

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-10/0453
of 18 March 2016

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

Torque controlled expansion anchor of sizes M6, M8,
M10 and M12 for use in non-cracked concrete

Manufacturer

Tecfi S.p.A
Strada Statale Appia, Km. 193
81050 PASTORANO (CE)
ITALIEN

Manufacturing plant

Tecfi S.p.A, Italy

This European Technical Assessment
contains

12 pages including 3 annexes

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

Guideline for European technical approval of
"Metal anchors for use in concrete", ETAG 001 Part 2:
"Torque controlled expansion anchors", April 2013,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

**European Technical Assessment
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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 anchor 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 anchor 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 tension and shear loads	See Annex C 1 to C 2
Displacements under tension and shear loads	See Annex C 1 to C 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

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

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

electronic copy of the eta by dibt: eta-10/0453

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5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

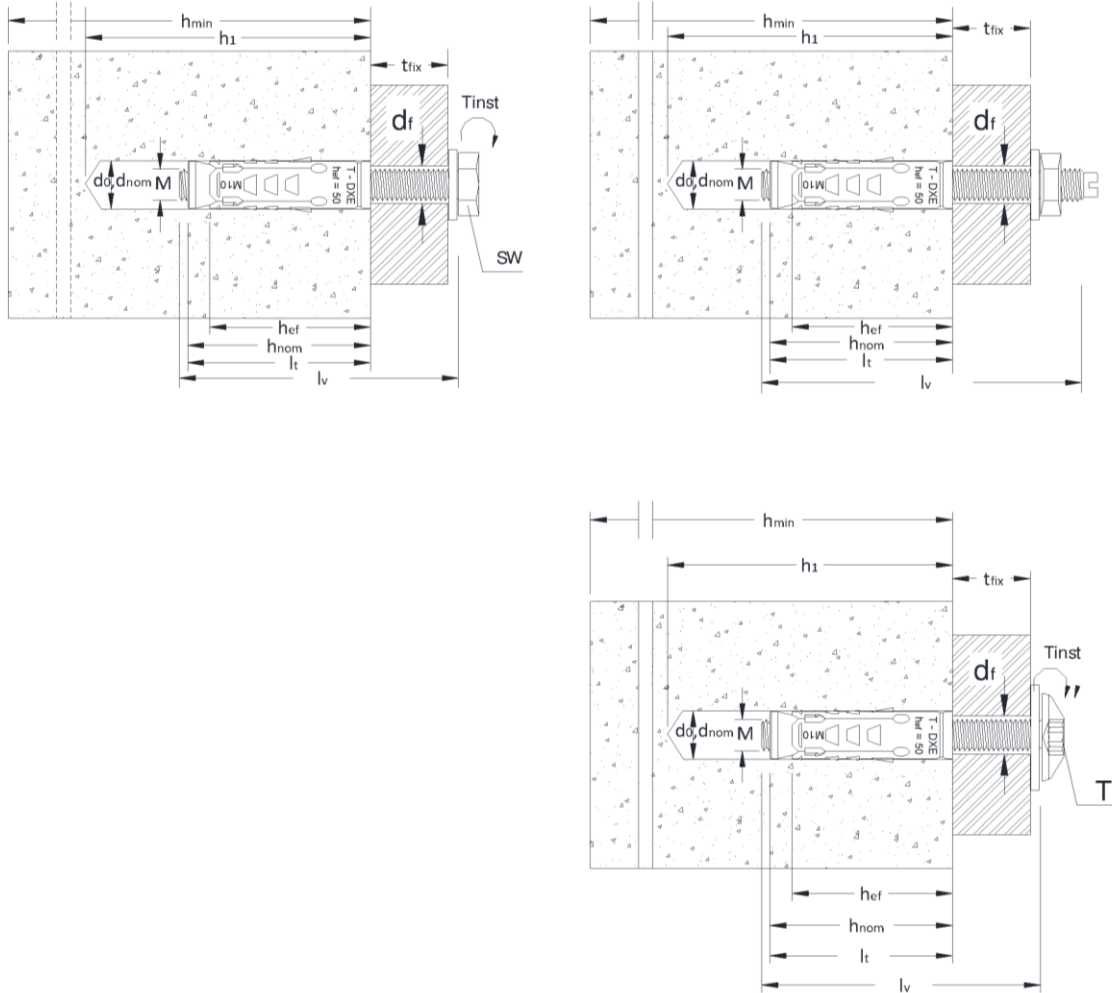
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 18 March 2016 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
G. Lange

Installed conditions



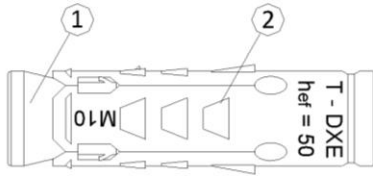
Installation details

d_{nom}	Outside diameter of the anchor
T_{inst}	Required torque moment
t_{fix}	Thickness of the fixtures
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

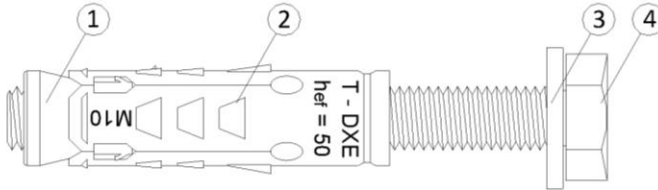
Tecfi DXE

Product description
Installed condition

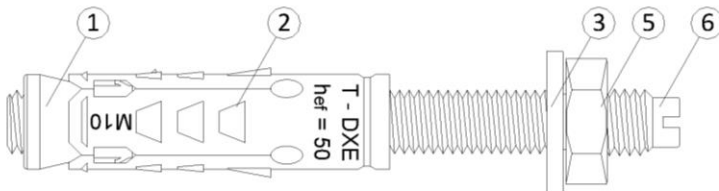
Annex A1



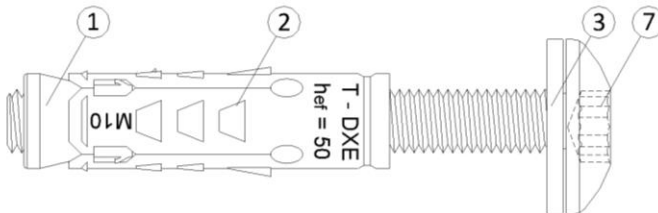
**DXE00
(M6-M12)**



**DXE01
(M6-M12)**



**DXE03
(M6-M12)**



**DXE04
(M8-M10)**

Marking

Expansion sleeve :

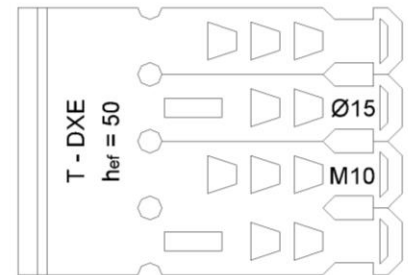
- Identifying mark of producer
- Trade name
- Anchor diameter
- Screw diameter
- Effective embedment depth

e.g : hef = 50

T - DXE

M10

Ø 15



Part	Description	Materials galvanised $\geq 5\mu\text{m}$ according to ISO 4042:1999
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, ISO 898-1:2013

¹⁾ Functional coating

Tecfi DXE

Product description
Anchor types and components

Annex A2

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Non-cracked 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 under static or quasi-static actions and under fire exposure are designed in accordance with:
 - ETAG 001, Annex C, design method A, Edition August 2010;
 - EOTA Technical Report TR 020, Edition May 2004(It must be ensured that local spalling of the concrete cover does not occur)

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 DXE

Intended use
Specifications

Annex B1

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



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 DXE

Intended use
Installation parameters

Annex B2

Drill bit

	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



Tecfi DXE

Intended use
Installation sequence and setting tools

Annex B3

Table B3: 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

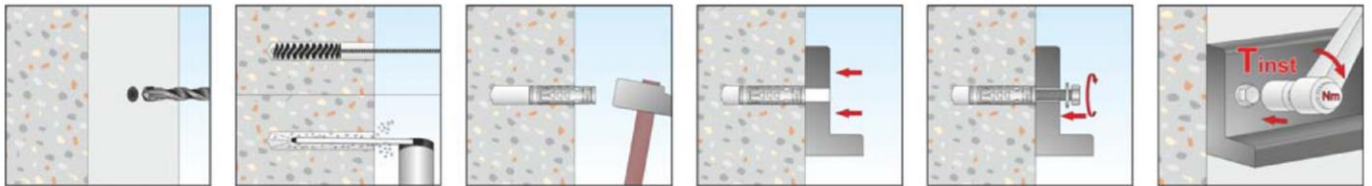


Table B4: DXE03 Installation sequence

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

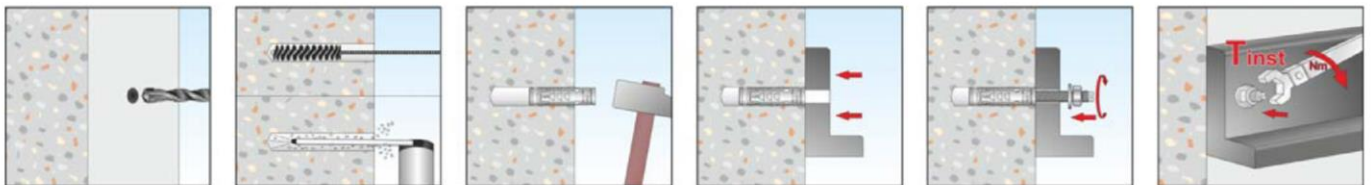
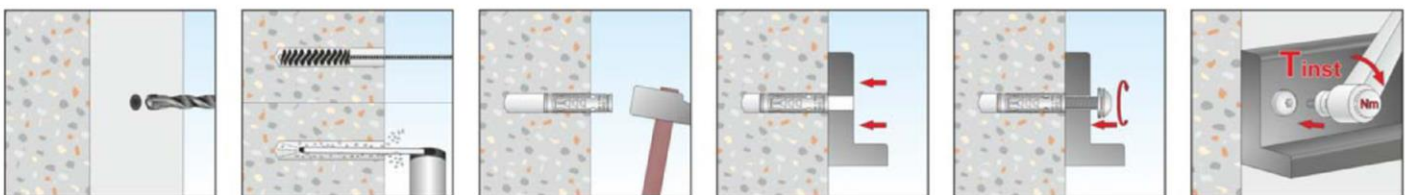


Table B5: DXE04 Installation sequence

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 DXE

Intended use

Installation sequence and setting tools

Annex B4

English translation prepared by DIBt

Table C1: Performances for design method A (tension)

Type of anchor / Size			DXE M6	DXE M8	DXE M10	DXE M12
Steel Failure						
DXE 00: Performances valid only if installed with ISO 898-1 8.8 strength class elements.						
Characteristic Resistance	$N_{Rk,s}$	[kN]	16	29	46	67
Partial safety factor	γ_{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 $N_{Rk,p}$ for cracked and uncracked concrete	Ψ_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	γ_2		1,0	1,0	1,2	1,0
Concrete cone failure and splitting failure						
Effective embedment depth	h_{ef}	[mm]	40	45	50	105
Spacing	$s_{cr,N}$	[mm]	120	135	150	195
Edge distance	$c_{cr,N}$	[mm]	60	67,5	75	97,5
Spacing (splitting)	$s_{cr,sp}$	[mm]	384	446	620	684
Edge distance (splitting)	$c_{cr,sp}$	[mm]	192	223	310	342

¹⁾ In absence of other national regulations.

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	δ_{N0}	[mm]	0,29	0,04	0,07	0,16
	$\delta_{N\infty}$	[mm]	-	-	0,48	-

Tecfi DXE

Performances

Characteristic resistance to tension loads

Annex C1

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						
DXE 00: Performances valid only if installed with ISO 898-1 8.8 strength class elements.						
Characteristic Resistance	$V_{Rk,s}$	[kN]	8	15	23	33
Partial safety factor ¹⁾	γ_{Ms}		1,5			
Steel Failure with level arm						
DXE 00: Performances valid only if installed with ISO 898-1 8.8 strength class elements.						
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	12,2	30,0	59,8	104,8
Partial safety factor ¹⁾	γ_{Ms}		1,5			
Concrete pryout failure						
Factor in equation (5.6) in ETAG 001, Annex C, Section 5.2.3.3	k		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	δ_{N0}	[mm]	1,12	1,40	2,19	2,05
	$\delta_{N\infty}$	[mm]	1,68	2,11	3,29	3,07

Tecfi DXE

Performances
Characteristic resistance to shear loads

Annex C2