

## HEAVY DUTY EXPANSION ANCHOR CE1

- CE option 1 for cracked and uncracked concrete
- Seismic performance category C1 (M10-M16) and C2 (M12-M16)
- Fire resistance R120
- Complete with nut and washer
- Suitable for dense materials
- Through fastening
- Torque-controlled expansion



USA, Canada and more design values available online.

### SERVICE CLASS

SC1

SC2

### ATMOSPHERIC CORROSIVITY

C1

C2

### MATERIAL

Zn  
ELECTRO  
PLATED

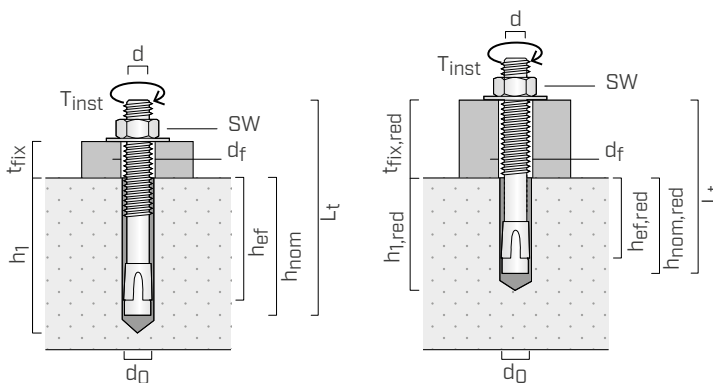
electrogalvanized carbon steel



## CODES AND DIMENSIONS

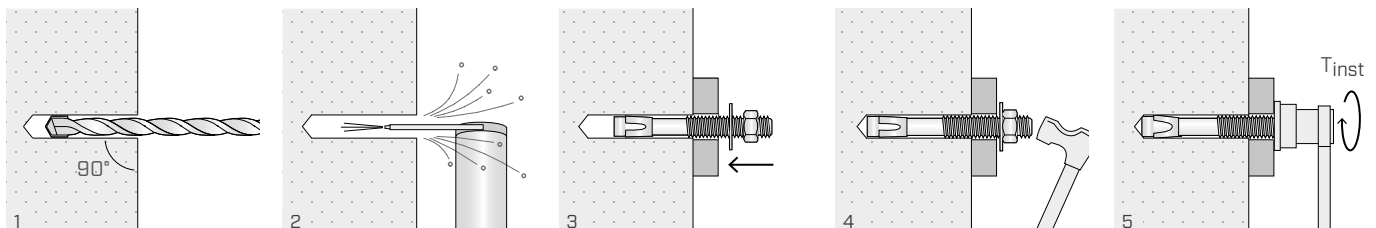
| CODE     | d = d <sub>0</sub> | L <sub>t</sub> | t <sub>fix</sub>   t <sub>fix,red</sub> | h <sub>1</sub>   h <sub>1,red</sub> | h <sub>nom</sub>   h <sub>nom,red</sub> | h <sub>ef</sub>   h <sub>ef,red</sub> | d <sub>f</sub> | SW   | T <sub>inst</sub> | pcs |
|----------|--------------------|----------------|-----------------------------------------|-------------------------------------|-----------------------------------------|---------------------------------------|----------------|------|-------------------|-----|
|          | [mm] [in]          | [mm] [in]      | [mm] [in]                               | [mm] [in]                           | [mm] [in]                               | [mm] [in]                             | [mm] [in]      | [mm] | [Nm] [ft.-lbf]    |     |
| AB110115 | M10 0.4            | 115 4 1/2      | 35 1.38                                 | 75 2.95                             | 68 2.68                                 | 60 2.36                               | 12 0.47        | 17   | 40 29             | 25  |
| AB110135 | M10 0.4            | 135 5 5/16     | 55 2.17                                 | 75 2.95                             | 68 2.68                                 | 60 2.36                               | 12 0.47        | 17   | 40 29             | 25  |
| AB112100 | M12 0.48           | 100 4          | 4 0.16                                  | 85 3.35                             | 80 3.15                                 | 70 2.76                               | 14 0.55        | 19   | 60 44             | 25  |
| AB112120 | M12 0.48           | 120 4 3/4      | 24 0.94                                 | 85 3.35                             | 80 3.15                                 | 70 2.76                               | 14 0.55        | 19   | 60 44             | 25  |
| AB112150 | M12 0.48           | 150 6          | 54 2.13                                 | 85 3.35                             | 80 3.15                                 | 70 2.76                               | 14 0.55        | 19   | 60 44             | 25  |
| AB112180 | M12 0.48           | 180 7 1/8      | 84 3.31                                 | 85 3.35                             | 80 3.15                                 | 70 2.76                               | 14 0.55        | 19   | 60 44             | 25  |
| AB116145 | M16 0.63           | 145 5 11/16    | 25   45 0.98   1.77                     | 110   90 4.33   3.54                | 97   77 3.82   3.03                     | 85   65 3.35   2.56                   | 18 0.71        | 24   | 90 66             | 10  |

## GEOMETRY

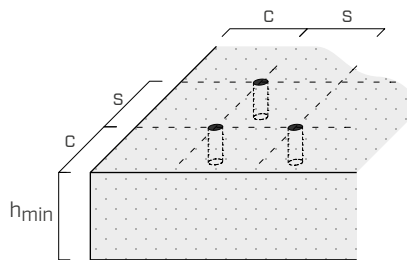


d anchor diameter  
d<sub>0</sub> hole diameter in the concrete support  
L<sub>t</sub> anchor length  
t<sub>fix</sub> maximum fastening thickness  
h<sub>1</sub> minimum hole depth  
h<sub>nom</sub> nominal anchoring depth  
h<sub>ef</sub> effective anchoring depth  
d<sub>f</sub> maximum hole diameter in the element to be fastened  
SW wrench size  
T<sub>inst</sub> tightening torque

## MOUNTING



## ■ INSTALLATION



| Spacing and minimum distances         |                   |      | M10 | M12 | M16 <sup>(*)</sup>  |
|---------------------------------------|-------------------|------|-----|-----|---------------------|
| Minimum spacing                       | $s_{min}$         | [mm] | 60  | 70  | 80                  |
| Minimum edge distance                 | $c_{min}$         | [mm] | 60  | 70  | 90                  |
| Minimum thickness of concrete support | $h_{min}$         | [mm] | 120 | 140 | 140                 |
| Spacing and critical distances        |                   |      | M10 | M12 | M16 <sup>(*)</sup>  |
| Critical spacing                      | $s_{cr,N}^{(1)}$  | [mm] | 180 | 210 | 255                 |
|                                       | $s_{cr,sp}^{(2)}$ | [mm] | 300 | 350 | $2 \cdot c_{cr,sp}$ |
| Critical edge distance                | $c_{cr,N}^{(1)}$  | [mm] | 90  | 105 | 127,5               |
|                                       | $c_{cr,sp}^{(2)}$ | [mm] | 150 | 175 | $2,5 \cdot h_{ef}$  |

For spacing and distances smaller than the critical ones, strength values have to be reduced depending on the installation parameters.

\*Values refer to installation of the M16 anchor in non-cracked concrete with insertion depth  $h_{nom}=97$  mm

## ■ STRUCTURAL VALUES

Valid for a single anchor in thickened C20/25 grade concrete with a thin reinforcing layer when spacing and edge-distance are not limiting parameters.

### CHARACTERISTIC VALUES

| rod  | UNCRACKED CONCRETE     |               |                      |               | CRACKED CONCRETE       |               |                      |               |
|------|------------------------|---------------|----------------------|---------------|------------------------|---------------|----------------------|---------------|
|      | tension <sup>(3)</sup> |               | shear <sup>(4)</sup> |               | tension <sup>(3)</sup> |               | shear <sup>(4)</sup> |               |
|      | $N_{Rk,p}$<br>[kN]     | $\gamma_{Mp}$ | $V_{Rk,s}$<br>[kN]   | $\gamma_{Ms}$ | $N_{Rk,p}$<br>[kN]     | $\gamma_{Mp}$ | $V_{Rk}$<br>[kN]     | $\gamma_{Ms}$ |
| M10  | 16                     |               | 17,4                 |               | 9                      |               | 17,4                 |               |
| M12  | 25                     | 1,5           | 25,3                 | 1,25          | 16                     | 1,5           | 25,3                 | 1,25          |
| M16* | 35                     |               | 55                   |               | 25                     |               | 55                   |               |

\*The characteristic values refer to the installation of the dowel with the  $h_{nom} = 97$  mm.

| incremental factor for $N_{Rk,p}^{(5)}$ |         |        |      |
|-----------------------------------------|---------|--------|------|
| $\psi_c$                                | M10-M12 | C30/37 | 1,16 |
|                                         |         | C40/50 | 1,31 |
|                                         |         | C50/60 | 1,41 |
|                                         | M16     | C30/37 | 1,22 |
|                                         |         | C40/50 | 1,41 |
|                                         |         | C50/60 | 1,58 |

### NOTES

- <sup>(1)</sup> Breakage characteristics for formation of concrete cone for tensile loads.
- <sup>(2)</sup> Splitting failure mode for tensile loads.
- <sup>(3)</sup> Pull-out failure mode.
- <sup>(4)</sup> Steel failure mode.
- <sup>(5)</sup> Tensile-strength increment factor (excluding steel failure).

### GENERAL PRINCIPLES

- The characteristic values for diameters M10 and M12 are calculated according to ETA-17/0481, for diameter M16 the values are calculated according to ETA-99/0010.
- The design values are obtained from the characteristic values as follows:  
 $R_d = R_k / \gamma_M$ .  
Coefficients  $\gamma_M$  are listed in the table in accordance with the failure characteristics and product certificates.
- For the calculation of anchors with reduced spacing, or too close to the edge, please refer to ETA. Similarly, in case of fastening on concrete-supports with a better-grade, limited thickness or a thick reinforcing layer please see ETA.
- For the design of anchors subjected to seismic loading refer to ETA and to EN 1992-4:2018.
- For the calculation of anchors subjected to fire refer to the ETA and the Technical Report 020.