ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
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

European Technical Assessment ETA-13/0743 of 2026/01/07

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:	ALSAFIX 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 for use in masonry Threaded rod sizes: M8 to M16 Rebar sizes: Ø8 to Ø12
Manufacturer:	ALSAFIX SAS 114a Rue Principale F-67240 Gries France 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:	39 pages including 34 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:	EAD 330076-01-0604 - Metal injection anchors for use in masonry
This version replaces:	The ETA with the same number issued on 2016-08-10

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The Injection system ALSAFIX PE50 PRO is a bonded anchor (injection type) consisting of a mortar cartridge with ALSAFIX injection mortar PE50 PRO, a perforated sleeve GC, and an anchor rod with hexagon nut and washer in the range of M8 to M16 and rebar from Ø8 to Ø12.

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

The anchor rod/rebar 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 documentation[1] of this European Technical Assessment.

The intended use specifications of the product are detailed in the Annex B1 to B13.

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

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability in the sense of the Basic Works Requirement 1 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) or AAC masonry category d according to Annex B2 to B5. 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 dry or wet base material and use in structures subjected to dry, internal conditions and Category w/w: installation in dry or wet base material and use in structures subjected to dry or wet environmental conditions.

The anchors may be used in the following temperature range:
Service temperature 1: 40ºC max short term temperature 24ºC max long term temperature
Service temperature 2: 50ºC max short term temperature 40ºC max long term temperature

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 C15.

Safety in case of fire (BWR 2):
No performance assessed.

Hygiene, health and the environment (BWR3):
No performance assessed.

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 in the sense of the Basic Works Requirement 1 has been made in accordance with EAD 330076-01-0604, based on the Use Categories b, c and d in respect of the base material and Category w/d and w/w in respect of installation and use.

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

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.

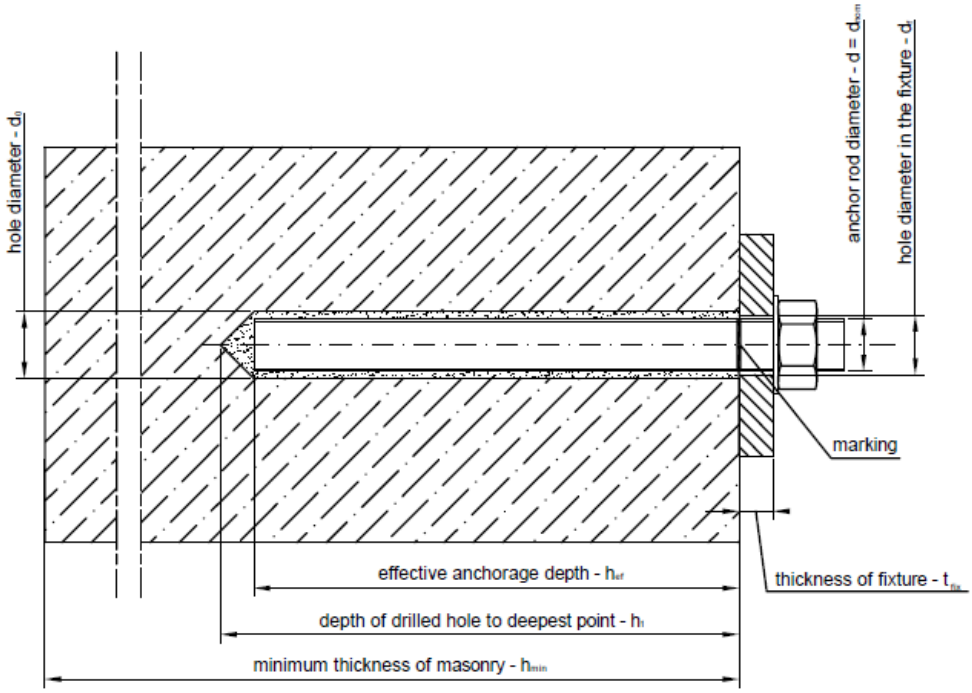
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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

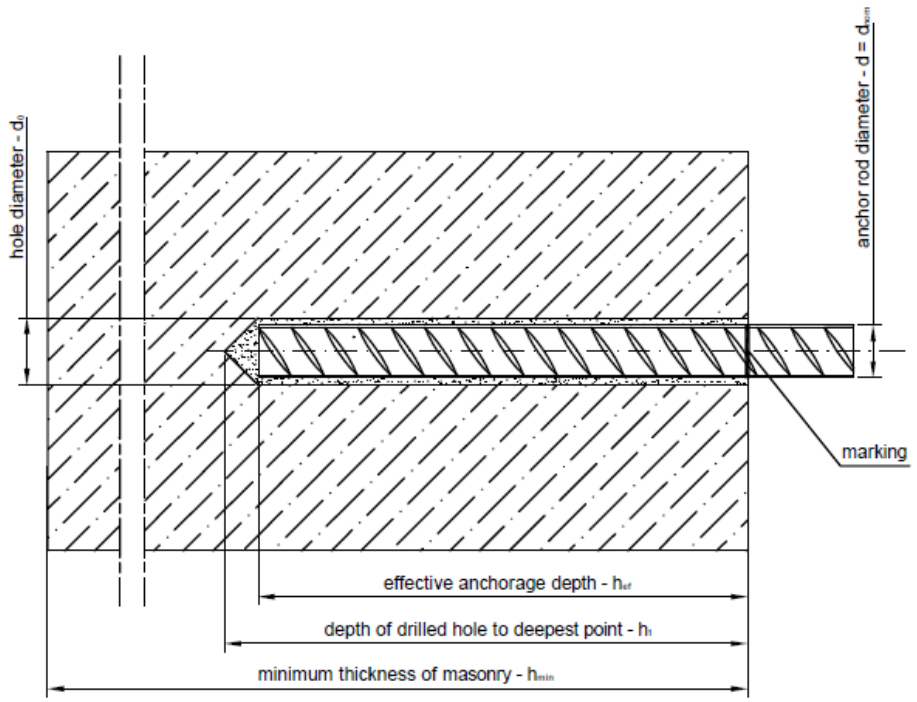
Issued in Copenhagen on 2026-01-07 by

Thomas Bruun
Manager, ETA-Danmark

Anchor application in solid masonry and in AAC masonry with threaded rod from M8 to M16

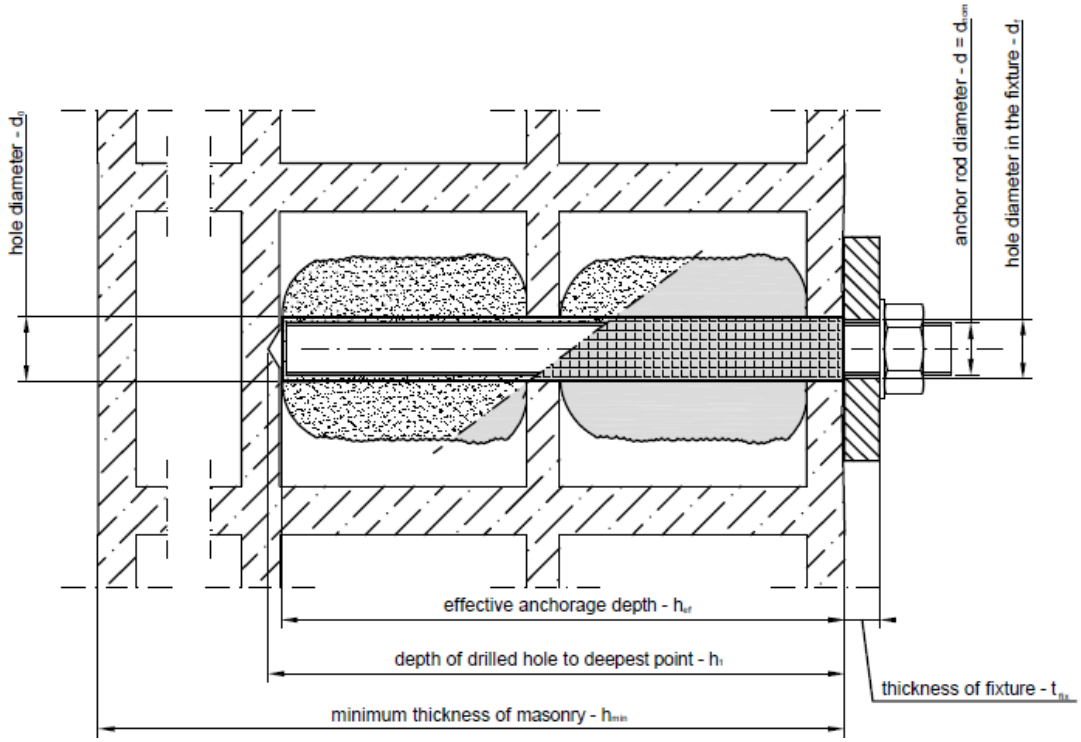


Anchor application in solid masonry with rebar from Ø8 to Ø12



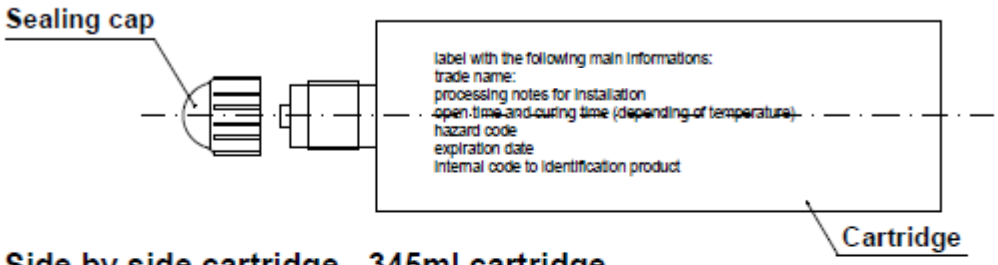
ALSAFIX PE50 PRO	**Annex A1** of European Technical Assessment ETA-13/0743
Product description Installed condition (1)	

Anchor application in hollow masonry with threaded rod from M8 to M12 and GC plastic sleeves

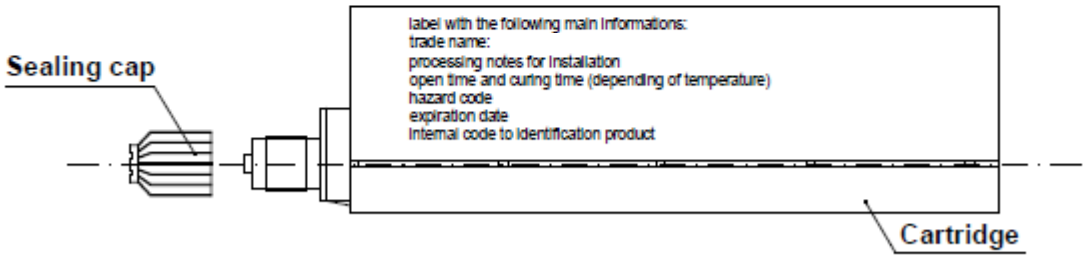


ALSAFIX PE50 PRO	**Annex A2**
Product description Installed condition (2)	of European Technical Assessment ETA-13/0743

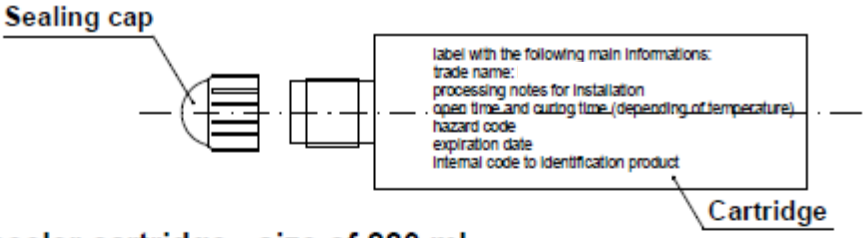
Coaxial cartridge - sizes from 75 ml to 420 ml



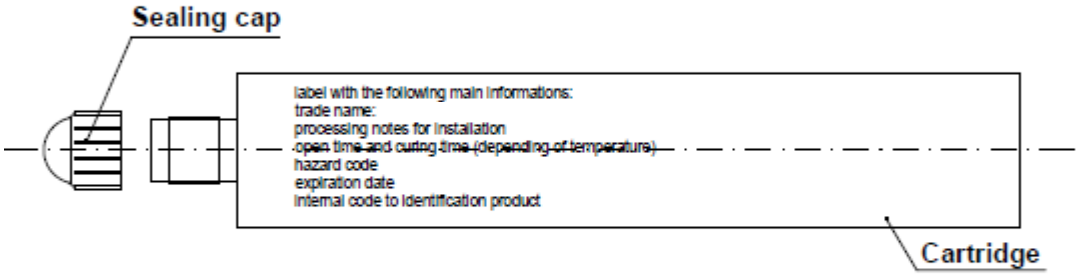
Side by side cartridge - 345ml cartridge



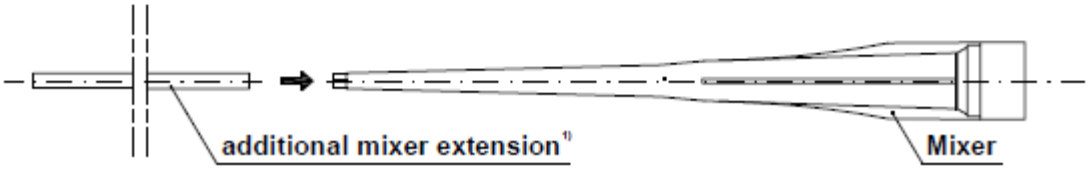
CIC foil cartridge - sizes from 165 ml to 300 ml



Coaxial peeler cartridge - size of 280 ml

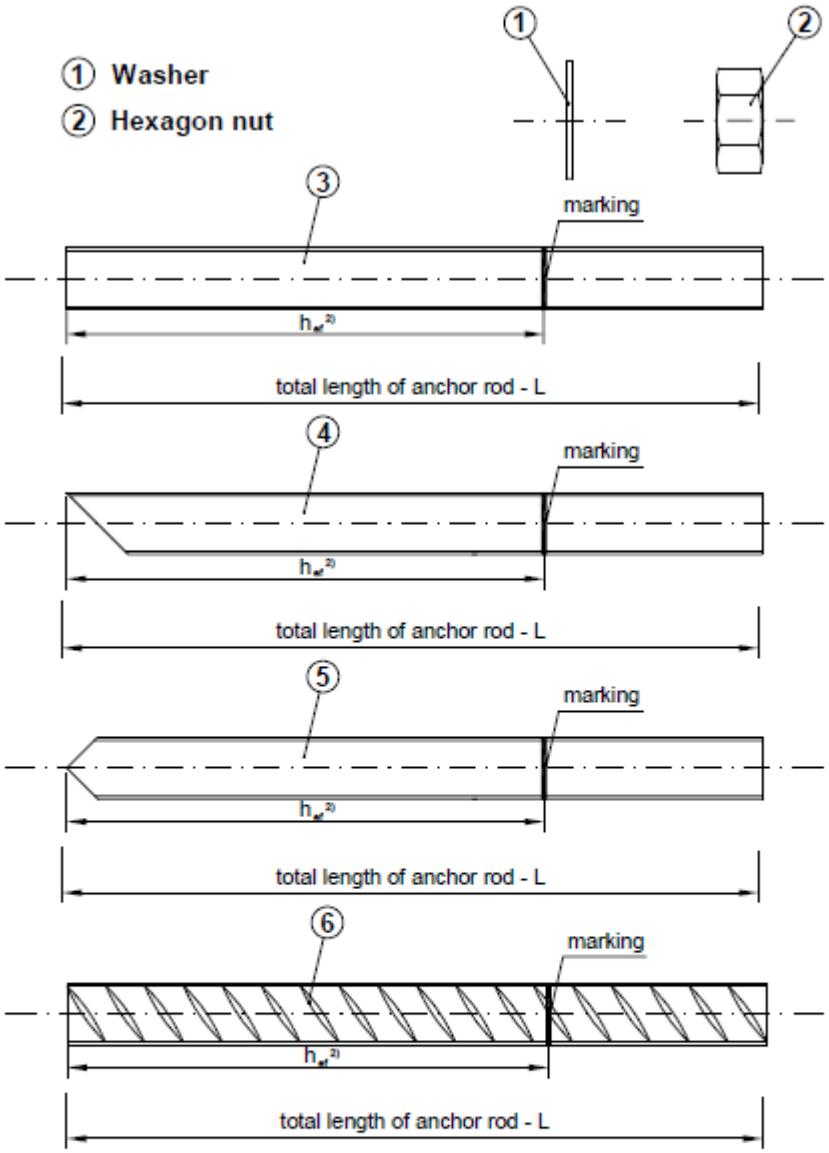


MIXER - the mixer is suitable for each type of cartridge



1) Variable length from 380 mm up to 1000 mm

ALSAFIX PE50 PRO	**Annex A3** of European Technical Assessment ETA-13/0743
Product description Cartridge types and sizes	



③ Version 1 - rod with flat end with marking on h_{ef}
④ Version 2 - rod with 45° cutted end with marking on h_{ef}
⑤ Version 3 - rod with V shape end with marking on h_{ef}
⑥ Rebar - Deformed reinforcing bar with marking on h_{ef}

ALSAFIX PE50 PRO	**Annex A4** of European Technical Assessment ETA-13/0743
Product description Steel elements	

Table A1: Threaded rod materials

Designation	**Material**				
Steel, zinc plated **electroplated ≥ 5 µm acc. to EN ISO 4042** **hot-dip galvanized ≥ 40 µm acc. to EN ISO 1461**					
Threaded rod	**Property class**	**Characteristic steel ultimate strength**	**Characteristic steel yield strength**	**Fracture elongation**	
	4.8	$f_{uk} \geq 400$ N/mm²	$f_{yk} \geq 320$ N/mm²	$A_5 > 8\%$	EN ISO 898-1
	5.8	$f_{uk} \geq 500$ N/mm²	$f_{yk} \geq 400$ N/mm²	$A_5 > 8\%$	
	8.8	$f_{uk} \geq 800$ N/mm²	$f_{yk} \geq 640$ N/mm²	$A_5 \geq 12\%$	
Hexagon nut	4	for class 4.8 rods			EN 898-2
	5	for class 5.8 rods			
	8	for class 8.8 rods			
Washer	Steel, according to EN ISO 7089; corresponding to anchor rod material				
Stainless steel A2 **(Materials) 1.4301, 1.4307, 1.4567, 1.4541** **Stainless steel A4** **(Materials) 1.4401, 1.4404, 1.4571, 1.4362,1.4578** **High corrosion resistance stainless steel (HCR)** **(Materials) 1.4529, 1.4565**					
Threaded rod	**Property class**	**Characteristic steel ultimate strength**	**Characteristic steel yield strength**	**Fracture elongation**	
	50	$f_{uk} \geq 500$ N/mm²	$f_{yk} \geq 210$ N/mm²	$A_5 > 8\%$	EN 10088 EN ISO 3506
	70	$f_{uk} \geq 700$ N/mm²	$f_{yk} \geq 450$ N/mm²	$A_5 \geq 12\%$	
	80	$f_{uk} \geq 800$ N/mm²	$f_{yk} \geq 600$ N/mm²	$A_5 \geq 12\%$	
Hexagon nut	50	for class 50 rods			EN 10088 EN ISO 3506
	70	for class 70 rods			
	80	for class 80 rods			
Washer	Steel, according to EN 10088; corresponding to anchor rod material				

Commercial standard threaded rods may be used, with: material and mechanical properties according to Table A1, 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, see Annex A4.

Table A2: Rebar materials

Designation	**Material**
Rebar according to EN 1992-1-1:2004+AC:2010, Annex C	Bars and de-coiled rods Class B or C With f_{yk} and k according to NDP or NCL or EN 1992-1-1:2004/NA $f_{uk} = f_{tk} = k \times f_{yk}$ - Rib height of the bar (h) in the range $0{,}05d \leq h \leq 0{,}07d$

Table A3: Injection mortar

Product	**Composition**
ALSAFIX PE50 PRO two components injection mortar	Mortar resin styrene-free, hardener, filler

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

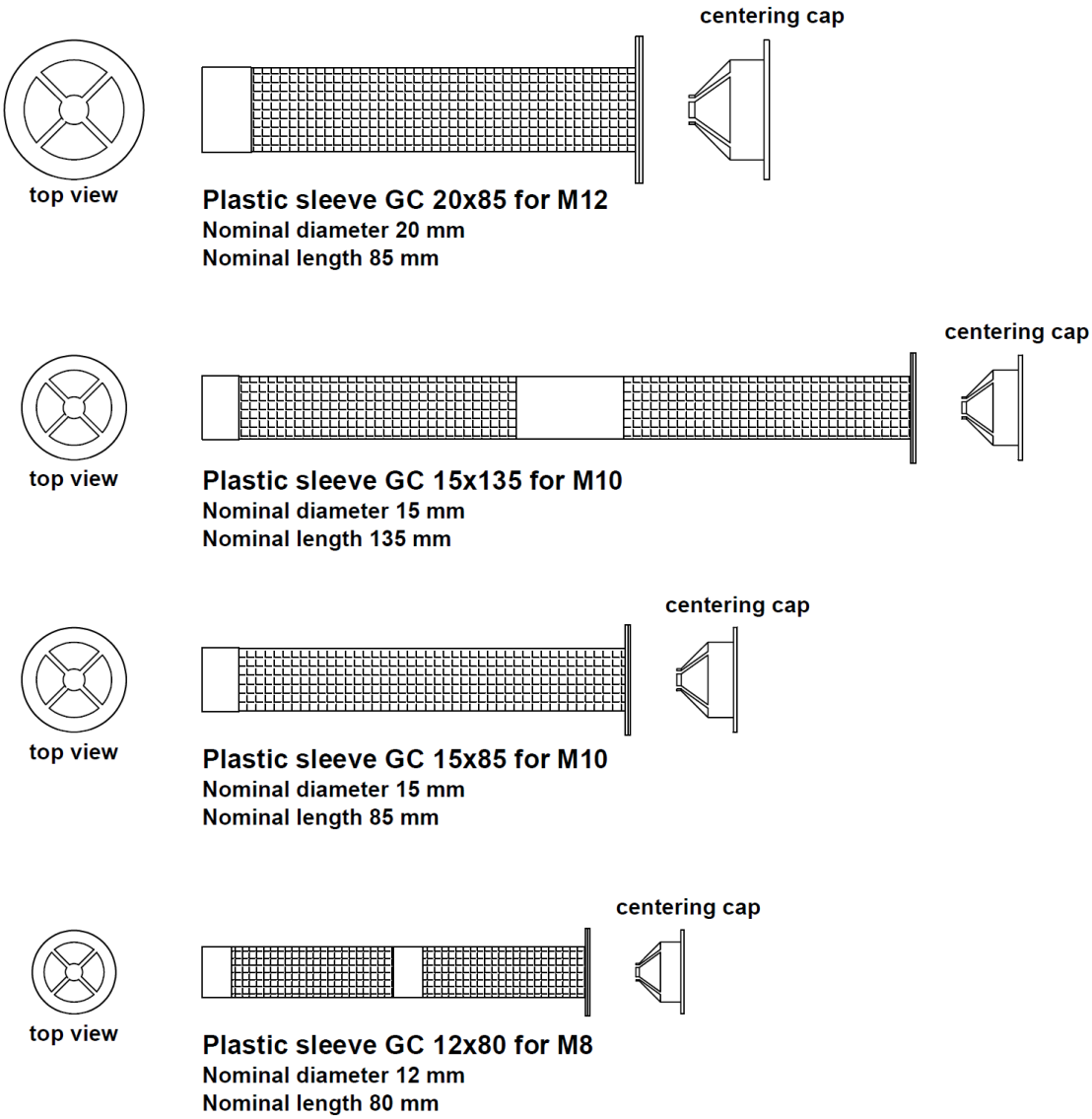


Table A4: Plastic sleeve materials

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

Use:
The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability in the sense of the Basic Works Requirement 1 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 M16 and ϕ8 to ϕ12

Base materials:
- Solid masonry (use category b)
- Hollow or perforated masonry (use category c)
- Autoclaved aerated concrete AAC masonry (use category d).

The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2010 at minimum.
For other bricks in solid masonry and in hollow masonry or in autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to EOTA TR 053, under consideration of the β-factor.

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):
- Structures subject to dry internal conditions: all materials according to Table A1 and Table A2, Annex A5.
- For all other conditions according to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance class:
- Stainless steel A2 according to Annex A5, Table A1: CRC II
- Stainless steel A4 according to Annex A5, Table A1: CRC III
- High corrosion resistance steel HCR according to Annex A5, Table A1: CRC V

Installation:
- Condition d/d: installation in dry base material and use in structures subjected to dry conditions.
- Condition w/d: installation in dry or wet base material and use in structures subjected to dry conditions.
- Condition w/w: installation in dry or wet base material and use in structures subjected to wet conditions.
- Perforation with drilling machine: hammer drilling for solid and AAC bricks, rotary drilling for hollow bricks.

Design methods:
- Verifiable calculation notes and drawings are prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.
- The anchorages are designed in accordance with the EOTA TR 054, Design method A under the responsibility of an engineer experienced in anchorages and masonry work.

Table B1: Brick types and properties with corresponding fastening elements

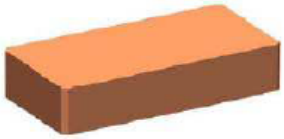
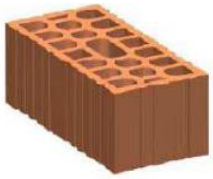
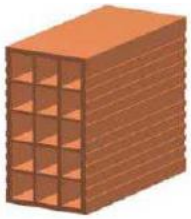
Brick n°	Brick Name - Category Density [kg/m3] Dimension L x B x H [mm]	Brick Picture	Steel element	Sleeve	Annex
1	**Solid brick (b) EN 771-1** Mattone Pieno ρ=1700 120 x 240 x 60		M8 to M12	-	C5
2	**Solid brick (b) EN 771-1** Rosso classico ρ=1560 120 x 250 x 55		M8 to M16 ϕ8 to ϕ12	-	C6-C7
3	**Hollow brick (c) EN 771-1** Mattone Doppio UNI ρ=810 240 x 120 x 120		M8 to M12	GC 12x80 GC15x85 GC 20x85	C8
4	**Hollow brick (c) EN 771-1** Mattone forato ρ=550 250 x 250 x 120		M8 to M12	GC 12x80 GC15x85 GC 20x85	C9
5	**Hollow brick (c) EN 771-1** Brique creuse RC 40 ρ=600 555 x 195 x 275		M8 to M12	GC 12x80 GC15x85 GC 20x85	C10

Table B2: Brick types and properties with corresponding fastening elements

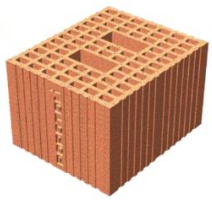
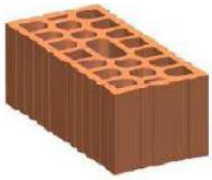
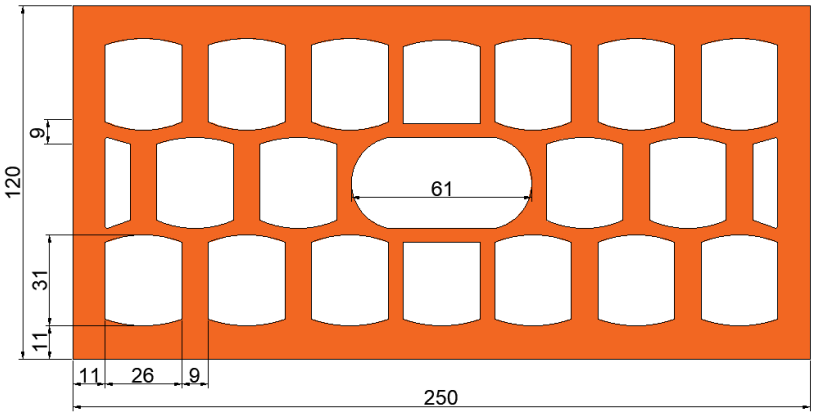
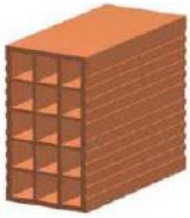
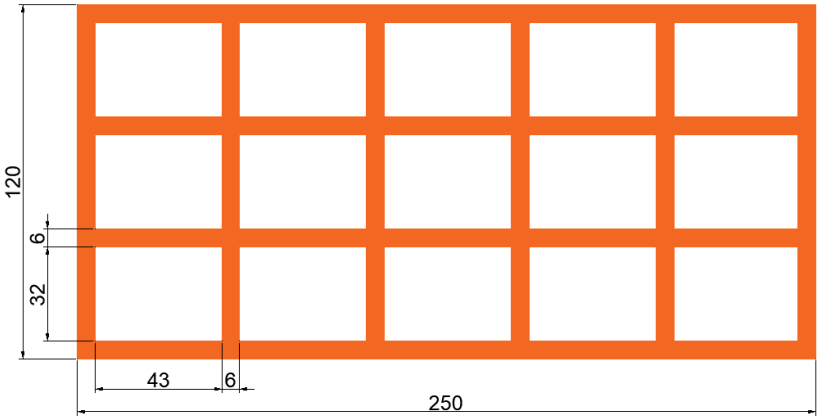
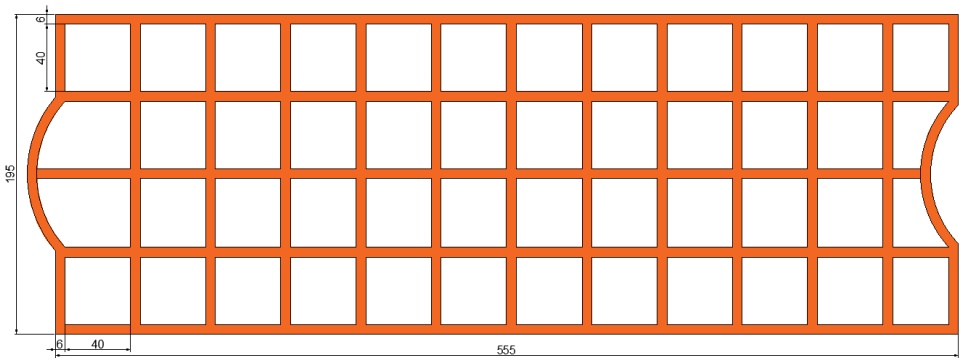
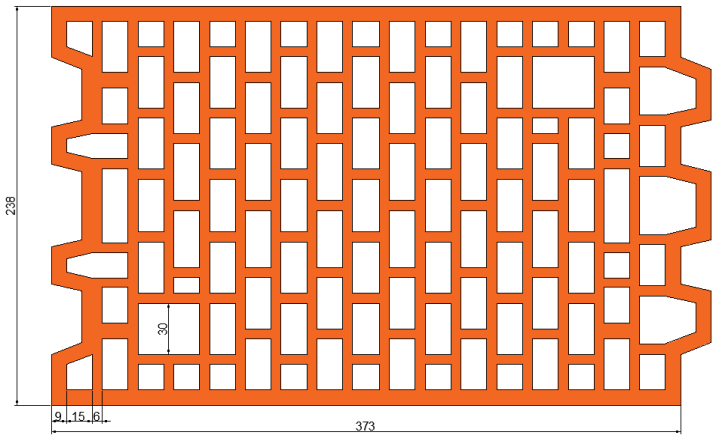
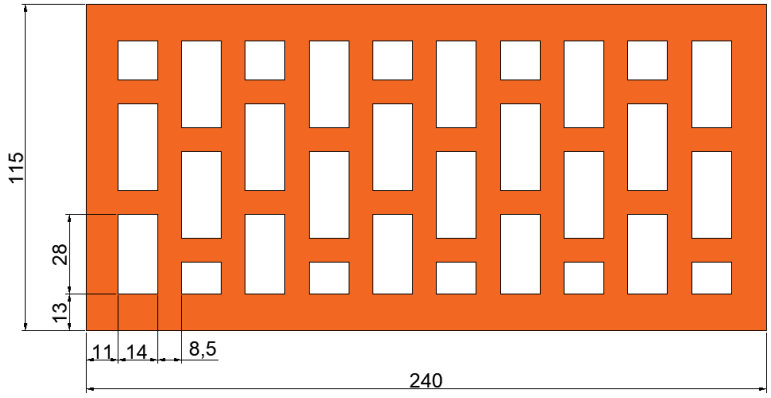
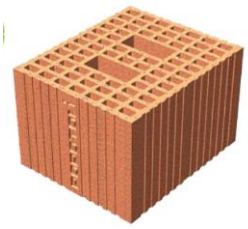
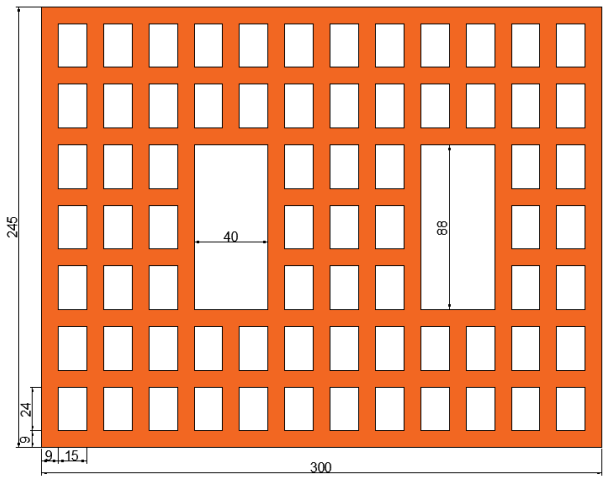
Brick n°	Brick Name - Category Density [kg/m3] Dimension L x B x H [mm]	Brick Picture	Steel element	Sleeve	Annex
6	**Hollow brick (c) EN 771-1** Porotherm 25 P+W ρ=800 373 x 238 x 250		M8 to M12	GC 12x80 GC15x85 GC 20x85	C11
7	**Hollow brick (c) EN 771-1** Hlz B – 1.0 1NF 12-1 ρ=900 115 x 240 x 71		M8 to M12	GC 12x80 GC15x85 GC 20x85	C12
8	**Hollow brick (c) EN 771-1** Poroton ρ=900 300 x 245 x 230		M10	GC15x135	C13
9	**AAC2 (d) EN 771-4** Climagold ρ=300 625 x 200 x 360		M8 to M16	-	C14
10	**AAC5 (d) EN 771-4** Blocco sismico ρ=575 625 x 200 x 300		M8 to M16	-	C15

Table B3: Brick types and properties with corresponding fastening elements

Hollow brick (c) **EN 771-1** Mattone Doppio UNI 	
Hollow brick (c) **EN 771-1** Mattone forato 	
Hollow brick (c) **EN 771-1** Brique creuse RC 40 	

ALSAFIX PE50 PRO	**Annex B4** of European Technical Assessment ETA-13/0743
Intended use Details for hollow bricks (1)	

Table B4: Brick types and properties with corresponding fastening elements

Hollow brick (c) **EN 771-1** Porotherm 25 P+W 	
Hollow brick (c) **EN 771-1** Hlz B – 1.0 1NF 12-1 	
Hollow brick (c) **EN 771-1** Poroton P800 	

ALSAFIX PE50 PRO	**Annex B5** of European Technical Assessment ETA-13/0743
Intended use Details for hollow bricks (2)	

Table B5 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		
Minimum wall thickness	h_{min} [mm]	h_{ef} + 30 mm		
Torque moment	T_{inst} [Nm]	5	8	10
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 B2

Table B6 Installation data for solid masonry (brick n°2)*

Size		**M8-ϕ8**	**M10-ϕ10**	**M12-ϕ12**	**M16**
Nominal drilling diameter	d_0 [mm]	10	12	14	18
Maximum diameter hole in the fixture	d_{fix} [mm]	9	12	14	18
Embedment depth	h_{ef} [mm]	80	85	95	105
Depth of the drilling hole	h_1 [mm]	h_{ef} + 5 mm			
Minimum wall thickness	h_{min} [mm]	h_{ef} + 30 mm			
Torque moment	T_{inst} [Nm]	5	8	10	10
Minimum spacing	S_{min} [mm]	50	50	50	60
Minimum edge distance	C_{min} [mm]	50	50	50	60

* Type of bricks are detailed in the Annex B2

Table B7: Installation data for hollow/perforated masonry (brick n° 3 to 8)*

Size		**M8**	**M10**	**M10**	**M12**
Plastic sleeve		**GC 12x80**	**GC 15x85**	**GC 15x135**	**GC 20x85**
Nominal drilling diameter	d_0 [mm]	12	16	16	20
Maximum diameter hole in the fixture	d_{fix} [mm]	9	12	12	14
Embedment depth	h_{ef} [mm]	80	85	135	85
Depth of the drilling hole	h_1 [mm]	h_{ef} + 5 mm			
Minimum wall thickness	h_{min} [mm]	h_{ef} + 30 mm			
Torque moment	T_{inst} [Nm]	3	4	4	6
Minimum spacing	S_{min} [mm]	See Annex C8 to C13			
Minimum edge distance	C_{min} [mm]				

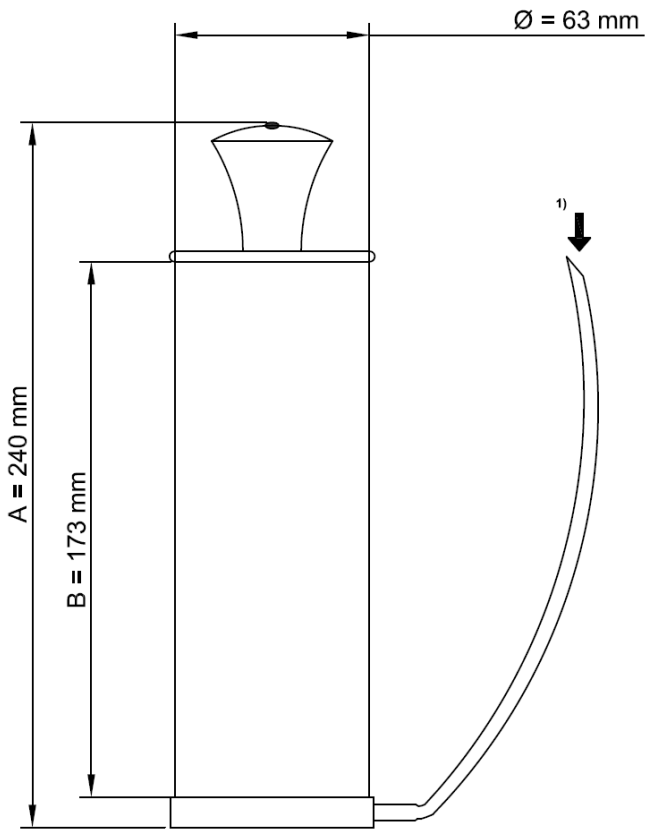
* Type of bricks are detailed in the Annex B2-B3

Table B8 Installation data for AAC masonry (brick n°9-10)*

Size		**M8**	**M10**	**M12**	**M16**
Nominal drilling diameter	d_0 [mm]	10	12	14	18
Maximum diameter hole in the fixture	d_{fix} [mm]	9	12	14	18
Embedment depth	h_{ef} [mm]	80	85	95	105
Depth of the drilling hole	h_1 [mm]	h_{ef} + 5 mm			
Minimum wall thickness	h_{min} [mm]	h_{ef} + 30 mm			
Torque moment	T_{inst} [Nm]	2			
Minimum spacing	S_{min} [mm]	50	50	50	60
Minimum edge distance	C_{min} [mm]	50	50	50	60

* Type of bricks are detailed in the Annex B3

Manual blower pump: nominal dimensions



It is possible to use the mixer extension with the manual blower pump.

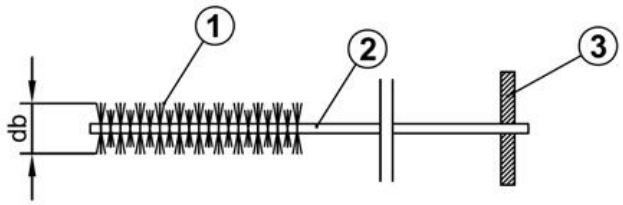
However it is possible to blow the hole using the mechanical air system (compressed air) also with the mixer estension

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

Mixer extension (from 380 mm to 1000 mm) with nominal diameter equal to 10 mm

ALSAFIX PE50 PRO	**Annex B8** of European Technical Assessment ETA-13/0743
Intended use Cleaning and installation accessories (1)	



① Steel bristles
② Steel stem
③ Wood handle

Table B9: Brush diameter for solid masonry and AAC

			Use in solid masonry and AAC			
Type of threaded rod			**M8-ϕ8**	**M10-ϕ10**	**M12-ϕ12**	**M16**
d_0	Nominal drill hole	[mm]	10	12	14	18
d_b	Brush diameter	[mm]	12	14	16	20

Table B10: Brush diameter for hollow/perforated masonry

			Use in hollow/perforated masonry			
Type of threaded rod			**M8**	**M10**	**M10**	**M12**
Type of plastic sleeve			**GC12x80**	**GC 15x85**	**GC 15x135**	**GC 20x85**
d_0	Nominal drill hole	[mm]	16	16	16	20
d_b	Brush diameter	[mm]	16	16	16	20

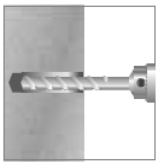
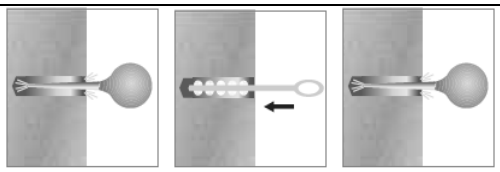
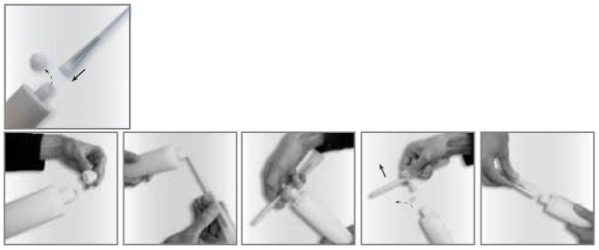
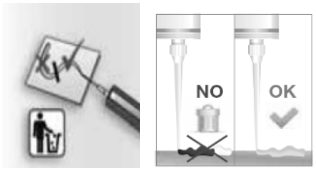
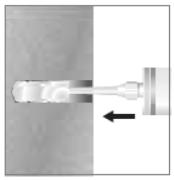
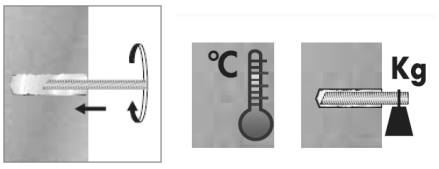
Table B11: Mortar injection dispenser

Injection dispensers	Cartridges
 *Manual*	420 ml 400 ml 380 ml
 *Manual*	345 ml 300 ml 280 ml 165 ml
 *Manual*	300 ml 280 ml 165 ml
 *Pneumatic*	420 ml 400 ml 380 ml
 *Battery*	420 ml 400 ml 380 ml 345 ml 300 ml

Table B12: Minimum curing time[1)3)]

Masonry temperature	Processing time	Minimum curing time[1)3)]
-5°C[2)]	30 min	360 min
0°C[2)]	25 min	180 min
5°C[2)]	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
40°C	1 min	20 min

1) the minimum time from the end of the mixing to the time when the anchor may be torque or loaded
2) minimum resin temperature recommended, for injection between 5°C and -5°C, equal to 10°C.
3) minimum curing time for dry and wet conditions.

1		Drill the hole with the correct diameter and depth using a **rotary-hammer drilling machine**. Check the perpendicularity of the hole during the drilling operation.
2	 **4x Blower Pump** **4x Brush** **4x Blower Pump** (Instead of the blower manual pump it is also possible to use the compressed air free oil)	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 (**2x2x2 for AAC**). Before brushing clean the brush and check (see Table B9 in Annex B9) if the brush diameter is sufficient. For the blower tools see Annex B8.
3		For coaxial, side by side and peeler cartridges 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: - insert the mixer in the eye of the plastic extractor, - pull the extractor to unhook the steel closing clip of the foil. In the version without extractor cut the foil pack. After that, screw on the mixer and insert the cartridge in the dispenser.
4		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 components, comes out from the mixer with a uniform color.
5		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.
6		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 B11. Wait the curing time according Annex B11.

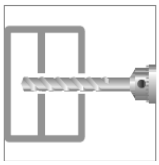
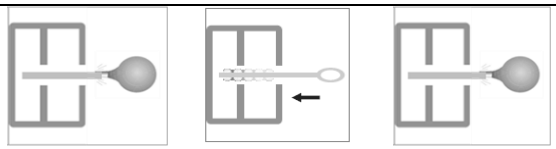
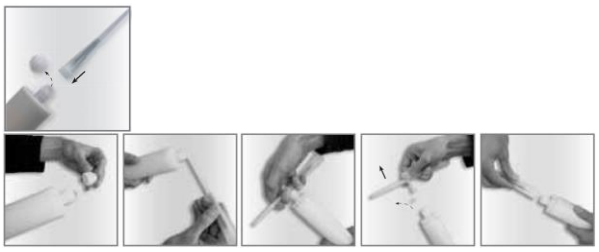
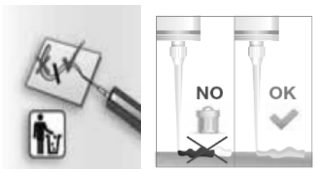
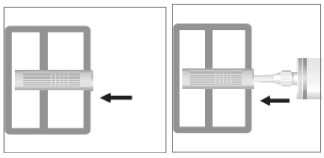
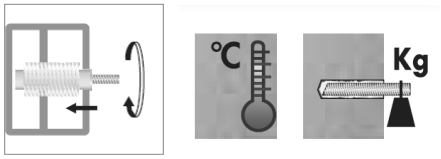
1		Drill the hole with the correct diameter and depth using a **rotary drilling machine**. Check the perpendicularity of the hole during the drilling operation.
2	 **4x Blower Pump** **2x Brush** **4x Blower Pump** (Instead of the blower manual pump it is also possible to use the compressed air free oil)	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 B10 in Annex B9) if the brush diameter is sufficient. For the blower tools see Annex B8.
3		For coaxial, side by side and peeler cartridges 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: - insert the mixer in the eye of the plastic extractor, - pull the extractor to unhook the steel closing clip of the foil. In the version without extractor cut the foil pack. After that, screw on the mixer and insert the cartridge in the dispenser.
4		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 components, comes out from the mixer with a uniform color.
5		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.
6		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 B11. Wait the curing time according Annex B11.

Table C1: β-factors for job-site testing under tension loading

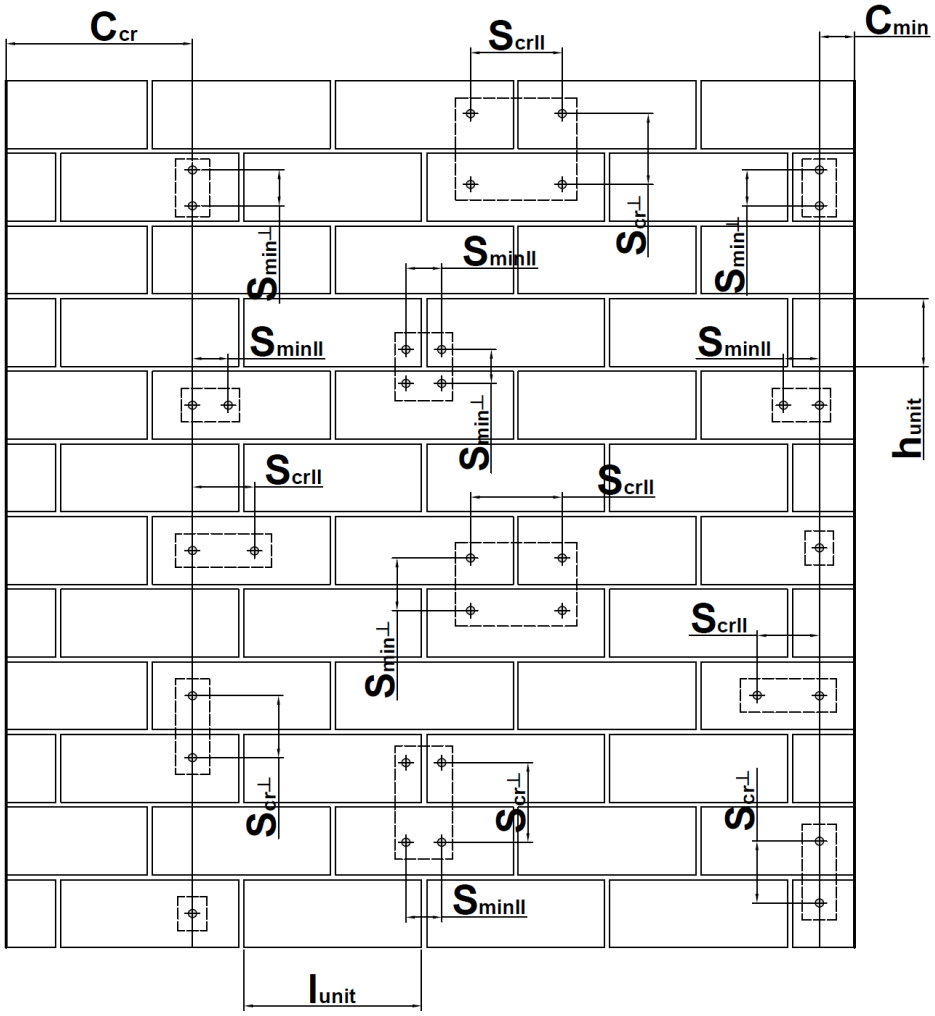
Brick	Installation and use conditions	Anchor size	β-factors
Brick n°1	d/d - w/d - w/w	M8-M10-M12	0,85
Brick n°2	d/d - w/d - w/w	M8 to M16 and ϕ8 to ϕ12	0,85
Brick n°3-4-5-6-7	d/d - w/d - w/w	M8+GC 12x80 M10+GC 15x85 M12+GC 20x85	0,85
Brick n°8	d/d - w/d - w/w	M10+GC 15x135	0,85
Brick n° 9-10	d/d - w/d - w/w	M8 to M16	0,89

Table C2: Characteristic values for steel: tension resistance and shear resistance for threaded rods and rebar

Size			**M8**	**M10**	**M12**	**M16**
Steel failure – characteristic tension resistance						
Steel class 4.8	$N_{Rk,s}$	[kN]	15	23	34	63
Steel class 5.8	$N_{Rk,s}$	[kN]	18	29	42	78
Steel class 8.8	$N_{Rk,s}$	[kN]	29	46	67	126
Stainless steel A2, A4, HCR class 50	$N_{Rk,s}$	[kN]	18	29	42	78
Stainless steel A2, A4, HCR class 70	$N_{Rk,s}$	[kN]	26	41	59	110
Stainless steel A4, HCR class 80	$N_{Rk,s}$	[kN]	29	46	67	126
Steel failure – characteristic tension resistance – partial factor						
Steel class 4.8 – 5.8 – 8.8	$\gamma_{Ms,N}$ 1)	[-]	1,50			
Stainless steel A2, A4, HCR class 50	$\gamma_{Ms,N}$ 1)	[-]	2,86			
Stainless steel A2, A4, HCR class 70	$\gamma_{Ms,N}$ 1)	[-]	1,87			
Stainless steel A4, HCR class 80	$\gamma_{Ms,N}$ 1)	[-]	1,60			
Steel failure – characteristic shear resistance without lever arm						
Steel class 4.8	$V^0_{Rk,s}$	[kN]	7	12	17	31
Steel class 5.8	$V^0_{Rk,s}$	[kN]	9	14	21	39
Steel class 8.8	$V^0_{Rk,s}$	[kN]	15	23	34	63
Stainless steel A2, A4, HCR class 50	$V^0_{Rk,s}$	[kN]	9	14	21	39
Stainless steel A2, A4, HCR class 70	$V^0_{Rk,s}$	[kN]	13	20	29	55
Stainless steel A4, HCR class 80	$V^0_{Rk,s}$	[kN]	15	23	34	63
Steel failure – characteristic shear resistance with lever arm						
Steel class 4.8	$M^0_{Rk,s}$	[Nm]	15	30	52	133
Steel class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166
Steel class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266
Stainless steel A2, A4, HCR class 50	$M^0_{Rk,s}$	[Nm]	19	37	66	166
Stainless steel A2, A4, HCR class 70	$M^0_{Rk,s}$	[Nm]	26	52	92	233
Stainless steel A4, HCR class 80	$M^0_{Rk,s}$	[Nm]	30	60	105	266
Steel failure – characteristic shear resistance – partial factor						
Steel class 4.8 – 5.8 – 8.8	$\gamma_{Ms,V}$ 1)	[-]	1,25			
Stainless steel A2, A4, HCR class 50	$\gamma_{Ms,V}$ 1)	[-]	2,38			
Stainless steel A2, A4, HCR class 70	$\gamma_{Ms,V}$ 1)	[-]	1,56			
Stainless steel A4, HCR class 80	$\gamma_{Ms,V}$ 1)	[-]	1,33			
Size			**ϕ8**	**ϕ10**	**ϕ12**	
Steel failure for reinforced bar (rebar)						
Characteristic tensile resistance	$N_{Rk,s}$	[kN]	A_s x f_{uk} 2)			
Cross section area	A_s	[mm^2]	50	79	113	
Partial factor	$\gamma_{Ms,N}$ 1)	[-]	1,4			
Characteristic shear resistance	$V^0_{Rk,s}$	[kN]	0,5 x A_s x f_{uk} 2)			
Partial factor	$\gamma_{Ms,V}$ 1)	[-]	1,5			

1) In the absence of national regulation
2) f_{uk} shall take from the specifications of the reinforcing bars

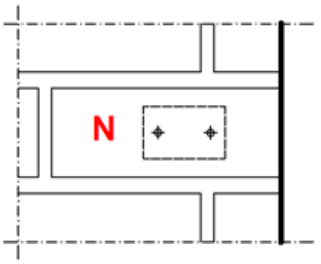
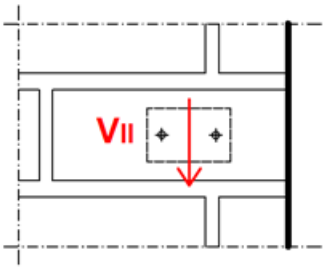
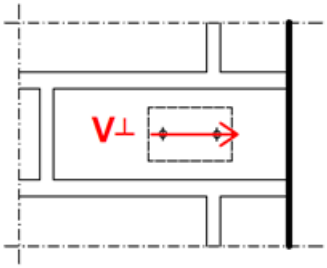
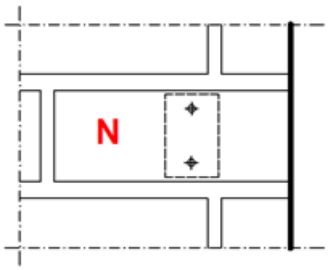
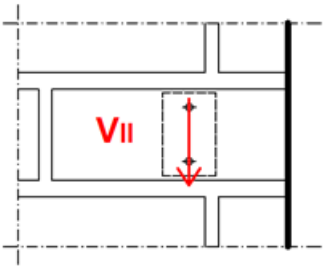
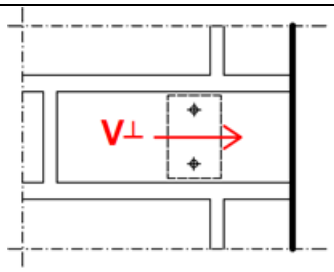
Spacing and edge distance



c_{cr} = Characteristic edge distance
c_{min} = Minimum edge distance
$s_{cr\,\parallel}$ = Characteristic spacing for anchors placed parallel to horizontal joint
$s_{cr\,\perp}$ = Characteristic spacing for anchors placed perpendicular to horizontal joint
$s_{min\,\parallel}$ = Minimum spacing for anchors placed parallel to horizontal joint
$s_{min\,\perp}$ = Minimum spacing for anchors placed perpendicular to horizontal joint
l_{unit} = Length of the masonry unit
h_{unit} = Height of the masonry unit

ALSAFIX PE50 PRO	**Annex C3** of European Technical Assessment ETA-13/0743
Intended use Anchor spacing and edge distance	

Group factor

Load Direction / Anchor Position	N Tension Load	$V_{\parallel}$ Shear load Parallel to free edge	$V_{\perp}$ Shear load perpendicular to free edge
Anchors parallel to horizontal joint	 $\alpha_{g\parallel, N}$	 $\alpha_{g\parallel, V\parallel}$	 $\alpha_{g\parallel, V\perp}$
Anchors perpendicular to horizontal joint	 $\alpha_{g\perp, N}$	 $\alpha_{g\perp, V\parallel}$	 $\alpha_{g\perp, V\perp}$

$\alpha_{g\parallel, N}$ = Group factor for anchors parallel to horizontal joint under tension load

$\alpha_{g\perp, N}$ = Group factor for anchors perpendicular to horizontal joint under tension load

$\alpha_{g\parallel, V\parallel}$= Group factor for anchors parallel to horizontal joint under shear load parallel to the free edge

$\alpha_{g\perp, V\parallel}$= Group factor for anchors perpendicular to horizontal joint under shear load parallel to the free edge

$\alpha_{g\parallel, V\perp}$ = Group factor for anchors parallel to horizontal joint under shear load perpendicular to the free edge

$\alpha_{g\perp, V\perp}$ = Group factor for anchors perpendicular to hor. joint under shear load perpendicular to the free edge

Group of 2 anchors: $N^{g}_{Rk} = \alpha_{g,N} * N_{RK,b}$

$V^{g}_{Rk} = \alpha_{g,V} * V_{Rk,b}$

Group of 4 anchors: $N^{g}_{Rk} = \alpha_{g\parallel, N} * \alpha_{g\perp, N} * N_{RK,b}$

$V^{g}_{Rk} = \alpha_{g,\parallel,V} * \alpha_{g\perp, V} * V_{Rk,b}$

Equations depend on anchor position and load direction (see table above).

ALSAFIX PE50 PRO	**Annex C4** of European Technical Assessment ETA-13/0743
Intended use Group factor	

Brick type: Solid Brick – Mattone Pieno

Table C3: Description

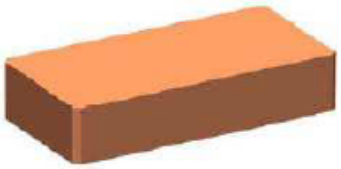
Brick Type	Mattone Pieno	
Compressive strength [N/mm²]	≥ 73	
Brick Dimensions [mm]	≥ 240 x 120 x 60	
Drilling method	Hammer drilling	

Table C4: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Edge distance [mm] $c_{min}=c_{cr}$	Spacing [mm] $s_{min}=s_{cr,\perp}=s_{cr,II}$
M8	80	120	240
M10	85	128	255
M12	95	143	285

Table C5: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
		N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	1,50	4,50
M10	85	3,00	9,00
M12	95	3,00	9,00

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C6: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,65	0,08	0,16	1,32	0,23	0,34
M10	85	1,03	0,07	0,16	2,94	0,48	0,72
M12	95	1,15	0,06	0,16	2,62	0,38	0,57

Table C7: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\ II,\ N}$	$\alpha_{g\perp,\ N}$	$\alpha_{g\ II,\ V\ II}$	$\alpha_{g\perp,\ V\ II}$	$\alpha_{g\ II,\ V\perp}$	$\alpha_{g\perp,,\ V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Solid Brick – Mattone Rosso Classico

Table C8: Description

Brick Type	Mattone Rosso Classico	
Compressive strength [N/mm²]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

Table C9: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		c_{min}	c_{cr}	s_{min}	$s_{cr,\perp} = s_{cr,II}$
M8	80	50	120	50	240
M10	85	50	128	50	255
M12	95	50	143	50	285
M16	105	60	158	60	315

Table C10: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C			
		N_{Rk} [kN]		$V_{Rk,b}$ [kN]	
		$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$	$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$
M8	80	2,00	2,00	4,50	5,50
M10	85	2,50	2,50	8,00	8,50
M12	95	3,00	3,50	11,00	11,50
M16	105	3,50	4,00	13,00	13,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C11: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,71	0,08	0,16	1,62	0,27	0,41
M10	85	0,97	0,10	0,20	2,50	0,30	0,45
M12	95	1,31	0,11	0,22	3,42	0,34	0,51
M16	105	1,48	0,13	0,26	3,87	0,35	0,53

Table C12: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,N}$	$\alpha_{g\perp,N}$	$\alpha_{g\,II,V\,II}$	$\alpha_{g\perp,V\,II}$	$\alpha_{g\,II,V\perp}$	$\alpha_{g\perp,V\perp}$
$S \geq S_{min}$ and $C \geq C_{min}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Solid Brick – Mattone Rosso Classico

Table C13: Description

Brick Type	Mattone Rosso Classico	
Compressive strength [N/mm²]	≥ 15	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

Table C14: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		c_{min}	c_{cr}	s_{min}	$s_{cr,\perp} = s_{cr,II}$
ϕ8	80	50	120	50	240
ϕ10	85	50	128	50	255
ϕ12	95	50	143	50	285

Table C15: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C			
		N_{Rk} [kN]		$V_{Rk,b}$ [kN]	
		$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$	$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$
ϕ8	80	2,00	2,00	4,50	5,50
ϕ10	85	3,00	3,00	8,00	8,00
ϕ12	95	3,00	3,50	11,00	11,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C16: Displacement

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
ϕ8	80	0,81	0,12	0,24	1,63	0,29	0,44
ϕ10	85	1,08	0,13	0,26	2,31	0,34	0,51
ϕ12	95	1,21	0,15	0,30	3,33	0,38	0,57

Table C17: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{min}$ and $C \geq C_{min}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Mattone DOPPIO UNI

Table C18: Description

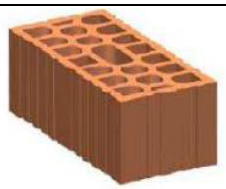
Brick Type	Mattone DOPPIO UNI	
Compressive strength [N/mm²]	≥ 18,3	
Brick Dimensions [mm]	≥ 240 x 120 x 120	
Drilling method	Rotary drilling	

Table C19: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M8	80	12x80	120	120	240	120
M10	85	15x85	120	120	240	120
M12	85	20x85	120	120	240	120

Table C20: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	12x80	4,00	6,00
M10	85	15x85	5,00	6,50
M12	85	20x85	5,50	9,00

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C21: Displacement

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	1,48	0,06	0,16	1,72	0,20	0,30
M10	85	1,81	0,08	0,16	2,03	0,38	0,57
M12	85	2,09	0,10	0,20	2,93	0,34	0,51

Table C22: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Mattone Forato

Table C23: Description

Brick Type	Mattone Forato	
Compressive strength [N/mm²]	≥ 5,3	
Brick Dimensions [mm]	≥ 250 x 120 x 250	
Drilling method	Rotary drilling	

Table C24: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M8	80	12x80	125	125	250	250
M10	85	15x85	125	125	250	250
M12	85	20x85	125	125	250	250

Table C25: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	12x80	0,75	3,00
M10	85	15x85	2,00	3,00
M12	85	20x85	2,00	3,00

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C26: Displacement

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,29	0,06	0,16	0,93	0,31	0,46
M10	85	0,73	0,08	0,16	1,08	0,23	0,34
M12	85	0,80	0,07	0,16	0,86	0,18	0,27

Table C27: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Brique creuse RC 40

Table C28: Description

Brick Type	Brique creuse RC 40	
Compressive strength [N/mm²]	≥ 4,0	
Brick Dimensions [mm]	≥ 555 x 195 x 275	
Drilling method	Rotary drilling	

Table C29: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M8	80	12x80	278	278	555	275
M10	85	15x85	278	278	555	275
M12	85	20x85	278	278	555	275

Table C30: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	12x80	1,00	1,50
M10	85	15x85	1,00	1,50
M12	85	20x85	0,75	1,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C31: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,39	0,06	0,16	0,44	0,10	0,15
M10	85	0,44	0,06	0,16	0,63	0,18	0,27
M12	85	0,26	0,06	0,16	0,44	0,27	0,40

Table C32: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Porotherm 25 P+W

Table C33: Description

Brick Type	Porotherm 25 P+W	
Compressive strength [N/mm²]	≥ 15,0	
Brick Dimensions [mm]	≥ 373 x 238 x 250	
Drilling method	Rotary drilling	

Table C34: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M8	80	12x80	187	187	373	250
M10	85	15x85	187	187	373	250
M12	85	20x85	187	187	373	250

Table C35: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	12x80	2,50	2,50
M10	85	15x85	2,50	3,50
M12	85	20x85	3,00	3,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C36: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,92	0,06	0,16	0,78	0,23	0,34
M10	85	0,91	0,06	0,16	1,06	0,19	0,28
M12	85	1,02	0,06	0,16	1,00	0,31	0,46

Table C37: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Hlz B – 1.0 1NF 12-1

Table C38: Description

Brick Type	Hlz B – 1.0 1NF 12-1	
Compressive strength [N/mm²]	≥ 15,0	
Brick Dimensions [mm]	≥ 115 x 240 x 71	
Drilling method	Rotary drilling	

Table C39: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M8	80	12x80	120	120	240	120
M16	85	15x85	120	120	240	120
M12	85	20x85	120	120	240	120

Table C40: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M8	80	12x80	3,50	4,00
M10	85	15x85	4,50	5,50
M12	85	20x85	5,00	5,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C41: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	1,19	0,12	0,24	1,25	0,17	0,25
M10	85	1,69	0,07	0,16	2,23	0,69	1,03
M12	85	1,78	0,06	0,16	1,65	0,13	0,19

Table C42: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,N}$	$\alpha_{g\perp,N}$	$\alpha_{g\,II,V\,II}$	$\alpha_{g\perp,V\,II}$	$\alpha_{g\,II,V\perp}$	$\alpha_{g\perp,,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: Hollow/Perforated Brick – Poroton P800

Table C43: Description

Brick Type	Poroton P800
Compressive strength [N/mm²]	≥ 15,0
Brick Dimensions [mm]	≥ 300 x 245 x 230
Drilling method	Rotary drilling

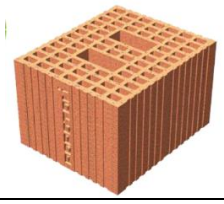


Table C44: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C_{min}	C_{cr}	$S_{min,II} = S_{cr,II}$	$S_{min,\perp} = S_{cr,\perp}$
M10	135	15x135	100	100	300	230

Table C45: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C	
			N_{Rk} [kN]	$V_{Rk,b}$ [kN]
M10	135	15x135	3,50	5,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C46: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M10	135	1,22	0,11	0,22	1,61	0,24	0,36

Table C47: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\,II,\,N}$	$\alpha_{g\perp,\,N}$	$\alpha_{g\,II,\,V\,II}$	$\alpha_{g\perp,\,V\,II}$	$\alpha_{g\,II,\,V\perp}$	$\alpha_{g\perp,,\,V\perp}$
$S \geq S_{cr}$ and $C \geq C_{cr}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: AAC Solid – AAC2

Table C48: Description

Brick Type	Climagold	
Compressive strength [N/mm²]	≥ 1,8	
Brick Dimensions [mm]	≥ 625 x 200 x 360	
Drilling method	Rotary drilling	

Table C49: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		C_{min}	$C_{cr,N}$	S_{min}	$S_{cr,\perp} = S_{cr,II}$
M8	80	50	120	50	240
M10	85	50	128	50	255
M12	95	50	143	50	285
M16	105	60	158	60	315

Table C50: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C			
		N_{Rk} [kN]		$V_{Rk,b}$ [kN]	
		$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$	$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$
M8	80	1,00	1,50	1,00	1,50
M10	85	1,50	2,00	1,50	1,50
M12	95	2,00	2,50	2,50	2,50
M16	105	2,00	2,50	2,50	2,50

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C51: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,63	0,10	0,20	0,65	0,31	0,47
M10	85	0,83	0,12	0,24	0,69	0,34	0,51
M12	95	1,01	0,15	0,30	0,90	0,38	0,57
M16	105	0,99	0,16	0,32	0,98	0,40	0,60

Table C52: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\ II,\ N}$	$\alpha_{g\perp,\ N}$	$\alpha_{g\ II,\ V\ II}$	$\alpha_{g\perp,\ V\ II}$	$\alpha_{g\ II,\ V\perp}$	$\alpha_{g\perp,,\ V\perp}$
$S \geq S_{min}$ and $C \geq C_{min}$	2,0	2,0	2,0	2,0	2,0	2,0

Brick type: AAC Solid Brick – AAC5

Table C53: Description

Brick Type	Blocco sismico	
Compressive strength [N/mm²]	≥ 5,0	
Brick Dimensions [mm]	≥ 625 x 200 x 300	
Drilling method	Rotary drilling	

Table C54: Installation parameter (Edge and spacing distances)

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		C_{min}	$C_{cr,N}$	S_{min}	$S_{cr,\perp} = S_{cr,II}$
M8	80	50	120	50	240
M10	85	50	128	50	255
M12	95	50	143	50	285
M16	105	60	158	60	315

Table C55: Characteristic values of resistance under tension and shear loads

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+40°C/+50°C			
		N_{Rk} [kN]		$V_{Rk,b}$ [kN]	
		$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$	$c=c_{min} - s=s_{min}$	$c=c_{cr} - s=s_{cr}$
M8	80	1,00	2,50	1,00	3,50
M10	85	1,50	3,00	1,50	4,00
M12	95	2,00	3,50	2,50	4,00
M16	105	2,00	4,00	2,50	4,00

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C56: Displacements

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
M8	80	1,10	0,08	0,16	1,29	0,31	0,47
M10	85	1,22	0,10	0,20	1,53	0,32	0,48
M12	95	1,52	0,11	0,22	1,55	0,43	0,65
M16	105	1,74	0,11	0,22	1,58	0,45	0,68

Table C57: Group factor

Configuration	Tensile		Shear parallel to free edge		Shear perpendicular to free edge	
	$\alpha_{g\ II,\ N}$	$\alpha_{g\perp,\ N}$	$\alpha_{g\ II,\ V\ II}$	$\alpha_{g\perp,\ V\ II}$	$\alpha_{g\ II,\ V\perp}$	$\alpha_{g\perp,,\ V\perp}$
$S \geq S_{min}$ and $C \geq C_{min}$	2,0	2,0	2,0	2,0	2,0	2,0