Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

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# European Technical Assessment

# ETA-10/0453 of 16 June 2025

English translation prepared by DIBt - Original version in German language

**General Part**

| | |
|---|---|
| Technical Assessment Body issuing the European Technical Assessment: | Deutsches Institut für Bautechnik |
| Trade name of the construction product | Tecfi Steel Anchor DXE |
| Product family to which the construction product belongs | Mechanical fastener for use in concrete |
| Manufacturer | Tecfi S.p.A<br>Via Andrea D'Iserna 59<br>80122 NAPLES<br>ITALIEN |
| Manufacturing plant | Tecfi S.p.A. Plant 3 |
| This European Technical Assessment contains | 12 pages including 3 annexes which form an integral part of this assessment |
| This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of | EAD 330232-01-0601, Edition 05/2021 |
| This version replaces | ETA-10/0453 issued on 18 March 2016 |

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## Specific Part

### 1 Technical description of the product

The Tecfi Steel Anchor DXE in the sizes of M6, M8, M10 and M12 is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

The product description is given in Annex A.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastener of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and references to the methods used for its assessment

#### 3.1 Mechanical resistance and stability (BWR 1)

| Essential characteristic | Performance |
|---|---|
| Characteristic resistance to tension load (static and quasi-static loading), method A | See Annex C 1 |
| Characteristic resistance to shear load (static and quasi-static loading) | See Annex C 2 |
| Characteristic resistance for seismic performance category C1 and C2 | No performance assessed |
| Displacements | See Annex C 1 and C 2 |

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

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Class A1 |
| Resistance to fire | No performance assessed |

#### 3.3 Aspects of durability

| Essential characteristic | Performance |
|---|---|
| Durability | See Annex B 1 |

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

In accordance with the European Assessment Document EAD 330232-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 16 June 2025 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

*beglaubigt:*
Ziegler

Deutsches Institut für Bautechnik DIBt

## Installed conditions

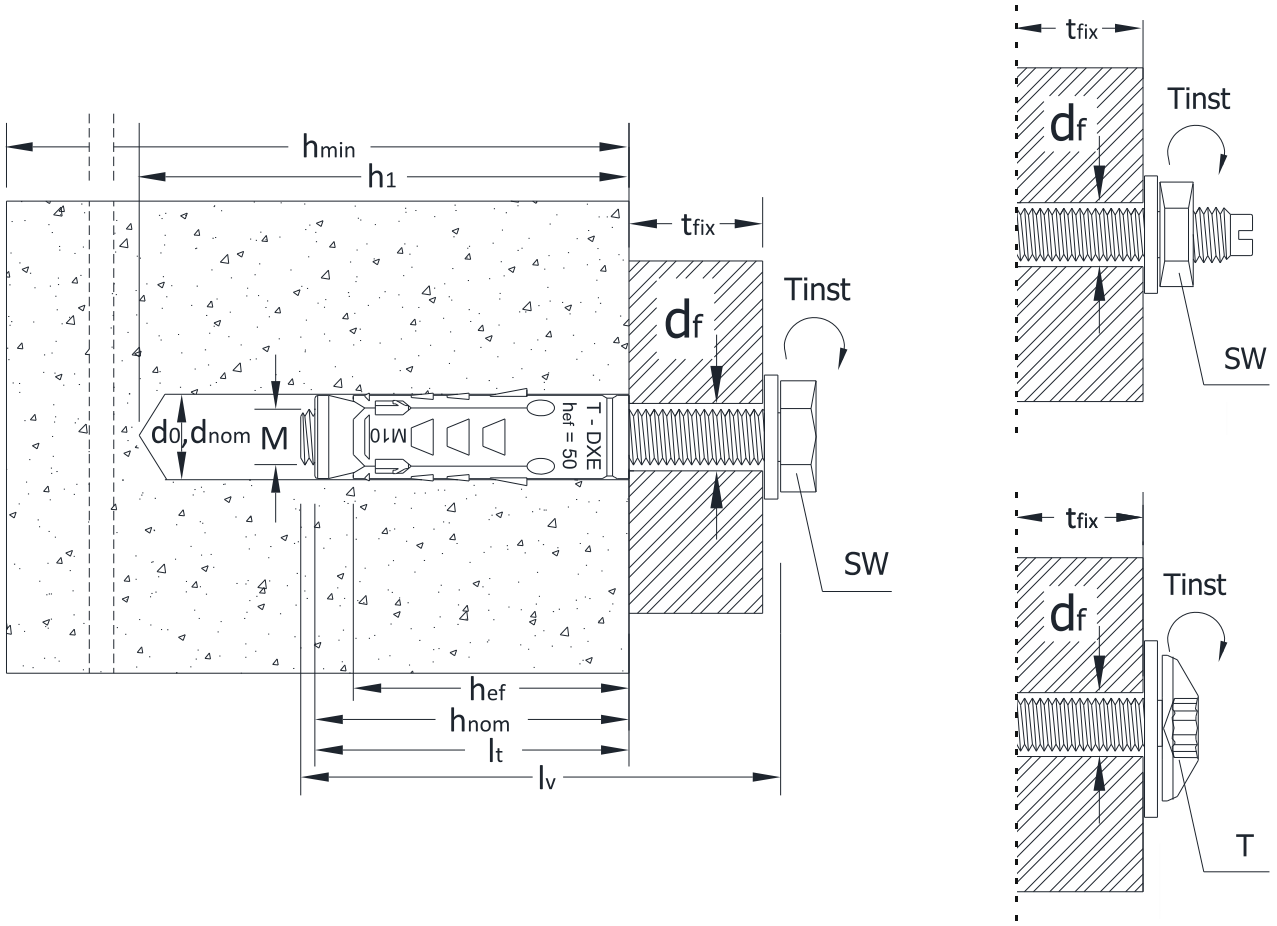


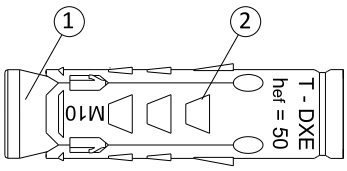

**Table A1: Installation details**

| | |
|---|---|
| $d_{nom}$ | Outside diameter of the anchor |
| $T_{inst}$ | Required torque moment |
| $t_{fix}$ | Thickness of the fixture |
| $d_0$ | Diameter of the drill hole |
| $d_f$ | Diameter of the clearance hole in the fixture |
| $h_{min}$ | Minimum thickness of the concrete member |
| $h_{nom}$ | Overall anchor embedment depth |
| $h_{ef}$ | Anchorage depth |
| $l_t$ | Anchor length |
| $l_v$ | Bolt length |
| **T** | Hexalobular socket number |
| **SW** | Wrench size/Socket size |
| **M** | Diameter of the metric thread |

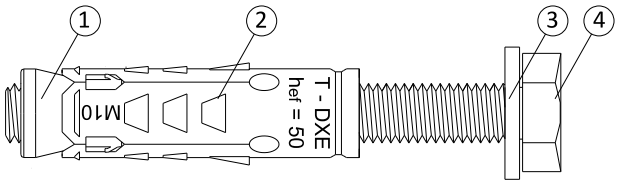
**Tecfi Steel Anchor DXE**

**Product description**
Installed condition

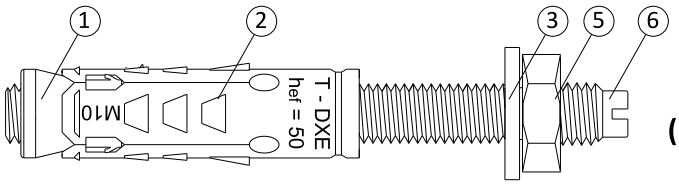
**Annex A 1**



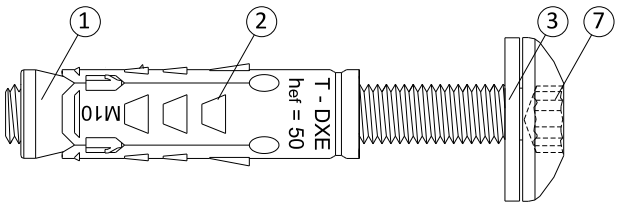

**DXE00 (M6-M12)**




**DXE01 (M6-M12)**




**DXE03 (M6-M12)**




**DXE04 (M8-M10)**

## Marking

**Expansion sleeve :**

T - Identifiyng mark of producer

DXE - Trade name

Ø - Anchor diameter

M - Screw diameter

$h_{ef}$ - Effective embedment depth

e.g : $h_{ef}$ = 50
T - DXE
M10
Ø 15

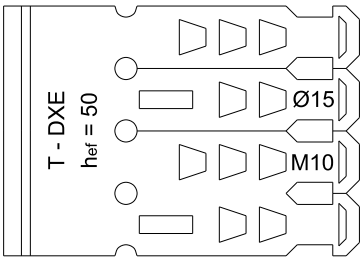



**Table A2: Materials**

| Part | Description | Materials galvanised ≥ 5µm according to ISO 4042:2022 |
|---|---|---|
| 1 | Conical nut | Steel, Strength class 8, EN ISO 898-2:2012 [1)] |
| 2 | Expansion sleeve | Steel, EN 10130:2006 - EN 10111:2008 |
| 3 | Washer | Steel, EN 10263:2014 |
| 4 | Hexagonal head screw | Steel, Strength class 8.8, EN ISO 898-1:2013 |
| 5 | Hexagonal nut | Steel, Strength class 8, EN ISO 898-2:2012 |
| 6 | Threaded stud | Steel, Strength class 8.8, EN ISO 898-1:2013 |
| 7 | Mushroom head screw | Steel, Strength class 8.8, EN ISO 898-1:2013 |

[1)] Functional coating

| | |
|---|---|
| **Tecfi Steel Anchor DXE** | **Annex A 2** |
| **Product description**<br>Anchor types, components and marking materials | |

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## Specifications of intended use

**Anchorages subject to:**
- Static and quasi-static loads

**Base materials:**
- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013+A2:2021.
- Strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021.
- Uncracked concrete

**Use conditions (Environmental conditions):**
- Anchorages subject to dry internal conditions

**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 in accordance with EN 1992-4:2018.

**Installation:**
- Hole drilling by rotary plus hammer mode
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

| | |
|---|---|
| **Tecfi Steel Anchor DXE** | **Annex B 1** |
| **Intended use**<br>Specifications | |

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**Table B1: Installation parameters**

| **Denomination** | | **DXE M6** | **DXE M8** | **DXE M10** | **DXE M12** |
|---|---|---|---|---|---|
| Nominal drill hole diameter | $d_o$ = [mm] | 10 | 12 | 15 | 18 |
| Cutting diameter of drill bit | $d_{cut} \leq$ [mm] | 10,45 | 12,50 | 15,50 | 18,50 |
| Effective anchorage depth | $h_{ef}$ = [mm] | 40 | 45 | 50 | 65 |
| Depth of drill hole | $h_1$ = [mm] | 60 | 65 | 70 | 95 |
| Diameter of clearance in the fixture | $d_f$ = [mm] | 7 | 9 | 12 | 14 |
| Overall anchor embedment depth in the concrete | $h_{nom}$ = [mm] | 45 | 50 | 60 | 75 |
| Required torque moment | $T_{inst}$ = [Nm] | 8 | 20 | 35 | 60 |
| Outside diameter of anchor | $d_{nom}$ = [mm] | 10 | 12 | 15 | 18 |

**Type DXE00:**
Screws to be provided by the customer according to Table A1, A2 and B2.

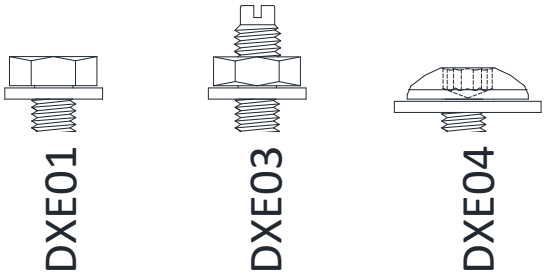


**Table B2: Wrenches and sockets**

| | **Denomination** | | **DXE M6** | **DXE M8** | **DXE M10** | **DXE M12** |
|---|---|---|---|---|---|---|
| **DXE 00** | Hexagonal head bolt | length= [mm] | $t_{fix}$ + 45 | $t_{fix}$ + 50 | $t_{fix}$ + 60 | $t_{fix}$ + 80 |
| | Thickness of fixture | $t_{fix,min}$ = [mm] | 1 | 1 | 1 | 1 |
| | Wrench size | SW = [mm] | 10 | 13 | 17 | 19 |
| **DXE 01** | Thickness of fixture | $t_{fix,min}$ = [mm] | 5 | 10 | 20 | 20 |
| | | $t_{fix,max}$ = [mm] | 5 | 10 | 20 | 20 |
| | Wrench size | SW = [mm] | 10 | 13 | 17 | 19 |
| **DXE 03** | Thickness of fixture | $t_{fix,min}$ = [mm] | 5 | 10 | 20 | 20 |
| | | $t_{fix,max}$ = [mm] | 5 | 10 | 20 | 20 |
| | Size of hexagonal socket | SW = [mm] | 10 | 13 | 17 | 19 |
| **DXE 04** | Thickness of fixture | $t_{fix,min}$ = [mm] | | 10 | 20 | |
| | | $t_{fix,max}$ = [mm] | | 70 | 60 | |
| | 6 lobe recess | T | | 40 | 40 | |

**Tecfi Steel Anchor DXE**

**Intended use**
Installation parameters

**Annex B 2**

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**Table B3: Installation tool - drill bits**

| | Anchor size | Drill bit item code |
|---|---|---|
|  | M6 / Ø10 | EO 01 10 210 |
| | M8 / Ø12 | EO 01 12 210 |
| | M10 / Ø15 | EO 01 15 160 |
| | M12 / Ø18 | EO 01 18 210 |

**Blowing pump**


**Item code**: DW 01 00 001

| | |
|---|---|
| **Tecfi Steel Anchor DXE** | **Annex B 3** |
| **Intended use**<br>Setting tools | |

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**Table B4: DXE01 Installation sequence**

| | |
|---|---|
| Step 1 | Drill a hole into the concrete in rotary plus hammer mode |
| Step 2 | Remove the dust into the hole using a brush and a blowing pump |
| Step 3 | Hammer the anchor in the hole |
| Step 4 | Place the fixture |
| Step 5 | Screw-in the hexagonal head bolt and apply the required torque moment |

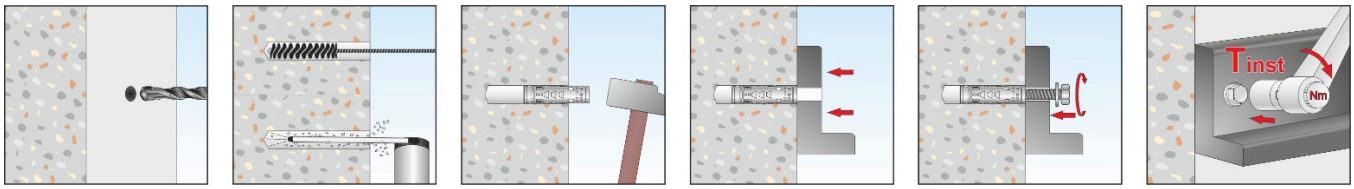



**Table B5: DXE03 Installation sequence**

| | |
|---|---|
| Step 1 | Drill a hole into the concrete in rotary plus hammer mode |
| Step 2 | Remove the dust into the hole using a brush and a blowing pump |
| Step 3 | Hammer the anchor in the hole |
| Step 4 | Place the fixture and screw in the hexagon nut |
| Step 5 | Screw-in the stud and apply the required torque moment on the hexagonal nut |

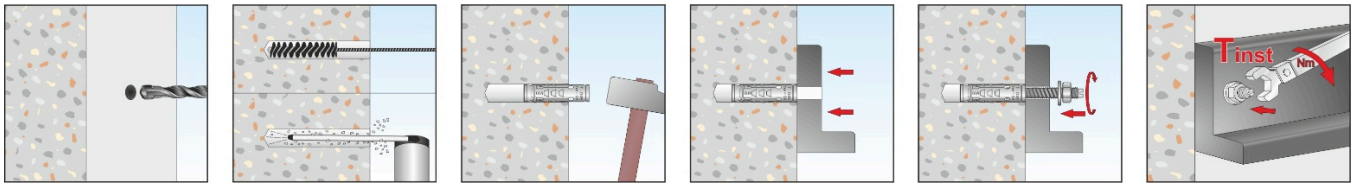
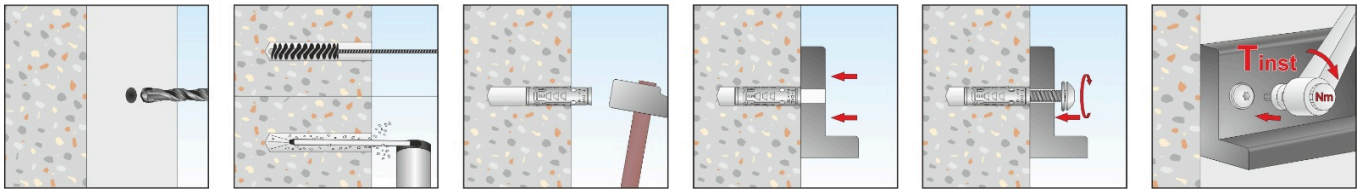



**Table B6: DXE04 Installation sequence**

| | |
|---|---|
| Step 1 | Drill a hole into the concrete in rotary plus hammer mode |
| Step 2 | Remove the dust into the hole using a brush and a blowing pump |
| Step 3 | Hammer the anchor in the hole |
| Step 4 | Place the fixture and screw in the mushroom head screw |
| Step 5 | Apply the required torque moment |




**Tecfi Steel Anchor DXE**

**Intended use**
Installation sequence

**Annex B 4**

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**Table C1: Performances for design method A (tension)**

| Type of anchor / Size | | | DXE M6 | DXE M8 | DXE M10 | DXE M12 |
|---|---|---|---|---|---|---|
| **Steel Failure** | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 16 | 29 | 46 | 67 |
| Partial safety factor | $\gamma_{Ms}$ [1)] | [-] | 1,5 | | | |
| **Pull-out failure** | | | | | | |
| Effective embedment depth | $h_{ef}$ | [mm] | 40 | 45 | 50 | 65 |
| Characteristic resistance in uncracked concrete C20/25 | $N_{Rk,p}$ | [kN] | 6 | 9 | 12 | 16 |
| Increasing factors for $N_{Rk,p}$ | $\Psi_c$ | C30/37 | 1,18 | 1,04 | 1,22 | 1,22 |
| | | C40/50 | 1,36 | 1,21 | 1,41 | 1,41 |
| | | C50/60 | 1,50 | 1,33 | 1,55 | 1,55 |
| Installation safety factor | $\gamma_2$ | [-] | 1,0 | 1,0 | 1,2 | 1,0 |
| **Concrete cone failure** | | | | | | |
| Effective embedment depth | $h_{ef}$ | [mm] | 40 | 45 | 50 | 105 |
| Factor uncracked concrete | $k_{ucr,N}$ | [-] | 11,0 | | | |
| Spacing | $s_{cr,N}$ | [mm] | 120 | 135 | 150 | 195 |
| Edge distance | $c_{cr,N}$ | [mm] | 60 | 67,5 | 75 | 97,5 |
| **Splitting failure** | | | | | | |
| Characteristic resistance in uncracked concrete C20/25 | $N^0_{Rk,sp}$ | [kN] | Min ($N_{Rk,p}$ ; $N^0_{Rk,c}$ [2)]) | | | |
| Spacing | $s_{cr,sp}$ | [mm] | 384 | 446 | 620 | 684 |
| Edge distance | $c_{cr,sp}$ | [mm] | 192 | 223 | 310 | 342 |
| Installation safety factor | $\gamma_{inst}$ | [-] | 1,0 | 1,0 | 1,2 | 1,0 |

[1)] In absence of other national regulations.
[2)] $N^0_{Rk,c}$ according to EN 1992-4:2018

**Table C2: Displacements to tension loads**

| Type of anchor / Size | | | DXE M6 | DXE M8 | DXE M10 | DXE M12 |
|---|---|---|---|---|---|---|
| Tension load | N | [kN] | 2,9 | 4,3 | 4,8 | 7,6 |
| Displacements | $\delta_{N0}$ | [mm] | 0,29 | 0,04 | 0,07 | 0,16 |
| | $\delta_{N\infty}$ | [mm] | - | - | 0,48 | - |

**Tecfi Steel Anchor DXE**

**Annex C 1**

**Performances**
Design method A, characteristic resistance under tension load
Displacements under tension loads

**Table C3: Performances for design method A (shear)**

| **Type of anchor / Size** | | | **DXE M6** | **DXE M8** | **DXE M10** | **DXE M12** |
|---|---|---|---|---|---|---|
| **Steel Failure without level arm** | | | | | | |
| Characteristic resistance | $V^0_{Rk,s}$ | [kN] | 8 | 15 | 23 | 33 |
| Partial safety factor | $\gamma_{Ms}$ 1) | [-] | 1,5 | | | |
| **Steel Failure with level arm** | | | | | | |
| Characteristic bending moment | $M^0_{Rk,s}$ | [Nm] | 12,2 | 30,0 | 59,8 | 104,8 |
| Partial safety factor | $\gamma_{Ms}$ 1) | [-] | 1,5 | | | |
| **Concrete pryout failure** | | | | | | |
| Pryout factor | $k_8$ | [-] | 1,0 | 1,0 | 1,0 | 2,0 |
| **Concrete edge failure** | | | | | | |
| Effective anchorage length | $l_f = h_{ef}$ | [mm] | 40 | 45 | 50 | 65 |
| Effective external diameter anchor | $d_{nom}$ | [mm] | 10 | 12 | 15 | 18 |

1) In absence of other national regulations.

**Table C4: Displacements to shear loads**

| **Type of anchor / Size** | | | **DXE M6** | **DXE M8** | **DXE M10** | **DXE M12** |
|---|---|---|---|---|---|---|
| Shear load | V | [kN] | 4,3 | 7,6 | 11,9 | 14,3 |
| Displacements | $\delta_{N0}$ | [mm] | 1,12 | 1,40 | 2,19 | 2,05 |
| | $\delta_{N\infty}$ | [mm] | 1,68 | 2,11 | 3,29 | 3,07 |

**Tecfi Steel Anchor DXE**

**Performances**
Design method A, characteristic resistance under shear load
Displacements under shear loads

**Annex C 2**