Deutsches Institut für Bautechnik

DIBt

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European Technical Assessment Body for construction products

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European Technical Assessment ETA-11/0319 of 17 July 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 wedge anchor AJE
Product family to which the construction product belongs	Mechanical fastener for use in concrete
Manufacturer	Tecfi S.p.A Via Andrea D'Isernia, 59 80122 NAPLES ITALIEN
Manufacturing plant	Tecfi S.p.A. Plant 3
This European Technical Assessment contains	14 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-11/0319 issued on 17 July 2014

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Specific Part

1 Technical description of the product

The Tecfi wedge anchor AJE is an anchor made of galvanised steel of sizes M8, M10, M12, M16 and M20 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 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 1
Displacements (static and quasi-static loading)	See Annex C 4
Characteristic resistance and displacements for seismic performance category C1 and C2	See Annex C 2 and C 4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 3

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 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 17 July 2025 by Deutsches Institut für Bautechnik

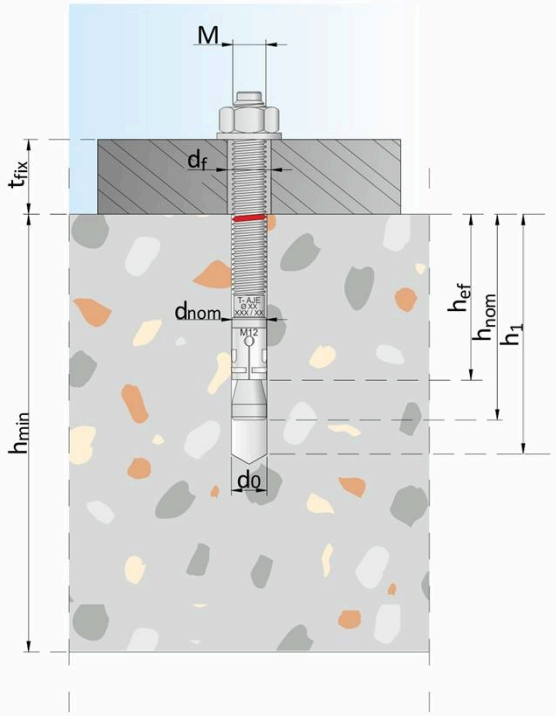
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

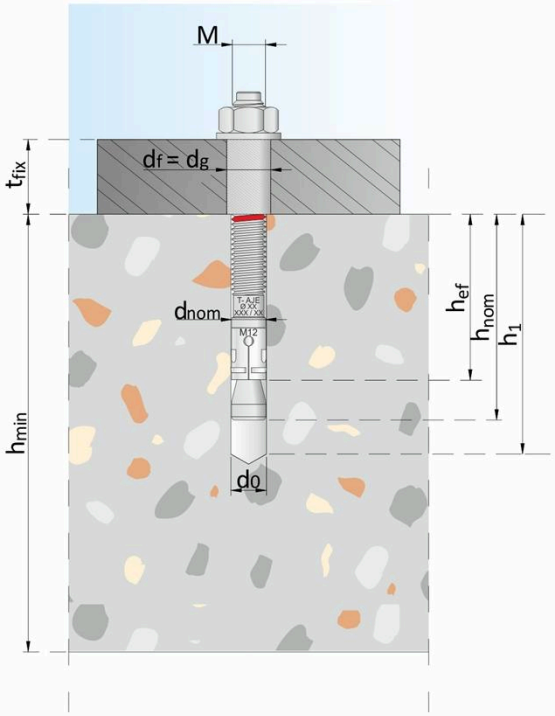
Deutsches Institut für Bautechnik DIBt

Installed condition

Installation for static and quasi-static loads



Installation for seismic performance categories C1 and C2



Seismic Protector®: spacer to fill the annular gap between the anchor and the fixture (item code SPS)

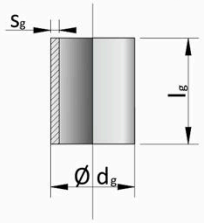


Table A1: Installation details

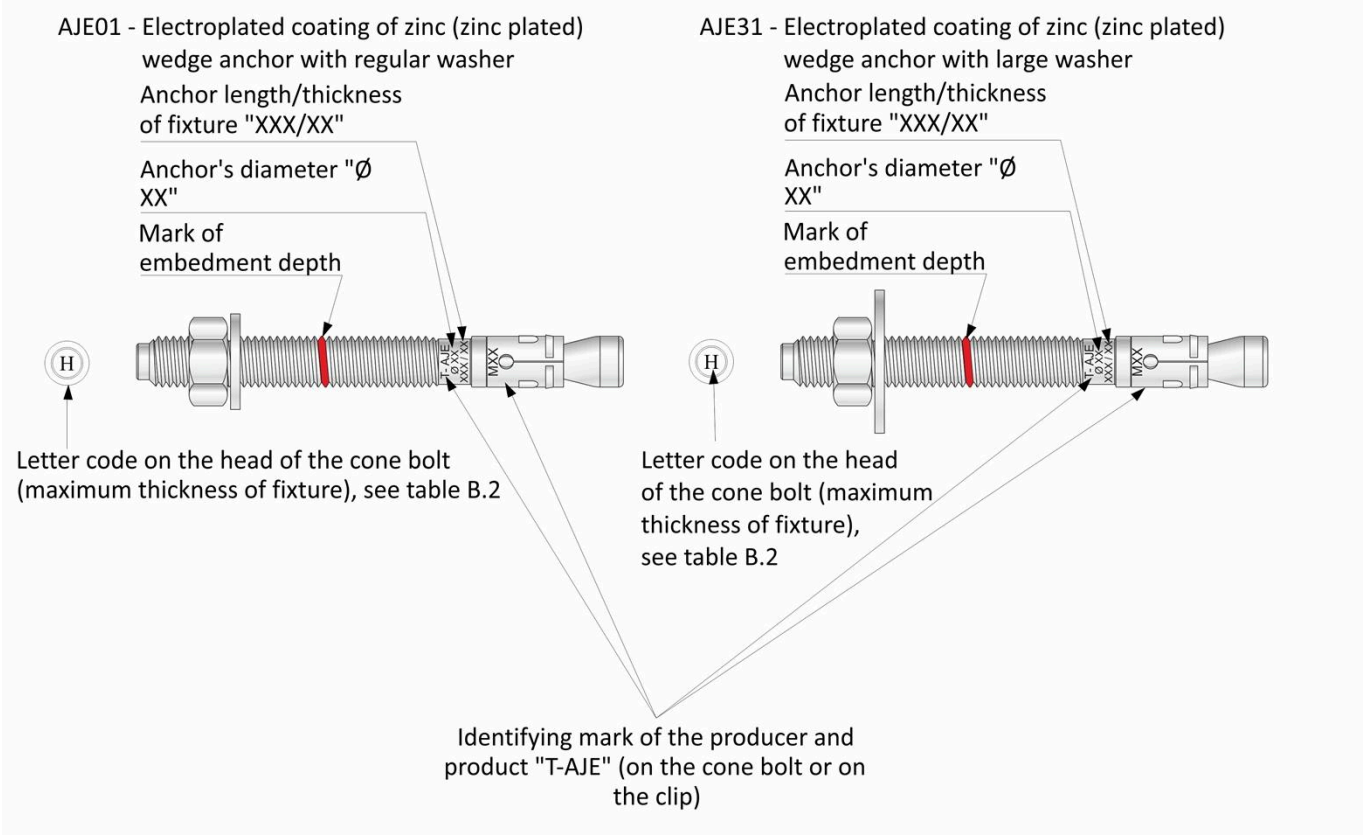
d_{nom}	Outside diameter of the anchor	h_{nom}	Overall anchor embedment depth
t_{fix}	Thickness of the fixture	h_{ef}	Effective embedment depth
d_0	Drill hole diameter	h_1	Depth of drilled hole to the deepest point
d_f	Diameter of the clearance hole in the fixture	d_g	Diameter of the spacer
M	Diameter of metric thread	l_g	Length of the spacer
h_{min}	Minimum thickness of the concrete member	s_g	Thickness of the spacer

Tecfi wedge anchor AJE

Product description
Installed condition

Annex A 1

Anchor types



AJE 01 components:

Part	Description
1	Sleeve expansion
2	Regular washer (ISO 7089)
3	Hexagonal nut
4	Cone bolt

AJE 31 components:

Part	Description
1	Sleeve expansion
2	Large washer (ISO 7093-1)
3	Hexagonal nut
4	Cone bolt

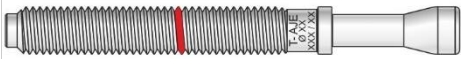
SPS – Seismic Protector®: spacer for seismic performance categories C1 and C2

Part	Description
1	Spacer

Tecfi wedge anchor AJE	**Annex A 2**
Product description Anchor types and components	

Table A2: Materials and components

AJE 01 – AJE 31 components

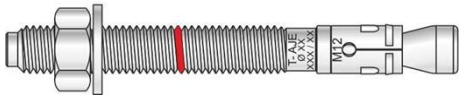
Part	Component	Description
1	**Cone Bolt** 	Electroplated coating of zinc (zinc plated) ≥ 5 µm according to EN ISO 4042:2022 carbon steel cone bolt, minimum tensile strength 800 N/mm^2
2	**Hexagonal nut** 	Electroplated coating of zinc (zinc plated) ≥ 5 µm according to EN ISO 4042:2022 carbon steel hexagonal nut DIN 934:1987-10 (or EN ISO 4032:2023-12).
3	**Washer** 	Electroplated coating of zinc (zinc plated) ≥ 5 µm according to EN ISO 4042:2022 carbon steel washer ISO 7089:2000-06 (type: AJE01) or ISO 7093-1:2000-06 (type: AJE31), hardness class HV 200.
4	**Steel sleeve** 	Electroplated coating of zinc (zinc plated) ≥ 5 µm according to EN ISO 4042:2022 carbon steel HRB 80.

SPS components

Part	Component	Description
1	**Seismic Protector®, spacer for seismic performance categories C1 and C2** 	Electroplated coating of zinc (zinc plated) ≥ 5 µm according to EN ISO 4042:2022 carbon steel spacer(s).

Assembled anchor

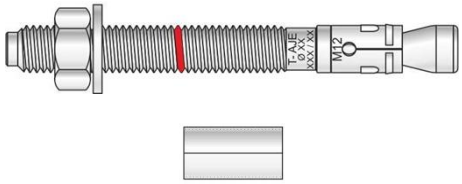
For static and quasi-static loads



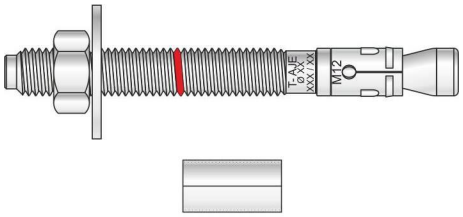
AJE 01

AJE 31

For seismic performance categories C1 and C2



AJE 01 + SPS



AJE 31 + SPS

Tecfi wedge anchor AJE	**Annex A 3**
Product description Materials and components	

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads: M8, M10, M12, M16, M20.
- Seismic action for Performance Category C1 and C2: sizes M10, M12, M16, M20 with Seismic Protector® only.
- Fire exposure: up to 120 minutes: M8, M10, M12, M16, M20.

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: M8, M10, M12, M16, M20.
- Cracked concrete: M8, M10, M12, M16, M20.

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.
- In case of requirements for resistance to fire, local spalling of the concrete cover must be avoided.

Installation:

- Hole drilling by rotary plus hammer mode: M8, M10, M12, M16, M20.
- 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 wedge anchor AJE	**Annex B 1**
Intended Use Specifications	

Table B1: Installation details

Anchor size			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**
Nominal drill hole diameter	d_0	[mm]	8	10	12	16	20
Maximum cutting diameter of drill bit	$d_{cut,max}$	[mm]	8,45	10,45	12,5	16,5	20,55
Required setting torque	T_{inst}	[Nm]	20	45	60	110	200
Minimum spacing (even in case of fire exposure)	s_{min}	[mm]	80	65	75	130	170
Minimum edge distance	c_{min}	[mm]	80	80	90	130	200
Wrench size	SW	[mm]	13	17	19	24	30
Overall anchor embedment depth in concrete	h_{nom}	[mm]	55	70	85	100	115
Minimum thickness of concrete member	h_{min}	[mm]	100	110	140	170	200
Depth of the drilled hole to deepest point	h_1	[mm]	65	85	105	120	135
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22
Thickness of the fixture	t_{fix}	[mm]	≤ 160	≤ 160	≤ 270	≤ 320	≤ 320
Nominal outside diameter of the spacer for seismic performance categories C1 and C2	d_g	[mm]	-[1)]	12	14	18	22
Nominal length of the spacer for seismic performance categories C1 and C2	l_g	[mm]	-[1)]	The total length of the spacer must be equal to the thickness of the fixture, with a tolerance of: - for t_{fix} ≤ 120 mm: +0/-3 mm; - for t_{fix} > 120 mm: +0/-5 mm. More spacers can be used to reach the total length.			
Minimum edge distance (fire exposure on one side)	c_{min}	[mm]	$2\ h_{ef}$				
Minimum edge distance (for fire exposure from more than one side)	c_{min}	[mm]	For fire exposure from more than one side: $c_{min} \geq 300$ mm or $\geq 2\ h_{ef}$				

[1)] No performance assessed.

Table B2: Details of letter code on the head

Letter code on the head of cone bolt*	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S
Maximum thickness of fixture	5	10	15	20	25	30	35	40	45	50	55	60	65	70	80	90	100

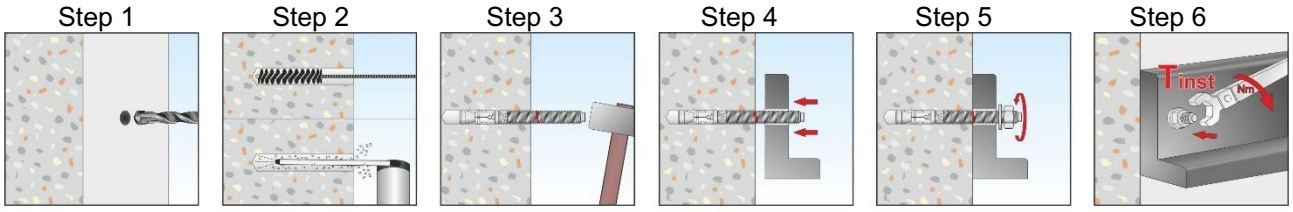
*For $100 < t_{fix} \leq 200$ there is the number 1 before the letter code;
$200 < t_{fix} \leq 300$ there is the number 2 before the letter code;
$300 < t_{fix} \leq 400$ there is the number 3 before the letter code.

Tecfi wedge anchor AJE

Intended use
Installation parameters

Annex B 2

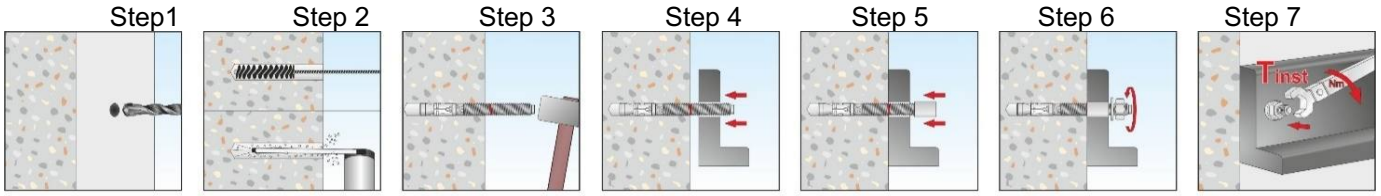
Installation instructions for static and quasi-static loads



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 (e.g. Tecfi DW01)
Step 3[1)]	Hammer the anchor into the hole
Step 4[1)]	Place the fixture
Step 5 & 6	Apply the required torque moment T_{inst}

[1)] Through fixing is allowed (place the fixture before placing the anchor).

Installation instructions for seismic performance categories C1 and C2



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[2)]	Hammer the anchor in the hole
Step 4[2)]	Place the fixture
Step 5[3)]	Insert the spacer Tecfi SDS to fill the annular gap between the anchor and the fixture
Step 6 & 7	Apply the required torque moment T_{inst}

[2)] Through fixing is allowed (place the fixture before placing the anchor).
[3)] Size and number of the spacers depends on the anchor size and the thickness of fixture.

Tecfi wedge anchor AJE	**Annex B 3**
Intended use Installation instruction	

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Table C1: Characteristic tension and shear resistance (design method A)

Anchor size				**M 8**	**M 10**	**M 12**	**M 16**	**M 20**
Steel failure								
Characteristic tension resistance		$N_{Rk,s}$	[kN]	16	25	40	70	115
Characteristic resistance under shear load without lever arm		$V_{Rk,s}$	[kN]	12	20	35	60	95
Characteristic resistance under shear load with lever arm		$M^0_{Rk,s}$	[Nm]	30	60	105	266	519
Partial safety factor		γ_{Ms} [1)]	[-]	1,5				
Pull-out failure								
Effective embedment depth		h_{ef}	[mm]	45	55	70	75	90
Characteristic tension resistance in **uncracked** concrete C20/25		$N_{Rk,p,ucr}$	[kN]	7,5	16	20	≥ $N^0_{Rk,c}$ [2)]	
Characteristic tension resistance in **cracked** concrete C20/25		$N_{Rk,p,cr}$	[kN]	6	9	16	25	30
Increasing factor for concrete $N_{Rk,p} = \Psi_c \times N_{Rk,p}$ (C20/25)	C30/37	Ψ_c	[-]	1,22				
	C40/50			1,41				
	C50/60			1,55				
Concrete cone failure								
Effective anchorage depth		h_{ef}	[mm]	45	55	70	75	90
Factor cracked concrete		$k_{cr,N}$	[-]	7,7 [3)]				
Factor uncracked concrete		$k_{ucr,N}$	[-]	11,0 [3)]				
Spacing		$s_{cr,N}$	[mm]	3 h_{ef}				
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}				
Splitting failure								
Characteristic resistance in concrete C20/25		$N^0_{Rk,sp}$	[kN]	Min ($N_{Rk,p}$; $N^0_{Rk,c}$ [3)])				
Spacing		$s_{cr,sp}$	[mm]	200	280	300	430	400
Edge distance		$c_{cr,sp}$	[mm]	100	140	150	215	200
Installation safety factor		γ_{inst}	[-]	1,2			1,0	
Concrete pry-out failure								
Pryout factor		k_8	[-]	1,0		2,0		
Concrete edge failure								
Effective length of anchor for transfer of shear loading		$l_f = h_{ef}$	[mm]	45	55	70	75	90
Outside diameter of anchor		d_{nom}	[mm]	8	10	12	16	20

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

Tecfi wedge anchor AJE

Performances
Characteristic tension and shear resistance for static and quasi-static action (design method A)

Annex C 1

Table C2: Characteristic tension and shear resistance for seismic loading – performance categories C1 and C2

Anchor size			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**
Effective embedment depth	h_{ef}	[mm]	45	55	70	75	90
Tension resistance							
Installation safety factor	γ_{inst}	[-]	1,2			1,0	
Steel failure							
Characteristic resistance seismic performance category **C1**	$N_{Rk,s,C1}$	[kN]	16	25	40	70	115
Characteristic resistance seismic performance category **C2**	$N_{Rk,s,C2}$	[kN]	16	25	40	70	115
Partial safety factor	$\gamma_{Ms,C1} = \gamma_{Ms,C2}$ [1)]	[-]	1,5				
Pull-out failure							
Characteristic resistance seismic performance category **C1**	$N_{Rk,p,C1}$	[kN]	-[2)]	3,2	12,8	25	30
Characteristic resistance seismic performance category **C2**	$N_{Rk,p,C2}$	[kN]	-[2)]	2,1	3,2	15,1	16,1
Shear resistance							
Characteristic resistance under shear load without lever arm seismic performance category **C1**	$V_{Rk,s,C1}$	[kN]	-[2)]	10	17	24	45
Characteristic resistance under shear load without lever arm seismic performance category **C2**	$V_{Rk,s,C2}$	[kN]	-[2)]	10	17	24	45
Partial safety factor	$\gamma_{Ms,C1} = \gamma_{Ms,C2}$ [1)]	[-]	1,5				
Reduction factor according to EN 1992-4:2018 with gap filling	α_{gap}	[-]	1,0				

[1)] In absence of other national regulations.
[2)] No performance assessed.

Tecfi wedge anchor AJE	**Annex C 2**
Performances Characteristic tension and shear resistance for seismic loading - performance categories C1 and C2	

Deutsches Institut für Bautechnik DIBt

Table C3: Characteristic tension and shear resistance under fire exposure in concrete C20/25 to C50/60

Anchor size				**M 8**	**M 10**	**M 12**	**M 16**	**M 20**
Steel Failure								
Characteristic resistance to tension and shear loads	R30	$N_{Rk,s,fi(30)} = V_{Rk,s,fi(30)}$	[kN]	0,37	0,87	1,69	3,14	4,90
	R60	$N_{Rk,s,fi(60)} = V_{Rk,s,fi(60)}$	[kN]	0,33	0,75	1,26	2,36	3,68
	R90	$N_{Rk,s,fi(90)} = V_{Rk,s,fi(90)}$	[kN]	0,26	0,58	1,10	2,04	3,19
	R120	$N_{Rk,s,fi(120)} = V_{Rk,s,fi(120)}$	[kN]	0,18	0,46	0,84	1,57	2,45
Characteristic bending moments	R30	$M^0_{Rk,s,fi(30)}$	[Nm]	0,4	1,1	2,6	6,7	13,0
	R60	$M^0_{Rk,s,fi(60)}$	[Nm]	0,3	1,0	2,0	5,0	9,7
	R90	$M^0_{Rk,s,fi(90)}$	[Nm]	0,3	0,7	1,7	4,3	8,4
	R120	$M^0_{Rk,s,fi(120)}$	[Nm]	0,2	0,6	1,3	3,3	6,5
Pull-out failure								
Characteristic resistance	R 30 to R 90	$N_{Rk,p,fi(90)}$	[kN]	1,5	2,25	4,0	6,25	7,5
	R 120	$N_{Rk,p,fi(120)}$	[kN]	1,2	1,8	3,2	5,0	6,0
Concrete cone failure								
Characteristic resistance	R 30 to R 90	$N^0_{Rk,c,fi(90)}$	[kN]	1,4	2,5	5,6	9,4	13,5
	R 120	$N^0_{Rk,c,fi(120)}$	[kN]	1,1	2,0	4,5	7,5	10,8
Concrete pry-out failure								
Pryout factor		k_8	[-]	1,0	1,0	2,0	2,0	2,0
Characteristic resistance in concrete > C20/25	R 30 to R 90	$V_{Rk,cp,fi}$	[kN]	1,4	2,5	11,2	18,8	27
	R 120	$V_{Rk,cp,fi}$	[kN]	1,1	2,0	9,0	15,0	21,6
Concrete edge failure								
The characteristic resistance $V_{Rk,cp,fi}$ in concrete C20/25 to C50/60 is determined by: $V^0_{Rk,c,fi(90)} = 0,25 \times V^0_{Rk,c}$ (R30, R60, R90) and $V^0_{Rk,c,fi(120)} = 0,20 \times V^0_{Rk,c}$ (R120) with $V^0_{Rk,c}$ as an initial value of the characteristic resistance of a single anchor in cracked concrete C20/25								
Edge distance								
R30 to R120		$c_{cr,N}$	[mm]	$2\ h_{ef}$				
If fire attack comes from more than one side, the edge distance of the anchor has to be ≥ 300 mm or ≥ $2\ h_{ef}$								
Anchor spacing								
R30 to R120		$s_{cr,N}$	[mm]	$4\ h_{ef}$				

Tecfi wedge anchor AJE

Performances
Characteristic tension and shear resistance under fire exposure

Annex C 3

Table C4: Displacements

Anchor size			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**
Displacements under static and quasi-static tension loads							
Service tension load in **uncracked** concrete C20/25 to C50/60	N	[kN]	3,30	6,40	7,90	16,70	23,30
Short-term displacement	δ_{N0}	[mm]	0,02	0,01	0,03	0,08	0,05
Long-term displacement	$\delta_{N\infty}$	[mm]	-	-	0,03	-	-
Service tension load in **cracked** concrete C20/25 to C50/60	N	[kN]	2,40	3,60	6,40	11,90	16,70
Short-term displacement	δ_{N0}	[mm]	0,10	0,06	0,20	0,21	0,31
Long-term displacement	$\delta_{N\infty}$	[mm]	1,02	0,60	0,84	1,40	0,55
Displacements under static and quasi-static shear loads							
Service shear load in **cracked and uncracked** concrete C20/25 to C50/60	V	[kN]	5,7	9,5	16,7	28,6	45,2
Short-term displacement	δ_{V0}	[mm]	2,0	2,0	3,0	4,0	6,0
Long-term displacement	$\delta_{V\infty}$	[mm]	3,0	4,0	6,0	8,0	10,0
Displacements for seismic performance category C2							
Damage Limit State - Tension load	$\delta_{N,C2(DLS)}$	[mm]	-[1)]	2,39	1,74	3,34	2,48
Ultimate Limit State - Tension load	$\delta_{N,C2\ (ULS)}$	[mm]		10,54	15,07	14,26	10,80
Damage Limit State - Shear load	$\delta_{V,C2\ (DLS)}$	[mm]		3,45	3,24	4,98	4,56
Ultimate Limit State - Shear load	$\delta_{V,C2\ (ULS)}$	[mm]		6,21	8,37	9,00	9,64

[1)] No performance assessed.

Tecfi wedge anchor AJE

Performances
Displacements

Annex C 4