Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-13/0135 of 7 September 2017

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 frame/multi-purpose anchor VS-Handyplug (R)
Product family to which the construction product belongs	Plastic anchor for multiple use in concrete and masonry for non-structural applications
Manufacturer	Tecfi S.p.A Strada Statale Appia, Km. 193 81050 PASTORANO (CE) ITALIEN
Manufacturing plant	Tecfi S.p.A Strada Statale Appia, Km. 193 81050 PASTORANO (CE) ITALIEN
This European Technical Assessment contains	22 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	ETAG 020, March 2012, used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The frame anchor VS-Handyplug is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel or of stainless steel.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled hole.

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 anchors 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)

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

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A 1
Resistance to fire	See Annex C 1

3.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annexes C 1 - C 4, C 9
Characteristic resistance for bending moments	See Annex C 1
Displacements under shear and tension loads	See Annex C 5 – C 9
Anchor distances and dimensions of members	See Annex B 2 - B 5

3.4 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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 020, March 2012 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: 97/463/EC.

The system to be applied is: 2+

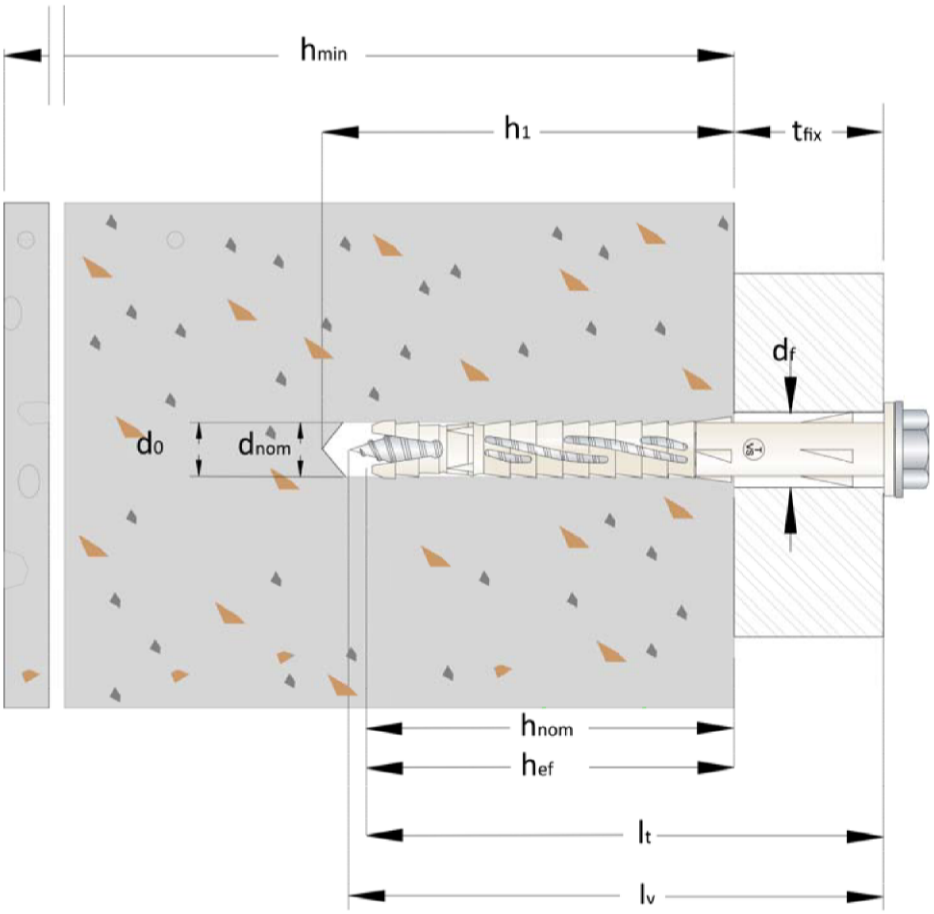
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

Issued in Berlin on 7 September 2017 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Ziegler



Intended use:

Fixing in concrete and different types of masonry.

Legend:

h_{min}:	minimum thickness of concrete member
h_{nom}:	minimum overall embedment depth
h_{ef}:	minimum effective embedment depth
d_{nom}:	anchor diameter
l_t:	anchor length
l_v:	screw length
d_0:	drill hole diameter
h_1:	minimum depth of drill hole
t_{fix}:	maximum thickness of fixture
d_f:	diameter of clearance hole in the fixture

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex A 1**
Product description Installed condition	

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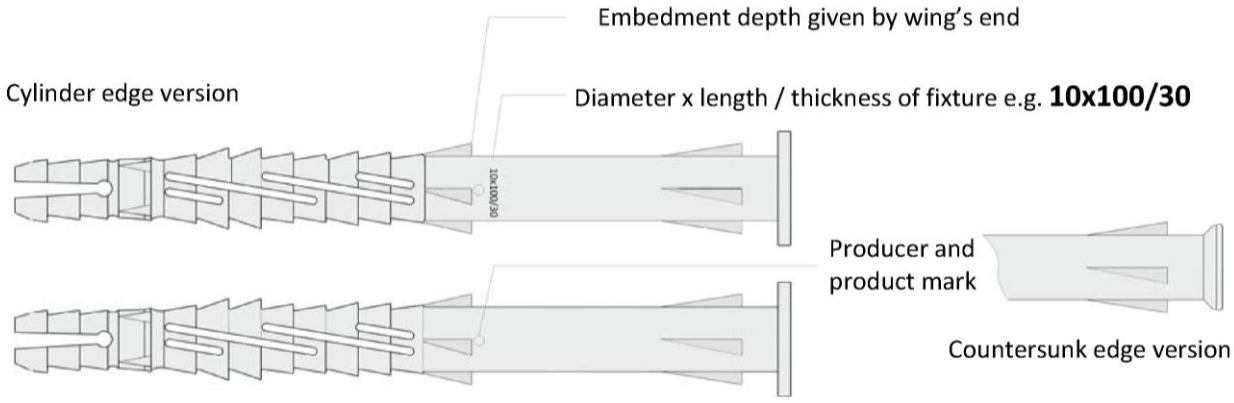
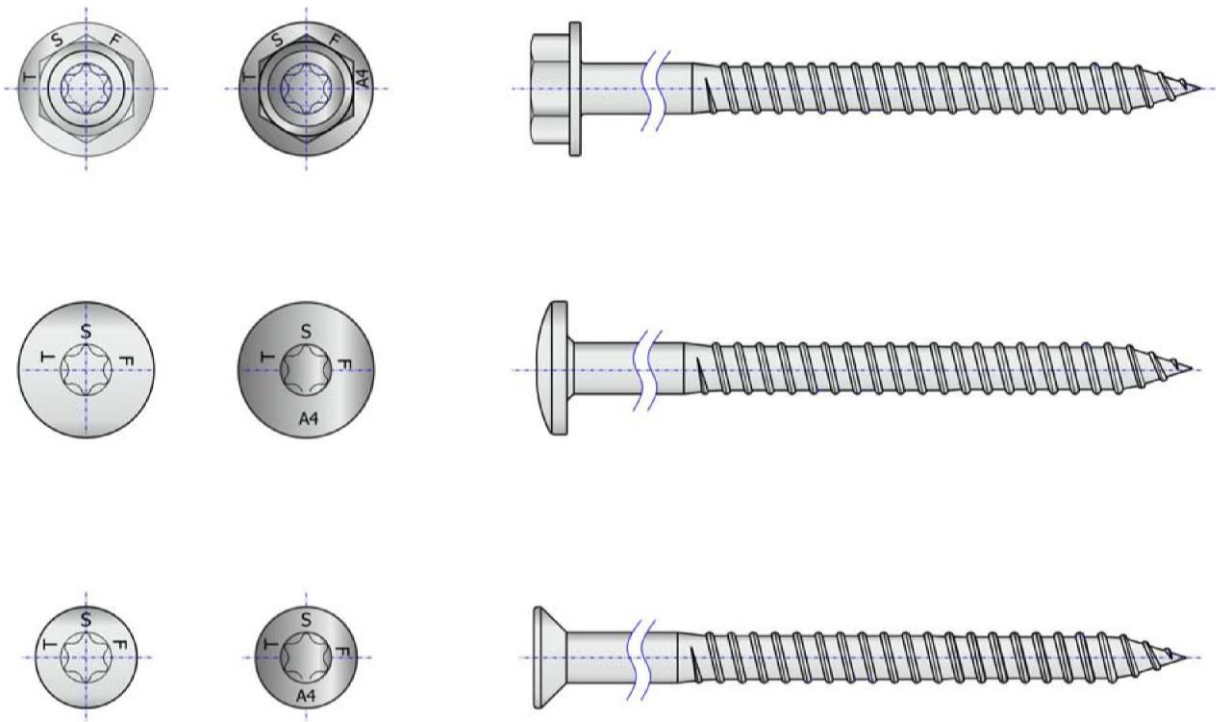
Anchor sleeve



Special screw (Carbon steel version and stainless steel A4 version)



Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex A 2**
Product description Anchor types / specific screw – marking and dimensions	

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Table 1 : Dimensions

Anchor type		VS Ø 8	VS Ø 10
Outside diameter of anchor	d_{nom}= [mm]	8	10
Length of the anchor	l_t = [mm]	≥80	
Screw diameter	dv = [mm]	6	7
Screw length	lv = [mm]	≥85	≥85

Table 2 : Materials

Anchor sleeve	Polyamide, PA 6, light grey color
Carbon steel screw	Carbon Steel grade 5.8, gvz min 5 µm acc. to ISO 2081:2008
Stainless steel screw	SS A4/70 (AISI 316) acc. to ISO 3506-1:2009 and EN 10088-3:2014

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex A 3**
Product description Dimensions and materials	

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads:
- Multiple fixing of non-structural applications

Base materials:

- Reinforced or unreinforced normal weight concrete with strength classes ≥ C16/20 (use category a), according to EN 206-1:2000, Annex C1.
- Solid brick masonry (use category b), according to Annex C2.
  Note: The characteristic resistance is also valid for larger brick sizes and larger compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annexes C3 and C4.
- Autoclaved aerated concrete (use category d), according to Annex C9
- Mortar strength class of the masonry ≥ M2,5 at minimum according to EN 998-2:2010.
- For other base materials of the use categories a, b, c and d the characteristic resistance of the anchor may be determined by job site tests according to ETAG 020, Annex B Edition March 2012.

Temperature Range:

- a: - 40 °C to 40 °C (max. short term temperature + 40 °C and max long term temperature + 24 °C)
- b: - 40 °C to 80 °C (max. short term temperature + 80 °C and max long term temperature + 50 °C)

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- The specific screw made of galvanized steel may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).

  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- The anchorages are designed in accordance with the ETAG 020, Annex C Edition March 2012 under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple use for non-structural application, according to ETAG 020 Edition March 2012.

Installation:

- Hole drilling by the drill modes according to Annex C1, C2, C3, C4, C9.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Installation temperature ≥ 0°C
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex B 1**
Intended use Specifications	

Table 3 : Installation parameters

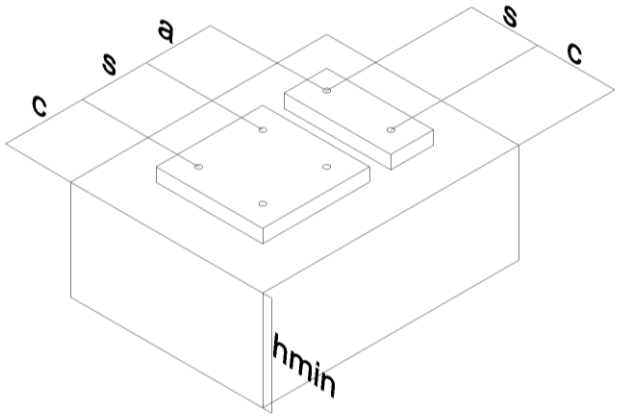
Parameter / Size		VS Ø 8	VS Ø 10
Nominal drill hole diameter	d_o [mm]	8	10
Cutting diameter of drill bit	$d_{cut} \leq$[mm]	8.45	10.45
Depth of drill hole	h_1 = [mm]	90	90
Effective anchorage depth	h_{ef} = [mm]	70	70
Diameter of clearance hole in the fixture	d_f = [mm]	9	11
Thickness of fixture	t_{fix} = [mm]	≥10	
Hexalobular socket number (ISO 10664)	T [-]	30	40
Wrench size (for hexagonal head only)	SW = [mm]	10	13

Table 4 : Minimum thickness of the member, edge distance and spacing in concrete

Parameter / Size		VS Ø 8	VS Ø 10
Concrete class		≥16/20	
Minimum thickness of the member	h_{min} [mm]	140	
Characteristic edge distance	$c_{cr,N}$ [1)] [mm]	105	105
Characteristic spacing	$s_{cr,N}$ [1)] [mm]	75	90
Minimum allowable spacing and edge distance [1)]	s_{min} [mm]	90	100
	c_{min} [mm]	90	100

[1)] Intermediate value by linear interpolation

Scheme of edge distance and spacing in concrete and masonry



Fixing points with a spacing $a \leq s_{cr,N}$ are considered as a group with a maximum characteristic resistance $N_{Rk,p}$ acc. to Table 17 – Table 27. For a spacing $a > s_{cr,N}$ the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table 17 – Table 27.

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex B 2**
Intended use Installation parameters, edge distances and spacing for use in concrete	

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Table 5 : Minimum distances and dimensions in solid masonry – Type "A"

Minimum thickness of the member	h_{min} [mm]	110
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	240
Spacing parallel to free edge	$S_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Table 6 : Minimum distances and dimensions in solid masonry – Type "B"

Minimum thickness of the member	h_{min} [mm]	120
Single anchor		
Minimum edge distance	c_{min} [mm]	125
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	250
Spacing parallel to free edge	$S_{2,min}$ [mm]	500
Minimum edge distance	c_{min} [mm]	125

Table 7 : Minimum distances and dimensions in solid masonry – Type "E"

Minimum thickness of the member	h_{min} [mm]	370
Single anchor		
Minimum edge distance	c_{min} [mm]	185
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	370
Spacing parallel to free edge	$S_{2,min}$ [mm]	740
Minimum edge distance	c_{min} [mm]	185

Table 8 : Minimum distances and dimensions in solid masonry – Type "F"

Minimum thickness of the member	h_{min} [mm]	240
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	240
Spacing parallel to free edge	$S_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex B 3**
Intended use Edge distances and spacing for use in solid masonry	

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Table 9 : Minimum distances and dimensions in hollow masonry – Type "C"

Minimum thickness of the member	h_{min} [mm]	120
Single anchor		
Minimum edge distance	c_{min} [mm]	125
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	250
Spacing parallel to free edge	$S_{2,min}$ [mm]	500
Minimum edge distance	c_{min} [mm]	125

Table 10 : Minimum distances and dimensions in hollow masonry – Type "D"

Minimum thickness of the member	h_{min} [mm]	120
Single anchor		
Minimum edge distance	c_{min} [mm]	125
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	250
Spacing parallel to free edge	$S_{2,min}$ [mm]	500
Minimum edge distance	c_{min} [mm]	75

Table 11 : Minimum distances and dimensions in hollow masonry – Type "G"

Minimum thickness of the member	h_{min} [mm]	240
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	240
Spacing parallel to free edge	$S_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Table 12 : Minimum distances and dimensions in hollow masonry – Type "H"

Minimum thickness of the member	h_{min} [mm]	115
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$S_{1,min}$ [mm]	240
Spacing parallel to free edge	$S_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex B 4**
Intended use Edge distances and spacing for use in hollow masonry	

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Table 13 : Minimum distances and dimensions in hollow masonry – Type "I"

Minimum thickness of the member	h_{min} [mm]	175
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$s_{1,min}$ [mm]	240
Spacing parallel to free edge	$s_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Table 14 : Minimum distances and dimensions in AAC

Minimum thickness of the member	h_{min} [mm]	240
Single anchor		
Minimum edge distance	c_{min} [mm]	120
Anchor Group		
Spacing perpendicular to free edge	$s_{1,min}$ [mm]	240
Spacing parallel to free edge	$s_{2,min}$ [mm]	480
Minimum edge distance	c_{min} [mm]	120

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug	**Annex B 5**
Intended use Edge distances and spacing for use in hollow masonry and AAC	

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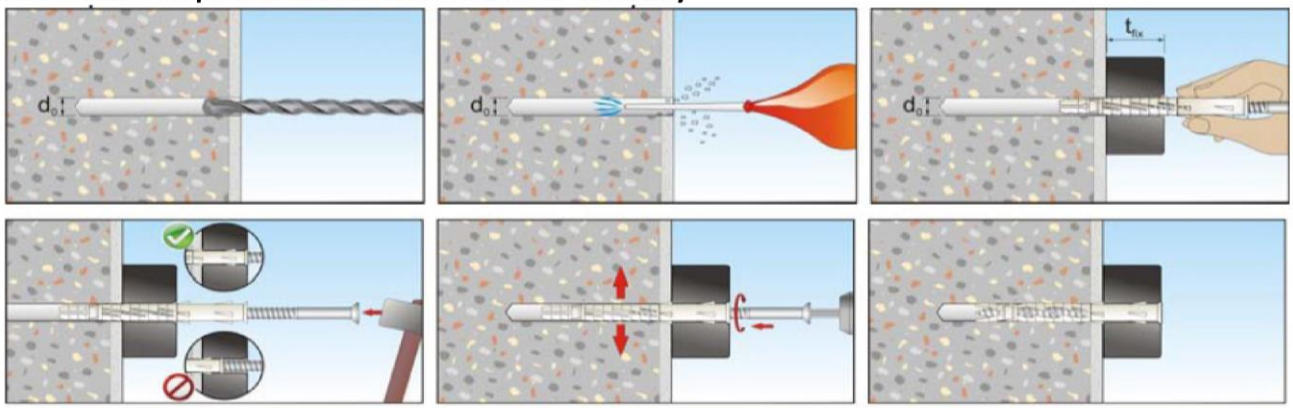
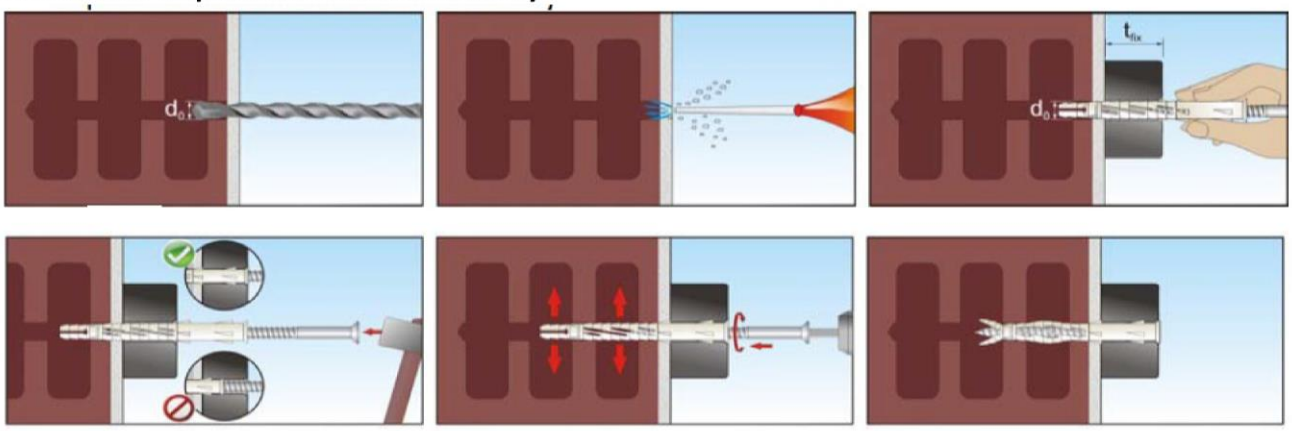
Setting instructions

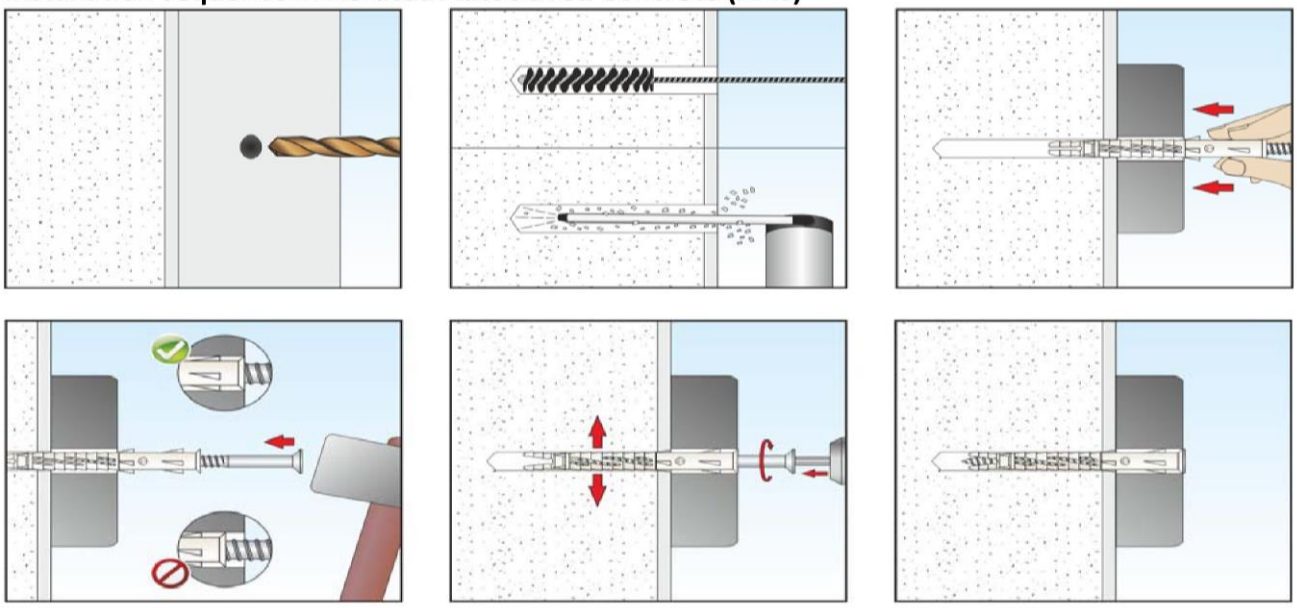
Installation sequence in concrete and solid masonry



Installation sequence in Hollow Masonry



Installation sequence in Aerated Autoclaved Concrete (AAC)



Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug

Intended use
Setting instructions

Annex B 6

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Table 15 : Characteristic bending resistance of the screw

Parameter / Size			VS Ø 8		VS Ø 10	
			Galvanized steel	Stainless steel	Galvanized steel	Stainless steel
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	12,1	16,9	19,3	27,1
Partial safety factor	γ_{Ms}	-	1,25			

Table 16 : Characteristic resistance of the screw

Parameter / Size			VS Ø 8		VS Ø 10	
			Galvanized steel	Stainless steel	Galvanized steel	Stainless steel
Characteristic tension resistance	$N_{Rk,s}$	[kN]	11,3	15,8	15,4	21,6
Partial safety factor	γ_{Ms}	-	1,5			
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5,6	7,9	7,7	10,8
Partial safety factor	γ_{Ms}	-	1,25			

Table 17 : Characteristic resistance for use in concrete[1)]

Plastic sleeve pull-out failure			VS Ø 8		VS Ø 10	
Temperature range			24/40 °C	50/80 °C	24/40 °C	50/80 °C
Characteristic tension resistance	$N_{Rk,p}$	[kN]	3,5	3,0	4,5	4,0
Partial safety factor	γ_{Mc} [2)]	[-]	1,8			

[1)] Concrete strength $f_{ck} \geq 16$ N/mm² (strength class C16/20 acc. to EN 206-1:2000)
Drill method: hammer drilling

[2)] In absence of other national regulations

Table 18 : Characteristic resistance under fire exposure in concrete[1)] in any load direction, no permanent centric tension load and without lever arm, fastening of façade systems

Anchor type	Fire resistance class	F_{Rk} [kN]
VS Handyplug	R 90	0,8

[1)] Concrete strength $f_{ck} \geq 16$ N/mm² (strength class C16/20 acc. to EN 206-1:2000)
Drill method: hammer drilling

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug

Performances
Characteristic resistance of the screw, characteristic resistance for use in concrete

Annex C 1

Deutsches Institut für Bautechnik DIBt

Table 19 : Characteristic resistance – Solid masonry type "A" (use category "b")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Solid clay brick acc. to EN 771-1:2011 Mattone pieno 110x60x240 "Danesi"	Rotary + hammer	1,7	39,0	3,0	2,0

Table 20 : Characteristic resistance – Solid masonry type "B" (use category "b")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Solid clay brick acc. to EN 771-1:2011 Mattone pieno 250x120x55 "Terreal Italia"	Rotary + hammer	1,7	27,0	4,0	5,0

Table 21 : Characteristic resistance – Solid masonry type "E" (use category "b")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Vulcanic tuff brick, acc. to EN 771-3:2011 Fior di tufo 370x370x110 "Cave riunite"	Rotary + hammer	2,4	7,5	-	0,3

Table 22 : Characteristic resistance – Solid masonry type "F" (use category "b")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Calcium silicate solid brick, acc. EN 771-2:2011 Kalksandsteine KS-Plansteine KS-R(P)-20-2,0-8DF (240) "Heidelberger-Kalksandstein"	Rotary + hammer	1,9	28,2	5,5	6,0

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Table 23 : Characteristic resistance – masonry type "C" (use category "c")

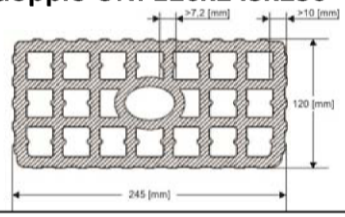
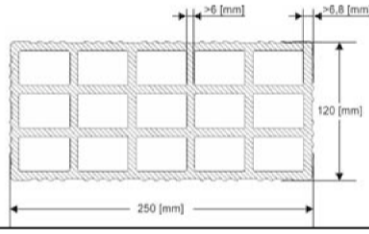
Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Perforated clay brick, acc. EN 771-1:2011 Doppio doppio UNI 120x245x250 "Danesi" 	Rotary	0.9	13.0	-	0,3

Table 24 : Characteristic resistance - masonry type "D" (use category "c")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Perforated clay brick, acc. EN 771-1:2011 Forati 120x250x250 "Wienerberger" 	Rotary	0.6	2.0	0,3	-

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug

Performances
Characteristic resistance for use in hollow or perforated masonry

Annex C 3

Deutsches Institut für Bautechnik DIBt

Table 25 : Characteristic resistance - masonry type "G" (use category "c")

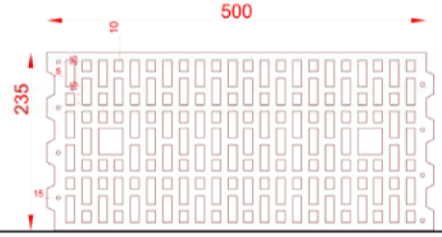
Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Perforated clay brick, acc. EN 771-1:2011 Poroton-Hochlochziegel-Block-T-24,0-0,9 L "Wienerberger" 	Rotary	0,9	7,0	0,9	0,9

Table 26 : Characteristic resistance - masonry type "H" (use category "c")

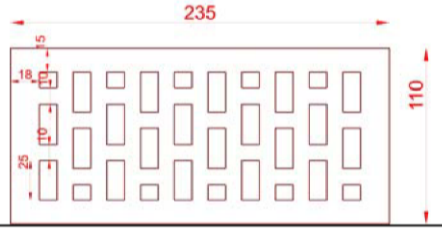
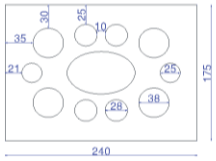
Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Perforated clay brick, acc. EN 771-1:2011 Poroton-Kleinformat HlzB- 2DF -0,9 "Wienerberger" 	Rotary	0,9	16,4	0,9	0,9

Table 27 : Characteristic resistance - masonry type "I" (use category "c")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Hollow calcium silicate brick acc. EN 771-2:2011 "Heidelberger-Kalksandstein" KS-L 	Rotary	1,5	16,3	5,0	5,5

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug

Performances
Characteristic resistance for use in hollow or perforated masonry

Annex C 4

Deutsches Institut für Bautechnik DIBt

Table 28 : Displacements under tension load in concrete

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load concrete	N	[kN]	1,2	1,6
Displacements	δ_{N0}	[mm]	0,24	0,29
	$\delta_{N\infty}$	[mm]	0,48	0,58

Table 29 : Displacements under shear load in concrete

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in concrete	V	[kN]	3,2	4,4
Displacements	δ_{V0}	[mm]	2,00	1,67
	$\delta_{V\infty}$	[mm]	3,00	2,50

Table 30 : Displacements under tension load in solid masonry – type "A"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in solid masonry	N	[kN]	0,9	0,6
Displacements	δ_{N0}	[mm]	0,04	0,06
	$\delta_{N\infty}$	[mm]	0,08	0,12

Table 31 : Displacements under tension load in solid masonry – type "B"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in solid masonry	N	[kN]	1,1	1,4
Displacements	δ_{N0}	[mm]	0,25	0,67
	$\delta_{N\infty}$	[mm]	0,50	1,34

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Table 32 : Displacements under tension load in solid masonry – type "E"

Parameter / Size			VS Ø 8
Service tension load in solid masonry	N	[kN]	0,09
Displacements	δ_{N0}	[mm]	0,01
	$\delta_{N\infty}$	[mm]	0,02

Table 33 : Displacements under tension load in solid masonry – type "F"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in solid masonry	N	[kN]	1,57	1,71
Displacements	δ_{N0}	[mm]	0,14	0,07
	$\delta_{N\infty}$	[mm]	0,29	0,15

Table 34 : Displacements under shear load in solid masonry type "A", "B" and "E"

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in solid masonry	V	[kN]	3,2	4,4
Displacements	δ_{V0}	[mm]	2,67	3,67
	$\delta_{V\infty}$	[mm]	4,00	5,50

Table 35 : Displacements under shear load in solid masonry type "F"

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in solid masonry	V	[kN]	1,57	1,71
Displacements	δ_{V0}	[mm]	1,31	1,43
	$\delta_{V\infty}$	[mm]	1,96	2,14

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Table 36 : Displacements under tension load in hollow masonry – type "C"

Parameter / Size			VS Ø 10
Service tension load in hollow masonry	N	[kN]	0,09
Displacements	δ_{N0}	[mm]	0,12
	$\delta_{N\infty}$	[mm]	0,24

Table 37 : Displacements under tension load in hollow masonry – type "D"

Parameter / Size			VS Ø 8
Service tension load in hollow masonry	N	[kN]	0,09
Displacements	δ_{N0}	[mm]	0,03
	$\delta_{N\infty}$	[mm]	0,06

Table 38 : Displacements under tension load in hollow masonry – type "G"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in hollow masonry	N	[kN]	0,26	0,26
Displacements	δ_{N0}	[mm]	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02

Table 39 : Displacements under tension load in hollow masonry – type "H"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in hollow masonry	N	[kN]	0,26	0,26
Displacements	δ_{N0}	[mm]	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02

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Table 40 : Displacements under tension load in hollow masonry – type "I"

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load in hollow masonry	N	[kN]	1,43	1,57
Displacements	δ_{N0}	[mm]	0,11	0,08
	$\delta_{N\infty}$	[mm]	0,21	0,17

Table 41 : Displacements under shear load in hollow masonry type "C" and "D"

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in hollow masonry	V	[kN]	3,2	4,4
Displacements	δ_{V0}	[mm]	6,40	8,80
	$\delta_{V\infty}$	[mm]	9,60	13,20

Table 42 : Displacements under shear load in hollow masonry type "G" and "H"

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in hollow masonry	V	[kN]	0,26	0,26
Displacements	δ_{V0}	[mm]	0,21	0,21
	$\delta_{V\infty}$	[mm]	0,32	0,32

Table 43 : Displacements under shear load in hollow masonry type "I"

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load in hollow masonry	V	[kN]	1,43	1,57
Displacements	δ_{V0}	[mm]	1,19	1,31
	$\delta_{V\infty}$	[mm]	1,79	1,96

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Table 44 : Characteristic resistance in autoclaved aerated concrete (use category "d")

Base material	Drill method	Bulk density class ρ	Minimum compressive strength f_b	VS Ø 8 F_{Rk}	VS Ø 10 F_{Rk}
description	-	[kg/dm³]	[N/mm²]	[kN]	[kN]
Non-cracked aerated autoclaved concrete (AAC Blocks) EN 771-4: 2011	Rotary only	0,5	3,5	0,5	0,6

Table 45 : Displacements under tension load in autoclaved aerated concrete

Parameter / Size			VS Ø 8	VS Ø 10
Service tension load	N	[kN]	0,18	0,21
Displacements	δ_{N0}	[mm]	0,01	0,01
	$\delta_{N\infty}$	[mm]	0,02	0,02

Table 46 : Displacements under shear load in autoclaved aerated concrete

Parameter / Size			VS Ø 8	VS Ø 10
Service shear load	V	[kN]	0,18	0,21
Displacements	δ_{V0}	[mm]	0,36	0,43
	$\delta_{V\infty}$	[mm]	0,54	0,64

Tecfi Frame/Multi purpose Nylon Anchor VS Handyplug

Performances
Characteristic resistance and displacements for use in autoclaved aerated concrete

Annex C 9