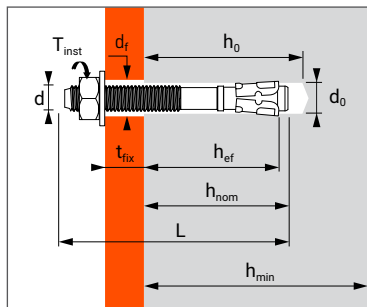


# FIX Z XTREM A4



Torque controlled expansion anchor, for use in cracked and non-cracked concrete and seismic performance categories C1 & C2



## TECHNICAL DATA

| RANGE        | marking | Maximum anchorage depth |              |                                 |                |                              | Minimum anchorage depth |              |                                 |                |                              | Thread Ø | Drilling Ø          | Clearance Ø         | Total anchor length | Tighten torque         | Code   |
|--------------|---------|-------------------------|--------------|---------------------------------|----------------|------------------------------|-------------------------|--------------|---------------------------------|----------------|------------------------------|----------|---------------------|---------------------|---------------------|------------------------|--------|
|              |         | Max. anchor depth       | Embed. depth | Max. thick. of part to be fixed | Drilling depth | Min. thick. of base material | Min. anchor depth       | Embed. depth | Max. thick. of part to be fixed | Drilling depth | Min. thick. of base material | (mm) d   | (mm) d <sub>0</sub> | (mm) d <sub>f</sub> | (mm) L              | (Nm) T <sub>inst</sub> |        |
| 8X55/5       | 0       |                         |              | -                               |                |                              |                         |              | 5                               |                |                              |          |                     |                     | 56                  |                        | 058616 |
| 8X70/20-7    | 1       | 48                      | 55           | 7                               | 65             | 100                          | 35                      | 42           | 20                              | 52             | 100                          | 8        | 8                   | 9                   | 71                  | 20                     | 058617 |
| 8X90/40-27   | 3       |                         |              | 27                              |                |                              |                         |              | 40                              |                |                              |          |                     |                     | 91                  |                        | 058618 |
| 10X70/10     | 1       |                         |              | -                               |                |                              |                         |              | 10                              |                |                              |          |                     |                     | 70                  |                        | 058619 |
| 10X95/35-15  | 2       | 60                      | 68           | 15                              | 75             | 120                          | 40                      | 48           | 35                              | 55             | 100                          | 10       | 10                  | 12                  | 95                  | 45                     | 058620 |
| 10X105/45-25 | 3       |                         |              | 25                              |                |                              |                         |              | 45                              |                |                              |          |                     |                     | 105                 |                        | 058621 |
| 10X130/70-50 | 4       |                         |              | 50                              |                |                              |                         |              | 70                              |                |                              |          |                     |                     | 130                 |                        | 058622 |
| 12X95/20     | 1       |                         |              | -                               |                |                              |                         |              | 20                              |                |                              |          |                     |                     | 95                  |                        | 058623 |
| 12X110/35-15 | 2       | 70                      | 80           | 15                              | 90             | 140                          | 50                      | 60           | 35                              | 70             | 100                          | 12       | 12                  | 14                  | 110                 | 75                     | 058624 |
| 12X120/45-25 | 3       |                         |              | 25                              |                |                              |                         |              | 45                              |                |                              |          |                     |                     | 120                 |                        | 058625 |
| 12X140/65-45 | 4       |                         |              | 45                              |                |                              |                         |              | 65                              |                |                              |          |                     |                     | 140                 |                        | 058626 |
| 16X120/20    | 1       | 85                      | 98           | -                               | 110            | 170                          | 65                      | 78           | 20                              | 90             | 130                          | 16       | 16                  | 18                  | 120                 | 110                    | 058627 |
| 16X140/40-20 | 2       |                         |              | 20                              |                |                              |                         |              | 40                              |                |                              |          |                     |                     | 140                 |                        | 058628 |

## CHARACTERISTICS

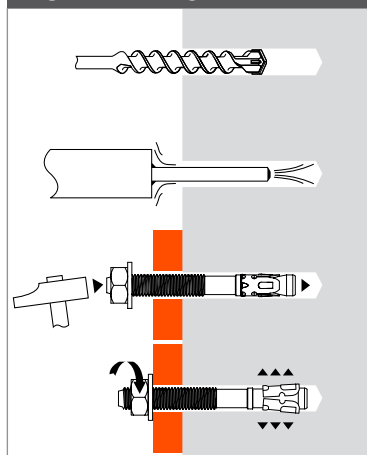


Vds CEA 4001  
M8 - M12

## APPLICATION

- Safety barriers
- Cladding brackets
- Curtain-walls
- Steel and timber framework and beams
- Lift guide rails
- Industrial doors and gates
- Brickwork support angles
- Storage systems

## INSTALLATION



## ANCHOR MECHANICAL PROPERTIES

| SIZE                                                              | M8   | M10  | M12   | M16   |
|-------------------------------------------------------------------|------|------|-------|-------|
| <b>Cross-section above cone</b>                                   |      |      |       |       |
| f <sub>uk</sub> [N/mm <sup>2</sup> ] Min. tensile strength        | 900  | 830  | 720   | 720   |
| f <sub>yk</sub> [N/mm <sup>2</sup> ] Yield strength               | 800  | 670  | 580   | 580   |
| A <sub>s</sub> [mm <sup>2</sup> ] Stressed cross-section          | 22,9 | 35,3 | 52,8  | 103,8 |
| <b>Threaded part</b>                                              |      |      |       |       |
| f <sub>uk</sub> [N/mm <sup>2</sup> ] Min. tensile strength        | 750  | 730  | 730   | 600   |
| f <sub>yk</sub> [N/mm <sup>2</sup> ] Yield strength               | 680  | 580  | 580   | 480   |
| A <sub>s</sub> [mm <sup>2</sup> ] Stressed cross-section          | 36,6 | 58,0 | 84,3  | 156,0 |
| W <sub>el</sub> [mm <sup>3</sup> ] Elastic section modulus        | 31,2 | 62,3 | 109,2 | 277,5 |
| M <sup>0</sup> <sub>Rk,s</sub> [Nm] Characteristic bending moment | 25,0 | 44,9 | 77,5  | 187,5 |
| M [Nm] Recommended bending moment                                 | 10,0 | 18,0 | 31,0  | 75,0  |
| SW [mm] Key size                                                  | 13   | 17   | 19    | 24    |



# FIX Z XTREM A4

## MINIMUM THICKNESS OF CONCRETE, CHARACTERISTIC & MINIMUM DISTANCES FOR SPACING, EDGE

| SIZE                                                              |               |      | M8  | M10 | M10 | M12 | M12 | M16  | M16   |
|-------------------------------------------------------------------|---------------|------|-----|-----|-----|-----|-----|------|-------|
| Anchorage depth                                                   | $h_{ef}$      | [mm] | 48  | 40  | 60  | 50  | 70  | 65   | 85    |
| Minimum thickness of base material                                | $h_{min}$     | [mm] | 100 | 100 | 120 | 100 | 140 | 130  | 170   |
| Characteristic edge and spacing distance for full anchor capacity | $C_{cr} \geq$ | [mm] | 72  | 60  | 90  | 75  | 105 | 97,5 | 127,5 |
|                                                                   | $S_{cr} \geq$ | [mm] | 144 | 120 | 180 | 150 | 210 | 195  | 255   |
|                                                                   | $C_{min}$     | [mm] | 60  | 60  | 60  | 60  | 60  | 90   | 90    |
|                                                                   | $S \geq$      | [mm] | 50  | 120 | 120 | 100 | 145 | 105  | 140   |
|                                                                   | $S_{min}$     | [mm] | 50  | 55  | 55  | 60  | 60  | 90   | 90    |
| Minimum distances for non-cracked concrete                        | $C \geq$      | [mm] | 60  | 65  | 65  | 100 | 100 | 105  | 105   |
|                                                                   | $C_{min}$     | [mm] | 60  | 55  | 55  | 60  | 60  | 80   | 80    |
|                                                                   | $S \geq$      | [mm] | 60  | 90  | 90  | 145 | 145 | 110  | 110   |
|                                                                   | $S_{min}$     | [mm] | 60  | 55  | 55  | 60  | 60  | 90   | 90    |
|                                                                   | $C \geq$      | [mm] | 60  | 65  | 65  | 100 | 100 | 100  | 100   |
| Minimum distances for cracked concrete                            | $C_{min}$     | [mm] | 60  | 55  | 55  | 60  | 60  | 80   | 80    |
|                                                                   | $S \geq$      | [mm] | 60  | 90  | 90  | 145 | 145 | 110  | 110   |
|                                                                   | $S_{min}$     | [mm] | 60  | 55  | 55  | 60  | 60  | 90   | 90    |
|                                                                   | $C \geq$      | [mm] | 60  | 65  | 65  | 100 | 100 | 100  | 100   |
|                                                                   |               |      |     |     |     |     |     |      |       |

## CHARACTERISTIC RESISTANCES [kN]

Characteristic resistances are shown as informative, and have to be used by application of safety factors.

### TENSILE

#### NON-CRACKED CONCRETE - C20/25

| SIZE            | M8   | M10  | M12  | M16  |
|-----------------|------|------|------|------|
| $h_{ef,1}$ [mm] | 35   | 40   | 50   | 65   |
| $N_{Rk,p}$ [kN] | 9,0  | 12,4 | 17,4 | 25,8 |
| $h_{ef,2}$ [mm] | 48   | 60   | 70   | 85   |
| $N_{Rk,p}$ [kN] | 12,0 | 20,0 | 30,0 | 40,0 |

#### CRACKED CONCRETE - C20/25

| SIZE            | M8  | M10 | M12  | M16  |
|-----------------|-----|-----|------|------|
| $h_{ef,1}$ [mm] | 35  | 40  | 50   | 65   |
| $N_{Rk,p}$ [kN] | 3,0 | 8,7 | 12,2 | 18,0 |
| $h_{ef,2}$ [mm] | 48  | 60  | 70   | 85   |
| $N_{Rk,p}$ [kN] | 4,0 | 9,0 | 16,0 | 20,0 |

### SHEAR

#### CRACKED AND NON-CRACKED CONCRETE - C20/25 to C50/60

| SIZE            | M8          | M10         | M12         | M16         |
|-----------------|-------------|-------------|-------------|-------------|
| $h_{ef,1}$ [mm] | 35          | 40          | 50          | 65          |
| $h_{ef,2}$ [mm] | 48          | 60          | 70          | 85          |
| $V_{Rk,s}$ [kN] | <u>12,4</u> | <u>18,7</u> | <u>28,2</u> | <u>51,9</u> |

## RECOMMENDED LOADS OF ONE ANCHOR WITHOUT INFLUENCE OF SPACING & CONCRETE EDGE [kN]

Recommended values are determined from performances given in the ETA, and are guaranteed for spacing  $\geq S_{cr}$  and edge distance  $\geq C_{cr}$ .

### TENSILE

#### NON-CRACKED CONCRETE - C20/25

| SIZE            | M8  | M10 | M12  | M16  |
|-----------------|-----|-----|------|------|
| $h_{ef,1}$ [mm] | 35  | 40  | 50   | 65   |
| $N_{Rec}$ [kN]  | 4,3 | 5,9 | 8,3  | 12,3 |
| $h_{ef,2}$ [mm] | 48  | 60  | 70   | 85   |
| $N_{Rec}$ [kN]  | 5,7 | 9,5 | 14,3 | 19,0 |

#### CRACKED CONCRETE - C20/25

| SIZE            | M8  | M10 | M12 | M16 |
|-----------------|-----|-----|-----|-----|
| $h_{ef,1}$ [mm] | 35  | 40  | 50  | 65  |
| $N_{Rec}$ [kN]  | 1,4 | 4,1 | 5,8 | 8,6 |
| $h_{ef,2}$ [mm] | 48  | 60  | 70  | 85  |
| $N_{Rec}$ [kN]  | 1,9 | 4,3 | 7,6 | 9,5 |

$N_{Rec} = \min [N_{Rd,p}; N_{Rd,c}; N_{Rd,s}] / \gamma_F; \gamma_F = 1,4$

### SHEAR

#### CRACKED AND NON-CRACKED CONCRETE - C20/25 to C50/60

| SIZE            | M8         | M10         | M12         | M16         |
|-----------------|------------|-------------|-------------|-------------|
| $h_{ef,1}$ [mm] | 35         | 40          | 50          | 65          |
| $h_{ef,2}$ [mm] | 48         | 60          | 70          | 85          |
| $V_{Rec}$ [kN]  | <u>8,2</u> | <u>12,7</u> | <u>19,2</u> | <u>29,7</u> |

$V_{Rec} = V_{Rd,s} / \gamma_F; \gamma_F = 1,4$

**Nota:** The values indicated *in italics and underlined* correspond to steel failure



Design resistances for static, seismic and fire loads are determined from performances given in the ETA, and are guaranteed for spacing  $\geq S_{cr}$  and edge distance  $\geq C_{cr}$ . For project with reduced spacing and edge distance, we recommend to use SPIT i-Expert software to design your project according to EN 1992-4.

## DESIGN RESISTANCE FOR STATIC LOADS IN NON CRACKED CONCRETE [kN]

| TENSILE       |        |     |      |      |      |
|---------------|--------|-----|------|------|------|
| SIZE          |        | M8  | M10  | M12  | M16  |
| $h_{ef,1}$    | [mm]   | 35  | 40   | 50   | 65   |
| $N_{Rd,uncr}$ | C20/25 | 6,0 | 8,3  | 11,6 | 17,2 |
|               | C40/50 | 8,5 | 9,5  | 13,3 | 21,8 |
| $h_{ef,2}$    | [mm]   | 48  | 60   | 70   | 85   |
| $N_{Rd,uncr}$ | C20/25 | 8,0 | 13,3 | 20,0 | 26,7 |
|               | C40/50 | 9,2 | 15,3 | 22,1 | 32,6 |

Distances  $S_{cr}$  and  $C_{cr}$  must be fulfilled

$$N_{Rd,uncr} = \min[N_{Rk,p,uncr} / \gamma_{Mc} ; N_{Rk,s} / \gamma_{Ms,N}]$$

$$\gamma_{Mc} = 1,5 ; M8 : \gamma_{Ms,N} = 1,4 ; M10-M16 : \gamma_{Ms,N} = 1,48 ; M20 : \gamma_{Ms,N} = 1,5$$

| SHEAR      |                    |            |             |             |             |
|------------|--------------------|------------|-------------|-------------|-------------|
| SIZE       |                    | M8         | M10         | M12         | M16         |
| $h_{ef,1}$ | [mm]               | 35         | 40          | 50          | 65          |
| $h_{ef,2}$ | [mm]               | 48         | 60          | 70          | 85          |
| $V_{Rd,s}$ | [kN] $\geq$ C20/25 | <u>8,2</u> | <u>12,7</u> | <u>19,2</u> | <u>29,7</u> |

$$V_{Rd,s} = V_{Rk,s} / \gamma_{Ms,V}$$

$$M8 : \gamma_{Ms,V} = 1,5 ; M10-M16 : \gamma_{Ms,V} = 1,27 ; M20 : \gamma_{Ms,V} = 1,5$$

## DESIGN RESISTANCE FOR STATIC LOADS IN CRACKED CONCRETE [kN]

| TENSILE     |        |     |     |      |      |
|-------------|--------|-----|-----|------|------|
| SIZE        |        | M8  | M10 | M12  | M16  |
| $h_{ef,1}$  | [mm]   | 60  | 55  | 60   | 80   |
| $N_{Rd,cr}$ | C20/25 | 2,0 | 5,8 | 8,1  | 12,0 |
|             | C40/50 | 2,8 | 6,7 | 9,3  | 15,2 |
| $h_{ef,2}$  | [mm]   | 48  | 60  | 70   | 85   |
| $N_{Rd,cr}$ | C20/25 | 2,7 | 6,0 | 10,7 | 13,3 |
|             | C40/50 | 3,8 | 6,9 | 12,3 | 16,9 |

Distances  $S_{cr}$  and  $C_{cr}$  must be fulfilled

$$N_{Rd,cr} = \min[N_{Rk,p,cr} / \gamma_{Mc} ; N_{Rk,s} / \gamma_{Ms,N}]$$

$$\gamma_{Mc} = 1,5 ; M8 : \gamma_{Ms,N} = 1,4 ; M10-M16 : \gamma_{Ms,N} = 1,48 ; M20 : \gamma_{Ms,N} = 1,5$$

| SHEAR      |                    |            |             |             |             |
|------------|--------------------|------------|-------------|-------------|-------------|
| SIZE       |                    | M8         | M10         | M12         | M16         |
| $h_{ef,1}$ | [mm]               | 35         | 40          | 50          | 65          |
| $h_{ef,2}$ | [mm]               | 48         | 60          | 70          | 85          |
| $V_{Rd,s}$ | [kN] $\geq$ C20/25 | <u>8,2</u> | <u>12,7</u> | <u>19,2</u> | <u>29,7</u> |

$$V_{Rd,s} = V_{Rk,s} / \gamma_{Ms,V}$$

$$M8 : \gamma_{Ms,V} = 1,5 ; M10-M16 : \gamma_{Ms,V} = 1,27 ; M20 : \gamma_{Ms,V} = 1,5$$

## DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C1 [kN]

| TENSILE     |        |     |     |      |      |
|-------------|--------|-----|-----|------|------|
| SIZE        |        | M8  | M10 | M12  | M16  |
| $h_{ef,2}$  | [mm]   | 48  | 60  | 70   | 85   |
| $N_{Rd,C1}$ | C20/25 | 2,7 | 4,9 | 10,7 | 13,3 |
|             | C40/50 | 3,8 | 5,7 | 12,3 | 16,9 |

Distances  $S_{cr}$  and  $C_{cr}$  must be fulfilled

$$N_{Rd,C1} = \min[N_{Rk,p,eq,C1} / \gamma_{Mc} ; N_{Rk,s,eq,C1} / \gamma_{Ms,N}]$$

$$\gamma_{Mc} = 1,5 ; M8 : \gamma_{Ms,N} = 1,4 ; M10-M16 : \gamma_{Ms,N} = 1,48 ; M20 : \gamma_{Ms,N} = 1,5$$

| SHEAR         |                    |            |            |             |             |
|---------------|--------------------|------------|------------|-------------|-------------|
| SIZE          |                    | M8         | M10        | M12         | M16         |
| $h_{ef,2}$    | [mm]               | 48         | 60         | 70          | 85          |
| $V_{Rd,s,C1}$ | [kN] $\geq$ C20/25 | <u>3,8</u> | <u>8,3</u> | <u>12,1</u> | <u>19,3</u> |

$$V_{Rd,s,C1} = V_{Rk,s,eq,C1} / \gamma_{Ms,V}$$

$$M8 : \gamma_{Ms,V} = 1,5 ; M10-M16 : \gamma_{Ms,V} = 1,27 ; M20 : \gamma_{Ms,V} = 1,5$$

## DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C2 [kN]

| TENSILE     |        |    |     |     |      |
|-------------|--------|----|-----|-----|------|
| SIZE        |        | M8 | M10 | M12 | M16  |
| $h_{ef,2}$  | [mm]   | 48 | 60  | 70  | 85   |
| $N_{Rd,C2}$ | C20/25 | -  | 1,7 | 4,0 | 9,7  |
|             | C40/50 | -  | 2,0 | 4,6 | 12,4 |

Distances  $S_{cr}$  and  $C_{cr}$  must be fulfilled

$$N_{Rd,C2} = \min[N_{Rk,p,eq,C2} / \gamma_{Mc} ; N_{Rk,s,eq,C2} / \gamma_{Ms,N}]$$

$$\gamma_{Mc} = 1,5 ; M8 : \gamma_{Ms,N} = 1,4 ; M10-M16 : \gamma_{Ms,N} = 1,48 ; M20 : \gamma_{Ms,N} = 1,5$$

| SHEAR         |                    |    |            |            |             |
|---------------|--------------------|----|------------|------------|-------------|
| SIZE          |                    | M8 | M10        | M12        | M16         |
| $h_{ef,2}$    | [mm]               | 48 | 60         | 70         | 85          |
| $V_{Rd,s,C2}$ | [kN] $\geq$ C20/25 | -  | <u>5,0</u> | <u>7,3</u> | <u>14,5</u> |

$$V_{Rd,s,C2} = V_{Rk,s,eq,C2} / \gamma_{Ms,V}$$

$$M8 : \gamma_{Ms,V} = 1,5 ; M10-M16 : \gamma_{Ms,V} = 1,27 ; M20 : \gamma_{Ms,V} = 1,5$$

## DESIGN RESISTANCE FOR FIRE EXPOSURE [kN]

| TENSILE     |           |     |     |     |      |
|-------------|-----------|-----|-----|-----|------|
| SIZE        |           | M8  | M10 | M12 | M16  |
| $h_{ef,2}$  | [mm]      | 48  | 60  | 70  | 85   |
| $N_{Rd,fi}$ | R30 [kN]  | 4,9 | 9,9 | 9,2 | 16,1 |
| $N_{Rd,fi}$ | R60 [kN]  | 3,2 | 6,3 | 6,5 | 11,3 |
| $N_{Rd,fi}$ | R90 [kN]  | 1,5 | 2,6 | 3,7 | 6,5  |
| $N_{Rd,fi}$ | R120 [kN] | 0,7 | 0,8 | 2,3 | 4,1  |

$$N_{Rd,fi} = N_{Rk,s,fi} / \gamma_{M,fi}$$

$$\gamma_{M,fi} = 1,0$$

| SHEAR       |           |     |     |     |      |
|-------------|-----------|-----|-----|-----|------|
| SIZE        |           | M8  | M10 | M12 | M16  |
| $h_{ef,2}$  | [mm]      | 48  | 60  | 70  | 85   |
| $V_{Rd,fi}$ | R30 [kN]  | 4,9 | 9,9 | 9,2 | 16,1 |
| $V_{Rd,fi}$ | R60 [kN]  | 3,2 | 6,3 | 6,5 | 11,3 |
| $V_{Rd,fi}$ | R90 [kN]  | 1,5 | 2,6 | 3,7 | 6,5  |
| $V_{Rd,fi}$ | R120 [kN] | 0,7 | 0,8 | 2,3 | 4,1  |

$$V_{Rd,fi} = V_{Rk,s,fi} / \gamma_{M,fi}$$

$$\gamma_{M,fi} = 1,0$$

**Nota:** The values indicated in *italics and underlined* correspond to steel failure