



ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



European Technical Assessment ETA-13/0743 of 10/08/2016

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

PE50 PRO bonded anchor

Product family to which the above construction product belongs:

Bonded anchor with anchor rod made of galvanized steel or stainless steel of sizes M8, M10 and M12, for use in masonry

Manufacturer:

ALSAFIX SAS
114a Rue Principale
F-67240 Gries
Tel. +33 388 72 42 41
Fax +33 388 72 17 15
Internet www.alsafix.com

Manufacturing plant:

ALSAFIX SAS
Manufacturing plant I

This European Technical Assessment contains:

22 pages including 17 annexes which form an integral part of the document

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

Guideline for European Technical Approval (ETAG) No. 029 Injection Anchors for use in masonry, April 2013, used as European Assessment Document (EAD).

This version replaces:

ETA-13/0743 issued on 2013/06/28

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

The Injection system PE50 PRO is a bonded anchor (injection type) consisting of a mortar cartridge with ALSAFIX injection mortar, a perforated sleeve, and an anchor rod with hexagon nut and washer in the range of M8, M10 and M12.

The steel elements are made of zinc coated steel or stainless steel.

The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry.

An illustration of the product and intended use is given in Annex A1 and Annex A2.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation¹ of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex A3, Table A1. For the installed anchor see Figure given in Annex A2. The intended use specifications of the product are detailed in the Annex B1.

2 Specification of the intended use in accordance with the applicable EAD

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences.

The anchor is to be used only for anchorages subject to static or quasi-static loading in solid masonry (use

category b) or hollow or perforated masonry (use category c) according to Annex B8. The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2010 at minimum.

The anchors may be installed in Category w/d: installation in wet substrate and use in structures subjected to dry, internal conditions.

The anchors may be used in the following 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 +50°C (max. short term temperature +50°C and max. long term temperature +40°C).

Elements made of galvanized steel or stainless steel may be used in structures subject to dry internal conditions only.

The provisions made in this European Technical Assessment are based on an assumed intended 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 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.

¹ The technical documentation of this European Technical Assessment is deposited at ETA-Danmark and, as far as relevant for the tasks of the Notified bodies involved in the attestation of conformity procedure, is handed over to the notified bodies.

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

3.1 Characteristics of product

Mechanical resistance and stability (BWR 1):

The essential characteristics are detailed in the Annex from C1 to C3.

Safety in case of fire (BWR 2):

The essential characteristics are detailed in the Annex from C4.

Hygiene, health and the environment (BWR3):

Regarding the 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 Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

Safety in use (BWR4):

For basic requirement Safety in use the same criteria are valid for Basic Requirement Mechanical resistance and stability (BWR1).

Sustainable use of natural resources (BWR7)

No performance determined

Other Basic Works Requirements are not relevant

3.2 Methods of assessment

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Injection Anchors for Use in Masonry", ETAG 029, based on the Use Categories b and c in respect of the base material and Category w/d in respect of installation and use.

In addition to the specific 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 Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

4 Attestation and verification of constancy of performance (AVCP)

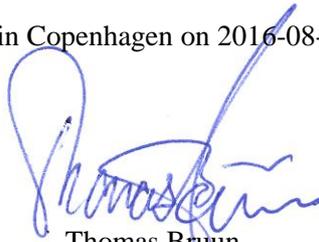
4.1 AVCP system

According to the decision 1997/177/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

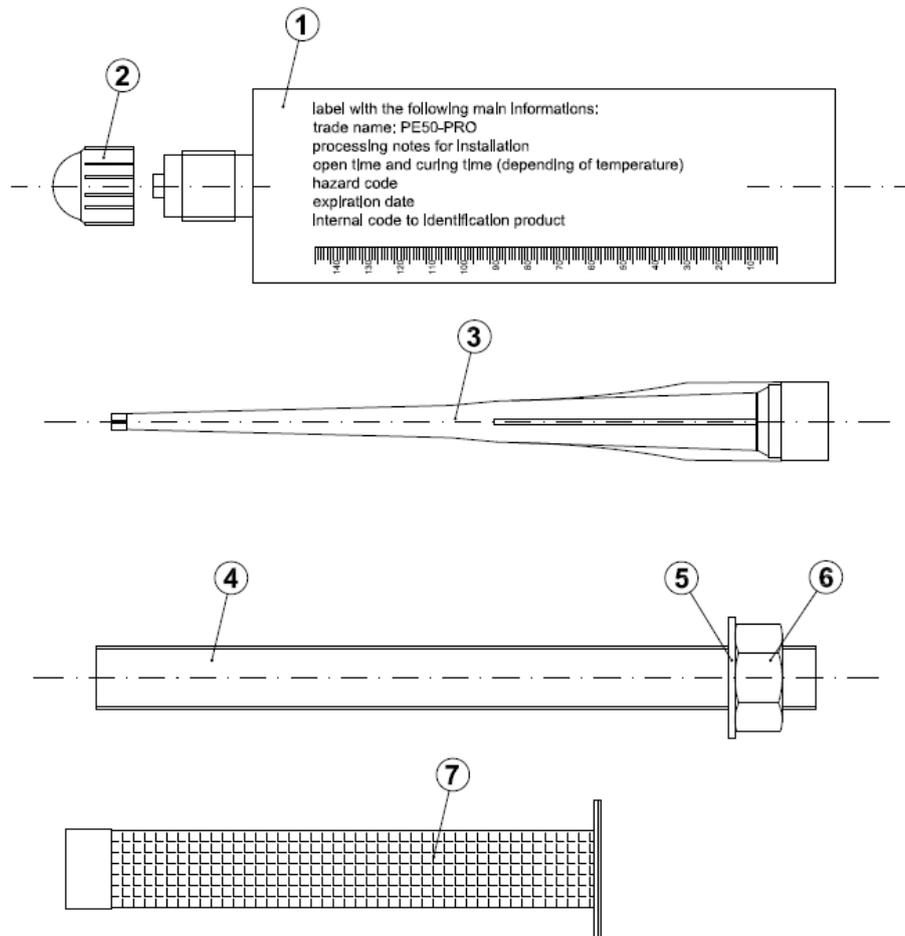
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark

Issued in Copenhagen on 2016-08-10 by



Thomas Bruun
Manager, ETA-Danmark



- ① Cartridge
- ② Sealing cap
- ③ Mixer
- ④ Anchor threaded rod
- ⑤ Washer
- ⑥ Hexagon nut
- ⑦ Plastic sleeve

Use category in respect of the base material:

Use category b: metal injection anchors for use in solid masonry.

Use category c: metal injection anchors for use in hollow or perforated masonry.

Use category in respect of installation and use:

Category w/d: installation in wet substrate and use in structures subjected to dry, internal conditions.

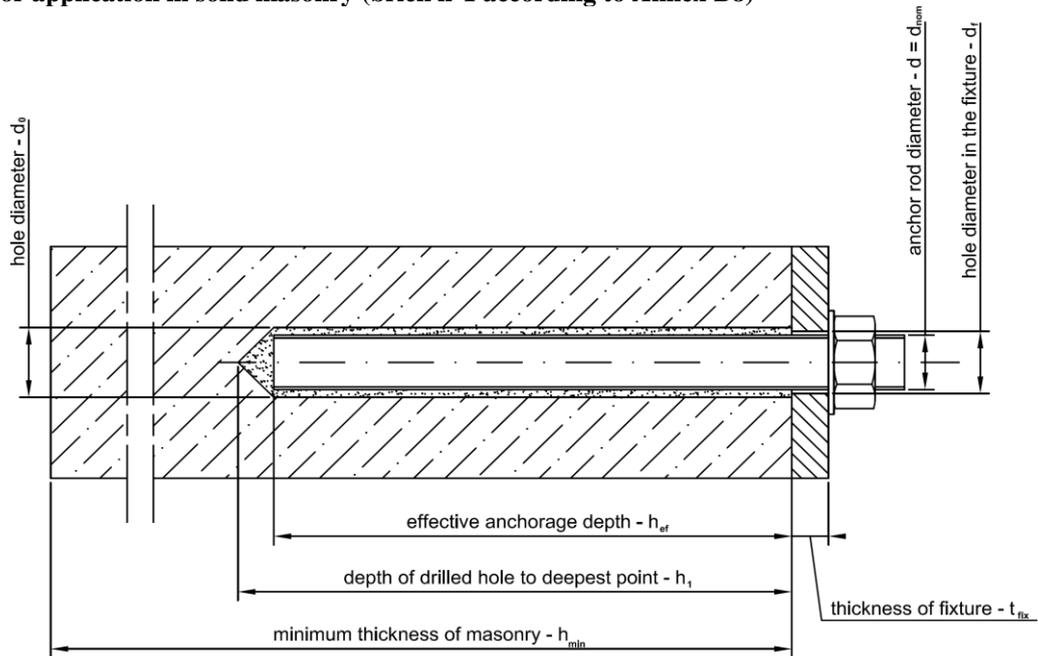
Temperature range:

-40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)

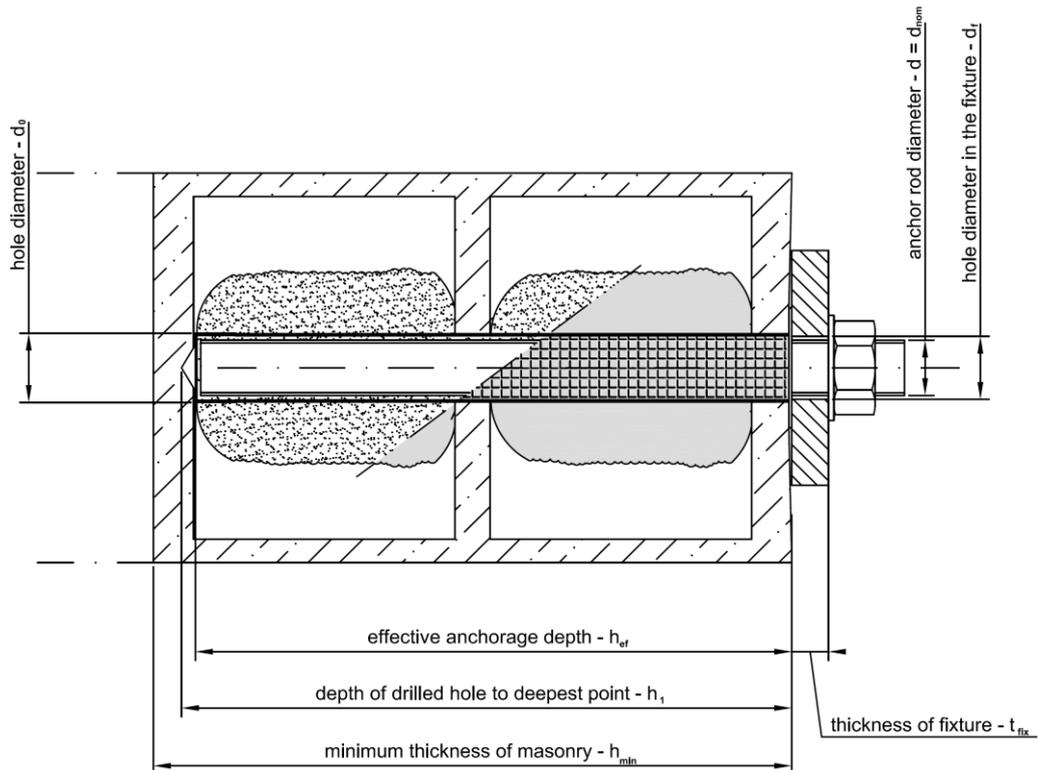
-40°C to +50°C (max. short term temperature +50°C and max. long term temperature +40°C)

| | |
|------------------------------|---|
| PE50 PRO | Annex A1 of European Technical Assessment ETA-13/0743 |
| Product and intended use (1) | |

Anchor application in solid masonry (brick n°1 according to Annex B8)



Anchor application in hollow/perforated masonry with plastic sleeve (brick n°2 to 6 according to Annex B7)



PE50 PRO

Product and intended use (2)

Annex A2

of European
Technical Assessment
ETA-13/0743

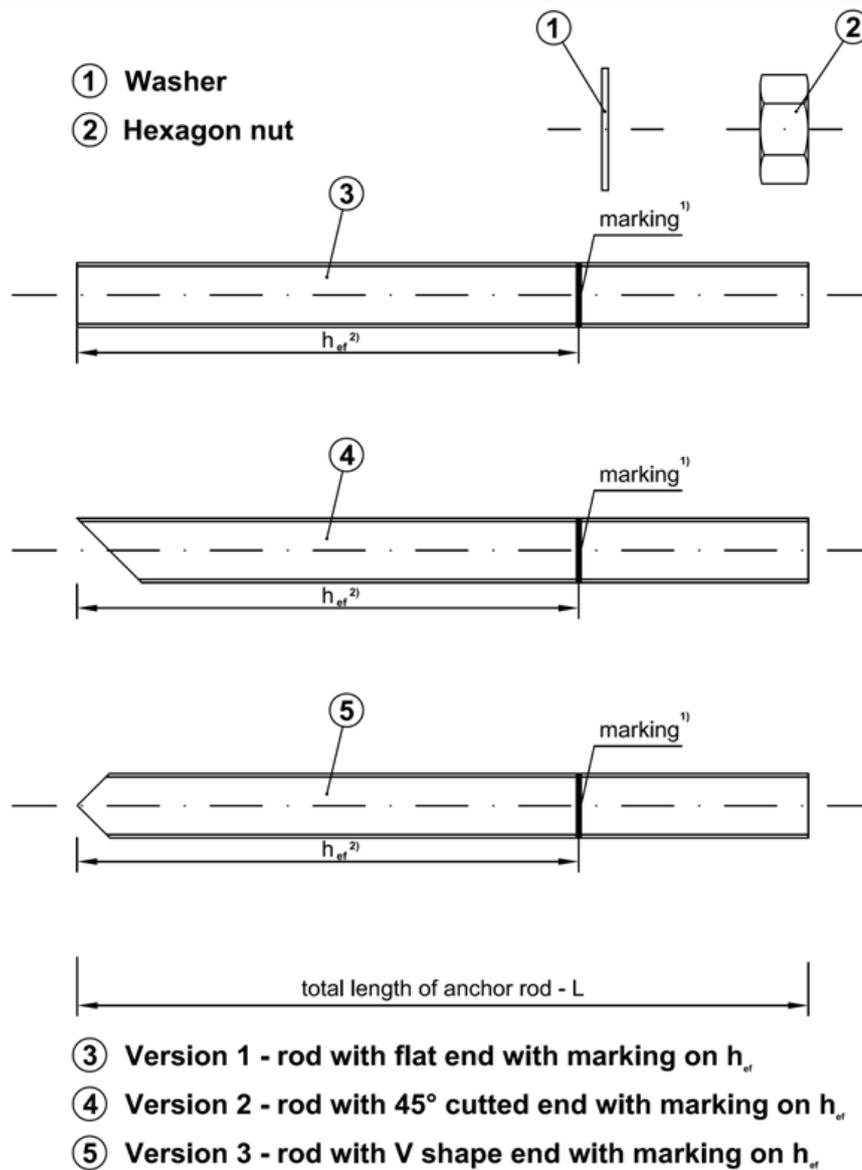


Table A1: Threaded rod dimensions

| Size | d [mm] | h_{ef} [mm] | |
|------|--------|---------------|---------------------------|
| | | solid masonry | hollow/perforated masonry |
| M8 | 8 | 80 | 80 |
| M10 | 10 | 85 | 85 |
| M12 | 12 | 95 | 85 |

- 1) Marking according to clause 4.3 point 3 of ETAG 029 – June 2010.
2) Effective anchorage depths according to the range specified in table 1.

| | |
|-----------------------------------|---|
| PE50 PRO | Annex A3 of European Technical Assessment ETA-13/0743 |
| Threaded rod types and dimensions | |

Table A2: Threaded rods materials

| Part | Designation | |
|--------------|--|--|
| | Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 | Stainless steel |
| Threaded rod | Steel, property class 5.8 or 6.8, acc. to EN ISO 898-1 | Material 1.4401 / 1.4571 acc. to EN 10088; property class 70 (A4-70) acc. to EN ISO 3506 |
| Hexagon nut | Steel, property class 5 or 6, acc. to EN 20898-2; corresponding to threaded rod material | Material 1.4401 / 1.4571 acc. to EN 10088; property class 70 (A4-70) acc. to EN ISO 3506 |
| Washer | Steel, acc. to EN ISO 7089; corresponding to threaded rod material | Material 1.4401 / 1.4571 acc. to EN 10088; corresponding to threaded rod material |

Commercial standard threaded rods with:

- material and mechanical properties according to Table 2;
- confirmation of material and mechanical properties by inspection certificate 3.1 according to EN-10204:2004;
- marking of the threaded rod with the embedment depth.

Table A3: Injection mortar

| Product | Composition |
|--|---|
| PE50 PRO two components injection mortar | Additive: quartz Bonding agent: polyester resin styrene free Hardener: dibenzoyl peroxide |

Table A4: Minimum curing time³⁾

| Masonry temperature | Processing time | Minimum curing time ⁵⁾ |
|---------------------|-----------------|-----------------------------------|
| 0°C ⁴⁾ | 25 min | 180 min |
| 5°C ⁴⁾ | 15 min | 120 min |
| 10°C | 12 min | 90 min |
| 15°C | 8 min | 60 min |
| 20°C | 6 min | 45 min |
| 25°C | 4 min | 30 min |
| 30°C | 3 min | 20 min |

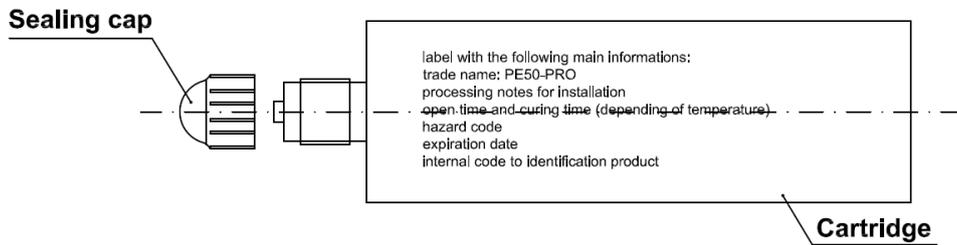
3) the minimum time from the end of the mixing to the time when the anchor may be torque or loaded (whichever is longer).

4) minimum resin temperature recommended, for injection between 5°C and 0°C, equal to 5°C.

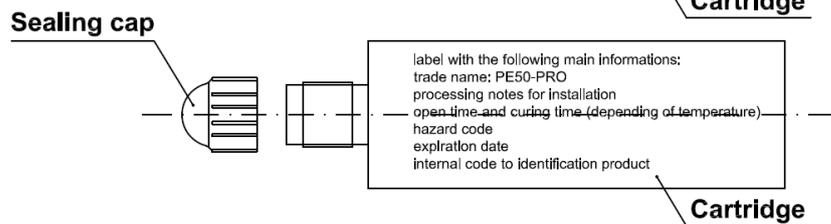
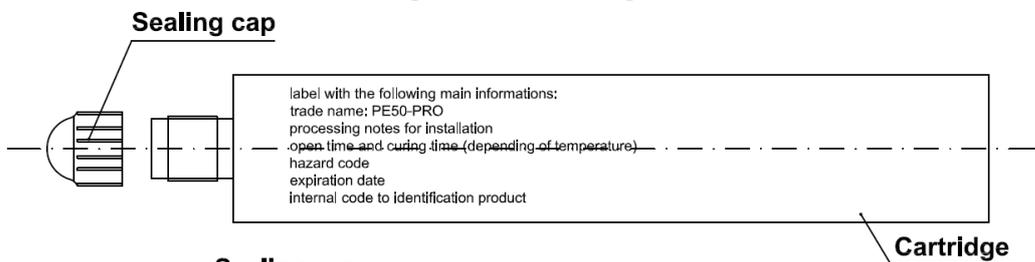
5) minimum curing time for dry and wet conditions.

| | |
|---------------------------|---|
| PE50 PRO | Annex A4 of European Technical Assessment ETA-13/0743 |
| Materials and curing time | |

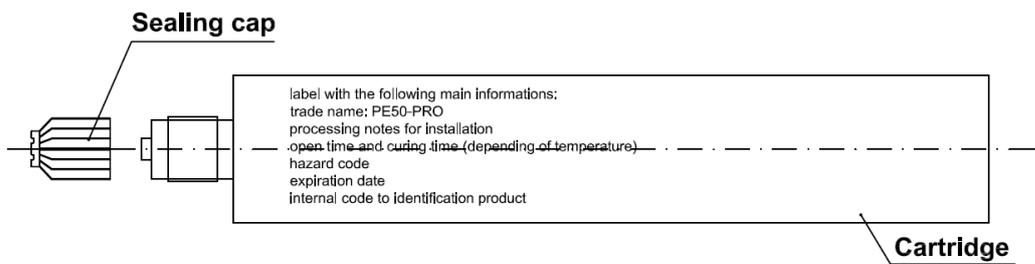
**PE50-PRO
400 ml cartridge - coaxial cartridge**



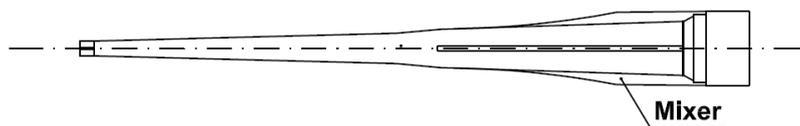
**PE50-PRO
300 ml and 165 ml cartridge - foil cartridge**



**PE50-PRO
280 ml cartridge - peeler cartridge**

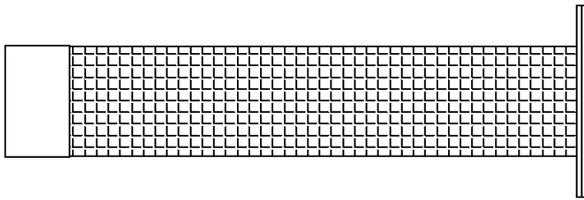


MIXER - the mixer is suitable for each type of cartridge

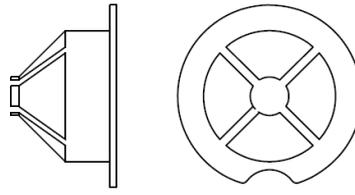


| | |
|---------------------------|---|
| PE50 PRO | Annex A5 of European Technical Assessment ETA-13/0743 |
| Cartridge types and sizes | |

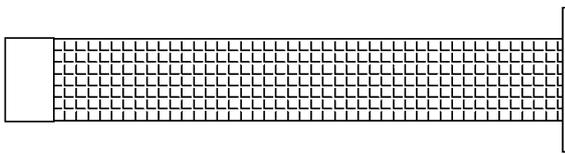
Plastic sleeve for hollow/perforated masonry: nominal dimensions and material



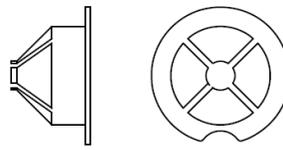
Plastic sleeve 20x85 for M12
 Nominal diameter 20 mm
 Nominal length 85 mm



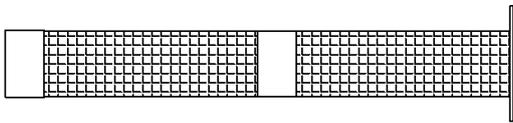
Lateral and top view of plastic centering cap for 20x85 plastic sleeve



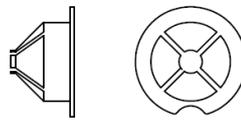
Plastic sleeve 15x85 for M10
 Nominal diameter 15 mm
 Nominal length 85 mm



Lateral and top view of plastic centering cap for 15x85 plastic sleeve



Plastic sleeve 12x80 for M8
 Nominal diameter 12 mm
 Nominal length 80 mm



Lateral and top view of plastic centering cap for 12x80 plastic sleeve

Table A5: Plastic sleeve materials

| Part | Designation |
|----------------|--|
| Plastic sleeve | Polypropylene (PP) / Polyethylene (PE) |
| Centering cap | Polypropylene (PP) / Polyethylene (PE) |

| | |
|-----------------|---|
| PE50 PRO | Annex A6 of European Technical Assessment ETA-13/0743 |
| Plastic sleeve | |

Use:

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 of Regulation 305/2011 (EU) shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences.

Anchors subject to:

- Static and quasi-static loads: sizes from M8 to M12.

Base materials:

- Solid masonry (use category b) or hollow or perforated masonry (use category c) according to Annex B7. The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2010 at minimum.

Temperature range:

The anchors may be used in the following 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 +50°C (max. short term temperature +50°C and max. long term temperature +40°C).

Use conditions (Environmental conditions):

Threaded rods:

- a) Carbon galvanized steel class 5.8 or 6.8 according to EN ISO 898-1 for dry internal conditions.
- b) Stainless steel A4-70 and A4-80 according to EN ISO 3506 for dry internal conditions.

Nuts and washers:

Corresponding to anchor rod material above mentioned for the different environmental exposures.

Installation:

- Category w/d: installation in wet substrate and use in structures subjected to dry, internal conditions.
- Perforation with drilling machine

Proposed design methods:

- ETAG 029, Annex C, Design method A

| | |
|------------------------------|---|
| PE50 PRO | Annex B1 of European Technical Assessment ETA-13/0743 |
| Intended use - Specification | |

Table B1 Installation data for solid masonry (brick n°1)*

| Size | | M8 | M10 | M12 |
|--------------------------------------|--------------------|-----------------|-----|-----|
| Nominal drilling diameter | d_0 [mm] | 10 | 12 | 14 |
| Maximum diameter hole in the fixture | d_{fix} [mm] | 9 | 12 | 14 |
| Embedment depth | h_{ef} [mm] | 80 | 85 | 95 |
| Depth of the drilling hole | h_1 [mm] | $h_{ef} + 5$ mm | | |
| Torque moment | T_{inst} [Nm] | 5 | 8 | 10 |
| Thickness to be fixed | $t_{fix,min}$ [mm] | > 0 | | |
| | $t_{fix,max}$ [mm] | < 1500 | | |
| Minimum spacing | S_{min} [mm] | 240 | 255 | 285 |
| Minimum edge distance | C_{min} [mm] | 120 | 128 | 143 |

* Type of bricks are detailed in the Annex B7

Table B2: Installation data for hollow/perforated masonry (brick n° 2 to 6)*

| Size | | M8 | M10 | M12 |
|--------------------------------------|--------------------|-----------------|--------------|--------------|
| Plastic sleeve | | 12x80 | 15x85 | 20x85 |
| Nominal drilling diameter | d_0 [mm] | 12 | 16 | 20 |
| Maximum diameter hole in the fixture | d_{fix} [mm] | 9 | 12 | 14 |
| Embedment depth | h_{ef} [mm] | 80 | 85 | 85 |
| Depth of the drilling hole | h_1 [mm] | $h_{ef} + 5$ mm | | |
| Torque moment | T_{inst} [Nm] | 3 | 4 | 6 |
| Thickness to be fixed | $t_{fix,min}$ [mm] | > 0 | | |
| | $t_{fix,max}$ [mm] | < 1500 | | |
| Minimum spacing | S_{min} [mm] | 100 | 100 | 120 |
| Minimum edge distance | C_{min} [mm] | 100 | 100 | 120 |

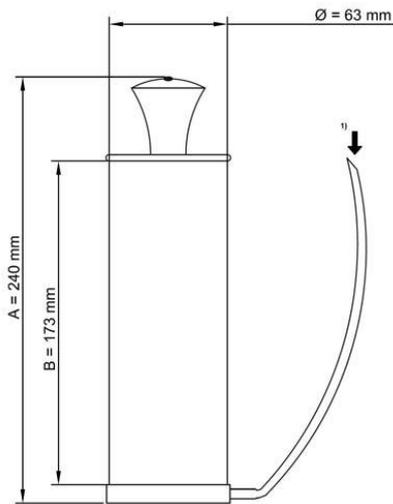
* Type of bricks are detailed in the Annex B7

PE50 PRO

Intended use - data

Annex B2
of European
Technical Assessment
ETA-13/0743

Manual blower pump: nominal dimensions



It is possible to use the mixer extension with the manual blower pump. However it is possible to blow the hole using the mechanical air system (compressed air) also with the mixer extension



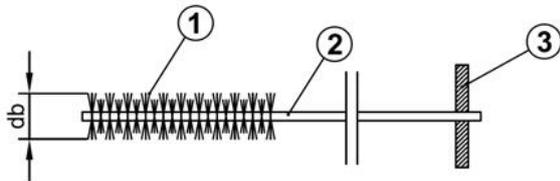
Suitable min pressure 6 bar at 6 m³/h
Oil-free compressed air
Recommended air gun with an orifice opening of minimum 3.5 mm in diameter

1) Position to insert the mixer extension

Brush

Mixer extension Ø 8 mm

Brush



- ① Steel bristles
- ② Steel stem
- ③ Wood handle

Table B3: Brush diameter

| Type of threaded rod | | | Use in solid masonry | | | Use in hollow/perforated masonry | | |
|------------------------|--------------------|------|----------------------|-----|-----|----------------------------------|-------|-------|
| | | | M8 | M10 | M12 | M8 | M10 | M12 |
| Type of plastic sleeve | | | - | - | - | 12x80 | 15x85 | 20x85 |
| d ₀ | Nominal drill hole | [mm] | 10 | 12 | 14 | 12 | 16 | 20 |
| d _b | Brush diameter | [mm] | 12 | 14 | 16 | 12 | 16 | 20 |

PE50 PRO

Cleaning tools

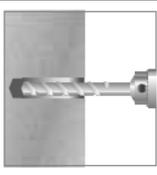
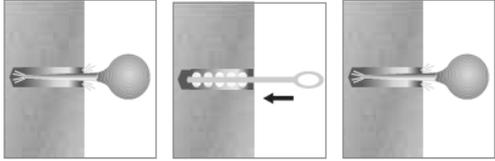
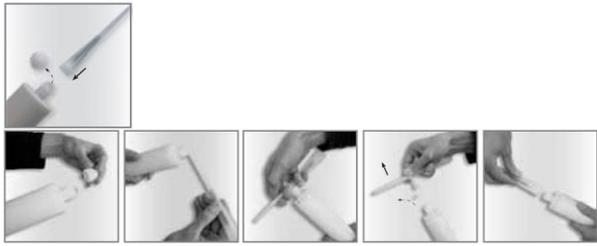
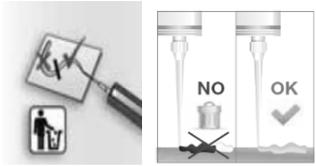
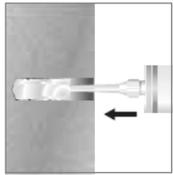
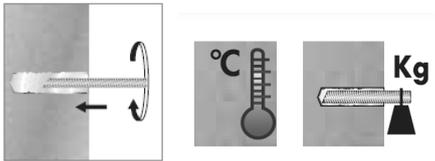
Annex B3
of European
Technical Assessment
ETA-13/0743

| Resin injection pump details | | |
|---|----------------------------|--------|
| Pump example | Size cartridge | Type |
|  | 400 ml | Manual |
|  | 300 ml 280 ml 165 ml | Manual |

PE50 PRO

Tools for injection

Annex B4
of European
Technical Assessment
ETA-13/0743

| | | |
|-----------------------------|---|---|
| 1 |  | <p>Drill the hole with the correct diameter and depth using a rotary percussive machine. Check the perpendicularity of the hole during the drilling operation.</p> |
| 2 |  <p style="text-align: center;">4x 4x 4x</p> <p style="text-align: center;">Blower Pump Brush Blower Pump</p> <p>(instead of the blower manual pump it is also possible to use the compressed air free oil)</p> | <p>Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Table B3 in Annex B3) if the brush diameter is sufficient. For the blower tools see Annex B3.</p> |
| 3 |  | <p>For sizes 400 ml and 280 ml unscrew the front cup, screw on the mixer and insert the cartridge in the gun. For the size 300 ml and 165 ml, unscrew the front cup, pull-out the steel closing clip according to the following operations:</p> <ul style="list-style-type: none"> - insert the mixer in the eye of the plastic extractor, - pull the extractor to unhook the steel closing clip of the foil. After that, screw on the mixer and insert the cartridge in the gun. |
| 4 |  | <p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two component, comes out from the mixer with an uniform color.</p> |
| 5 |  | <p>Fill the drilled hole uniformly starting from the drilled hole bottom, in order to avoid entrapment of the air; remove the mixer slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth.</p> |
| 6 |  | <p>Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex A4. Wait the curing time according Annex A4.</p> |
| PE50 PRO | | Annex B5 |
| Procedure for solid masonry | | of European Technical Assessment ETA-13/0743 |

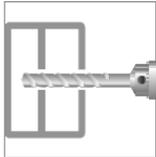
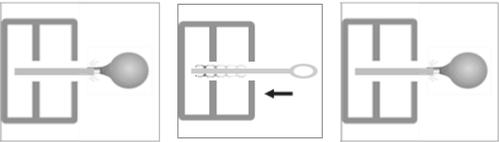
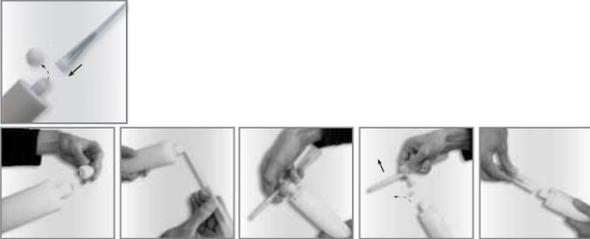
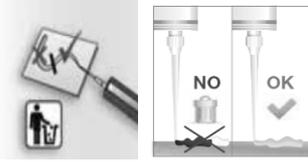
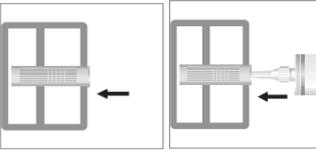
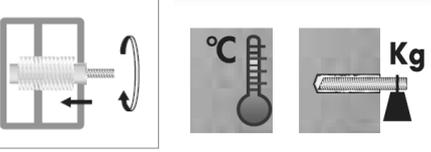
| | | |
|---|--|---|
| 1 |  | <p>Drill the hole with the correct diameter and depth using a rotary machine. Check the perpendicularity of the hole during the drilling operation.</p> |
| 2 |  <p>4x Blower Pump 2x Brush 4x Blower Pump (instead of the blower manual pump it is also possible to use the compressed air free oil)</p> | <p>Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 2 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Table B3 in Annex B3) if the brush diameter is sufficient. For the blower tools see Annex B3.</p> |
| 3 |  | <p>For sizes 400 ml and 280 ml unscrew the front cup, screw on the mixer and insert the cartridge in the gun. For the size 300 ml and 165 ml, unscrew the front cup, pull-out the steel closing clip according to the following operations:</p> <ul style="list-style-type: none"> - insert the mixer in the eye of the plastic extractor, - pull the extractor to unhook the steel closing clip of the foil. After that, screw on the mixer and insert the cartridge in the gun. |
| 4 |  | <p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two component, comes out from the mixer with an uniform color.</p> |
| 5 |  | <p>Remove the centering cap from the plastic sleeve. Insert in the hole the plastic sleeve (see Annex A6). Fill the sleeve uniformly starting from the sleeve bottom. Remove the mixer slowly bit by bit during pressing-out: remove the mixer about 10 mm for each pressing operation. Filling the sleeve completely.</p> |
| 6 |  | <p>Put on the centering cup on the filled plastic sleeve. Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex A4. Wait the curing time according Annex A4.</p> |
| PE50 PRO | | Annex B6 of European Technical Assessment ETA-13/0743 |
| Procedure for hollow/perforated masonry | | |

Table B5: Type of solid and hollow/perforated masonry

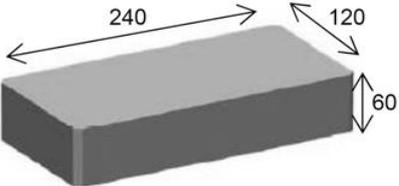
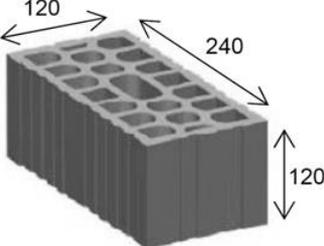
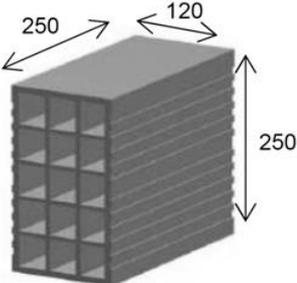
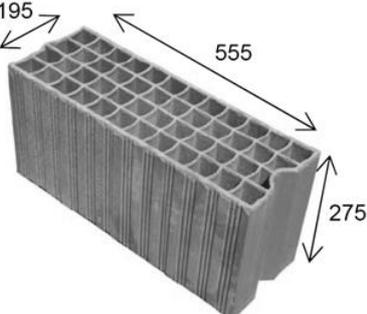
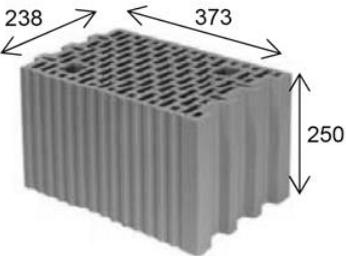
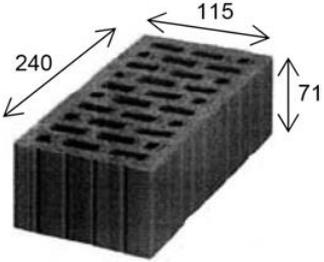
| | | |
|---|---|---|
| <p>Brick n°1 – Solid according to EN 771-1 - HD (High density)</p>  <p>Dimensions [mm]: 120 x 240 x 60 f_b class $\geq 73 \text{ N/mm}^2$ density $\rho_m \geq 1700 \text{ kg/m}^3$ (e.g. type "Mattone Pieno")</p> | <p>Brick n°2 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions [mm]: 240 x 120 x 120 f_b class $\geq 18,3 \text{ N/mm}^2$ density $\rho_m \geq 810 \text{ kg/m}^3$ (e.g. type "Mattone Doppio UNI")</p> | |
| <p>Brick n°3 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions [mm]: 120 x 250 x 250 f_b class $\geq 5,3 \text{ N/mm}^2$ density $\rho_m \geq 550 \text{ kg/m}^3$ (e.g. type "Forato")</p> | <p>Brick n°4 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions [mm]: 555 x 195 x 275 f_b class $\geq 4,0 \text{ N/mm}^2$ density $\rho_m \geq 600 \text{ kg/m}^3$ (e.g. type "Brique creuse RC 40")</p> | |
| <p>Brick n°5 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions [mm]: 373 x 238 x 250 f_b class $\geq 15 \text{ N/mm}^2$ density $\rho_m \geq 800 \text{ kg/m}^3$ (e.g. type "Porotherm 25 P+W")</p> | <p>Brick n°6 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions [mm]: 115 x 240 x 71 f_b class $\geq 12 \text{ N/mm}^2$ density $\rho_m \geq 900 \text{ kg/m}^3$ (e.g. type "Hiz B – 1.0 1NF 12-1")</p> | |
| <p>PE50 PRO</p> | | <p>Annex B7 of European Technical Assessment ETA-13/0743</p> |
| <p>Type and dimensions of brick</p> | | |

Table C1: Essential Characteristics

| ESSENTIAL CHARACTERISTICS | | PERFORMANCE | | |
|--|----------------------|------------------------|-------|-------|
| Installation parameters | | M8 | M10 | M12 |
| d [mm] | | 8 | 10 | 12 |
| d ₀ [mm] category b (solid masonry) | | 10 | 12 | 14 |
| d ₀ [mm] category c (hollow or perforated masonry) | | 12 | 16 | 20 |
| Type of plastic sleeve for use in category c | | 12x80 | 15x85 | 20x85 |
| d _{fix} [mm] | | 9 | 12 | 14 |
| h _l [mm] | | h _{ef} + 5 mm | | |
| t _{fix} [mm] | Min | > 0 | | |
| | Max | ≤ 1500 mm | | |
| T _{inst} [Nm] category b (solid masonry) | | 5 | 8 | 10 |
| T _{inst} [Nm] category c (hollow or perforated masonry) | | 3 | 4 | 6 |
| S _{min} [mm] category b (solid masonry) | | 240 | 255 | 285 |
| C _{min} [mm] category b (solid masonry) | | 120 | 128 | 143 |
| S _{min} e C _{min} [mm] category c (hollow or perforated masonry) | | 100 | 100 | 120 |
| * Resistance for tensile and shear load Temperature range -40°C/+40°C (T _{mlp} = 24°C) and -40°C/+50°C (T _{mlp} = 40°C) | | M8 | M10 | M12 |
| Brick n°1 | N _{Rk} [kN] | 1,50 | 2,50 | 3,00 |
| | V _{Rk} [kN] | 1,50 | 2,50 | 3,00 |
| Brick n°2 | N _{Rk} [kN] | 3,50 | 4,00 | 5,00 |
| | V _{Rk} [kN] | 3,50 | 4,00 | 5,00 |
| Brick n°3 | N _{Rk} [kN] | 0,60 | 1,50 | 1,50 |
| | V _{Rk} [kN] | 0,60 | 1,50 | 1,50 |
| Brick n°4 | N _{Rk} [kN] | 0,90 | 0,90 | 0,60 |
| | V _{Rk} [kN] | 0,90 | 0,90 | 0,60 |
| Brick n°5 | N _{Rk} [kN] | 2,00 | 2,00 | 2,50 |
| | V _{Rk} [kN] | 2,00 | 2,00 | 2,50 |
| Brick n°6 | N _{Rk} [kN] | 3,00 | 4,00 | 4,00 |
| | V _{Rk} [kN] | 3,00 | 4,00 | 4,00 |

* For design according to ETAG 029 Annex C: N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,pb} – steel failure is not decisive

* For design according to ETAG 029: V_{Rk} = V_{Rk,b} – steel failure without lever arm is not decisive – V_{Rk,c} according to ETAG 029 Annex C section C.5.2.2.5

Table C2: Characteristic bending moments

| Size | | | M8 | M10 | M12 |
|---|-------------------|------|------|-----|-----|
| Characteristic resistance with standard threaded rod grade 5.8 | M _{Rk,s} | [Nm] | 19 | 37 | 65 |
| Partial safety factor | γ _{Ms} | [-] | 1,25 | | |
| Characteristic resistance with standard threaded rod grade 6.8 | M _{Rk,s} | [Nm] | 22 | 45 | 79 |
| Partial safety factor | γ _{Ms} | [-] | 1,25 | | |
| Characteristic resistance with standard threaded rod stainless steel A4-70 (class 70) | M _{Rk,s} | [Nm] | 26 | 52 | 92 |
| Partial safety factor | γ _{Ms} | [-] | 1,56 | | |

PE50 PRO

Performance for static and quasi-static loads: Resistances

Annex C1
of European
Technical Assessment
ETA-13/0743

Table C3: Characteristic values for tension and shear load.

| ESSENTIAL CHARACTERISTICS | | PERFORMANCE | | |
|--|------------------------|---------------------------|---|----------------------------|
| * Resistance for tensile and shear load Temperature range -40°C/+40°C (T_{mlp} = 24°C) and -40°C/+50°C (T_{mlp} = 40°C) | | M8 | M10 | M12 |
| γ _{Mm} [-] Category w/d | | 2,50 | | |
| Brick n°1 | S _{cr,N} [mm] | 240 | 255 | 285 |
| | C _{cr,N} [mm] | 120 | 128 | 143 |
| Brick n°2 | S _{cr,N} [mm] | 240 | 240 | 240 |
| | C _{cr,N} [mm] | 120 | 120 | 120 |
| Brick n°3 | S _{cr,N} [mm] | 250 | 250 | 250 |
| | C _{cr,N} [mm] | 125 | 125 | 125 |
| Brick n°4 | S _{cr,N} [mm] | 555 | 555 | 555 |
| | C _{cr,N} [mm] | 278 | 278 | 278 |
| Brick n°5 | S _{cr,N} [mm] | 373 | 373 | 373 |
| | C _{cr,N} [mm] | 187 | 187 | 187 |
| Brick n°6 | S _{cr,N} [mm] | 240 | 240 | 240 |
| | C _{cr,N} [mm] | 120 | 120 | 120 |
| β coefficient for in situ test (ETAG 029 Annex B) Temperature range: -40°C/+40°C e -40°C/+50°C | | M8 | M10 | M12 |
| Brick n° 1, 2, 3, 4, 6 | | β [-] 0,70 | | |
| Brick n° 5 | | 0,65 | 0,70 | 0,70 |
| Displacement under service load | | | | |
| Tensile load | | | | |
| Brick n°1 – Solid brick | | M8 | M10 | M12 |
| Admissible service load in tensile | F [kN] | 0,65 | 1,03 | 1,15 |
| Displacement | δ _{N0} [mm] | 0,08 | 0,07 | 0,06 |
| | δ _{N∞} [mm] | 0,16 | 0,16 | 0,16 |
| Brick n°2 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in tensile | F [kN] | 1,48 | 1,81 | 2,09 |
| Displacement | δ _{N0} [mm] | 0,06 | 0,08 | 0,10 |
| | δ _{N∞} [mm] | 0,16 | 0,16 | 0,20 |
| Brick n°3 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in tensile | F [kN] | 0,29 | 0,73 | 0,80 |
| Displacement | δ _{N0} [mm] | 0,06 | 0,08 | 0,07 |
| | δ _{N∞} [mm] | 0,16 | 0,16 | 0,16 |
| Brick n°4 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in tensile | F [kN] | 0,39 | 0,44 | 0,26 |
| Displacement | δ _{N0} [mm] | 0,06 | 0,06 | 0,06 |
| | δ _{N∞} [mm] | 0,16 | 0,16 | 0,16 |
| Brick n°5 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in tensile | F [kN] | 0,92 | 0,91 | 1,02 |
| Displacement | δ _{N0} [mm] | 0,06 | 0,06 | 0,06 |
| | δ _{N∞} [mm] | 0,16 | 0,16 | 0,16 |
| Brick n°6 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in tensile | F [kN] | 1,19 | 1,69 | 1,78 |
| Displacement | δ _{N0} [mm] | 0,12 | 0,07 | 0,06 |
| | δ _{N∞} [mm] | 0,24 | 0,16 | 0,16 |
| PE50 PRO | | | Annex C2 of European Technical Assessment ETA-13/0743 | |
| Performance for static and quasi-static loads: Resistances | | | | |

Table C3 cont.: Characteristic values for tension and shear load..

| ESSENTIAL CHARACTERISTICS | | PERFORMANCE | | |
|--|-------------------------|---------------------------|----------------------------|----------------------------|
| Displacement under service load | | | | |
| Shear load | | | | |
| Brick n°1 – Solid brick | | M8 | M10 | M12 |
| Admissible service load in shear | F [kN] | 1,32 | 2,94 | 2,62 |
| Displacement | δ_{v0} [mm] | 0,23 | 0,48 | 0,38 |
| | $\delta_{v\infty}$ [mm] | 0,34 | 0,72 | 0,57 |
| Brick n°2 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in shear | F [kN] | 1,72 | 2,03 | 2,93 |
| Displacement | δ_{v0} [mm] | 0,20 | 0,38 | 0,34 |
| | $\delta_{v\infty}$ [mm] | 0,30 | 0,57 | 0,51 |
| Brick n°3 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in shear | F [kN] | 0,93 | 1,08 | 0,86 |
| Displacement | δ_{v0} [mm] | 0,31 | 0,23 | 0,18 |
| | $\delta_{v\infty}$ [mm] | 0,46 | 0,34 | 0,27 |
| Brick n°4 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in shear | F [kN] | 0,44 | 0,63 | 0,44 |
| Displacement | δ_{v0} [mm] | 0,10 | 0,18 | 0,27 |
| | $\delta_{v\infty}$ [mm] | 0,15 | 0,27 | 0,40 |
| Brick n°5 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in shear | F [kN] | 0,78 | 1,06 | 1,00 |
| Displacement | δ_{v0} [mm] | 0,23 | 0,19 | 0,31 |
| | $\delta_{v\infty}$ [mm] | 0,34 | 0,28 | 0,46 |
| Brick n°6 – Hollow/perforated brick | | M8 12x80 | M10 15x85 | M12 20x85 |
| Admissible service load in shear | F [kN] | 1,25 | 2,23 | 1,65 |
| Displacement | δ_{v0} [mm] | 0,17 | 0,69 | 0,13 |
| | $\delta_{v\infty}$ [mm] | 0,25 | 1,03 | 0,19 |

Table C4: Reaction to fire.

| ESSENTIAL CHARACTERISTICS | PERFORMANCE |
|---------------------------|--|
| Reaction to fire | In the final application the thickness of the mortar layer is about 1 to 2 mm and most of the mortar is material classified class A1 according to EC Decision 96/603/EC. Therefore it may be assumed that the bonding material (synthetic mortar or a mixture of synthetic mortar and cementitious mortar) in connection with the metal anchor in the end use application do not make any contribution to fire growth or to the fully developed fire and they have no influence to the smoke hazard. |

Table C5: Resistance to fire.

| ESSENTIAL CHARACTERISTICS | PERFORMANCE |
|---------------------------|-------------|
| Resistance to fire | NPD |

PE50 PRO

Performance for static and quasi-static loads: Resistances

Annex C3
of European
Technical Assessment
ETA-13/0743

Table C6: Terminology and symbols

| TERMINOLOGY AND SYMBOLS | |
|-------------------------|--|
| d | Diameter of anchor bolt or thread diameter |
| d ₀ | Drill hole diameter |
| d _{fix} | Diameter of clearance hole in the fixture |
| h _{ef} | Effective anchorage depth |
| h ₁ | Depth of the drilling hole |
| T _{inst} | Torque moment to installation |
| t _{fix} | Thickness to be fixed |
| S _{min} | Minimum allowable spacing |
| C _{min} | Minimum allowable edge distance |
| N _{Rk} | Characteristic tensile resistance for single anchor |
| V _{Rk} | Characteristic shear resistance for single anchor |
| γ _{Mm} | Partial safety factors |
| S _{cr,N} | Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects |
| C _{cr,N} | Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects |
| β | Factor according to ETAG 029 Annex B |
| F | Service load |
| δ ₀ | Short term displacement under service load |
| δ _∞ | Long term displacement under service load |
| NPD | No performance declared |

PE50 PRO

Terminology and symbols

Annex C4
of European
Technical Assessment
ETA-13/0743