

## DÉCLARATION DES PERFORMANCES

DoP No MKT-1.1-200\_fr

- ✧ **Code d'identification unique du produit type:** **Boulon d'ancrage B**
- ✧ **Usage(s) prévu(s):** Ancrage mécanique pour ancrage dans le béton, voir l'annexe/Annex B
- ✧ **Fabricant:** MKT Metall-Kunststoff-Technik GmbH & Co.KG  
Auf dem Immel 2  
67685 Weilerbach
- ✧ **Système(s) d'évaluation et de vérification de la constance des performances:** 1
- ✧ **Document d'évaluation européen:** **EAD 330232-01-0601**  
Évaluation technique européenne: **ETA-01/0013, 17.09.2020**  
Organisme d'évaluation technique: **DIBt, Berlin**  
Organisme(s) notifié(s): **NB 2873 – Technische Universität Darmstadt**
- ✧ **Performance(s) déclarée(s):**


| Caractéristiques essentielles  | Performances                 |
|--|------------------------------|
| <b>Résistance mécanique et stabilité (BWR 1)</b>   |                              |
| Résistance caractéristique sous contrainte de traction (effets statiques et quasi statiques) | Annexe/Annex B4, C1, C2      |
| Résistance caractéristique sous contrainte latérale (effets statiques et quasi statiques)    | Annexe/Annex C3              |
| Décalage (effets statiques et quasi statiques)   | Annexe/Annex B1, C4          |
| Résistances caractéristiques et déplacements pour la classe de performance sismique C1 + C2  | performances non déterminées |
| <b>Sécurité en cas d'incendie (BWR 2)</b>  |                              |
| Le comportement du feu   | Classe A1                    |
| Résistance au feu  | performances non déterminées |

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:



**Stefan Weustenhagen**  
(Directeur général)  
Weilerbach, 23.10.2020

p.p. 

**Dipl.-Ing. Detlef Bigalke**  
(Directeur du développement de produits)



L'original de cette déclaration d'exécution a été rédigé en allemand. En cas de divergences dans la traduction, la version allemande fait foi.

## Specifications of intended use

| B / B fvz / B sh / B A2 / B A4 / B HCR |                                | M6 | M8 | M10 | M12 | M16 | M20 |
|--|--------------------------------|----|----|-----|-----|-----|-----|
| B                                      | electroplated                  | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   |
| B fvz                                  | hot-dip galvanized             | -  | ✓  | ✓   | ✓   | ✓   | ✓   |
| B sh                                   | sherardized                    | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   |
| B A2                                   | stainless steel                | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   |
| B A4                                   | stainless steel                | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   |
| B HCR                                  | high corrosion resistant steel | ✓  | ✓  | ✓   | ✓   | ✓   | ✓   |
| All versions                           | static or quasi-static action  | ✓  |    |     |     |     |     |
|  | uncracked concrete             | ✓  |    |     |     |     |     |

### Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013 + A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (all materials)
- For all other conditions:

| Anchor version | Use according to EN 1993-1-4:2015 corresponding to the corrosion resistance class CRC according to Annex A, Table A.2 |
|----------------|---|
| B A2           | CRC II  |
| B A4           | CRC III   |
| B HCR          | CRC V   |

### 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.)
- Anchorages are designed according to EN 1992-4:2018 or TR 055

### Installation:

- Hole drilling by hammer drill bit or vacuum drill bit
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener

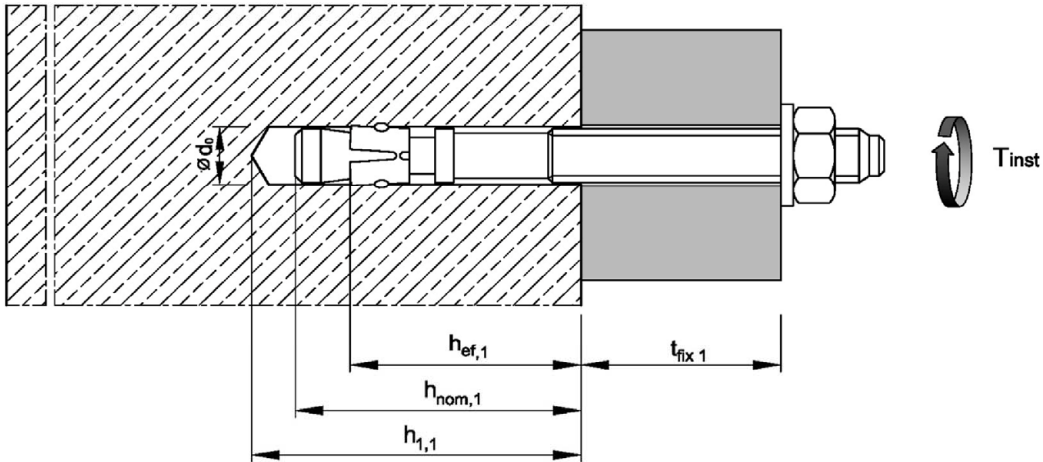
## Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use  
Specifications

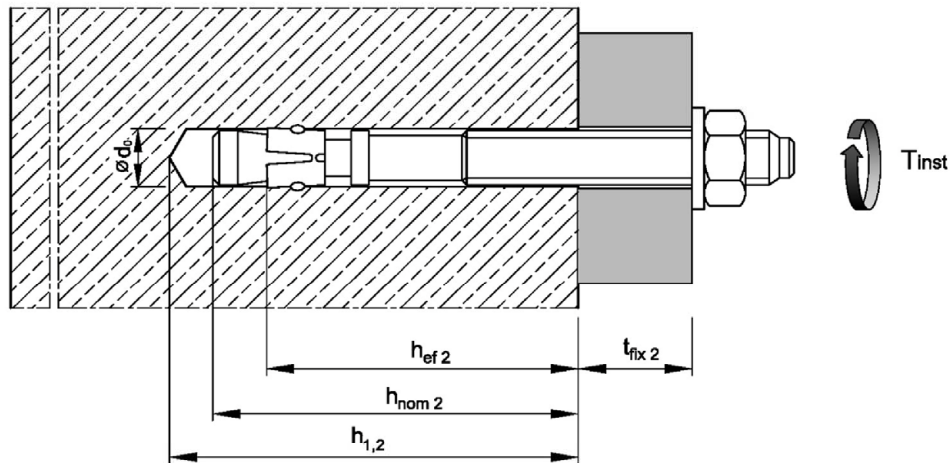
Annex B1

## Installation parameters

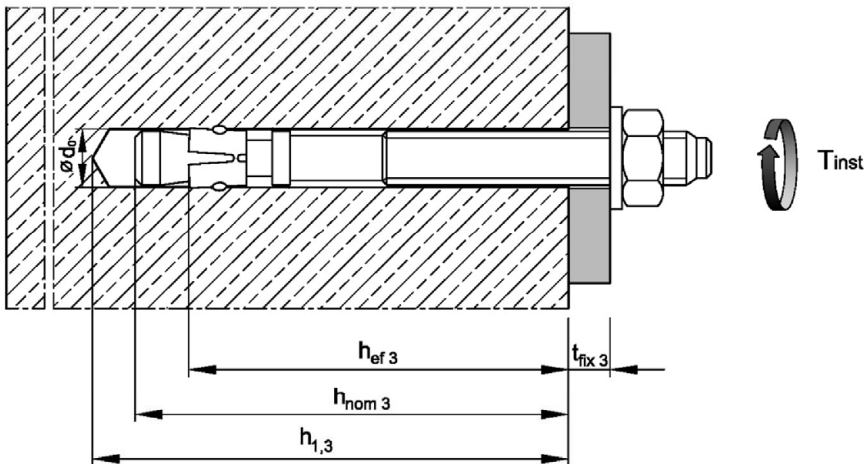
### Effective embedment depths $h_{ef,1}$



### Effective embedment depths $h_{ef,2}$



### Effective embedment depths $h_{ef,3}$



Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use  
Installation parameters

Annex B2

**Table B1: Installation parameters**

| Anchor size                                  |                     |              | M6   | M8   | M10   | M12  | M16                   | M20   |     |
|--|---------------------|--------------|------|------|-------|------|-----------------------|-------|-----|
| Nominal drill hole diameter                  | $d_0 =$             | [mm]         | 6    | 8    | 10    | 12   | 16                    | 20    |     |
| Cutting diameter of drill bit                | $d_{cut} \leq$      | [mm]         | 6,40 | 8,45 | 10,45 | 12,5 | 16,5                  | 20,55 |     |
| Installation torque                          | B                   | $T_{inst} =$ | [Nm] | 8    | 15    | 30   | 50                    | 100   | 200 |
|  | B fvz               | $T_{inst} =$ | [Nm] | -    | 15    | 30   | 40                    | 90    | 120 |
|  | B sh                | $T_{inst} =$ | [Nm] | 5    | 15    | 30   | 40                    | 90    | 120 |
|  | B A2 / B A4 / B HCR | $T_{inst} =$ | [Nm] | 6    | 15    | 25   | 50                    | 100   | 160 |
| Diameter of clearance hole in the fixture    | $d_f \leq$          | [mm]         | 7    | 9    | 12    | 14   | 18                    | 22    |     |
| <b>Embedment depth <math>h_{ef,1}</math></b> |                     |              |      |      |       |      |                       |       |     |
| Effective embedment depth                    | $h_{ef,1} \geq$     | [mm]         | 30   | 35   | 42    | 50   | 64                    | 78    |     |
| Depth of drill hole                          | $h_{1,1} \geq$      | [mm]         | 45   | 55   | 65    | 75   | 95                    | 110   |     |
| Embedment depth                              | $h_{nom,1} \geq$    | [mm]         | 39   | 47   | 56    | 67   | 84                    | 99    |     |
| <b>Embedment depth <math>h_{ef,2}</math></b> |                     |              |      |      |       |      |                       |       |     |
| Effective embedment depth                    | $h_{ef,2} \geq$     | [mm]         | 40   | 44   | 48    | 65   | 82 (80) <sup>1)</sup> | 100   |     |
| Depth of drill hole                          | $h_{1,2} \geq$      | [mm]         | 55   | 65   | 70    | 90   | 110                   | 130   |     |
| Embedment depth                              | $h_{nom,2} \geq$    | [mm]         | 49   | 56   | 62    | 82   | 102                   | 121   |     |
| <b>Embedment depth <math>h_{ef,3}</math></b> |                     |              |      |      |       |      |                       |       |     |
| Effective embedment depth                    | $h_{ef,3} \geq$     | [mm]         | 60   | 70   | 80    | 100  | 120                   | 115   |     |
| Depth of drill hole                          | $h_{1,3} \geq$      | [mm]         | 75   | 91   | 102   | 125  | 148                   | 145   |     |
| Embedment depth                              | $h_{nom,3} \geq$    | [mm]         | 69   | 82   | 94    | 117  | 140                   | 136   |     |

<sup>1)</sup> Anchor version B A2 / B A4 / B HCR

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**

**Intended use**  
Installation data

**Annex B3**

**Table B2: Minimum spacings and edge distances for B / B fvz<sup>1)</sup> / B sh**

| Anchor size                                  |           |      | M6  | M8  | M10 | M12 | M16 | M20 |
|--|-----------|------|-----|-----|-----|-----|-----|-----|
| <b>Embedment depth <math>h_{ef,1}</math></b> |           |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$ | [mm] | 80  | 80  | 100 | 100 | 130 | 160 |
| Minimum spacing                              | $s_{min}$ | [mm] | 35  | 40  | 55  | 100 | 100 | 140 |
| Minimum edge distance                        | $c_{min}$ | [mm] | 40  | 45  | 65  | 100 | 100 | 140 |
| <b>Embedment depth <math>h_{ef,2}</math></b> |           |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$ | [mm] | 100 | 100 | 100 | 130 | 170 | 200 |
| Minimum spacing                              | $s_{min}$ | [mm] | 35  | 40  | 55  | 75  | 90  | 105 |
| Minimum edge distance                        | $c_{min}$ | [mm] | 40  | 45  | 65  | 90  | 105 | 125 |
| <b>Embedment depth <math>h_{ef,3}</math></b> |           |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$ | [mm] | 120 | 126 | 132 | 165 | 208 | 215 |
| Minimum spacing                              | $s_{min}$ | [mm] | 35  | 40  | 55  | 75  | 90  | 105 |
| Minimum edge distance                        | $c_{min}$ | [mm] | 40  | 45  | 65  | 90  | 105 | 125 |

<sup>1)</sup> Anchor version B fvz: M8-M20

**Table B3: Minimum spacings and edge distances for B A2 / B A4 / B HCR**

| Anchor size                                  |              |      | M6  | M8  | M10 | M12 | M16 | M20 |
|--|--------------|------|-----|-----|-----|-----|-----|-----|
| <b>Embedment depth <math>h_{ef,1}</math></b> |              |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$    | [mm] | 80  | 80  | 100 | 100 | 130 | 160 |
| Minimum spacing                              | $s_{min}$    | [mm] | 35  | 60  | 55  | 100 | 110 | 140 |
| Minimum edge distance                        | $c_{min}$    | [mm] | 40  | 60  | 65  | 100 | 110 | 140 |
| <b>Embedment depth <math>h_{ef,2}</math></b> |              |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$    | [mm] | 100 | 100 | 100 | 130 | 160 | 200 |
| Minimum spacing                              | $s_{min}$    | [mm] | 35  | 35  | 45  | 60  | 80  | 100 |
|  | for $c \geq$ | [mm] | 40  | 65  | 70  | 100 | 120 | 150 |
| Minimum edge distance                        | $c_{min}$    | [mm] | 35  | 45  | 55  | 70  | 80  | 100 |
|  | for $s \geq$ | [mm] | 60  | 110 | 80  | 100 | 140 | 180 |
| <b>Embedment depth <math>h_{ef,3}</math></b> |              |      |     |     |     |     |     |     |
| Minimum member thickness                     | $h_{min}$    | [mm] | 120 | 126 | 132 | 165 | 200 | 215 |
| Minimum spacing                              | $s_{min}$    | [mm] | 35  | 35  | 45  | 60  | 80  | 100 |
|  | for $c \geq$ | [mm] | 40  | 65  | 70  | 100 | 120 | 150 |
| Minimum edge distance                        | $c_{min}$    | [mm] | 35  | 45  | 55  | 70  | 80  | 100 |
|  | for $s \geq$ | [mm] | 60  | 110 | 80  | 100 | 140 | 180 |

Intermediate values by linear interpolation

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**

**Intended use**  
Minimum spacings and edge distances

**Annex B4**

## Installation instructions

|   |  |   |
|---|--|---|
| 1 |  | <p>Drill hole perpendicular to concrete surface, positioning of the drill holes without damaging the reinforcement.<br/>If using a 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, such that the selected embedment depth is met.</p>  |
| 4 |  | <p>Apply installation torque <math>T_{inst}</math> as specified in Table B1.</p>  |

Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR

Intended use  
Installation instructions

Annex B5

**Table C1: Characteristic values for tension loads for B / B fvz<sup>1)</sup> / B sh**

| Anchor size  |                     |                 |                  | M6  | M8                 | M10  | M12                                     | M16                                     | M20                                    |
|--|---------------------|-----------------|------------------|---|--------------------|------|---|---|--|
| Installation factor                                    |                     | $\gamma_{inst}$ | [-]              | 1,0   |                    |      |   |   |  |
| <b>Steel failure</b>                                   |                     |                 |                  |   |                    |      |   |   |  |
| Characteristic resistance                              |                     | $N_{Rk,s}$      | [kN]             | 8,7   | 15,3               | 26   | 35                                      | 65                                      | 107                                    |
| Partial factor   |                     | $\gamma_{Ms}$   | [-]              | 1,5   |                    |      |   | 1,6                                     |  |
| <b>Pull-out</b>  |                     |                 |                  |   |                    |      |   |   |  |
| Characteristic resistance in uncracked concrete C20/25 | for $h_{ef,1}$      | $N_{Rk,p}$      | [kN]             | 6,5 <sup>2)</sup>                               | 10,2 <sup>2)</sup> | 13,4 | 17,4                                    | 25,2                                    | 33,9                                   |
|  | for $h_{ef,2}$      | $N_{Rk,p}$      | [kN]             | 10  | 13                 | 16,4 | 25,8                                    | 36,5                                    | 49,2                                   |
|  | for $h_{ef,3}$      | $N_{Rk,p}$      | [kN]             | 10  | 13                 | 16,4 | 26                                      | 40                                      | 55                                     |
| Increasing factor for $N_{Rk,p}$                       |                     | $\psi_C$        | [-]              | $\left(\frac{f_{ck}}{20}\right)^{0,5}$          |                    |      | $\left(\frac{f_{ck}}{20}\right)^{0,29}$ | $\left(\frac{f_{ck}}{20}\right)^{0,33}$ | $\left(\frac{f_{ck}}{20}\right)^{0,5}$ |
| <b>Splitting</b>                                       |                     |                 |                  |   |                    |      |   |   |  |
| Characteristic resistance in uncracked concrete C20/25 |                     | $N^0_{Rk,sp}$   | [kN]             | min [ $N_{Rk,p}$ ; $N^0_{Rk,c}$ <sup>3)</sup> ] |                    |      |   |   |  |
| <b>Embedment depth <math>h_{ef,1}</math></b>           |                     |                 |                  |   |                    |      |   |   |  |
| Spacing  |                     | $s_{cr,sp}$     | [mm]             | 180   | 210                | 230  | 240                                     | 320                                     | 400                                    |
| Edge distance  |                     | $c_{cr,sp}$     | [mm]             | 90  | 105                | 115  | 120                                     | 160                                     | 200                                    |
| <b>Embedment depth <math>h_{ef,2}</math></b>           |                     |                 |                  |   |                    |      |   |   |  |
| Spacing  |                     | $s_{cr,sp}$     | [mm]             | 160   | 220                | 240  | 330                                     | 410                                     | 500                                    |
| Edge distance  |                     | $c_{cr,sp}$     | [mm]             | 80  | 110                | 120  | 165                                     | 205                                     | 250                                    |
| <b>Embedment depth <math>h_{ef,3}</math></b>           |                     |                 |                  |   |                    |      |   |   |  |
| Spacing  |                     | $s_{cr,sp}$     | [mm]             | 360   | 240                | 480  | 600                                     | 720                                     | 690                                    |
| Edge distance  |                     | $c_{cr,sp}$     | [mm]             | 180   | 210                | 240  | 300                                     | 360                                     | 345                                    |
| <b>Concrete cone failure</b>                           |                     |                 |                  |   |                    |      |   |   |  |
| Effective embedment depth                              | for $h_{ef,1} \geq$ | [mm]            | 30 <sup>2)</sup> | 35 <sup>2)</sup>                                | 42                 | 50   | 64                                      | 78                                      |  |
|  | for $h_{ef,2} \geq$ | [mm]            | 40               | 44  | 48                 | 65   | 82                                      | 100                                     |  |
|  | for $h_{ef,3} \geq$ | [mm]            | 60               | 70  | 80                 | 100  | 120                                     | 115                                     |  |
| Spacing  |                     | $s_{cr,N}$      | [mm]             | 3 $h_{ef(1,2,3)}$                               |                    |      |   |   |  |
| Edge distance  |                     | $c_{cr,N}$      | [mm]             | 1,5 $h_{ef(1,2,3)}$                             |                    |      |   |   |  |
| Factor   | uncracked concrete  | $k_{ucr,N}$     | [-]              | 11,0  |                    |      |   |   |  |
|  | cracked concrete    | $k_{cr,N}$      | [-]              | No performance assessed                         |                    |      |   |   |  |

<sup>1)</sup> Anchor version B fvz: M8-M20

<sup>2)</sup> Restricted to the use of structural components with  $h_{ef} < 40$ mm which are statically indeterminate and subject to internal exposure conditions only

<sup>3)</sup>  $N^0_{Rk,c}$  according to EN 1992-4:2018

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**

**Performance**  
Characteristic values for tension loads for B / B fvz / B sh

**Annex C1**

**Table C2: Characteristic values for tension loads for B A2 / B A4 / B HCR**

| Anchor size   |                     |             | M6                                     | M8                      | M10             | M12  | M16  | M20  |      |
|---|---------------------|-------------|--|-------------------------|-----------------|------|------|------|------|
| Installation factor   | $\gamma_{inst}$     | [-]         | 1,0                                    |                         |                 |      |      |      |      |
| <b>Steel failure</b>  |                     |             |  |                         |                 |      |      |      |      |
| Characteristic resistance   | $N_{Rk,s}$          | [kN]        | 10                                     | 18                      | 30              | 44   | 88   | 134  |      |
| Partial factor  | $\gamma_{Ms}$       | [-]         | 1,50                                   |                         |                 |      |      |      | 1,68 |
| <b>Pull-out</b>   |                     |             |  |                         |                 |      |      |      |      |
| Characteristic resistance in uncracked concrete C20/25                        | for $h_{ef,1}$      | $N_{Rk,p}$  | [kN]                                   | 6,5 <sup>1)</sup>       | 9 <sup>1)</sup> | 12   | 17,4 | 25,2 | 33,9 |
|   | for $h_{ef,2}$      | $N_{Rk,p}$  | [kN]                                   | 8                       | 15              | 16,4 | 25   | 35,2 | 49,2 |
|   | for $h_{ef,3}$      | $N_{Rk,p}$  | [kN]                                   | 8                       | 15              | 16,4 | 25   | 42   | 60   |
| Increasing factor for $N_{Rk,p}$  | $\psi_C$            | [-]         | $\left(\frac{f_{ck}}{20}\right)^{0,5}$ |                         |                 |      |      |      |      |
| <b>Splitting</b>  |                     |             |  |                         |                 |      |      |      |      |
| Characteristic resistance in uncracked concrete C20/25                        | $N^0_{Rk,sp}$       | [kN]        | min [ $N_{Rk,p}$ ; $N^0_{Rk,c^2}$ ]    |                         |                 |      |      |      |      |
| <b>Embedment depth <math>h_{ef,1}</math></b>                                  |                     |             |  |                         |                 |      |      |      |      |
| Spacing   | $s_{cr,sp}$         | [mm]        | 180                                    | 180                     | 180             | 180  | 180  | 180  |      |
| Edge distance   | $c_{cr,sp}$         | [mm]        | 90                                     | 90                      | 90              | 90   | 90   | 90   |      |
| <b>Embedment depth <math>h_{ef,2}</math></b>                                  |                     |             |  |                         |                 |      |      |      |      |
| The higher one of the decisive resistances of Case 1 and Case 2 is applicable |                     |             |  |                         |                 |      |      |      |      |
| <b>Case 1</b>   |                     |             |  |                         |                 |      |      |      |      |
| Characteristic resistance in uncracked concrete C20/25                        | $N^0_{Rk,sp}$       | [kN]        | 6                                      | 9                       | 12              | 20   | 30   | 40   |      |
| Spacing   | $s_{cr,sp}$         | [mm]        | 3 $h_{ef}$                             |                         |                 |      |      |      |      |
| Edge distance   | $c_{cr,sp}$         | [mm]        | 1,5 $h_{ef}$                           |                         |                 |      |      |      |      |
| Increasing factor for $N^0_{Rk,sp}$   | $\psi_C$            | [-]         | $\left(\frac{f_{ck}}{20}\right)^{0,5}$ |                         |                 |      |      |      |      |
| <b>Case 2</b>   |                     |             |  |                         |                 |      |      |      |      |
| Spacing   | $s_{cr,sp}$         | [mm]        | 160                                    | 220                     | 240             | 340  | 410  | 560  |      |
| Edge distance   | $c_{cr,sp}$         | [mm]        | 80                                     | 110                     | 120             | 170  | 205  | 280  |      |
| <b>Embedment depth <math>h_{ef,3}</math></b>                                  |                     |             |  |                         |                 |      |      |      |      |
| Spacing   | $s_{cr,sp}$         | [mm]        | 360                                    | 240                     | 480             | 600  | 720  | 690  |      |
| Edge distance   | $c_{cr,sp}$         | [mm]        | 180                                    | 210                     | 240             | 300  | 360  | 345  |      |
| <b>Concrete cone failure</b>  |                     |             |  |                         |                 |      |      |      |      |
| Effective Embedment depth   | for $h_{ef,1} \geq$ | [mm]        | 30 <sup>1)</sup>                       | 35 <sup>1)</sup>        | 42              | 50   | 64   | 78   |      |
|   | for $h_{ef,2} \geq$ | [mm]        | 40                                     | 44                      | 48              | 65   | 80   | 100  |      |
|   | for $h_{ef,3} \geq$ | [mm]        | 60                                     | 70                      | 80              | 100  | 120  | 115  |      |
| Spacing   | $s_{cr,N}$          | [mm]        | 3 $h_{ef}$                             |                         |                 |      |      |      |      |
| Edge distance   | $c_{cr,N}$          | [mm]        | 1,5 $h_{ef}$                           |                         |                 |      |      |      |      |
| Factor  | uncracked concrete  | $k_{ucr,N}$ | [-]                                    | 11,0                    |                 |      |      |      |      |
|   | cracked concrete    | $k_{cr,N}$  | [-]                                    | No performance assessed |                 |      |      |      |      |

<sup>1)</sup> Restricted to the use of structural components with  $h_{ef} < 40\text{mm}$  which are statically indeterminate and subject to internal exposure conditions only

<sup>2)</sup>  $N^0_{Rk,c}$  according to EN 1992-4:2018

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**

**Performance**  
Characteristic values for tension loads for B A2 / B A4 / B HCR

**Annex C2**



**Table C3: Characteristic values for shear loads**

| Anchor size  |                                |                 |      | M6               | M8               | M10 | M12 | M16                      | M20 |
|--|--------------------------------|-----------------|------|------------------|------------------|-----|-----|--------------------------|-----|
| Installation factor                                  |                                | $\gamma_{inst}$ | [-]  | 1,0              |                  |     |     |                          |     |
| <b>Steel failure without lever arm</b>               |                                |                 |      |                  |                  |     |     |                          |     |
| Characteristic resistance                            | B / B fvz <sup>1)</sup> / B sh | $V^{0}_{Rk,s}$  | [kN] | 5                | 11               | 17  | 25  | 44                       | 69  |
|  | B A2 / B A4 / B HCR            | $V^{0}_{Rk,s}$  | [kN] | 7                | 12               | 19  | 27  | 50                       | 86  |
| Ductility factor                                     |                                | $k_7$           | [-]  | 1,0              |                  |     |     |                          |     |
| <b>Steel failure with lever arm</b>                  |                                |                 |      |                  |                  |     |     |                          |     |
| Characteristic bending resistance                    | B / B fvz <sup>1)</sup> / B sh | $M^{0}_{Rk,s}$  | [Nm] | 9                | 23               | 45  | 78  | 186                      | 363 |
|  | B A2 / B A4 / B HCR            | $M^{0}_{Rk,s}$  | [Nm] | 10               | 24               | 49  | 85  | 199                      | 454 |
| Partial factor for $V^{0}_{Rk,s}$ and $M^{0}_{Rk,s}$ | B / B fvz <sup>1)</sup> / B sh | $\gamma_{Ms}$   | [-]  | 1,25             |                  |     |     | 1,33                     |     |
|  | B A2 / B A4 / B HCR            | $\gamma_{Ms}$   | [-]  | 1,25             |                  |     |     |                          | 1,4 |
| <b>Concrete pry-out failure</b>                      |                                |                 |      |                  |                  |     |     |                          |     |
| Factor for $h_{ef}$                                  | B / B fvz <sup>1)</sup> / B sh | $k_8$           | [-]  | 1,0              | 2,3              | 2,5 | 2,9 | 2,8                      | 3,1 |
|  | B A2 / B A4 / B HCR            | $k_8$           | [-]  | 1,0              | 2,3              | 2,8 | 2,8 | 3,0                      | 3,3 |
| <b>Concrete edge failure</b>                         |                                |                 |      |                  |                  |     |     |                          |     |
| Effective length of anchor in shear loading          | for $h_{ef,1}$                 | $l_f$           | [mm] | 30 <sup>2)</sup> | 35 <sup>2)</sup> | 42  | 50  | 64                       | 78  |
|  | for $h_{ef,2}$                 | $l_f$           | [mm] | 40               | 44               | 48  | 65  | 82<br>(80) <sup>3)</sup> | 100 |
|  | for $h_{ef,3}$                 | $l_f$           | [mm] | 60               | 70               | 80  | 100 | 120                      | 115 |
| Outside diameter of anchor                           |                                | $d_{nom}$       | [mm] | 6                | 8                | 10  | 12  | 16                       | 20  |

<sup>1)</sup> Anchor version B fvz: M8-M20

<sup>2)</sup> Restricted to the use of structural components which are statically indeterminate and subject to internal exposure conditions only

<sup>3)</sup> Anchor version B A2 / B A4 / B HCR

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**
**Performance**  
 Characteristic values for **shear loads**
**Annex C3**

**Table C5: Displacements under tension loads**

| Anchor size  |                    |      | M6  | M8  | M10 | M12  | M16  | M20  |
|--|--------------------|------|-----|-----|-----|------|------|------|
| <b>Embedment depth <math>h_{ef,1}</math></b>                           |                    |      |     |     |     |      |      |      |
| <b>B / B fvz<sup>1)</sup> / B sh</b>                                   |                    |      |     |     |     |      |      |      |
| Tension load   | N                  | [kN] | 2,9 | 5,0 | 6,5 | 8,5  | 12,3 | 16,6 |
| Displacement   | $\delta_{N0}$      | [mm] | 0,3 | 0,4 |     |      |      |      |
|  | $\delta_{N\infty}$ | [mm] | 0,6 | 1,8 |     |      |      |      |
| <b>B A2 / B A4 / B HCR</b>   |                    |      |     |     |     |      |      |      |
| Tension load   | N                  | [kN] | 2,9 | 4,3 | 5,7 | 8,5  | 12,3 | 16,6 |
| Displacement   | $\delta_{N0}$      | [mm] | 0,4 | 0,7 | 0,4 | 0,4  | 0,6  | 1,5  |
|  | $\delta_{N\infty}$ | [mm] | 1,3 |     |     |      |      | 2,9  |
| <b>Embedment depth <math>h_{ef,2}</math> and <math>h_{ef,3}</math></b> |                    |      |     |     |     |      |      |      |
| <b>B / B fvz<sup>1)</sup> / B sh</b>                                   |                    |      |     |     |     |      |      |      |
| Tension load   | N                  | [kN] | 4,3 | 5,8 | 7,6 | 11,9 | 16,7 | 23,8 |
| Displacement   | $\delta_{N0}$      | [mm] | 0,4 | 0,5 |     |      |      |      |
|  | $\delta_{N\infty}$ | [mm] | 0,7 | 2,3 |     |      |      |      |
| <b>B A2 / B A4 / B HCR</b>   |                    |      |     |     |     |      |      |      |
| Tension load   | N                  | [kN] | 3,6 | 5,7 | 7,6 | 11,9 | 17,2 | 24,0 |
| Displacement   | $\delta_{N0}$      | [mm] | 0,7 | 0,9 | 0,5 | 0,6  | 0,9  | 2,1  |
|  | $\delta_{N\infty}$ | [mm] | 1,8 |     |     |      |      | 4,2  |

<sup>1)</sup> Anchor version B fvz: M8-M20

**Table C6: Displacements under shear loads**

| Anchor size                          |                    |      | M6  | M8  | M10  | M12  | M16  | M20  |
|--------------------------------------|--------------------|------|-----|-----|------|------|------|------|
| <b>B / B fvz<sup>1)</sup> / B sh</b> |                    |      |     |     |      |      |      |      |
| Shear load                           | V                  | [kN] | 2,9 | 6,3 | 9,7  | 14,3 | 23,6 | 37,0 |
| Displacement                         | $\delta_{V0}$      | [mm] | 1,2 | 1,5 | 1,6  | 2,6  | 3,1  | 4,4  |
|                                      | $\delta_{V\infty}$ | [mm] | 2,4 | 2,2 | 2,4  | 3,9  | 4,6  | 6,6  |
| <b>B A2 / B A4 / B HCR</b>           |                    |      |     |     |      |      |      |      |
| Shear load                           | V                  | [kN] | 4,0 | 6,9 | 10,9 | 15,4 | 28,6 | 43,7 |
| Displacement                         | $\delta_{V0}$      | [mm] | 1,1 | 2,0 | 1,2  | 2,0  | 2,2  | 2,1  |
|                                      | $\delta_{V\infty}$ | [mm] | 1,7 | 3,0 | 1,8  | 3,0  | 3,3  | 3,2  |

<sup>1)</sup> Anchor version B fvz: M8-M20

**Wedge Anchor B / B fvz / B sh / B A2 / B A4 / B HCR**

**Performance  
Displacements**

**Annex C4**