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European Technical Assessment

ETA-16/0413 of 11/07/2016

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	FRAMID-PRO HEX and FRAMID-PRO CSK
Product family to which the construction product belongs	Plastic anchors for multiple use in concrete and masonry for non-structural applications
Manufacturer	DEWALT Richard-Klinger Str. 11 D-65510 Idstein Germany
Manufacturing plant	Plant 1
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	Guideline for European Technical Approval of "Plastic anchors for multiple use in concrete and masonry for non-structural applications", ETAG 020, Edition March 2012 used as European Assessment Document (EAD)

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

Specific Part

1 Technical description of the product

The FRAMID-PRO HEX and FRAMID-PRO CSK frame anchors are the plastic anchors consisting of a plastic sleeve made of polyamide and an accompanying specific screw made of galvanized or 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 illustration and the description of the product are given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performance given in Annex C are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Requirements with respect to the mechanical resistance and stability of non load bearing parts of the works are not included in this Basic Requirement but are under the Basic Requirement safety in use (BWR 4).

3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	The metal parts of anchor can be classified to class A1 reaction to fire
Resistance to fire	Annex C2

3.1.3 Hygiene, health and the environment (BWR 3)

In addition to the clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, Regulations and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.1.4 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	Annex C1, C2, C3
Characteristic resistance for bending moment	Annex C1
Displacements under shear and tension loads	Annex C2, C4
Edge distances and spacings	Annex B3, B4

3.1.5 Sustainable use of natural resources (BWR 7)

No performance assessed.

3.1.6 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

3.2 Methods used for the assessment

The assessment of fitness of the anchor for the declared intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirement 4 has been made in accordance with the ETAG 020 *"Plastic anchors for multiple use in concrete and masonry for non-structural applications".*

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

According to the Decision 97/463/EC of the Commission of 27 June 1997 the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table is applied.

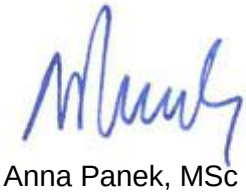
Product	Intended use	Level or class	System
Plastic anchors for use in concrete and masonry	For use in systems, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems	–	2+

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

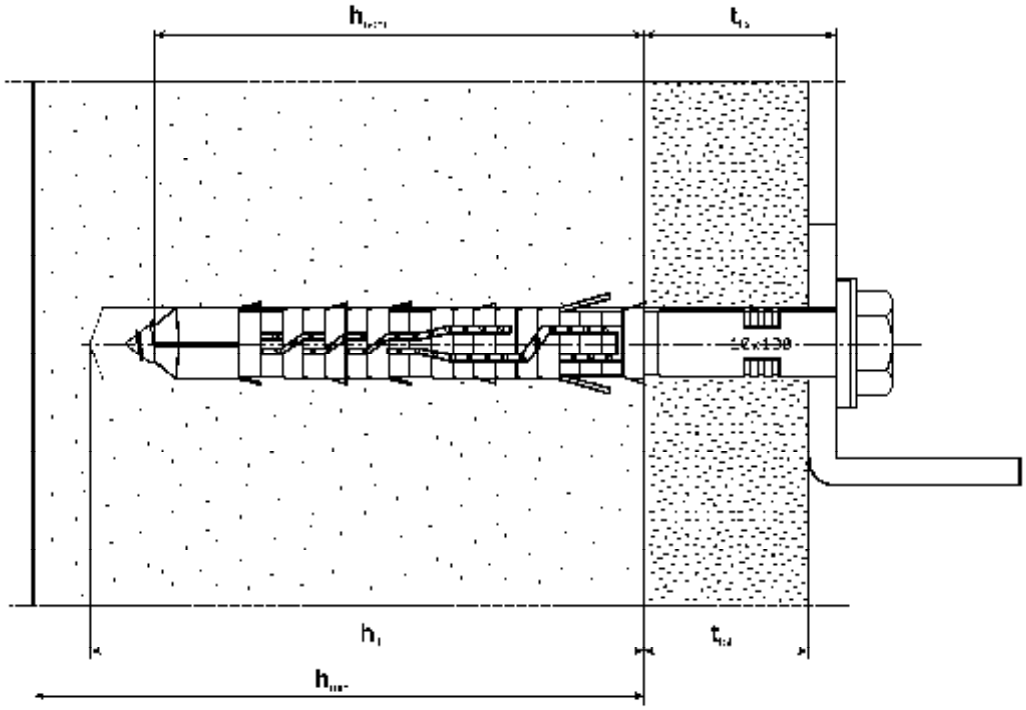
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For the type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 11/07/2016 by Instytut Techniki Budowlanej



Anna Panek, MSc
Deputy Director of ITB



Intended Use

Fixing in concrete and different types of masonry

Legend

h_{nom} = overall plastic anchor embedment depth in the base material

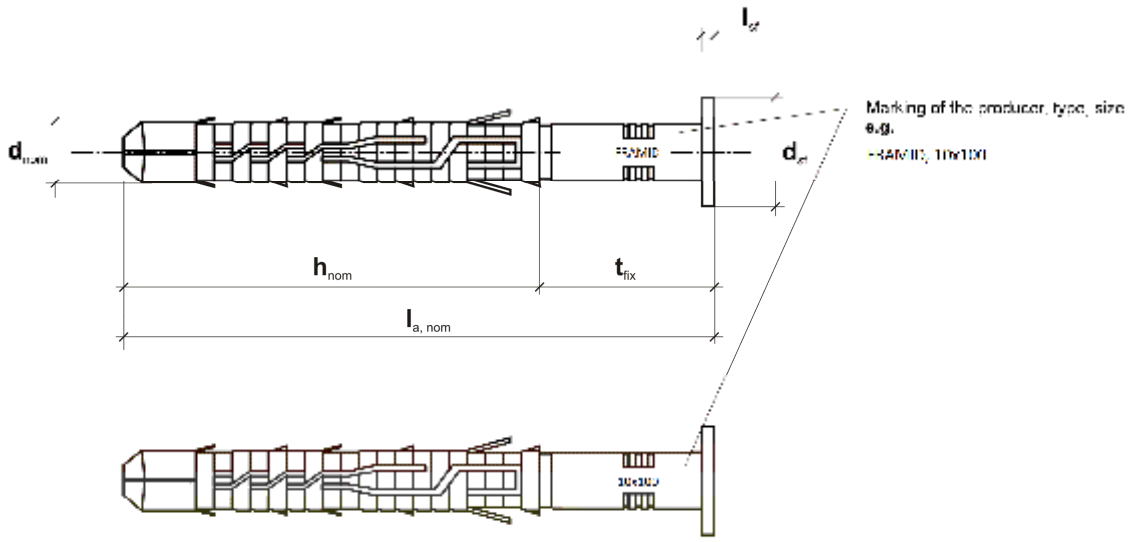
h_1 = depth of drill hole to deepest point

h = thickness of member (wall)

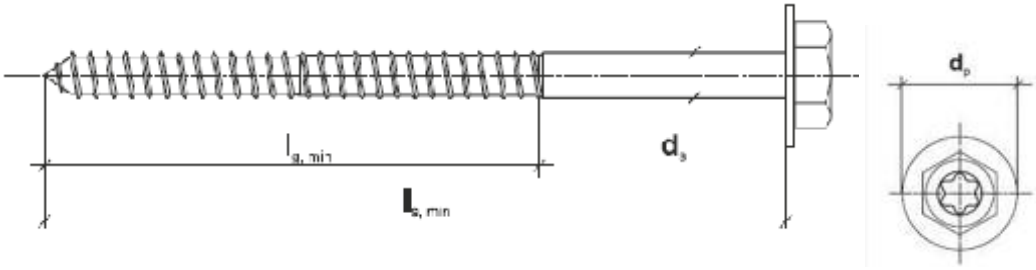
t_{fix} = t_{tol} + thickness of fixture

t_{tol} = thickness of equalizing layer or non-load-bearing coating

FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex A1** of European Technical Assessment ETA-16/0413
Product description Intended use	

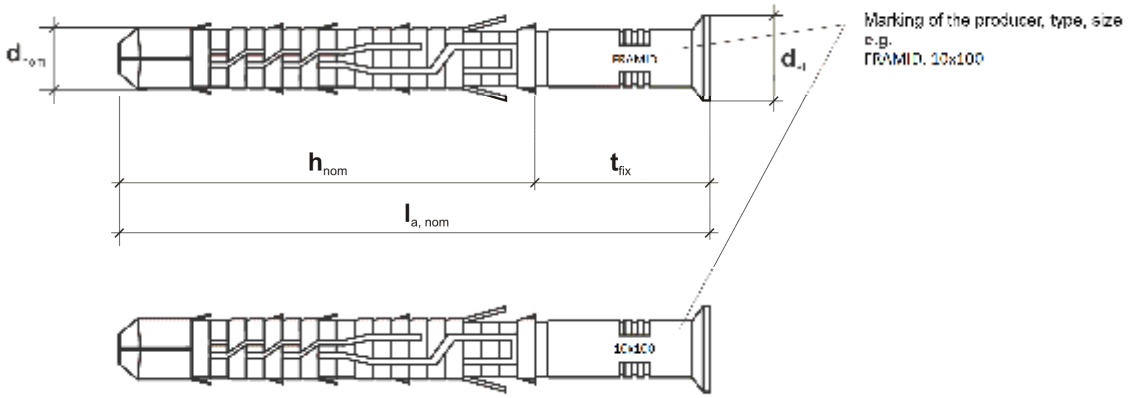


Sleeve

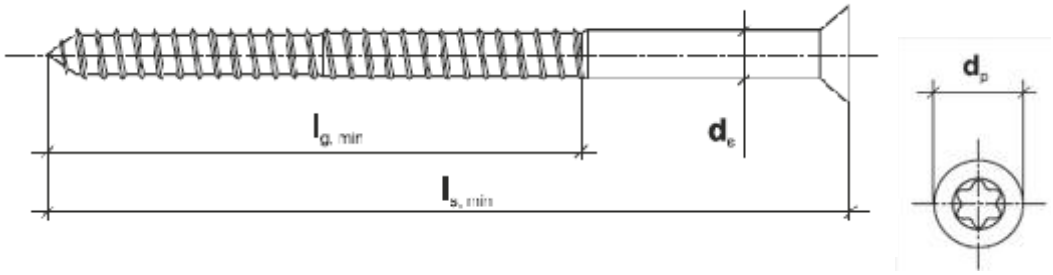


Screw K

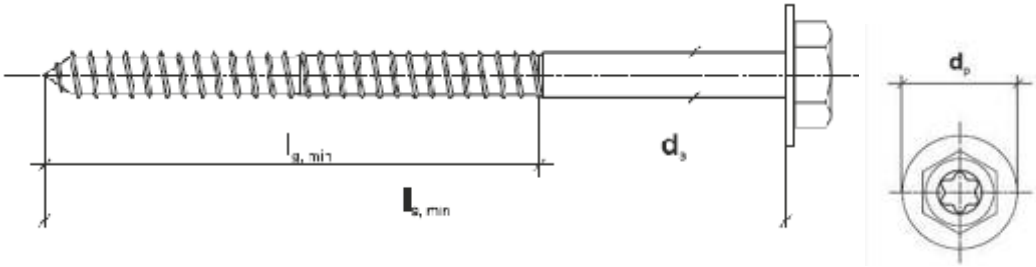
FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex A2** of European Technical Assessment ETA-16/0413
Product description FRAMID-PRO HEX 10 anchor	



Sleeve

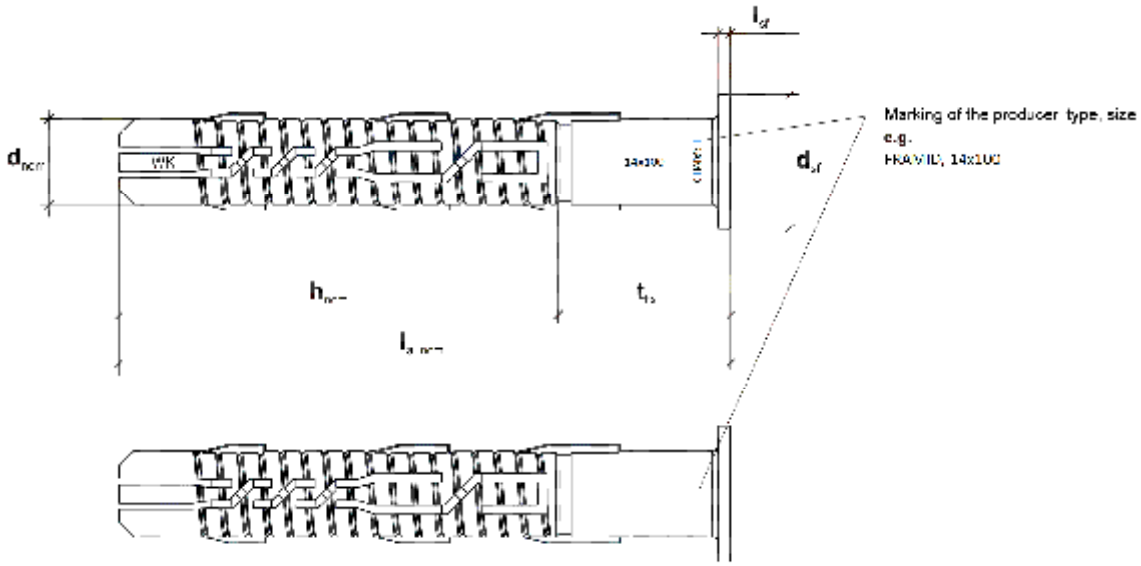


Screw S

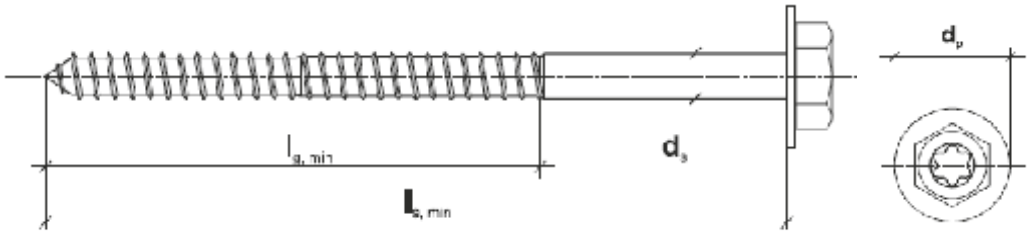


Screw K

FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex A3** of European Technical Assessment ETA-16/0413
Product description FRAMID-PRO CSK 10 anchor	

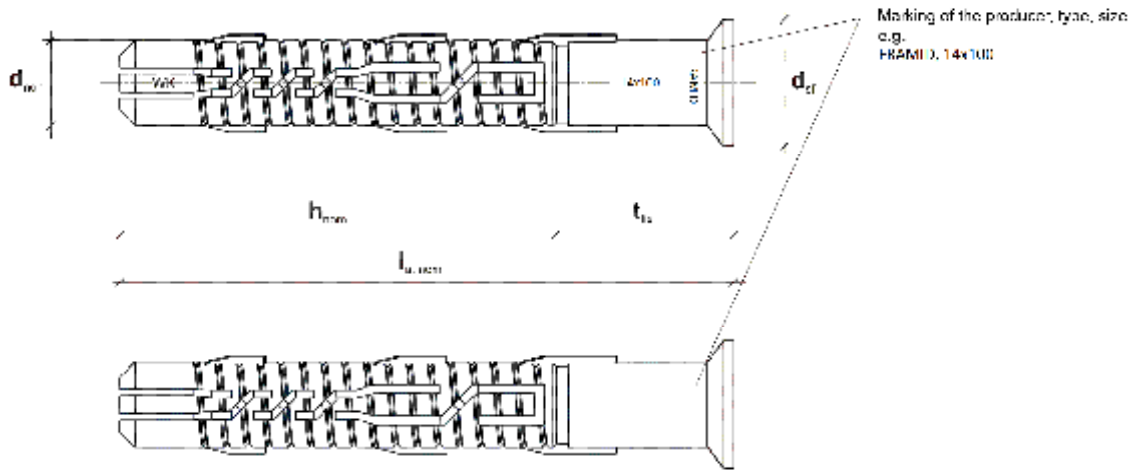


Sleeve

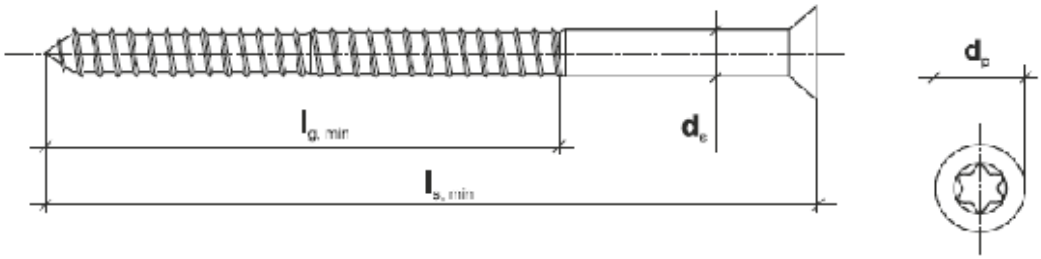


Screw K

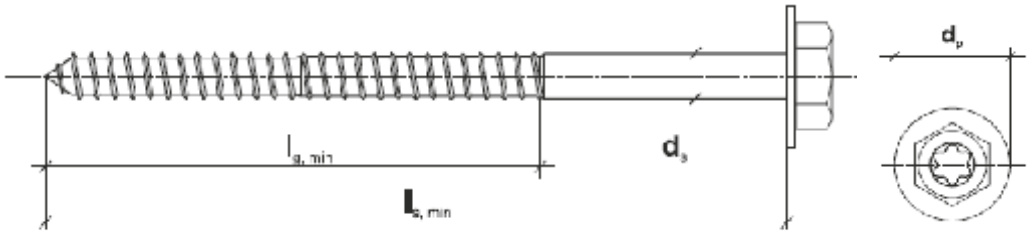
FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex A4** of European Technical Assessment ETA-16/0413
Product description FRAMID-PRO HEX 14 anchor	



Sleeve



Screw S



Screw K

FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex A5** of European Technical Assessment ETA-16/0413
Product description FRAMID-PRO CSK 14 anchor	

Table A1: Anchor types and dimensions [mm]

Anchor type	Anchor sleeve[1)]				Screw[1)]			d_p	
	d_{nom} [mm]	h_{nom} [mm]	d_{sf} [mm]	$l_{a,\ nom}$ [mm]	d_s [mm]	$l_{s,\ min}$ [mm]	$lg_{,\ min}$ [mm]	K	S
FRAMID-PRO HEX 10	10	70	18	80-300	7,0	$l_{a,nom}$ + 5 mm	75	18	–
FRAMID-PRO CSK 10	10	70	15	80-300	7,0	$l_{a,nom}$ + 5 mm	75	18	14
FRAMID-PRO HEX 14	14	70	22	80-360	9,8	$l_{a,nom}$ + 10 mm	80	22	–
FRAMID-PRO CSK 14	14	70	22	80-360	9,8	$l_{a,nom}$ + 10 mm	80	22	20

[1)] The anchor (plastic sleeve and special screw) shall only be packaged and supplied as a complete unit.

Table A2: Materials

Element	Material	
	FRAMID-PRO HEX	**FRAMID-PRO CSK**
Anchor sleeve	Polyamid, PA6, colour grey	Polyamid, PA6, colour grey
Special screw	Steel ($f_{y,k} \geq 400$ MPa, $f_{u,k} \geq 500$ MPa) galvanized ≥ 5 µm according to EN ISO 4042 or stainless steel grade 1.4401, 1.4404 or 1.4571 according to EN 10088 ($f_{y,k} \geq 470$ MPa, $f_{u,k} \geq 580$ MPa)	

Specification 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 ≥ C12/15 (use category a), according to EN 206.
- Solid masonry (use category b), according to Annex C3.
  Note: The characteristic resistance is also valid for larger sizes and larger compressive strength of the masonry unit.
- Hollow or perforated masonry (use category c), according to Annex C3.
- Autoclaved aerated concrete (use category d), according to Annex C3.
- Mortar strength class of the masonry M2.5 at minimum according to EN 998-2.
- 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, edition March 2012, Annex B.

Temperature range:

-20°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).
- Structures subject to external atmospheric exposure including industrial and marine environment (stainless steel).
- Structures subject 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, edition March 2012, Annex C under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account 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 fixings for non-structural application, according to ETAG 020, edition March 2012.

Installation:

- Hole shall be drilled by the drill modes given in Annexes C2 and C3 for use categories a, b, c and d; the influence of other drilling methods may be determined by job side tests according to ETAG 020, edition March 2012, Annex B.
- Anchor installation shall be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation shall be executed in temperature from 0°C to +40°C.
- Exposure to UV due to solar radiation of the anchor not protected by the mortar shall not exceed ≤ 6 weeks.

FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex B1** of European Technical Assessment ETA-16/0413
Intended use Specifications	

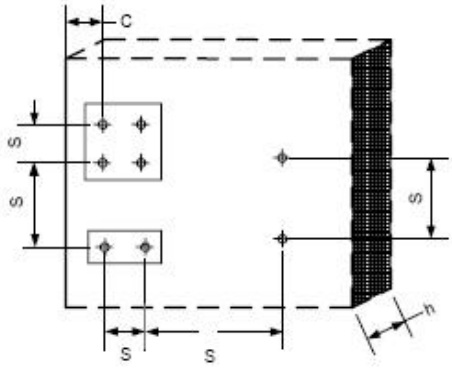
Table B1: Installation parameters

Anchor type		FRAMID-PRO CSK, HEX ϕ10	FRAMID-PRO CSK, HEX ϕ14
Drill hole diameter	d_o [mm]	10	14
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	10,45	14,45
Depth of drill hole to deepest point	$h_1 \geq$ [mm]	80	85
Overall plastic anchor embedment depth in the base material	$h_{nom} \geq$ [mm]	70	70
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	10-10,5	14-14,5
Thickness of fixture – minimum	$t_{fix, min} \geq$ [mm]	10	10
Thickness of fixture – maximum	$t_{fix, max} \leq$ [mm]	230	290
Installation temperature	°C	0 to +40	0 to +40
Torque moment for concrete and masonry	T_{inst} [Nm]	15	50
Torque moment for AAC	T_{inst} [Nm]	5	18

Table B2: Minimum thickness of member, edge distance and anchor spacing in concrete

Anchor diameter	Base material	h_{min} [mm]	$c_{cr,N}$ [mm]	c_{min} [mm]	s_{min} [mm]
ϕ10	Concrete ≥ C20/25	100	100	60	100
ϕ14	Concrete ≥ C20/25	100	100	60	100

Scheme of distances and spacing in concrete



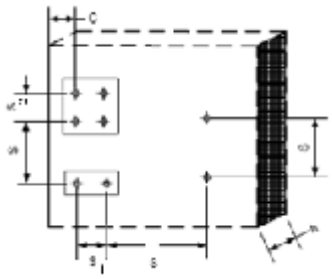
FRAMID-PRO HEX and FRAMID-PRO CSK	Annex B3 of European Technical Assessment ETA-16/0413
Intended use Minimum thickness of member, edge distance and anchor spacing in concrete	

Table B3: Minimum thickness of member, edge distance and anchor spacing in masonry

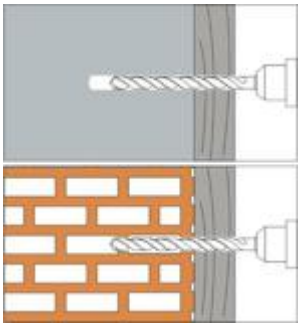
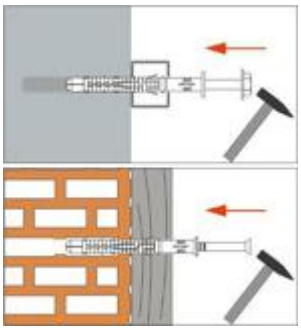
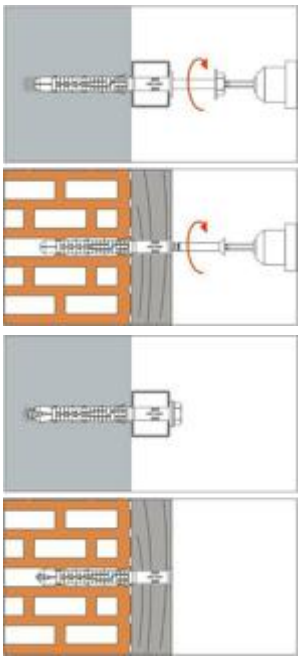
Anchor type	Base material	Type of element	Single anchor			Anchor group [1]	
			h_{min} [mm]	c_{min} [mm]	s_{min} [mm]	s_{min1} [2] [mm]	s_{min2} [3] [mm]
FRAMID-PRO HEX 10 and FRAMID-PRO CSK 10	masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	solid	120	105	250	200	400
		perforated or hollow	250	100	250	200	400
	masonry made of autoclaved aerated concrete elements	–	250	100	250	200	400
FRAMID-PRO HEX 14 and FRAMID-PRO CSK 14	masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	solid	120	105	250	200	400
		perforated or hollow	250	100	250	200	400
	masonry made of autoclaved aerated concrete elements	–	250	100	250	200	400

(1) The design method valid for single anchor and anchor groups with two or four anchors
(2) In direction perpendicular to free edge
(3) In direction parallel to free edge

Scheme of distances and spacing in masonry



FRAMID-PRO HEX and FRAMID-PRO CSK	Annex B4 of European Technical Assessment ETA-16/0413
Intended use Minimum thickness of member, edge distance and anchor spacing in masonry	

	Drill the hole considering the drilling method and clean the hole of drilling dust
	Insert the plastic sleeve and special screw into the hole through the fixture by slight hammer blows
	Screw-in the special screw until the head of the screw touches the sleeve; the anchor is correct mounted, if there is no turn-through of the plastic sleeve in the drill hole and if slightly move on turning of the screw is impossible

FRAMID-PRO HEX and FRAMID-PRO CSK	**Annex B5** of European Technical Assessment ETA-16/0413
Intended use Installation instruction	

Table C1: Characteristic bending resistance of the screw in concrete and masonry

Anchor diameter		ϕ10	ϕ14
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	20,2[1)] (23,4)[2)]	55,4[1)] (64,3)[2)]
Partial safety factor	γ_{Ms}[3)]	1,25	1,25

1) galvanized steel
2) stainless steel
3) in absence of other national regulations

Table C2: Characteristic resistance of the screw for use in concrete, failure of expansion element (special screw)

Anchor diameter		ϕ10	ϕ14
Characteristic tension resistance	$N_{Rk,s}$ [kN]	19,2[1)] (22,3)[2)]	37,7[1)] (43,7)[2)]
Partial safety factor	γ_{Ms}[3)]	1,50	1,50
Characteristic shear resistance	$V_{Rk,s}$ [kN]	9,6[1)] (11,1)[2)]	18,9[1)] (21,9)[2)]
Partial safety factor	γ_{Ms}[3)]	1,25	1,25

1) galvanized steel
2) stainless steel
3) in absence of other national regulations

Table C3: Characteristic resistance for use in concrete, pull-out failure (plastic sleeve); hammer drilling

Anchor diameter		ϕ10	ϕ14
Temperature range		-20 to +80	
Concrete ≥ C16/20			
Characteristic resistance	$N_{Rk,p}$ [kN]	4,0	7,5
Partial safety factor	γ_{Mc} [1)]	1,8	
Concrete C12/15			
Characteristic resistance	$N_{Rk,p}$ [kN]	3,0	5,0
Partial safety factor	γ_{Mc} [1)]	1,8	

[1)] in absence of other national regulations

Table C4: Displacements under tension and shear loading in concrete [1), 2)]

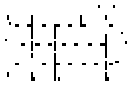
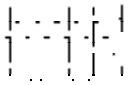
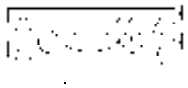
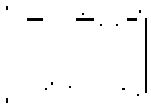
Anchor diameter	Tension load			Shear load		
	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
ϕ10	1,60	0,26	0,73	7,20	3,60	5,39
ϕ14	2,98	0,31	0,86	12,91	5,77	8,65

[1)] Valid for all ranges of temperatures
[2)] Intermediate values by linear interpolation

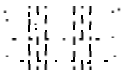
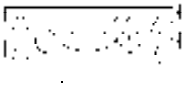
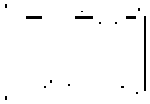
Table C5: Characteristic values F_{Rk} in any load direction under fire exposure in concrete C20/25 to C50/60, no permanent centric tension load and shear load with lever arm

Anchor type	Fire resistence class	F_{rk}, kN
FRAMID-PRO HEX 10 FRAMID-PRO CSK 10	R 90	≤ 0,8

Table C6: Characteristic resistance F_{Rk} [kN] in masonry

Anchor type / base material	Bulk density class [kg/dm³]	Compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [kN] 12)
FRAMID-PRO HEX 10 and FRAMID-PRO CSK 10					
Clay brick Polish 1), 5)	≥ 1,70	≥ 10		hammer	3,5
Clay brick Polish 1), 5)	≥ 1,70	≥ 20		hammer	3,5
Clay brick German 1), 6)	≥ 2,00	≥ 10		hammer	3,5
Clay brick German 1), 6)	≥ 2,00	≥ 20		hammer	3,5
Calcium silicate brick 2), 7)	≥ 2,00	≥ 20		hammer	3,5
Porotherm 25P + W 1)	≥ 0,80	≥ 15		rotary drilling only	1,2
MAX 250 1)	≥ 0,80	≥ 15		rotary drilling only	0,9
Perforated ceramic brick 1), 8)	≥ 1,20	≥ 12		rotary drilling only	2,0
Calcium silicate hollow block 2), 9)	≥ 1,60	≥ 12		rotary drilling only	2,5
Solid lightweight aggregate concrete element 3), 10)	≥ 0,80	≥ 2		rotary drilling only	2,0
Hollow lightweight aggregate concrete element 3), 11)	≥ 0,80	≥ 2		rotary drilling only	2,0
Autoclaved aerated concrete element AAC 2 4)	≥ 0,35	≥ 2	–	rotary drilling only	0,6
Autoclaved aerated concrete element AAC 7 4)	≥ 0,65	≥ 6,5	–	rotary drilling only	1,5

Extension of Table C6

Anchor type / base material	Bulk density class [kg/dm³]	Compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} 12) [kN]
FRAMID-PRO HEX 14 and FRAMID-PRO CSK 14					
Clay brick Polish 1), 5)	≥ 1,70	≥ 10		hammer	4,0
Clay brick Polish 1), 5)	≥ 1,70	≥ 20		hammer	4,0
Clay brick German 1), 6)	≥ 2,00	≥ 10		hammer	4,0
Clay brick German 1), 6)	≥ 2,00	≥ 20		hammer	4,0
Calcium silicate brick 2), 7)	≥ 2,00	≥ 20		hammer	4,0
Perforated ceramic brick 1), 8)	≥ 1,20	≥ 12		rotary drilling only	2,0
Calcium silicate hollow block 2), 9)	≥ 1,60	≥ 12		rotary drilling only	3,5
Hollow lightweight aggregate concrete element 3), 11)	≥ 0,80	≥ 2		rotary drilling only	2,0
Autoclaved aerated concrete element AAC 2 4)	≥ 0,35	≥ 2	–	rotary drilling only	0,9
Autoclaved aerated concrete element AAC 7 4)	≥ 0,65	≥ 6,5	–	rotary drilling only	3,0
Partial safety factor γ_{Mm} 13)	2,5 / 2,0				

1) According to EN 771-1
2) According to EN 771-2
3) According to EN 771-3
4) According to EN 771-4
5) Polish clay brick
6) German clay brick MZ Rd 2.0/20
7) For example Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106
8) For example HLZ Rd1 1.2/12 according to DIN 105
9) For example KSL-R(P)8DF Lochstein according to DIN 106
10) For example Vbl 2/0.8 Vollblock according to DIN V 18 152-100
11) For example Hbl 2/0.8 Leichtbetonhohlstein according to DINV 18 151-100
12) Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing s_{min} according to table B3 (Annex B4).
13) Partial safety factor for use in masonry γ_{Mm} = 2,5 and partial safety factor for use in autoclaved aerated concrete γ_{MAAC} = 2,0 in absence of other national regulations

Table C7: Displacements under tension and shear loading in masonry

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
FRAMID-PRO HEX 10 and FRAMID-PRO CSK 10	Clay brick Polish[1), 5)]	1,00	0,20	0,40	1,0	0,83	1,25
	Clay brick German[1), 6)]	1,00	1,07	2,13	1,0	0,83	1,25
	Calcium silicate brick[2), 7)]	1,00	0,09	0,18	1,00	0,83	1,25
	Porotherm 25P + W[1), 8)]	0,34	0,07	0,13	0,34	0,69	1,03
	MAX 250[1)]	0,26	0,73	1,46	0,26	0,51	0,77
	Perforated ceramic brick[1), 8)]	0,57	1,38	2,75	0,57	1,14	1,71
	Calcium silicate hollow block[2), 9)]	0,71	0,55	1,09	0,71	1,43	2,14
	Solid lightweight aggregate concrete element[3), 10)]	0,57	2,21	4,41	0,57	1,14	1,71
	Hollow lightweight aggregate concrete element[3), 11)]	0,57	1,35	2,70	0,57	1,14	1,71
	Autoclaved aerated concrete element AAC 2[4)]	0,21	0,15	0,29	0,21	0,43	0,64
	Autoclaved aerated concrete element AAC 7[4)]	0,54	0,02	0,04	0,54	1,07	1,61
FRAMID-PRO HEX 14 and FRAMID-PRO CSK 14	Clay brick Polish[1), 5)]	1,14	0,28	0,56	1,14	0,95	1,43
	Clay brick German[1), 6)]	1,14	0,27	0,54	1,14	0,95	1,43
	Calcium silicate brick[2), 7)]	1,14	0,09	0,18	1,14	0,95	1,43
	Perforated ceramic brick[1), 8)]	0,57	0,13	0,26	0,57	1,14	1,71
	Calcium silicate hollow block[2), 9)]	1,00	0,16	0,32	1,00	2,00	3,00
	Hollow lightweight aggregate concrete element[3), 11)]	0,57	0,09	0,18	0,57	1,14	1,71
	Autoclaved aerated concrete element AAC 2[4)]	0,32	0,39	0,78	0,32	0,64	0,96
	Autoclaved aerated concrete element AAC 7[4)]	1,07	0,17	0,34	1,07	2,14	3,21

[1)] according to EN 771-1
[2)] according to EN 771-2
[3)] according to EN 771-3
[4)] according to EN 771-4
[5)] Polish clay brick
[6)] German clay brick MZ Rd 2.0/20
[7)] for example Kalksandstein KS NF 20-2.0
[8)] for example HLZ Rd1 1.2/12 according to DIN 105
[9)] for example KSL-R(P)8DF Lochstein according to DIN 106
[10)] for example Vbl 2/0,8 Vollblock according to DIN V 18 152-100
[11)] for example Hbl 2/0,8 Leichtbetonhohlstein according to DINV 18 151-100