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## SUORITUSTASOILMOITUS

DoP Nro: MKT-132 - fi

- ◇ **Tuotetyypin yksilöllinen tunniste:** MKT törmäankkuri E / ES
- ◇ **Aiottu käyttötarkoitus (aiotut käyttötarkoitukset):** Polkuohjattu laajeneva ankkuri käytettäväksi rakenteellisten järjestelmien moninkertaisena kiinnityksenä betoniin, katso liite / Annex B
- ◇ **Valmistaja:** MKT Metall-Kunststoff-Technik GmbH & Co.KG  
Auf dem Immel 2  
67685 Weilerbach
- ◇ **Suoritustason pysyvyyden arvioinnissa ja varmentamisessa käytetty järjestelmä/käytetyt järjestelmät:** 2+
- ◇ **Eurooppalainen arviointiasiakirja:** ETAG 001-6  
Eurooppalainen tekninen arviointi: ETA-05/0116, 04.01.2017  
Teknisestä arvioinnista vastaava laitos: DIBt, Berlin  
Ilmoitettu laitos/ilmoitetut laitokset: NB 1343 – MPA, Darmstadt

◇ **Ilmoitettu suoritusaso/ilmoitetut suoritusastot:**

| Olennaiset ominaisuudet                   | Suoritusaso         |
|---|---------------------|
| <b>Paloturvallisuus (BWR2)</b>            |                     |
| Palokäyttäytyminen                        | Luokka A1           |
| Palonkestävyys                            | Liite/Annex C4 – C5 |
| <b>Käyttöturvallisuus käytössä (BWR4)</b> |                     |
| Ominaisarvot kaikille kuorman suunnan     | Liite/Annex C1 – C3 |

Edellä yksilöidyn tuotteen suoritusaso on ilmoitettujen suoritusastojen joukon mukainen. Tämä suoritusastoilmoitus on asetuksen (EU) N:o 305/2011 mukaisesti annettu edellä ilmoitetun valmistajan yksinomaisella vastuulla.

Valmistajan puolesta allekirjoittanut:

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Tämän suoritusastoilmoituksen alkuperäinen teksti on kirjoitettu saksaksi. Jos käännökset poikkeavat toisistaan, saksankielinen versio on pätevä.

## Specifications of intended use

| Drop-in Anchor  |       |       |        |        |        |        |        |
|---|-------|-------|--------|--------|--------|--------|--------|
| Anchorage depth $h_{ef} \geq 30$ mm                       | M6x30 | M8x30 | M8x40  | M10x30 | M10x40 | M12x50 | M16x65 |
| Steel, zinc plated  |       |       |        | ✓      |        |        |        |
| Stainless steel A4 and high corrosion resistant steel HCR |       | ✓     |        | -      |        | ✓      |        |
| Static and quasi-static loads                             |       |       |        | ✓      |        |        |        |
| Fire exposure   |       |       |        | ✓      |        |        |        |
| Cracked and uncracked concrete                            |       |       |        | ✓      |        |        |        |
| Solid concrete <b>C20/25 to C50/60</b>                    |       |       |        | ✓      |        |        |        |
| Anchorage depth $h_{ef} = 25$ mm                          | M6x25 | M8x25 | M10x25 | M12x25 |        |        |        |
| Steel, zinc plated  |       |       | ✓      |        |        |        |        |
| Stainless steel A4 and high corrosion resistant steel HCR |       |       | -      |        |        |        |        |
| Static and quasi-static loads                             |       |       | ✓      |        |        |        |        |
| Fire exposure (solid concrete, C20/25 to C50/60)          |       |       | ✓      |        |        |        |        |
| Cracked and uncracked concrete                            |       |       | ✓      |        |        |        |        |
| Solid concrete <b>C12/15 to C50/60</b>                    |       |       | ✓      |        |        |        |        |
| Precast pre-stressed hollow core slabs (C30/37 to C50/60) |       |       | ✓      |        |        |        |        |

### Base materials:

- reinforced or unreinforced normal weight concrete according to EN 206-1:2000

### Use conditions:

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

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

## Drop-in Anchor E / ES

Intended use  
Specifications

Annex B1

## Specifications of intended use

### 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.).
- The strength class and the length of the fastening screw or threaded rod shall be defined by the designing engineer
- Anchorages under static or quasi-static actions for multiple use for non-structural applications are designed in accordance with:
  - ETAG 001, Annex C, design method B, Edition August 2010 or
  - CEN/TS 1992-4:2009, design method B
- Anchorages under static or quasi-static actions for precast pre-stressed hollow core slabs:
  - ETAG 001, Annex C, design method C, Edition August 2010.
  - CEN/TS 1992-4:2009, design method C
- Anchorages under fire exposure are designed in accordance with:
  - ETAG 001, Annex C, design method B, Edition August 2010 and EOTA Technical Report TR 020, Edition May 2004 or
  - CEN/TS 1992-4:2009, Annex D
  - It must be ensured that local spalling of the concrete cover does not occur.

### Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools,
- Drill hole by hammer drilling only (use of vacuum drill bits is admissible),
- Positioning of the drill holes without damaging the reinforcement.

**Drop-in Anchor E / ES**

**Intended use**  
Specifications

**Annex B2**

**Table B1: Installation parameters for  $h_{ef} \geq 30$  mm**

| Anchor size                               |                      | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M16x65 |
|---|----------------------|-------|-------|-------|--------|--------|--------|--------|
| Depth of drill hole                       | $h_0 =$ [mm]         | 30    | 30    | 40    | 30     | 40     | 50     | 65     |
| Drill hole diameter                       | $d_0 =$ [mm]         | 8     | 10    | 10    | 12     | 12     | 15     | 20     |
| Cutting diameter of drill bit             | $d_{cut} \leq$ [mm]  | 8,45  | 10,45 | 10,45 | 12,5   | 12,5   | 15,5   | 20,55  |
| Max. recommended installation torque      | $T_{inst} \leq$ [Nm] | 4     | 8     | 8     | 15     | 15     | 35     | 60     |
| Diameter of clearance hole in the fixture | $d_f \leq$ [mm]      | 7     | 9     | 9     | 12     | 12     | 14     | 18     |
| Available thread length                   | $L_{th}$ [mm]        | 13    | 13    | 20    | 12     | 15     | 18     | 23     |
| Minimum screw-in depth                    | $L_{sdmin}$ [mm]     | 7     | 9     | 9     | 10     | 11     | 13     | 18     |
| <b>Steel, zinc plated</b>                 |                      |       |       |       |        |        |        |        |
| Minimum thickness of member               | $h_{min}$ [mm]       | 100   | 100   | 100   | 120    | 120    | 130    | 160    |
| Minimum spacing                           | $s_{min}$ [mm]       | 55    | 60    | 80    | 100    | 100    | 120    | 150    |
| Minimum distance                          | $c_{min}$ [mm]       | 95    | 95    | 95    | 115    | 135    | 165    | 200    |
| <b>Stainless steel A4, HCR</b>            |                      |       |       |       |        |        |        |        |
| Minimum thickness of member               | $h_{min}$ [mm]       | 100   | 100   | 100   | -      | 130    | 140    | 160    |
| Minimum spacing                           | $s_{min}$ [mm]       | 50    | 60    | 80    | -      | 100    | 120    | 150    |
| Minimum distance                          | $c_{min}$ [mm]       | 80    | 95    | 95    | -      | 135    | 165    | 200    |

**Table B2: Installation parameters for  $h_{ef} = 25$  mm**

| Anchor size  |                      | M6x25      | M8x25 | M10x25 | M12x25 |
|--|----------------------|------------|-------|--------|--------|
| Depth of drill hole  | $h_0 =$ [mm]         | 25         | 25    | 25     | 25     |
| Drill hole diameter  | $d_0 =$ [mm]         | 8          | 10    | 12     | 15     |
| Cutting diameter of drill bit  | $d_{cut} \leq$ [mm]  | 8,45       | 10,45 | 12,5   | 15,5   |
| Max. recommended installation torque   | $T_{inst} \leq$ [Nm] | 4          | 8     | 15     | 35     |
| Diameter of clearance hole in the fixture                                      | $d_f \leq$ [mm]      | 7          | 9     | 12     | 14     |
| Available thread length  | $L_{th}$ [mm]        | 12         | 12    | 12     | 12     |
| Minimum screw-in depth   | $L_{sdmin}$ [mm]     | 6          | 8     | 10     | 12     |
| Minimum thickness of member  | $h_{min,1}$ [mm]     | <b>80</b>  |       |        |        |
| Minimum spacing  | $s_{min}$ [mm]       | 30         | 70    | 70     | 100    |
| Minimum edge distance  | $c_{min}$ [mm]       | 60         | 100   | 100    | 130    |
| Standard thickness of member   | $h_{min,2}$ [mm]     | <b>100</b> |       |        |        |
| Minimum spacing  | $s_{min}$ [mm]       | 30         | 50    | 60     | 100    |
| Minimum edge distance  | $c_{min}$ [mm]       | 60         | 100   | 100    | 110    |
| <b>Installation in precast pre-stressed hollow core slabs C30/37 to C50/60</b> |                      |            |       |        |        |
| Spacing  | $s_{min}$ [mm]       |            |       |        | 200    |
| Edge distance  | $c_{min}$ [mm]       |            |       |        | 150    |

**Drop-in Anchor E / ES**

**Intended use**  
Installation parameters

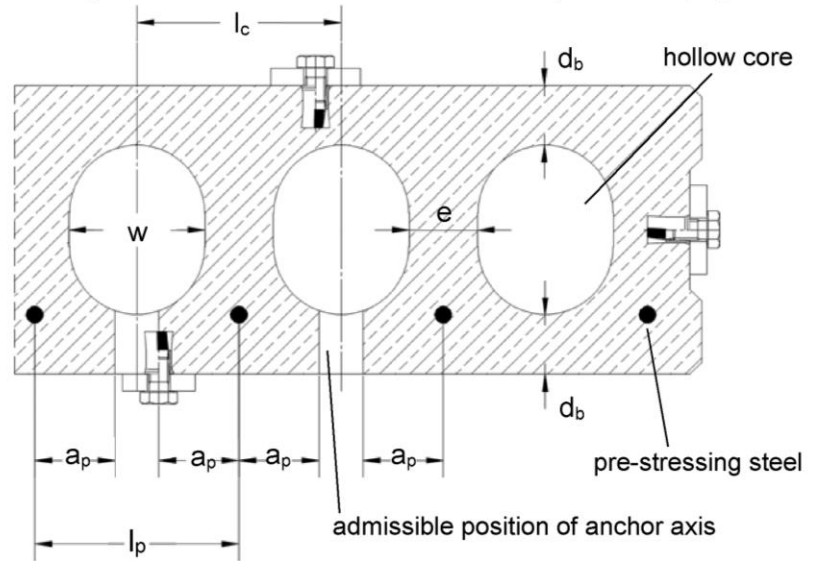
**Annex B3**

## Admissible anchor positions in precast pre-stressed hollow core slabs ( $w / e \leq 4,2$ )

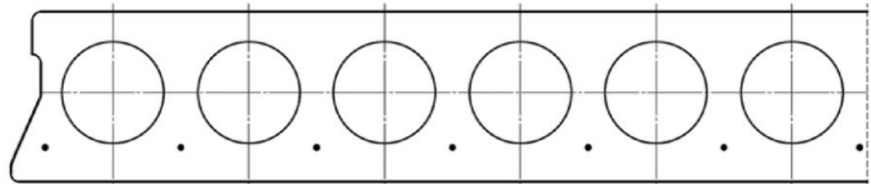
core distance:  
 $l_c \geq 100$  mm

pre-stressing steel distance:  
 $l_p \geq 100$  mm

distance between anchor  
 position and pre-stressing steel:  
 $a_p \geq 50$  mm

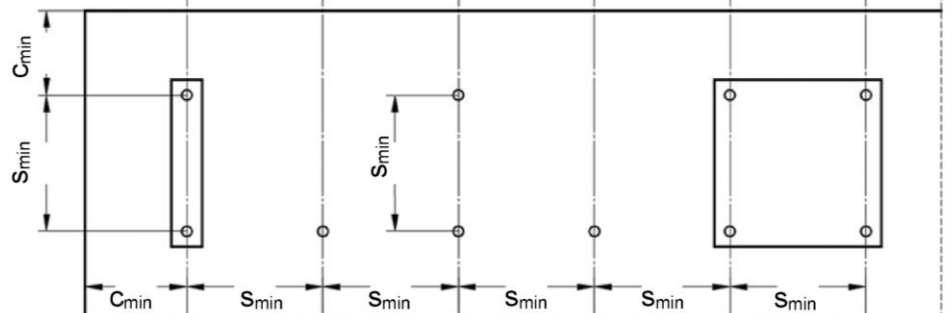


## Minimum spacing and edge distance of anchors and distance between anchor groups in precast pre-stressed hollow core slabs



Minimum edge distance  
 $C_{min} \geq 150$  mm

Minimum anchor spacing  
 $S_{min} \geq 200$  mm

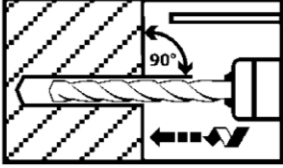
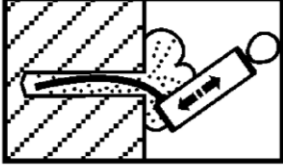
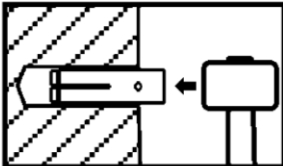
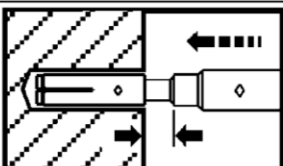
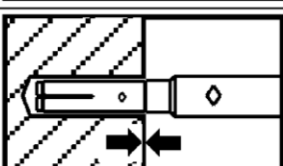
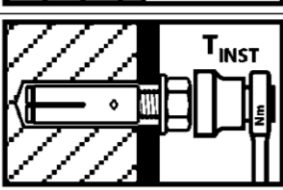


### Drop-in Anchor E / ES

**Intended use**  
 Installation in precast pre-stressed hollow core slabs

**Annex B4**

## Installation instructions for solid concrete slabs

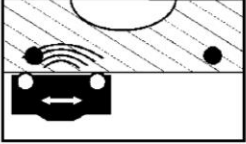
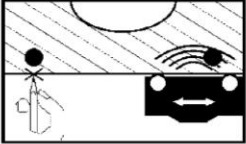
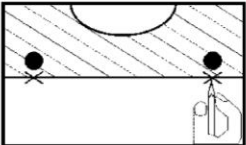
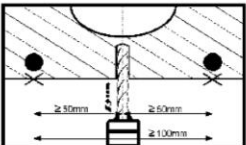
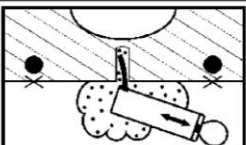
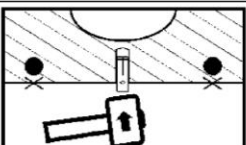
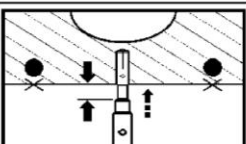
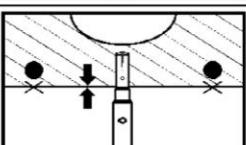
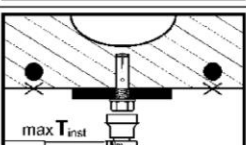
|   |   |   |
|---|---|---|
| 1 |    | <p>Drill hole perpendicular to concrete surface. When using vacuum drill bit proceed with step 3.</p> |
| 2 |    | <p>Blow out dust. Alternatively vacuum-clean down to the bottom of the hole.</p>                      |
| 3 |    | <p>Drive in anchor.</p>   |
| 4 |    | <p>Drive in cone by using setting tool.</p>   |
| 5 |   | <p>Shoulder of setting tool must fit on anchor rim.</p>   |
| 6 |  | <p>Apply installation torque <math>T_{inst}</math> by using calibrated torque wrench.</p>             |

**Drop-in Anchor E / ES**

**Intended use**  
Installation instructions for solid concrete slabs

**Annex B5**

## Installation instructions for precast pre-stressed hollow core slabs

|   |   |   |
|---|---|---|
| 1 |    | Search for the position of the reinforcement.   |
| 2 |    | Mark the position of the reinforcement and search for the other position of the reinforcement |
| 3 |    | Mark the positions of reinforcement.  |
| 4 |    | Drill hole while maintaining the required distances.  |
| 5 |    | Blow out dust. Alternatively vacuum clean down to the bottom of the hole.                     |
| 6 |   | Drive in anchor.  |
| 7 |  | Drive in cone by using setting tool.  |
| 8 |  | Shoulder of setting tool must fit on anchor rim.  |
| 9 |  | Apply installation torque $T_{inst}$ by using calibrated torque wrench.                       |

### Drop-in Anchor E / ES

#### Intended use

Installation instructions for precast pre-stressed hollow core slabs

Annex B6

**Table C1: Characteristic resistance for  $h_{ef} \geq 30$  mm in solid concrete slabs**

| Anchor size   |                    |      | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M16x65 |
|---|--------------------|------|-------|-------|-------|--------|--------|--------|--------|
| <b>Load in any direction</b>                                  |                    |      |       |       |       |        |        |        |        |
| Characteristic resistance in concrete <b>C20/25 to C50/60</b> | $F^{0}_{RK}$       | [kN] | 3     | 5     | 6     | 6      | 6      | 6      | 16     |
| Partial safety factor   | $\gamma_M$         | [-]  | 1,8   | 2,16  |       | 2,1    | 2,16   | 1,8    | 1,8    |
| Spacing   | $s_{cr}$           | [mm] | 130   | 180   | 210   | 230    | 170    | 170    | 400    |
| Edge distance   | $c_{cr}$           | [mm] | 65    | 90    | 105   | 115    | 85     | 85     | 200    |
| <b>Shear load with lever arm, Steel zinc plated</b>           |                    |      |       |       |       |        |        |        |        |
| Characteristic resistance <b>(Steel 4.6)</b>                  | $M^{0}_{RK,s}{}^1$ | [Nm] | 6,1   | 15    | 15    | 30     | 30     | 52     | 133    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,67  |       |       |        |        |        |        |
| Characteristic resistance <b>(Steel 4.8)</b>                  | $M^{0}_{RK,s}{}^1$ | [Nm] | 6,1   | 15    | 15    | 30     | 30     | 52     | 133    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,25  |       |       |        |        |        |        |
| Characteristic resistance <b>(Steel 5.6)</b>                  | $M^{0}_{RK,s}{}^1$ | [Nm] | 7,6   | 19    | 19    | 37     | 37     | 65     | 166    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,67  |       |       |        |        |        |        |
| Characteristic resistance <b>(Steel 5.8)</b>                  | $M^{0}_{RK,s}{}^1$ | [Nm] | 7,6   | 19    | 19    | 37     | 37     | 65     | 166    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,25  |       |       |        |        |        |        |
| Characteristic resistance <b>(Steel 8.8)</b>                  | $M^{0}_{RK,s}{}^1$ | [Nm] | 12    | 30    | 30    | 59     | 60     | 105    | 266    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,25  |       |       |        |        |        |        |
| <b>Shear load with lever arm, Stainless steel A4 / HCR</b>    |                    |      |       |       |       |        |        |        |        |
| Characteristic resistance <b>(Property class 70)</b>          | $M^{0}_{RK,s}{}^1$ | [Nm] | 11    | 26    | 26    | -      | 52     | 92     | 233    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,56  |       |       |        |        |        |        |
| Characteristic resistance <b>(Property class 80)</b>          | $M^{0}_{RK,s}{}^1$ | [Nm] | 12    | 30    | 30    | -      | 60     | 105    | 266    |
| Partial safety factor   | $\gamma_{Ms}$      | [-]  | 1,33  |       |       |        |        |        |        |

1) Characteristic bending moment  $M^{0}_{RK,s}$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

|  |                 |
|--|-----------------|
| <b>Drop-in Anchor E / ES</b>   | <b>Annex C1</b> |
| <b>Performance</b><br>Characteristic resistance for $h_{ef} \geq 30$ mm in <b>solid concrete</b> |                 |



**Table C2: Characteristic resistance for  $h_{ef} = 25$  mm in solid concrete slabs**

| Anchor size  |                    |      | M6x25 | M8x25 | M10x25 | M12x25 |
|--|--------------------|------|-------|-------|--------|--------|
| <b>Load in any direction</b>                                   |                    |      |       |       |        |        |
| Characteristic resistance in concrete <b>C12/15 and C16/20</b> | $F^{0}_{Rk}$       | [kN] | 2,5   | 2,5   | 3,5    | 3,5    |
| Characteristic resistance in concrete <b>C20/25 to C50/60</b>  | $F^{0}_{Rk}$       | [kN] | 3,5   | 4,0   | 4,5    | 4,5    |
| Partial safety factor  | $\gamma_M$         | [-]  | 1,5   |       |        |        |
| Spacing  | $s_{cr}$           | [mm] | 75    | 75    | 75     | 75     |
| Edge distance  | $c_{cr}$           | [mm] | 38    | 38    | 38     | 38     |
| <b>Shear load with lever arm</b>                               |                    |      |       |       |        |        |
| Characteristic resistance <b>(Steel 4.6)</b>                   | $M^{0}_{Rk,s}{}^1$ | [Nm] | 6,1   | 15    | 30     | 52     |
| Partial safety factor  | $\gamma_{Ms}$      | [-]  | 1,67  |       |        |        |
| Characteristic resistance <b>(Steel 4.8)</b>                   | $M^{0}_{Rk,s}{}^1$ | [Nm] | 6,1   | 15    | 30     | 52     |
| Partial safety factor  | $\gamma_{Ms}$      | [-]  | 1,25  |       |        |        |
| Characteristic resistance <b>(Steel 5.6)</b>                   | $M^{0}_{Rk,s}{}^1$ | [Nm] | 7,6   | 19    | 37     | 65     |
| Partial safety factor  | $\gamma_{Ms}$      | [-]  | 1,67  |       |        |        |
| Characteristic resistance <b>(Steel 5.8)</b>                   | $M^{0}_{Rk,s}{}^1$ | [Nm] | 7,6   | 19    | 37     | 65     |
| Partial safety factor  | $\gamma_{Ms}$      | [-]  | 1,25  |       |        |        |
| Characteristic resistance <b>(Steel 8.8)</b>                   | $M^{0}_{Rk,s}{}^1$ | [Nm] | 12    | 30    | 60     | 105    |
| Partial safety factor  | $\gamma_{Ms}$      | [-]  | 1,25  |       |        |        |

<sup>1)</sup> Characteristic bending moment  $M^{0}_{Rk,s}$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

|  |                 |
|--|-----------------|
| <b>Drop-in Anchor E / ES</b>   | <b>Annex C2</b> |
| <b>Performance</b><br>Characteristic resistance for $h_{ef} = 25$ mm in solid concrete |                 |

**Table C3: Characteristic resistance for  $h_{ef} = 25$  mm in precast pre-stressed hollow core slabs**

| Anchor size  |                  | M6x25 | M8x25                        | M10x25 | M12x25 |     |
|--|------------------|-------|------------------------------|--------|--------|-----|
| <b>Load in any direction</b>   |                  |       |                              |        |        |     |
| Flange thickness   | $d_b$            | [mm]  | $\geq 35$ (30) <sup>1)</sup> |        |        |     |
| Characteristic resistance in precast pre-stressed hollow core slabs<br><b>C30/37 to C50/60</b> | $F_{Rk}$         | [kN]  | 3,5                          | 4,0    | 4,5    | 4,5 |
| Partial safety factor  | $\gamma_M$       | [-]   | 1,5                          |        |        |     |
| Spacing  | $s_{cr}$         | [mm]  | 200                          |        |        |     |
| Edge distance  | $c_{cr}$         | [mm]  | 150                          |        |        |     |
| <b>Shear load with lever arm</b>   |                  |       |                              |        |        |     |
| Characteristic resistance<br><b>(Steel 4.6)</b>  | $M^0_{Rk,s^{2)}$ | [Nm]  | 6,1                          | 15     | 30     | 52  |
| Partial safety factor  | $\gamma_{Ms}$    | [-]   | 1,67                         |        |        |     |
| Characteristic resistance<br><b>(Steel 4.8)</b>  | $M^0_{Rk,s^{2)}$ | [Nm]  | 6,1                          | 15     | 30     | 52  |
| Partial safety factor  | $\gamma_{Ms}$    | [-]   | 1,25                         |        |        |     |
| Characteristic resistance<br><b>(Steel 5.6)</b>  | $M^0_{Rk,s^{2)}$ | [Nm]  | 7,6                          | 19     | 37     | 65  |
| Partial safety factor  | $\gamma_{Ms}$    | [-]   | 1,67                         |        |        |     |
| Characteristic resistance<br><b>(Steel 5.8)</b>  | $M^0_{Rk,s^{2)}$ | [Nm]  | 7,6                          | 19     | 37     | 65  |
| Partial safety factor  | $\gamma_{Ms}$    | [-]   | 1,25                         |        |        |     |
| Characteristic resistance<br><b>(Steel 8.8)</b>  | $M^0_{Rk,s^{2)}$ | [Nm]  | 12                           | 30     | 60     | 105 |
| Partial safety factor  | $\gamma_{Ms}$    | [-]   | 1,25                         |        |        |     |

<sup>1)</sup> The anchor may be set in a flange thickness of 30 mm with identical characteristic loads, if the borehole cuts no hollow core.

<sup>2)</sup> Characteristic bending moment  $M^0_{Rk,s}$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

**Drop-in Anchor E / ES**

**Performance**

Characteristic resistance for  $h_{ef} = 25$  mm in precast pre-stressed hollow core slabs

**Annex C3**

**Table C4: Characteristic values under fire exposure in solid concrete slabs C20/25 to C50/60 for  $h_{ef} \geq 30$  mm**

| Anchor size                           |  |                           |               | M6x30 | M8x30 | M8x40 | M10x30 | M10x40 | M12x50 | M16x65 |     |
|---------------------------------------|--|---------------------------|---------------|-------|-------|-------|--------|--------|--------|--------|-----|
| Fire resistance class                 |  | Load in any direction     |               |       |       |       |        |        |        |        |     |
| Steel<br>4.6                          | R 30   | Characteristic resistance | $F_{Rk,fi}^0$ | [kN]  | 0,4   | 0,6   | 0,6    | 0,9    | 0,9    | 1,5    | 3,1 |
|                                       | R 60   |                           |               | [kN]  | 0,35  | 0,6   | 0,6    | 0,8    | 0,8    | 1,3    | 2,4 |
|                                       | R 90   |                           |               | [kN]  | 0,30  | 0,6   | 0,6    | 0,6    | 0,6    | 1,1    | 2,0 |
|                                       | R 120  |                           |               | [kN]  | 0,25  | 0,5   | 0,5    | 0,5    | 0,5    | 0,8    | 1,6 |
| Steel<br>4.8                          | R 30   | Characteristic resistance | $F_{Rk,fi}^0$ | [kN]  | 0,4   | 0,9   | 1,1    | 0,9    | 1,5    | 1,5    | 4,0 |
|                                       | R 60   |                           |               | [kN]  | 0,35  | 0,9   | 0,9    | 0,9    | 1,5    | 1,5    | 4,0 |
|                                       | R 90   |                           |               | [kN]  | 0,3   | 0,6   | 0,6    | 0,9    | 1,1    | 1,5    | 3,0 |
|                                       | R 120  |                           |               | [kN]  | 0,3   | 0,5   | 0,5    | 0,7    | 0,9    | 1,2    | 2,4 |
| Steel<br>$\geq 5.6$                   | R 30   | Characteristic resistance | $F_{Rk,fi}^0$ | [kN]  | 0,8   | 0,9   | 1,5    | 0,9    | 1,5    | 1,5    | 4,0 |
|                                       | R 60   |                           |               | [kN]  | 0,8   | 0,9   | 1,5    | 0,9    | 1,5    | 1,5    | 4,0 |
|                                       | R 90   |                           |               | [kN]  | 0,4   | 0,9   | 0,9    | 0,9    | 1,5    | 1,5    | 3,7 |
|                                       | R 120  |                           |               | [kN]  | 0,3   | 0,5   | 0,5    | 0,7    | 1,0    | 1,2    | 2,4 |
| A4 /<br>HCR                           | R 30   | Characteristic resistance | $F_{Rk,fi}^0$ | [kN]  | 0,8   | 0,9   | 1,5    | -      | 1,5    | 1,5    | 4,0 |
|                                       | R 60   |                           |               | [kN]  | 0,8   | 0,9   | 1,5    | -      | 1,5    | 1,5    | 4,0 |
|                                       | R 90   |                           |               | [kN]  | 0,4   | 0,9   | 0,9    | -      | 1,5    | 1,5    | 3,7 |
|                                       | R 120  |                           |               | [kN]  | 0,3   | 0,5   | 0,5    | -      | 1,0    | 1,2    | 2,4 |
| Partial safety factor $\gamma_{M,fi}$ |  |                           | [-]           | 1,0   |       |       |        |        |        |        |     |
| <b>Steel zinc plated</b>              |  |                           |               |       |       |       |        |        |        |        |     |
| R 30 – R 120                          | Spacing  |                           | $S_{cr,fi}$   | [mm]  | 130   | 180   | 210    | 170    | 170    | 200    | 400 |
|                                       | Edge distance  |                           | $C_{cr,fi}$   | [mm]  | 65    | 90    | 105    | 85     | 85     | 100    | 200 |
|                                       | If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm. |                           |               |       |       |       |        |        |        |        |     |
| <b>Stainless steel A4, HCR</b>        |  |                           |               |       |       |       |        |        |        |        |     |
| R 30 – R 120                          | Spacing  |                           | $S_{cr,fi}$   | [mm]  | 130   | 180   | 210    | -      | 170    | 200    | 400 |
|                                       | Edge distance  |                           | $C_{cr,fi}$   | [mm]  | 65    | 90    | 105    | -      | 85     | 100    | 200 |
|                                       | If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm. |                           |               |       |       |       |        |        |        |        |     |

**Drop-in Anchor E / ES**

**Performance**  
Characteristic values under fire exposure for  $h_{ef} \geq 30$  mm

**Annex C4**

**Table C5: Characteristic values under fire exposure in solid concrete slabs C20/25 to C50/60 for  $h_{ef} = 25$  mm**

| Anchor size  |                           | M6x25   | M8x25 | M10x25 | M12x25 |     |     |
|--|---------------------------|---|-------|--------|--------|-----|-----|
| <b>Fire resistance class</b>   |                           | <b>Load in any direction</b>                    |       |        |        |     |     |
| Steel<br>$\geq 4.6$  | R 30                      | Characteristic<br>resistance<br>$F^{0}_{Rk,fi}$ | [kN]  | 0,4    | 0,6    | 0,6 | 0,6 |
|  | R 60                      |   | [kN]  | 0,35   | 0,6    | 0,6 | 0,6 |
|  | R 90                      |   | [kN]  | 0,30   | 0,6    | 0,6 | 0,6 |
|  | R 120                     |   | [kN]  | 0,25   | 0,5    | 0,5 | 0,5 |
| Partial safety factor $\gamma_{M,fi}$  |                           | [-]   | 1,0   |        |        |     |     |
| R 30 – R 120   | Spacing $s_{cr,fi}$       | [mm]  | 100   | 100    | 100    | 100 |     |
|  | Edge distance $c_{cr,fi}$ | [mm]  | 50    | 50     | 50     | 50  |     |
| If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm. |                           |   |       |        |        |     |     |

**Drop-in Anchor E / ES**

**Performance**  
Characteristic values under fire exposure for  $h_{ef} = 25$  mm

**Annex C5**