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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-19/0461 of 2019/07/11

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:	ARVEX CPS
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:	ARVEX GROBELNY Sp. z o.o. Ul. Makuszyńskiego 4 PL-30-969 Kraków Tel. +48 12 644 64 57 Internet www.arvex.pl
Manufacturing plant:	ARVEX GROBELNY Sp. z o.o. Manufacturing plant I
This European Technical Assessment contains:	25 pages including 20 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 330076-00-0604 Metal injection anchors for use in masonry
This version replaces:	

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 ARVEX CPS is a bonded anchor (injection type) consisting of a mortar cartridge with ARVEX CPS injection mortar, a perforated nylon 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 A3.

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 anchors are intended to be used with embedment depth given in Annex A4, Table A1. For the installed anchor see Figure given in Annex A3. 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 (Masonry Group b) or hollow or perforated masonry (Masonry Group c) according to Annex B9. 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 Condition 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:
Ta: -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C),
Tb: -40°C to +80°C (max short term temperature + 80 °C and max long term temperature + 50 °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 C5.

Safety in case of fire (BWR 2):
The essential characteristics are detailed in the Annex from C4.

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 assessed

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 EAD 330076-00-0604 Metal injection anchors for use in masonry, based on the Use Categories b and c in respect of the base material and Category w/d in respect of installation and use.

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 prior to CE marking

Issued in Copenhagen on 2019-07-11 by

Thomas Bruun
Manager, ETA-Danmark

Injection Mortar : ARVEX CPS **Polyester Resin System**

A) Foil Bag Cartridge 165ml, 300ml

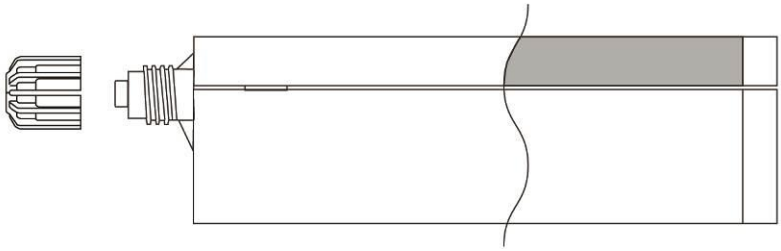
B) Coaxial Cartridge 380ml, 400ml, 410ml

C) Side by Side Cartridge 345ml, 825ml

A

B

C



Use category in respect of the base material:

Masonry Group b: metal injection anchors for use in solid masonry.

Masonry Group c: metal injection anchors for use in hollow or perforated masonry.

Use category in respect of installation and use:

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

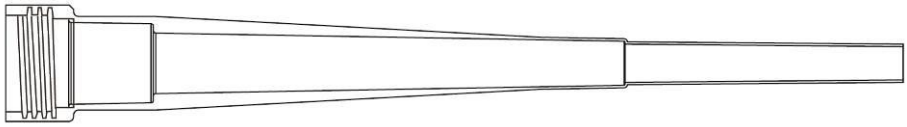
Temperature range:

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

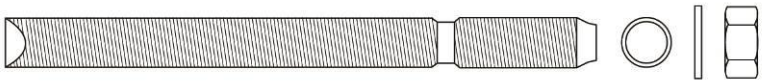
Tb: -40°C to +80°C (max short term temperature + 80 °C and max long term temperature + 50 °C)

ARVEX CPS	**Annex A1** of European Technical Assessment ETA-19/0461
Product and intended use (1)	

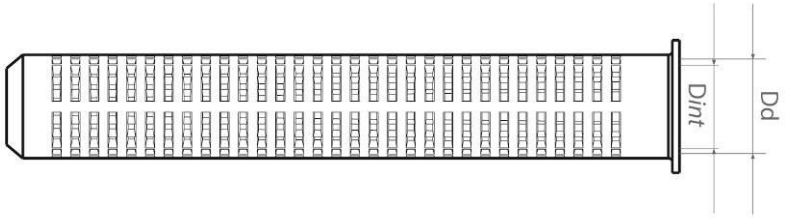
Mixer (Standard / + Hanger)



Threaded Steel Stud / Washer + Nut
Sizes M8, M10, M12

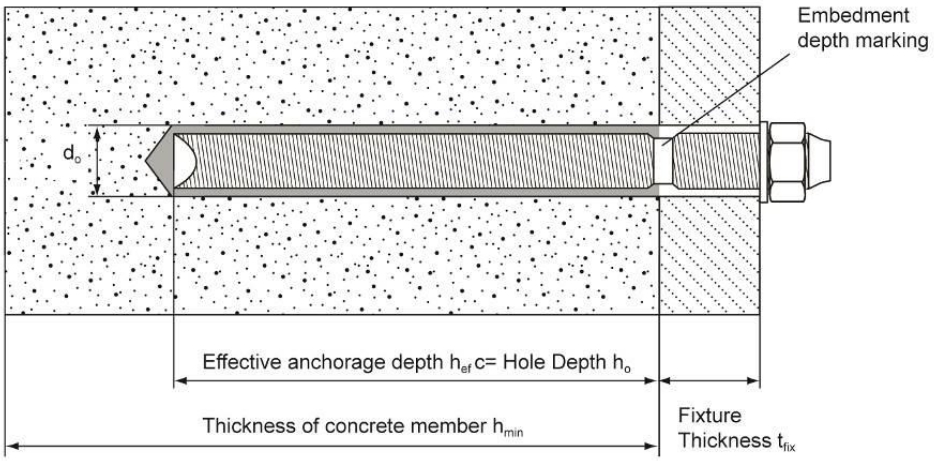


Perforated Nylon Sleeve
Size 16/85

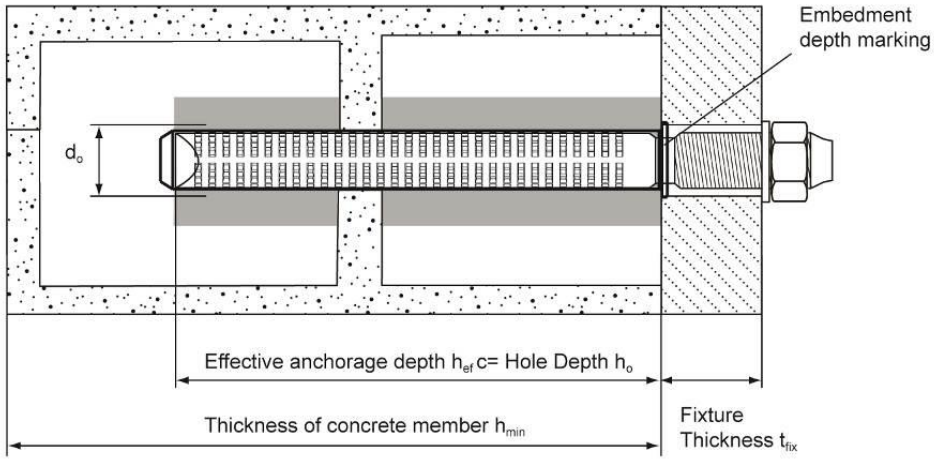


ARVEX CPS	Annex A2 of European Technical Assessment ETA-19/0461
Product and intended use (2)	

Anchor application in solid masonry (brick n°1 according to Annex B9)



Anchor application in hollow/perforated masonry with nylon sleeve (brick n°2 according to Annex B9)



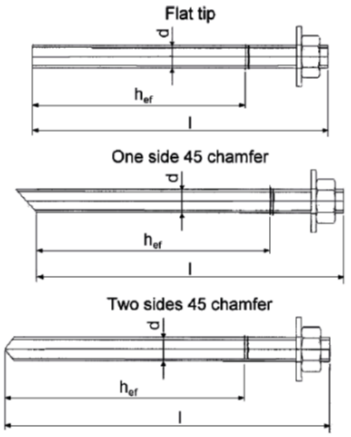


Table A1: Threaded rod dimensions

Anchor size			**M8**	**M10**	**M12**
Diameter of anchor rod	d	[mm] =	8	10	12
Size of sleeve	d_{nom} x l_s	[mm] =	16 x 85		
Nominal anchorage depth	h_{ef}	[mm] =	85		
Maximum diameter hole in fixture	d_{fix}	[mm] ≤	9	12	14
Installation torque moment	T_{inst}	[Nm] =	2	2	2
Depth of drilled hole to deepest point	h_1	[mm] =	90		

1) Marking according EAD 330076-00-0604 Metal injection anchors for use in masonry.
2) Effective anchorage depths according to the range specified in table 1.

Table A2: Threaded rods materials

Designation	**Material**
Threaded rods made of zinc coated steel	
Threaded rod M8 – M12	Strength class 4.6, 5.8, 6.8 EN ISO 898-1 Steel galvanized ≥ 5µm EN ISO 4042 Hot dipped galvanized ≥ 45µm EN ISO 10684
Washer ISO 7089	Steel galvanized EN ISO 4042; hot dipped galvanized EN ISO 10684
Nut EN ISO 4032	Strength class 8 EN ISO 898-2 Steel galvanized ≥ 5µm EN ISO 4042 Hot dipped galvanized ≥ 45µm EN ISO 10684
Threaded rods made of stainless steel	
Threaded rod M8 – M12	Strength class A4-70 and A4-80 EN ISO 3506-1;
Washer ISO 7089	Strength class A4-70 and A4-80 EN ISO 3506-1;
Nut EN ISO 4032	Strength class A4-70 and A4-80 EN ISO 3506-1;

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.

ARVEX CPS	**Annex A4** of European Technical Assessment ETA-19/0461
Threaded rod types, dimensions and materials	

Table A3: Injection mortar

Product	Composition
ARVEX CPS **Two components injection mortar**	Additive: quartz Bonding agent: polyester resin Hardener: dibenzoyl peroxide

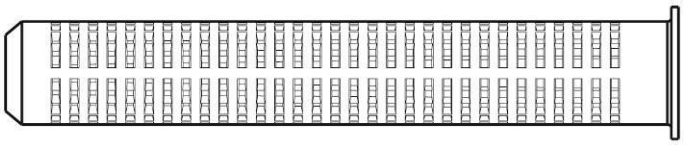
Table A4: Minimum curing time

Temperature in the concrete member	Minimum gelling time in dry conditions (mins)	Minimum load time in dry conditions (mins)
≥ - 5°C	40	180
≥ +5°C	20	90
≥ +15°C	9	60
≥ +25°C	5	30
≥ +35°C	3	20

For wet conditions, the loading time must be doubled

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

Resin sleeves are the effective way to create a fixing where there is a hollow void, such as for perforated bricks and blocks, or a more porous material for example blockwork. Resin is injected to fill the volume of the sleeve, and then forced through the fine perforations once the metal fixing rod is inserted. This distributes the resin material into the fixing cavity, forming a solid joint between the resin, the sleeve and the fixing.



Nylon Perforated Sleeve – 16 x 85

Nominal Diameter 16 mm

Nominal Length 85 mm

ARVEX CPS	**Annex A6** of European Technical Assessment ETA-19/0461
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 (Masonry Group b) or hollow or perforated masonry (Masonry Group c) according to Annex B9. 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:
Ta: -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C),
Tb: -40°C to +80°C (max short term temperature + 80 °C and max long term temperature + 50 °C).

Use conditions (Environmental conditions):
Threaded rods:
a) Carbon galvanized steel class 4.6, 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:
- Condition w/d: installation in wet substrate and use in structures subjected to dry, internal conditions.
- Perforation with drilling machine

Proposed design methods:
- EOTA Technical Report 054, Design method A

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]	85	85	85
Depth of the drilling hole	h_1 [mm]	h_{ef} + 5 mm		
Torque moment	T_{inst} [Nm]	2	2	2
Thickness to be fixed	$t_{fix,min}$ [mm]	> 0		
	$t_{fix,max}$ [mm]	< 1500		
Minimum spacing	S_{min} [mm]	255	255	255
Minimum edge distance	C_{min} [mm]	127,5	127,5	127,5

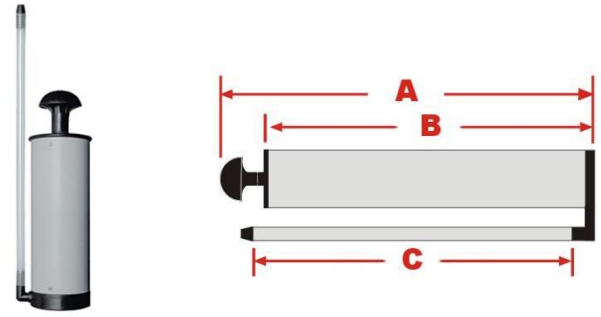
* Type of bricks are detailed in the Annex B9

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

Size		**M8**	**M10**	**M12**
Plastic sleeve		**16x85**		
Nominal drilling diameter	d_0 [mm]	16	16	16
Maximum diameter hole in the fixture	d_{fix} [mm]	9	12	14
Embedment depth	h_{ef} [mm]	85	85	85
Depth of the drilling hole	h_1 [mm]	h_{ef} + 5 mm		
Torque moment	T_{inst} [Nm]	2	2	2
Thickness to be fixed	$t_{fix,min}$ [mm]	> 0		
	$t_{fix,max}$ [mm]	< 1500		
Minimum spacing	$S_{min,\parallel}$ [mm]	560	560	560
	$S_{min,\perp}$ [mm]	200	200	200
Minimum edge distance	C_{min} [mm]	100	100	100

* Type of bricks are detailed in the Annex B9

Manual blower pump: nominal dimensions



190mm (240x190x300mm) -(A) : 240mm (overall) -(B) : 190mm (Body) -(C) : 300mm (Tube)	265mm (310x265x330mm) -(A) : 310mm (overall) -(B) : 265mm (Body) -(C) : 330mm (Tube)	370mm (420x370x460mm) -(A) : 420mm (overall) -(B) : 370mm (Body) -(C) : 460mm (Tube)

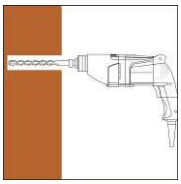
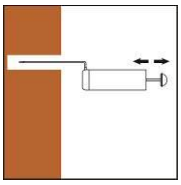
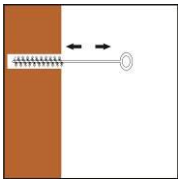
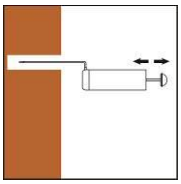
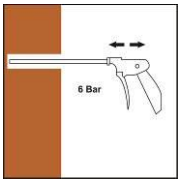
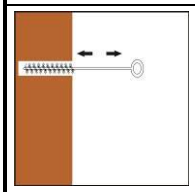
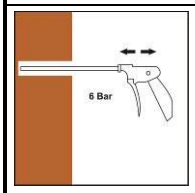
Steel Wire Brushes

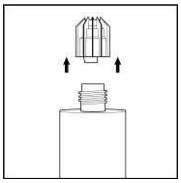
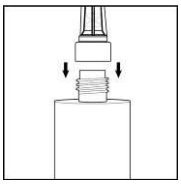
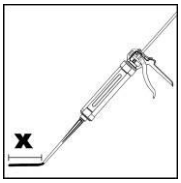
Specification
28 mm
18 mm
13 mm
10 mm

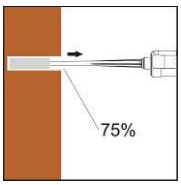
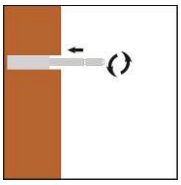
Table B3: Brush diameter

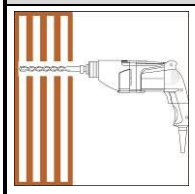
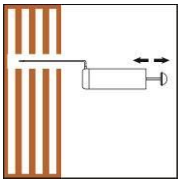
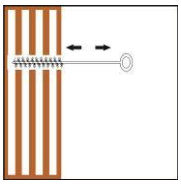
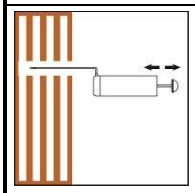
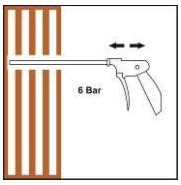
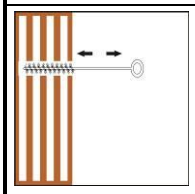
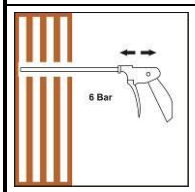
			Use in solid masonry			Use in hollow/perforated masonry		
Type of threaded rod			**M8**	**M10**	**M12**	**M8**	**M10**	**M12**
d_0	Nominal drill hole	[mm]	10	12	14	16	16	16
d_b	Brush diameter	[mm]	10	13	15	18	18	18

Resin injection pump details		
Image	**Size Cartridge / Code**	**Type**
	**165 / 300ml** **300 ml 10:1**	**Manual**
	**345ml** **345 ml 10:1**	**Manual**
	**380 / 410ml** **380/410 ml 10:1**	**Manual**
	**165 / 300 / 345 / 380 / 410ml** **300 ml 7.4v Tool** **345 ml 7.4v Tool** **380 ml 7.4v Tool**	**Battery**

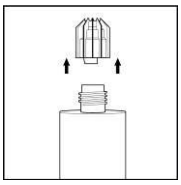
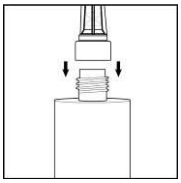
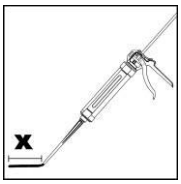
Instructions for use		
Bore hole drilling		
		Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.
Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris.		
a) Manual air cleaning (MAC)		
	**X 4**	The manual pump may be used for blowing out bore holes Blow out at least 4 times from the back of the bore hole until return air stream is free of noticeable dust.
	**X 4**	Brush 4 times with the specified brush size (brush Ø ≥ bore hole Ø, see Table B3) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
	**X 4**	Blow out again with manual pump at least 4 times until return air stream is free from noticeable dust.
b) Compressed air cleaning (CAC)		
	**X 2**	Blow 2 times from the back of the hole (if needed with a nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6m³/h) until return air stream is free from noticeable dust.
	**X 2**	Brush 2 times with the specified brush size (brush Ø ≥ bore hole Ø, see Table B3) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
	**X 2**	Blow out again with compressed air at least 2 times until return air stream is free from noticeable dust.

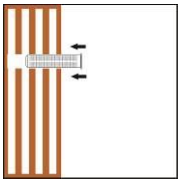
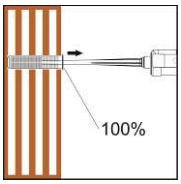
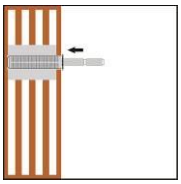
Instructions for use	
	Remove the threaded cap from the cartridge. Cut the bag below the clip if appropriate.
	Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer with the adhesive.
	Insert the cartridge into the dispenser. Press the release trigger to retract the plunger and insert the cartridge neatly into the cradle without any distortion.
	Discard the initial trigger pulls 10cm of adhesive. Resin will flow from the cartridge as soon as dispensing is initiated.

Instructions for use	
	Insert the nozzle to the bottom of the hole and inject the resin until the hole is filled 75%
	Insert the anchor, slowly with a slight twisting motion into the hole. Remove excess resin and leave the fixing until minimum curing (loading) times has elapsed

Instructions for use		
Bore hole drilling		
		Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.
Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris.		
a) Manual air cleaning (MAC)		
	**X 4**	The manual pump may be used for blowing out bore holes Blow out at least 4 times from the back of the bore hole until return air stream is free of noticeable dust.
	**X 4**	Brush 4 times with the specified brush size (brush Ø ≥ bore hole Ø, see Table B3) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
	**X 4**	Blow out again with manual pump at least 4 times until return air stream is free from noticeable dust.
b) Compressed air cleaning (CAC)		
	**X 2**	Blow 2 times from the back of the hole (if needed with a nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6m³/h) until return air stream is free from noticeable dust.
	**X 2**	Brush 2 times with the specified brush size (brush Ø ≥ bore hole Ø, see Table B3) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
	**X 2**	Blow out again with compressed air at least 2 times until return air stream is free from noticeable dust.

ARVEX CPS	**Annex B7** of European Technical Assessment ETA-19/0461
Procedure for hollow/perforated masonry (1)	

Instructions for use	
	Remove the threaded cap from the cartridge. Cut the bag below the clip if appropriate.
	Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer with the adhesive.
	Insert the cartridge into the dispenser. Press the release trigger to retract the plunger and insert the cartridge neatly into the cradle without any distortion.
	Discard the initial trigger pulls 10cm of adhesive. Resin will flow from the cartridge as soon as dispensing is initiated.

Instructions for use	
	Introduce the sleeve of suitable dimension (see table) to the back of the hole so that the collar is level with the hole face. The cap may be opened to allow full nozzle insertion.
	Insert the nozzle to the end of the sleeve and inject the resin until the sleeve is 100% filled. Close the cap.
	Insert the anchor, slowly with a slight twisting motion into the sleeve. Remove excess resin and leave the fixing until minimum curing (loading) times has elapsed

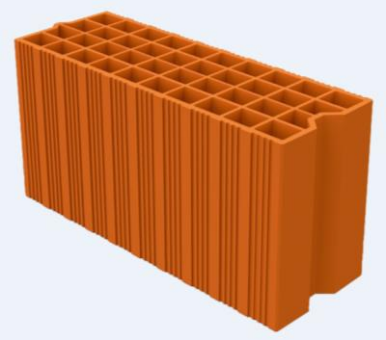
ARVEX CPS	**Annex B8** of European Technical Assessment ETA-19/0461
Procedure for hollow/perforated masonry (2)	

Table B5: Type of solid (Brick Nº 1) and hollow/perforated masonry (Brick Nº 2)

Solid Brick

Dimensions [mm]: 120 x 250 x 60
f_b class ≥ 40 N/mm^2
density ρ_m ≥ 1666,7 kg/m^3
(e.g. type "Mattone Pieno")

Hollow/Perforated



Dimensions [mm]: 200 x 560 x 274
f_b class ≥ 8,5 N/mm^2
density ρ_m ≥ 600 kg/m^3
(e.g. type "French brick")

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)		16	16	16
Type of plastic sleeve for use in category c		16x85	16x85	16x85
d_{fix} [mm]		9	12	14
h_1 [mm]		h_{ef} + 5 mm		
t_{fix} [mm]	Min	> 0		
	Max	≤ 1500 mm		
T_{inst} [Nm] category b (solid masonry)		2	2	2
T_{inst} [Nm] category c (hollow or perforated masonry)		2	2	2
S_{min} [mm] category b (solid masonry)		255	255	255
C_{min} [mm] category b (solid masonry)		127,5	127,5	127,5
S_{min} [mm] category c (hollow masonry) $S_{min,\parallel}$		560	560	560
S_{min} [mm] category c (hollow) $S_{min,\perp}$		200	200	200
C_{min} [mm] category c (hollow masonry)		100	100	100
*** Resistance for tensile and shear load Temperature range -40°C/+40°C (T_{mlp} = 24°C)**		**M8**	**M10**	**M12**
Brick n°1 (solid)	N_{Rk} [kN]	2,5		
	V_{Rk} [kN]	6,0		
Brick n°2 (hollow)	N_{Rk} [kN]	0,75		
	V_{Rk} [kN]		3,5	
*** Resistance for tensile and shear load Temperature range -40°C to +80°C (T_{mlp} = 50°C)**		**M8**	**M10**	**M12**
Brick n°1 (solid)	N_{Rk} [kN]	2,0		
	V_{Rk} [kN]	6,0		
Brick n°2 (hollow)	N_{Rk} [kN]	0,6		
	V_{Rk} [kN]	3,5		

* For design according to EOTA Technical Report 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,pb}$ – steel failure is not decisive
* For design according to EOTA Technical Report 054: $V_{Rk} = V_{Rk,b}$ – steel failure without lever arm is not decisive – $V_{Rk,c}$ according to EOTA Technical Report 054

Table C2: Characteristic bending moments

Size			**M8**	**M10**	**M12**
Characteristic resistance with standard threaded rod grade 4.6	$M_{Rk,s}$	[Nm]	15	30	52
Partial safety factor	γ_{Ms}	[-]	1,67		
Characteristic resistance with standard threaded rod grade 5.8	$M_{Rk,s}$	[Nm]	19	37	66
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		
Characteristic resistance with standard threaded rod stainless steel A4-80 (class 80)	$M_{Rk,s}$	[Nm]	30	60	105
Partial safety factor	γ_{Ms}	[-]	1,33		

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 to +80°C (T_{mlp} = 50°C)**		**M8**	**M10**	**M12**
γ_{Mm} [-] Category w/d		2,50		
Brick n°1	$S_{cr,N}$ [mm]	255	255	255
	$C_{cr,N}$ [mm]	127,5	127,5	127,5
Brick n°2	$S_{cr,N,\parallel}$ [mm]	560	560	560
	$S_{cr,N,\perp}$ [mm]	200	200	200
	$C_{cr,N}$ [mm]	100	100	100
β coefficient for in situ test (EOTA 053) Temperature range: -40°C/+40°C		**M8**	**M10**	**M12**
Brick Nº 1 - Solid brick	β [-]	0,57		
Brick Nº 2 - French Brick	β [-]	0,60		
β coefficient for in situ test (EOTA TR 053) Temperature range: -40°C/+80°C		**M8**	**M10**	**M12**
Brick Nº 1 - Solid brick	β [-]	0,45		
Brick Nº 2 - French Brick	β [-]	0,47		
Displacement under service load Tensile load Temperature range -40°C/+40°C (T_{mlp} = 24°C)				
Brick n°1 – Solid brick		**M8**	**M10**	**M12**
Admissible service load in tensile	F [kN]	0,71		
Displacement	δ_{N0} [mm]	0,02		
	$\delta_{N\infty}$ [mm]	0,05		
Brick n°2 – Hollow/perforated brick		**M8 With sleeve**	**M10 With sleeve**	**M12 With sleeve**
Admissible service load in tensile	F [kN]	0,21		
Displacement	δ_{N0} [mm]	0,03		
	$\delta_{N\infty}$ [mm]	0,05		
Displacement under service load Tensile load Temperature range -40°C to +80°C (T_{mlp} = 50°C)				
Brick n°1 – Solid brick		**M8**	**M10**	**M12**
Admissible service load in tensile	F [kN]	0,57		
Displacement	δ_{N0} [mm]	0,03		
	$\delta_{N\infty}$ [mm]	0,06		
Brick n°2 – Hollow/perforated brick		**M8 With sleeve**	**M10 With sleeve**	**M12 With sleeve**
Admissible service load in tensile	F [kN]	0,17		
Displacement	δ_{N0} [mm]	0,03		
	$\delta_{N\infty}$ [mm]	0,07		

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

ESSENTIAL CHARACTERISTICS		PERFORMANCE		
Displacement under service load **Shear load** **Temperature range -40°C/+40°C (T_{mlp} = 24°C) and -40°C to +80°C (T_{mlp} = 50°C)**				
Brick n°1 – Solid brick		**M8**	**M10**	**M12**
Admissible service load in shear	F [kN]	1,71		
Displacement	δ_{V0} [mm]	0,45		
	$\delta_{V\infty}$ [mm]	0,68		
Brick n°2 – Hollow/perforated brick		**M8** **With sleeve**	**M10** **With sleeve**	**M12** **With sleeve**
Admissible service load in shear	F [kN]	1,00		
Displacement	δ_{V0} [mm]	1,15		
	$\delta_{V\infty}$ [mm]	1,73		

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	No performance assessed

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 EOTA TR 053
F	Service load
δ_0	Short term displacement under service load
δ_∞	Long term displacement under service load
NPD	No performance declared