | USA M20x80 RL A4 |

## Upat Drop-in Anchor USA

**Product description**
Anchor types
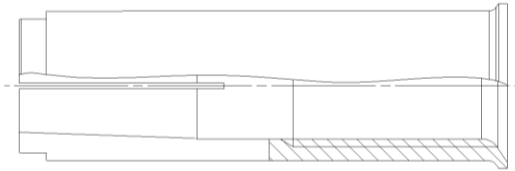
Expansion sleeve
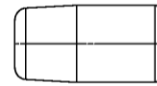
Expansion pin

## Table A1: Materials

| Designation | Material | |
| --- | --- | --- |
| | galvanised steel (≥ 5 µm) | stainless steel |
| Expansion sleeve | EN 10277:2008 or EN 10084:2008 or EN 10111:2008 or EN 10263:2001 or EN 10087:1998 or ASTM A29/A29M | EN 10088:2005 |
| Expansion pin | | |
| Fastening screw or threaded rod | steel, property class 4.6, 5.6, 5.8 or 8.8 according to EN ISO 898-1:2012 | property class 50, 70 or 80 according to EN ISO 3506:2009 |

Upat Drop-in Anchor USA

**Product description**
Material

# Specifications of Intended use

**Anchorages subject to:**

- Static and quasi-static loads

**Base materials:**

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000
- Strength classes C20/25 to C50/60 according to EN 206-1:2000
- Non-cracked concrete: all sizes

**Use conditions (Environmental conditions):**

- Structures subject to dry internal conditions
  (zinc coated steel or stainless steel)
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist
  (stainless steel)

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

**Design:**

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings are prepared taking into account the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.)
- Design of fastenings in accordance to FprEN 1992-4:2016 and EOTA Technical Report TR 055.
- Fasteners can be used as a single fixing for use in structural application.

**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 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 B 3. The anchor is property 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 B 3 and B 4

| Upat Drop-in Anchor USA | **Annex B 1** |
|---|---|
| **Intended Use**<br>Specifications | Appendix 5 / 12 |

## Table B2: Installation parameters for concrete C20/25 to C50/60

| Anchor size | | | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M12x50D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal drill hole diameter | $d_0$ | [mm] | 8 | 10 | | 12 | | 15 | 16 | 20 | 25 |
| Effective anchorage depth | $h_{ef}$ | [mm] | 30 | 30 | 40 | 30 | 40 | 50 | | 65 | 80 |
| Maximum installation torque | max. $T_{inst}$ | [Nm] | 4 | 8 | | 15 | | 35 | | 60 | 120 |
| Minimum drill hole depth | $h_1$ | [mm] | 32 | 33 | 43 | 33 | 43 | 54 | | 70 | 85 |
| Minimum screw-in depth | $l_{s,min}$ | [mm] | 6 | 8 | | 10 | | 12 | | 16 | 20 |
| Maximum screw-in depth | $l_{s,max}$ | [mm] | 14 | 14 | | 14 | 17 | 22 | | 28 | 34 |
| Clearance of hole diameter | $\varnothing\, d_f \leq$ | [mm] | 7 | 9 | | 12 | | 14 | | 18 | 22 |
| **$h_{min} = 80$ mm** | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 70 | 110 | 200 | 200 | | - | - | - | - |
| Minimum edge distance | $c_{min}$ | [mm] | 150 | 150 | | 150 | | - | - | - | - |
| **$h_{min} = 100$ mm** | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 65 | 70 | | 90 | 150 | 200 | | - | - |
| Minimum edge distance | $c_{min}$ | [mm] | 115 | 115 | | 160 | 180 | 200 | | - | - |
| **$h_{min} = 120$ mm** | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 65 | 70 | | 85 | 95 | 145 | | - | - |
| Minimum edge distance | $c_{min}$ | [mm] | 115 | 115 | | 140 | 150 | 200 | | - | - |
| **$h_{min} = 160$ mm** | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 65 | 70 | | 85 | 95 | 145 | | 180 | - |
| Minimum edge distance | $c_{min}$ | [mm] | 115 | 115 | | 140 | 150 | 200 | | 240 | - |
| **$h_{min} = 200$ mm** | | | | | | | | | | | |
| Minimum spacing | $s_{min}$ | [mm] | 65 | 70 | | 85 | 95 | 145 | | 180 | 190 |
| Minimum edge distance | $c_{min}$ | [mm] | 115 | 115 | | 140 | 150 | 200 | | 240 | 280 |
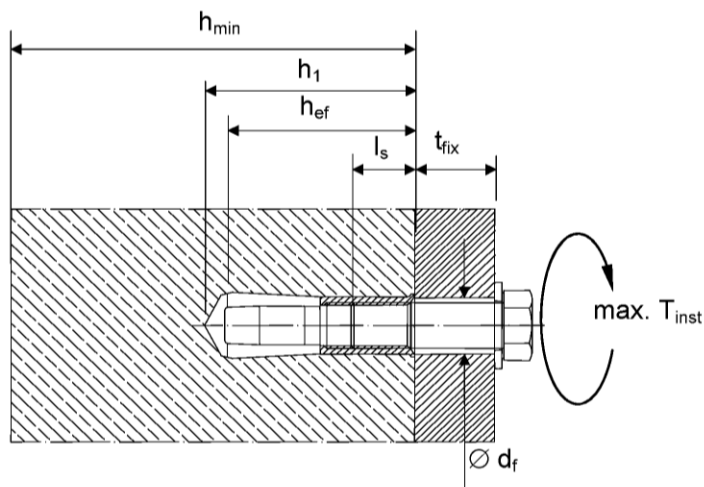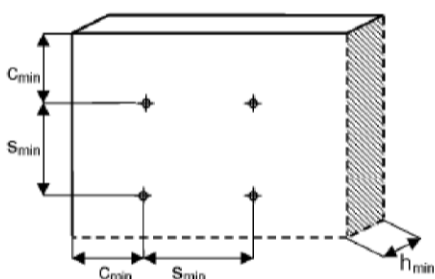


Fastening screw or threaded rod:
- Minimum property class and materials according to table A1
- The length of the fastening screw or threaded rod shall be determined depending on thickness of fixture $t_{fix}$, admissible tolerances and maximum screw length $l_{s,max}$ as well as minimum screw-in depth $l_{s,min}$

Upat Drop-in Anchor USA
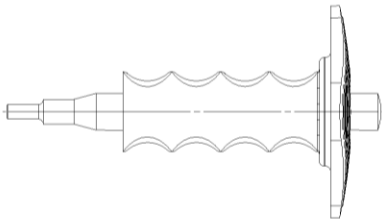
**Intended Use**
Installation parameters

**Annex B 2**

# Setting & drilling tools
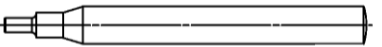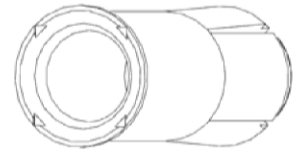
| Setting tools | | Marking | Description | Marking on USA with rim and rimless |
|---|---|---|---|---|
|  | | EHS Plus M..x $h_{ef}$ | Manual setting tool with hand guard |  |
|  | | EHS M..x $h_{ef}$ | Manual setting tool basic format |  |
|  | | EMS M..x $h_{ef}$ | Machine setting tool with SDS Plus | No marking |

| Drilling tools | | | | |
|---|---|---|---|---|
|  | | EBB $\varnothing$D x l | Stop drill |  |
| Or other usual driller | | | | |
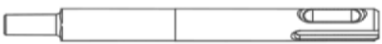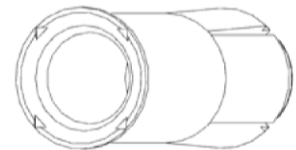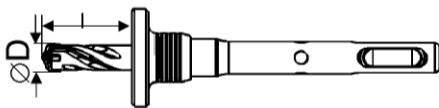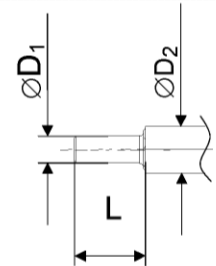
## Table B3: Parameters of setting tools

| Manual setting tool | Machine setting tool | Stop drill | For anchor size USA | $\varnothing$ D1 | $\varnothing$ D2 | L |
|---|---|---|---|---|---|---|
| EHS M6x25/30 | EMS M6x25/30 | EBB 8x30 | USA M6x30 | 4,8 | 9,0 | 17,0 |
| EHS M8x25/30 | EMS M8x25/30 | EBB 10x30 | USA M8x30 | 6,4 | 11,0 | 18,0 |
| EHS M8x40 | EMS M8x40 | EBB 10x40 | USA M8x40 | | | 28,0 |
| EHS M10x25/30 | EMS M10x25/30 | EBB 12x30 | USA M10x30 | 7,9 | 13,0 | 18,0 |
| EHS M10x40 | EMS M10x40 | EBB 12x40 | USA M10x40 | | | 24,0 |
| EHS M12x50 | EMS M12x50 | EBB 15x50 | USA M12x50 | 10,2 | 16,5 | 30,0 |
| EHS M12x50 | EMS M12x50 | EBB 16x50 | USA M12x50 D | | | |
| EHS M16x65 | EMS M16x65 | EBB 20x65 | USA M16x65 | 13,5 | 22 | 36,0 |
| EHS M20x80 | EMS M20x80 | EBB 25x80 | USA M20x80 | 16,4 | 27 | 50,0 |

Upat Drop-in Anchor USA

**Intended Use**
Setting & Drilling tools

# Installation instructions

**1**        EBB ⌀D x l

next step no. 3

**2**

**3**

**4**      EMS M..x $h_{ef}$       EHS Plus M..x $h_{ef}$

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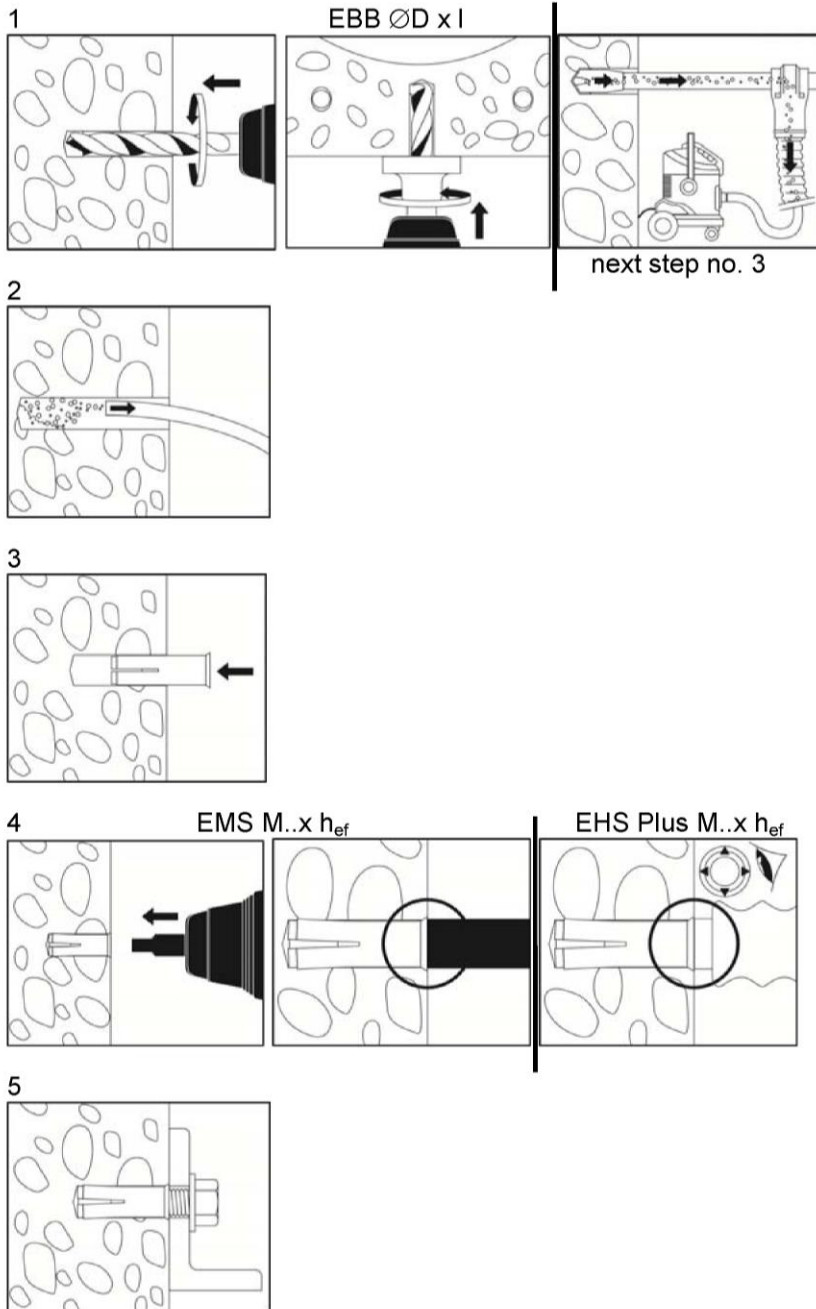
| No. | Description |
|-----|-------------|
| 1 | Create drill hole with hammer drill or with hollow drill and vacuum cleaner |
| 2 | Clean from drill-dust |
| 3 | Set anchor till anchor is flush with surface of concrete |
| 4 | Expand the sleeve by driving the pin into the sleeve and control the correct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

## Upat Drop-in Anchor USA

**Intended Use**
Installation instructions

**Annex B 4**

# Table C1: Characteristic values for tension loads

| USA | | property class | M6x30[1] | M8x30[1] | M8x40 | M10x30[1] | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Installation safety factor | $\gamma_{inst}$ | [-] | 1,0 | | | | | | | | |
| **Steel failure** | | | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | A4-50 | 10,1 | 18,3 | | 29,0 | | 42,1 | | 78,3 | 122,4 |
| Partial safety factor | $\gamma_{Ms}$ | | 2,86 | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | A4-70 | 14,1 | 19,6 | | 24,9 | | 45,1 | 59,0 | 73,8 | 117,2 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,87 | 1,5 | | | | 1,87 | | 1,5 | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | A4-80 | 16,1 | 19,6 | | 24,9 | | 45,1 | 59,0 | 73,8 | 117,2 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,6 | 1,5 | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | steel 4.6 | 8,0 | 14,6 | | 23,2 | | 33,7 | | 62,7 | 97,9 |
| Partial safety factor | $\gamma_{Ms}$ | | 2,0 | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | steel 5.6 | 10,1 | 18,3 | | 29,0 | | 42,1 | | 78,3 | 122,4 |
| Partial safety factor | $\gamma_{Ms}$ | | 2,0 | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | steel 5.8 | 10,1 | 17,2 | | 21,8 | | 39,6 | 42,1 | 64,7 | 102,8 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,5 | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ [kN] | steel 8.8 | 13,5 | 17,2 | | 21,8 | | 39,6 | 53,3 | 64,7 | 102,8 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,5 | | | | | | | | |
| **Pull-out failure not decisive** | | | | | | | | | | | |
| **Concrete cone failure** | | | | | | | | | | | |
| Effective anchorage depth | $h_{ef}$ | [mm] | 30 | 40 | 30 | 40 | | 50 | | 65 | 80 |
| Characteristic spacing | $s_{cr,N}$ | [mm] | 90 | 120 | 90 | 120 | | 150 | | 195 | 240 |
| Characteristic edge distance | $c_{cr,N}$ | [mm] | 45 | 60 | 45 | 60 | | 75 | | 97 | 120 |
| Factor $k_1$ | $k_{ucr,N}$ | [-] | 11,0 | | | | | | | | |
| **Splitting failure** | | | | | | | | | | | |
| Characteristic spacing | $s_{cr,sp}$ | [mm] | 210 | 280 | 210 | 320 | | 350 | | 455 | 560 |
| Characteristic edge distance | $c_{cr,sp}$ | [mm] | 105 | 140 | 105 | 160 | | 175 | | 227 | 280 |

[1] Only for application with statically indeterminate structural components.

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Upat Drop-in Anchor USA

**Performances**
Characteristic values for tension loads

**Annex C 1**

# Table C2: Characteristic values for shear loads

| USA | | property class | M6x30 [1] | M8x30 [1] | M8x40 | M10x30 [1] | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor for ductility | $k_7$ [-] | | 1,0 | | | | | | | | |
| **Steel failure without lever arm** | | | | | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | A4-50 | 5,0 | 9,2 | 14,5 | | | 21,1 | | 39,2 | 61,2 |
| Partial safety factor | $\gamma_{Ms}$ | | 2,38 | | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | A4-70 | 7,0 | 9,8 | 12,4 | | | 22,6 | 29,5 | 37 | 59 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,56 | 1,25 | | | | | 1,56 | 1,25 | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | A4-80 | 8,0 | 9,8 | 12,4 | | | 22,6 | 30,4 | 36,9 | 58,6 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,33 | 1,25 | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | steel 4.6 | 4,0 | 7,3 | 11,6 | | | 16,9 | | 31 | 49 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,67 | | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | steel 5.6 | 5,0 | 9,2 | 14,5 | | | 21,1 | | 39 | 61 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,67 | | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | steel 5.8 | 5,0 | 8,6 | 10,9 | | | 19,8 | 21,1 | 32 | 51 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,25 | | | | | | | | |
| Characteristic resistance | $V_{Rk,s}$ [kN] | steel 8.8 | 6,8 | 8,6 | 10,9 | | | 19,8 | 27 | 32 | 51 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,25 | | | | | | | | |
| **Steel failure with lever arm** | | | | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-50 | 8 | 19 | 37 | | | 66 | | 166 | 324 |
| Partial safety factor | $\gamma_{Ms}$ | | 2,38 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-70 | 11 | 26 | 52 | | | 92 | | 232 | 454 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,56 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | A4-80 | 12 | 30 | 60 | | | 105 | | 266 | 519 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,33 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | Stahl 4.6 | 6,1 | 15 | 30 | | | 52 | | 133 | 259 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,67 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | Stahl 5.6 | 7,6 | 19 | 37 | | | 66 | | 166 | 324 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,67 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | Stahl 5.8 | 7,6 | 19 | 37 | | | 66 | | 166 | 324 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,25 | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ [Nm] | Stahl 8.8 | 12 | 30 | 60 | | | 105 | | 266 | 517 |
| Partial safety factor | $\gamma_{Ms}$ | | 1,25 | | | | | | | | |

[1] Only for application with statically indeterminate structural components.

Upat Drop-in Anchor USA

**Performances**
Characteristic values for shear loads

## Table C3: Characteristic values for shear loads

| USA | | | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Concrete pry out failure** | | | | | | | | | | | |
| Factor | $k_8$ | [-] | 1,74 | | 1,88 | 1,74 | 1,88 | 2,0 | | | |
| Installation safety factor | $\gamma_{inst}$ | [-] | 1,0 | | | | | | | | |
| **Concrete edge failure** | | | | | | | | | | | |
| Effective length of anchor in shear loading | $l_f = h_{ef}$ [mm] | | 30 | | 40 | 30 | 40 | 50 | | 65 | 80 |
| Effective diameter of anchor | $\varnothing\, d_{nom}$ [mm] | | 8 | | 10 | | 12 | | 15 | 16 | 20 | 25 |

Upat Drop-in Anchor USA

**Performances**
Characteristic values for shear loads

**Annex C 3**

## Table C4.1: Displacements under tension and shear loads for USA in galvanised steel

| USA | | | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tension load in C20/25 to C50/60 | N | [kN] | 4,0 | | 6,1 | 4,0 | 6,1 | 8,5 | | 12,6 | 17,2 |
| Displacement | $\delta_{No}$ | [mm] | 0,1 | | | | | | | | |
| | $\delta_{N\infty}$ | [mm] | 0,2 | | | | | | | | |
| Shear load in C20/25 to C50/60 | V | [kN] | 3,9 | 4,9 | 6,2 | | | 11,3 | 15,2 | 18,5 | 29,4 |
| Displacement | $\delta_{Vo}$ | [mm] | 0,95 | 1,00 | | 1,05 | | 1,10 | | 1,40 | 1,80 |
| | $\delta_{V\infty}$ | [mm] | 1,40 | 1,50 | | 1,60 | | 1,70 | | 2,10 | 2,70 |

## Table C4.2: Displacements under tension and shear loads for USA in stainless steel

| USA A4 | | | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M12x50 D | M16x65 | M20x80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tension load in C20/25 to C50/60 | N | [kN] | 4,0 | | 6,1 | 4,0 | 6,1 | 8,5 | | 12,6 | 17,2 |
| Displacement | $\delta_{No}$ | [mm] | 0,1 | | | | | | | | |
| | $\delta_{N\infty}$ | [mm] | 0,2 | | | | | | | | |
| Shear load in C20/25 to C50/60 | V | [kN] | 3,2 | 5,6 | 7,1 | | | 12,9 | 13,5 | 21,1 | 33,5 |
| Displacement | $\delta_{Vo}$ | [mm] | 0,95 | 1,00 | | 1,05 | | 1,10 | | 1,40 | 1,80 |
| | $\delta_{V\infty}$ | [mm] | 1,40 | 1,50 | | 1,60 | | 1,70 | | 2,10 | 2,70 |

Upat Drop-in Anchor USA

**Performances**
Displacements

**Annex C 4**