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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

MEMBER OF EOTA



European Technical Assessment ETA-11/0533 of 09/11/2016

I General Part

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

Trade name of the construction product:

Sinto ST-PE Tecfi Polyester Resin without styrene - DGE01 bonded anchor

Product family to which the above construction product belongs:

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

Manufacturer:

Tecfi SpA
Strada Statale Appia, Km. 193
IT-81050 Pastorano (CE)
Tel. +39 823 88 33 38
Fax +39 823 88 32 60
Internet www.tecfi.it

Manufacturing plant:

Tecfi SpA
Manufacturing Plant I

This European Technical Assessment contains:

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

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

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

This version replaces:

ETA-11/0533 issued on 2011/12/22

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 Sinto ST-PE Tecfi Polyester Resin without styrene - DGE01 is a bonded anchor (injection type) consisting of a mortar cartridge with Sinto ST-PE Tecfi Polyester Resin without styrene - DGE01 injection mortar, a perforated sleeve, and an anchor rod with hexagon nut and washer in the range of M8, M10 and M12.

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

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

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

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

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

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

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

The anchor is to be used only for anchorages subject to static or quasi-static loading in solid masonry (use category b) or hollow or perforated masonry (use category c) according to Annex B8. The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2010 at minimum.

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

The anchors may be used in the following temperature range:

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

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

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

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

3.1 Characteristics of product

Mechanical resistance and stability (BWR 1):

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

Safety in case of fire (BWR 2):

The essential characteristics are detailed in the Annex from C4.

Hygiene, health and the environment (BWR3):

Regarding the dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

Safety in use (BWR4):

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

Sustainable use of natural resources (BWR7)

No performance determined

Other Basic Works Requirements are not relevant

3.2 Methods of assessment

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

In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

4 Attestation and verification of constancy of performance (AVCP)

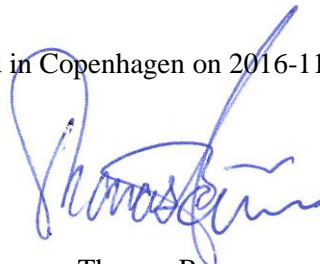
4.1 AVCP system

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

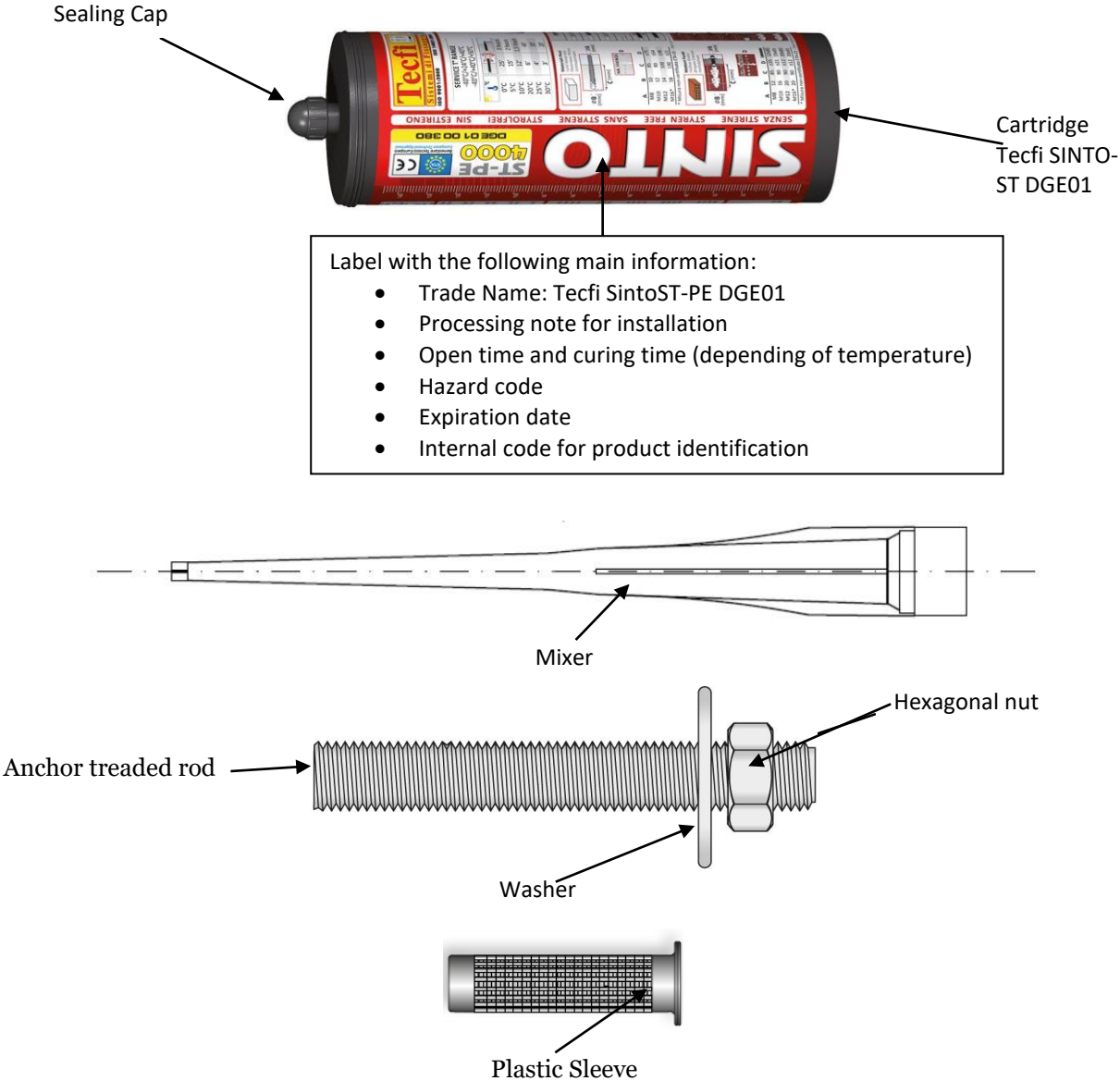
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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

Issued in Copenhagen on 2016-11-09 by



Thomas Bruun
Managing Director, ETA-Danmark



Use category in respect of the base material:

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

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

Use category in respect of installation and use:

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

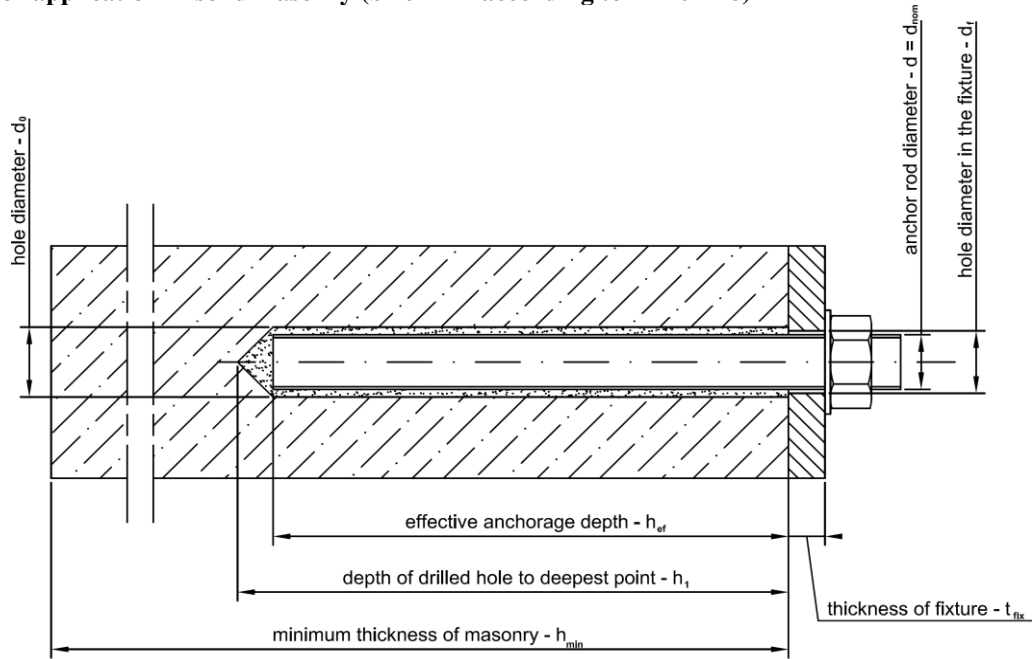
Temperature range:

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

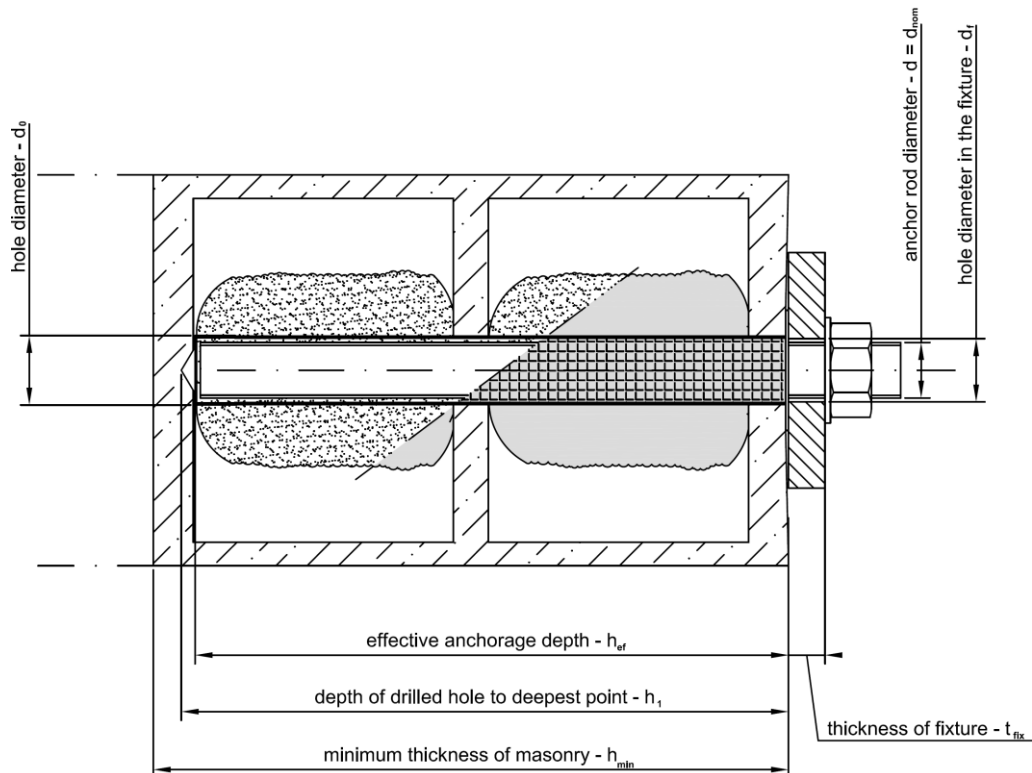
-40°C to +50°C (max. short term temperature +50°C and max. long term temperature +40°C)

TECFI SINTO ST-PE Polyester resin without styrene - DGE01	Annex A1 of European Technical Assessment ETA-11/0533
Product and intended use (1)	

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



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



TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Product and intended use (2)

Annex A2
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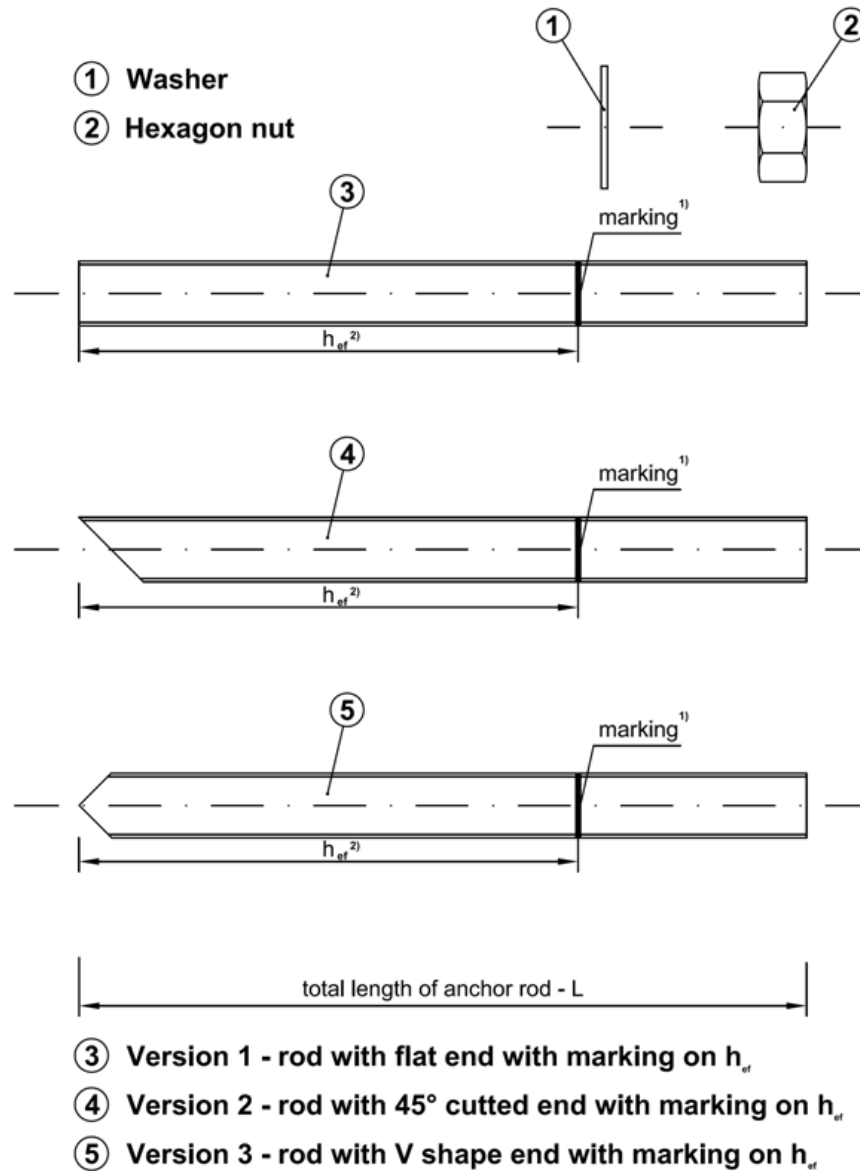


Table A1: Threaded rod dimensions

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

1) Marking according to clause 4.3 point 3 of ETAG 029 – June 2010.

2) Effective anchorage depths according to the range specified in table A1.

TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Threaded rod types and dimensions

Annex A3
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Table A2: Threaded rods materials

Part	Designation		
	Steel: zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 hot dipped galvanized $\geq 45 \mu\text{m}$ EN ISO 10684	Stainless steel A4	High corrosion resistance stainless steel (HCR)
Threaded rod	Property class from 4.8 to 8.8, acc. to EN ISO 898-1	Material 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 acc. to EN 10088-1. Property class 50, 70 or 80 acc. to EN ISO 3506-1	Material 1.4529 / 1.4565, acc. to EN 10088-1 Property class 50, 70 or 80 acc. to EN ISO 3506-1
Washer EN ISO 7089	Steel acc. to corresponding to threaded rod material	Material 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 acc. to EN 10088-1 Mechanical properties suitable to threaded rod property class	Material 1.4529 / 1.4565, acc. to EN 10088-1; Mechanical properties suitable to threaded rod property class
Hexagon nut	Property class from 4 to 8 acc. to EN 898-2 to be matched to threaded rod material	Material 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 acc. to EN 10088-1 Property class 50, 70 or 80 acc. to EN ISO 3506-2 to be matched to threaded rod material	Material 1.4529 / 1.4565, acc. to EN 10088-1 Property class 50, 70 or 80 acc. to EN ISO 3506-2 to be matched to threaded rod material

Commercial standard threaded rods with:

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

Table A3: Injection mortar

Product	Composition
TECFI SINTO ST-PE Polyester resin, Styrene free - DGE01 two components injection mortar	Additive: quartz Bonding agent: polyester resin styrene free Hardener: dibenzoyl peroxide

Table A4: Minimum curing time³⁾

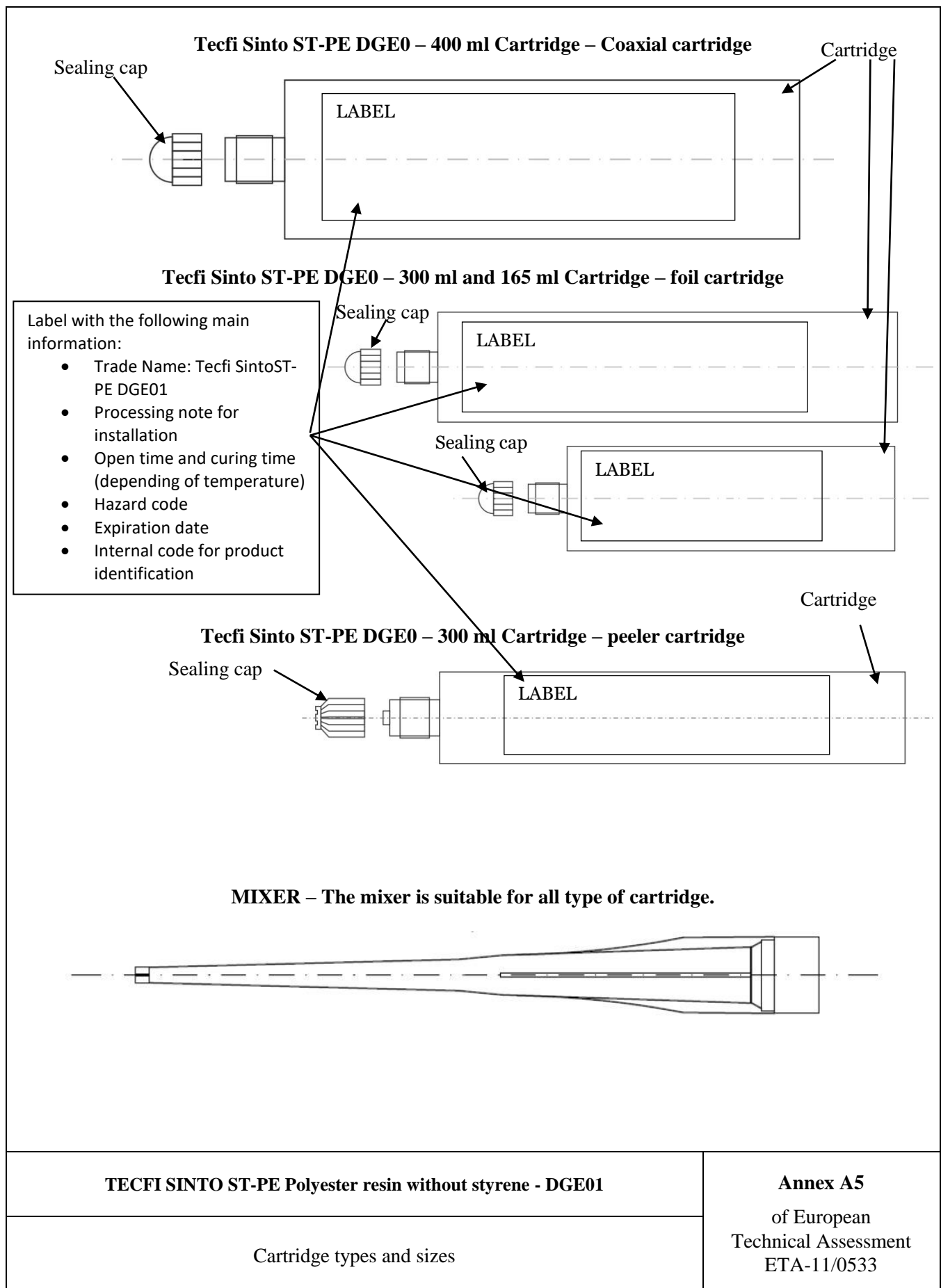
Masonry temperature	Processing time	Minimum curing time ⁵⁾
0°C ⁴⁾	25 min	180 min
5°C ⁴⁾	15 min	120 min
10°C	12 min	90 min
15°C	8 min	60 min
20°C	6 min	45 min
25°C	4 min	30 min
30°C	3 min	20 min

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

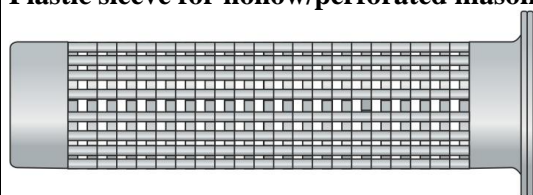
4) minimum resin temperature recommended, for injection between 5°C and 0°C, equal to 5°C.

5) minimum curing time for dry and wet conditions.

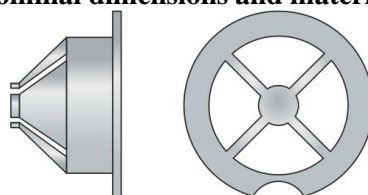
TECFI SINTO ST-PE Polyester resin without styrene - DGE01	Annex A4 of European Technical Assessment ETA-11/0533
Materials and curing time	



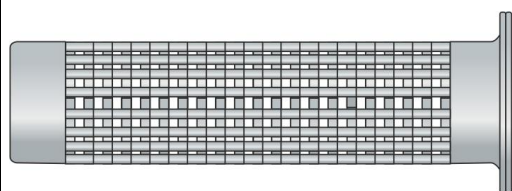
Plastic sleeve for hollow/perforated masonry: nominal dimensions and material



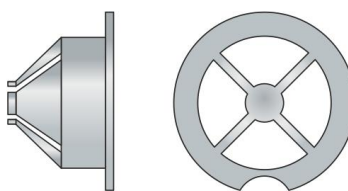
Plastic sleeve Ø 20 x 85 for Rod M12
Nominal diameter: Ø 20 mm
Nominal length: 85 mm



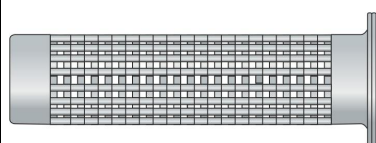
Lateral and top view of plastic centering cap for Ø 20 x 85 plastic sleeve



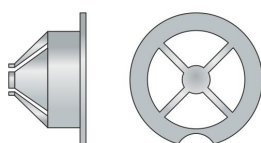
Plastic sleeve Ø 15 x 85 for Rod M10
Nominal diameter: Ø 15 mm
Nominal length: 85 mm



Lateral and top view of plastic centering cap for Ø 15 x 85 plastic sleeve



Plastic sleeve Ø 12 x 80 for Rod M8
Nominal diameter: Ø 12 mm
Nominal length: 80 mm



Lateral and top view of plastic centering cap for Ø 12 x 80 plastic sleeve

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

TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Plastic sleeve

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Use:

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

Anchors subject to:

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

Base materials:

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

Temperature range:

The anchors may be used in the following temperature range:

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

Use conditions (Environmental conditions):

Threaded rods:

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

Nuts and washers:

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

Installation:

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

Proposed design methods:

- ETAG 029, Annex C, Design method A

TECFI SINTO ST-PE Polyester resin without styrene - DGE01	Annex B1 of European Technical Assessment ETA-11/0533
Intended use - Specification	

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

Size		M8	M10	M12
Nominal drilling diameter	d ₀ [mm]	10	12	14
Maximum diameter hole in the fixture	d _{fix} [mm]	9	12	14
Embedment depth	h _{ef} [mm]	80	85	95
Depth of the drilling hole	h _l [mm]	h _{ef} + 5 mm		
Torque moment	T _{inst} [Nm]	5	8	10
Thickness to be fixed	t _{fix,min} [mm]	> 0		
	t _{fix,max} [mm]	< 1500		
Minimum spacing	S _{min} [mm]	240	255	285
Minimum edge distance	C _{min} [mm]	120	128	143

* Type of bricks are detailed in the Annex B7

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

Size		M8	M10	M12
Plastic sleeve		12x80	15x85	20x85
Nominal drilling diameter	d ₀ [mm]	12	16	20
Maximum diameter hole in the fixture	d _{fix} [mm]	9	12	14
Embedment depth	h _{ef} [mm]	80	85	85
Depth of the drilling hole	h _l [mm]	h _{ef} + 5 mm		
Torque moment	T _{inst} [Nm]	3	4	6
Thickness to be fixed	t _{fix,min} [mm]	> 0		
	t _{fix,max} [mm]	< 1500		
Minimum spacing	S _{min} [mm]	100	100	120
Minimum edge distance	C _{min} [mm]	100	100	120

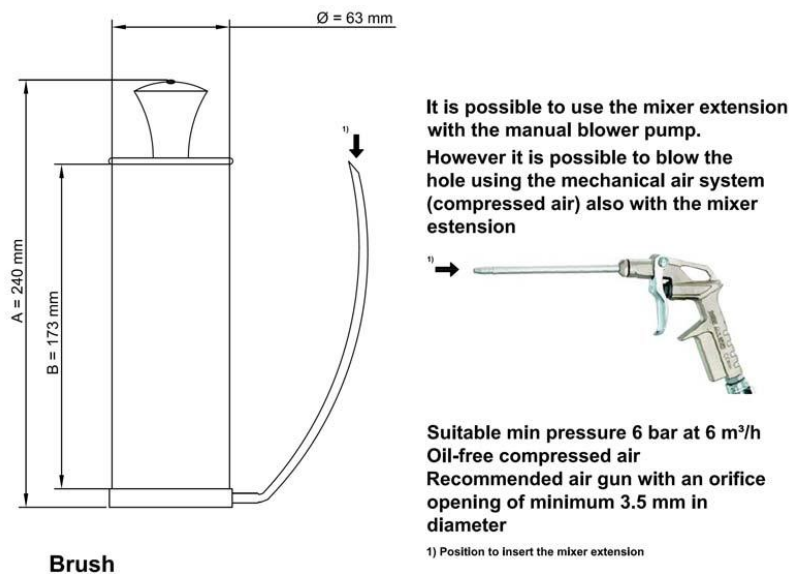
* Type of bricks are detailed in the Annex B7

TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Intended use - data

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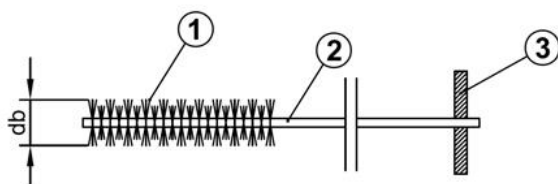
Manual blower pump: nominal dimensions



Brush

Mixer extension Ø 8 mm

Brush



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




Table B3: Brush diameter

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

TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Cleaning tools

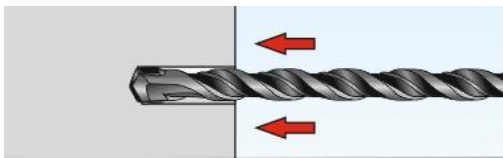


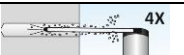

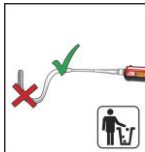
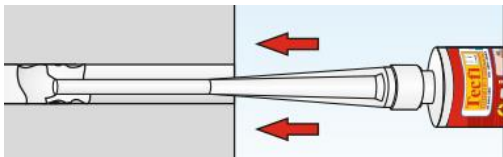
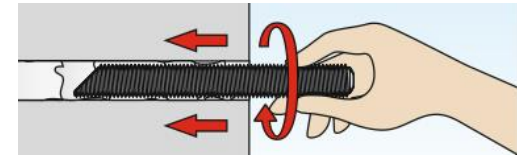
Annex B3
of European
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Resin injection gun details		
Picture	Size Cartridge	Operating principle
 DH 01 00 400	400 ml	Manual
 DH 01 00 345	300 ml	Manual
	280 ml	
	165 ml	
 DH 01 00 300	300 ml	Manual
	280 ml	
	165 ml	

TECFI SINTO ST-PE Polyester resin without styrene - DGE01

Tools for injection

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1		Drill the hole with the correct diameter and depth using a rotary percussive machine. Check the perpendicularity of the hole during the drilling operation.
2	<div><div>4 x Blower</div><div>4 x Brush</div><div>4 x Blower</div></div> <p>Instead of the blower manual pump it is also possible to use the compressed air free oil</p>	Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Table B3 in Annex B3) if the brush diameter is sufficient. For the blower tools see Annex B3.
3		<p>For sizes 400 ml and 280 ml unscrew the front cup, screw on the mixer and insert the cartridge in the gun.</p> <p>For the size 300 ml and 165 ml, unscrew the front cup, pull-out the steel closing clip according to the following operations:</p> <ul style="list-style-type: none">- insert the mixer in the eye of the plastic extractor,- pull the extractor to unhook the steel closing clip of the foil. <p>After that, screw on the mixer and insert the cartridge in the gun.</p>
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 an 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	 <p>ATTENTION: Use the rods dry and free oil and other contaminants</p>	Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex A4. Wait the curing time according Annex A4.
TECFI SINTO ST-PE Polyester resin without styrene - DGE01		Annex B5 of European Technical Assessment ETA-11/0533
Procedure for solid masonry		

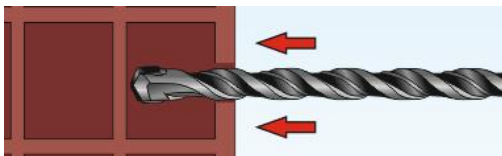


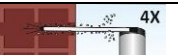

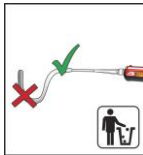
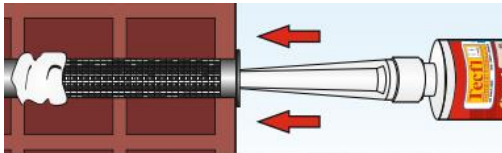
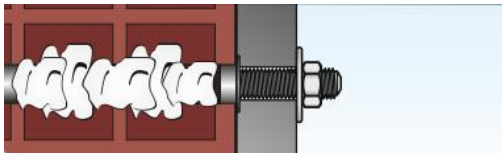
1		Drill the hole with the correct diameter and depth using a rotary machine. Check the perpendicularity of the hole during the drilling operation.
2	<div><div> 4 x Blower</div><div> 4 x Brush</div><div> 4 x Blower</div></div> <p>Instead of the blower manual pump it is also possible to use the compressed air free oil</p>	Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Table B3 in Annex B3) if the brush diameter is sufficient. For the blower tools see Annex B3.
3		<p>For sizes 400 ml and 280 ml unscrew the front cup, screw on the mixer and insert the cartridge in the gun.</p> <p>For the size 300 ml and 165 ml, unscrew the front cup, pull-out the steel closing clip according to the following operations:</p> <ul style="list-style-type: none">- insert the mixer in the eye of the plastic extractor,- pull the extractor to unhook the steel closing clip of the foil. <p>After that, screw on the mixer and insert the cartridge in the gun.</p>
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 an 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	 <p>ATTENTION: Use the rods dry and free oil and other contaminants</p>	Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex A4. Wait the curing time according Annex A4.
TECFI SINTO ST-PE Polyester resin without styrene - DGE01		Annex B6 of European Technical Assessment ETA-11/0533
Procedure for hollow/perforated masonry		

Table B5: Type of solid and hollow/perforated masonry

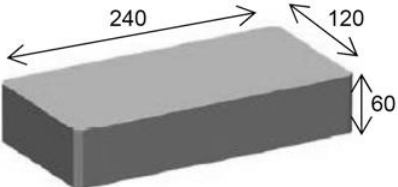
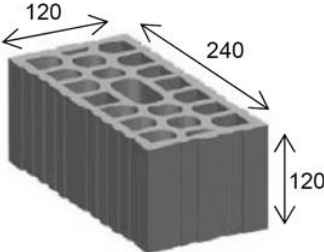
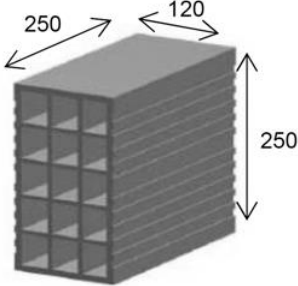
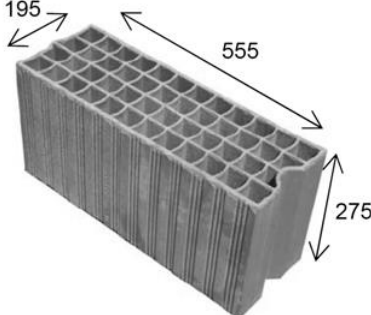
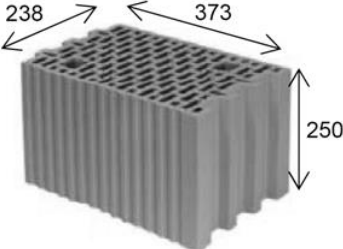
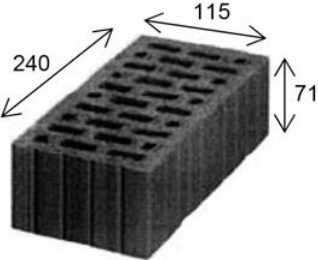
<p>Brick n°1 – Solid according to EN 771-1 - HD (High density)</p>  <p>Dimensions [mm]: 120 x 240 x 60 f_b class $\geq 73 \text{ N/mm}^2$ density $\rho_m \geq 1700 \text{ kg/m}^3$ (e.g. type "Mattone Pieno")</p>	<p>Brick n°2 – Hollow/perforated according to EN 771-1 - LD (Low density)</p>  <p>Dimensions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

Table C1: Essential Characteristics

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

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

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

Table C2: Characteristic bending moments

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

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Table C3: Characteristic values for tension and shear load.

ESSENTIAL CHARACTERISTICS			PERFORMANCE		
* Resistance for tensile and shear load Temperature range -40°C/+40°C (T _{mlp} = 24°C) and -40°C/+50°C (T _{mlp} = 40°C)			M8	M10	M12
γ _{Mm} [-] Category w/d			2,50		
Brick n°1	S _{cr,N} [mm]		240	255	285
	C _{cr,N} [mm]		120	128	143
Brick n°2	S _{cr,N} [mm]		240	240	240
	C _{cr,N} [mm]		120	120	120
Brick n°3	S _{cr,N} [mm]		250	250	250
	C _{cr,N} [mm]		125	125	125
Brick n°4	S _{cr,N} [mm]		555	555	555
	C _{cr,N} [mm]		278	278	278
Brick n°5	S _{cr,N} [mm]		373	373	373
	C _{cr,N} [mm]		187	187	187
Brick n°6	S _{cr,N} [mm]		240	240	240
	C _{cr,N} [mm]		120	120	120
β coefficient for in situ test (ETAG 029 Annex B) Temperature range: -40°C/+40°C e -40°C/+50°C			M8	M10	M12
Brick n° 1, 2, 3, 4, 6		β [-]	0,70		
Brick n° 5		β [-]	0,65	0,70	0,70
Displacement under service load					
Tensile load					
Brick n°1 – Solid brick			M8	M10	M12
Admissible service load in tensile	F [kN]		0,65	1,03	1,15
Displacement	δ _{N0} [mm]		0,08	0,07	0,06
	δ _{N∞} [mm]		0,16	0,16	0,16
Brick n°2 – Hollow/perforated brick			M8 12x80	M10 15x85	M12 20x85
Admissible service load in tensile	F [kN]		1,48	1,81	2,09
Displacement	δ _{N0} [mm]		0,06	0,08	0,10
	δ _{N∞} [mm]		0,16	0,16	0,20
Brick n°3 – Hollow/perforated brick			M8 12x80	M10 15x85	M12 20x85
Admissible service load in tensile	F [kN]		0,29	0,73	0,80
Displacement	δ _{N0} [mm]		0,06	0,08	0,07
	δ _{N∞} [mm]		0,16	0,16	0,16
Brick n°4 – Hollow/perforated brick			M8 12x80	M10 15x85	M12 20x85
Admissible service load in tensile	F [kN]		0,39	0,44	0,26
Displacement	δ _{N0} [mm]		0,06	0,06	0,06
	δ _{N∞} [mm]		0,16	0,16	0,16
Brick n°5 – Hollow/perforated brick			M8 12x80	M10 15x85	M12 20x85
Admissible service load in tensile	F [kN]		0,92	0,91	1,02
Displacement	δ _{N0} [mm]		0,06	0,06	0,06
	δ _{N∞} [mm]		0,16	0,16	0,16
Brick n°6 – Hollow/perforated brick			M8 12x80	M10 15x85	M12 20x85
Admissible service load in tensile	F [kN]		1,19	1,69	1,78
Displacement	δ _{N0} [mm]		0,12	0,07	0,06
	δ _{N∞} [mm]		0,24	0,16	0,16
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Table C3 cont.: Characteristic values for tension and shear load.

ESSENTIAL CHARACTERISTICS		PERFORMANCE		
Displacement under service load				
Shear load				
Brick n°1 – Solid brick		M8	M10	M12
Admissible service load in shear	F [kN]	1,32	2,94	2,62
Displacement	δv0 [mm]	0,23	0,48	0,38
	δv∞ [mm]	0,34	0,72	0,57
Brick n°2 – Hollow/perforated brick		M8 12x80	M10 15x85	M12 20x85
Admissible service load in shear	F [kN]	1,72	2,03	2,93
Displacement	δv0 [mm]	0,20	0,38	0,34
	δv∞ [mm]	0,30	0,57	0,51
Brick n°3 – Hollow/perforated brick		M8 12x80	M10 15x85	M12 20x85
Admissible service load in shear	F [kN]	0,93	1,08	0,86
Displacement	δv0 [mm]	0,31	0,23	0,18
	δv∞ [mm]	0,46	0,34	0,27
Brick n°4 – Hollow/perforated brick		M8 12x80	M10 15x85	M12 20x85
Admissible service load in shear	F [kN]	0,44	0,63	0,44
Displacement	δv0 [mm]	0,10	0,18	0,27
	δv∞ [mm]	0,15	0,27	0,40
Brick n°5 – Hollow/perforated brick		M8 12x80	M10 15x85	M12 20x85
Admissible service load in shear	F [kN]	0,78	1,06	1,00
Displacement	δv0 [mm]	0,23	0,19	0,31
	δv∞ [mm]	0,34	0,28	0,46
Brick n°6 – Hollow/perforated brick		M8 12x80	M10 15x85	M12 20x85
Admissible service load in shear	F [kN]	1,25	2,23	1,65
Displacement	δv0 [mm]	0,17	0,69	0,13
	δv∞ [mm]	0,25	1,03	0,19

Table C4: Reaction to fire.

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

Table C5: Resistance to fire.

ESSENTIAL CHARACTERISTICS	PERFORMANCE
Resistance to fire	NPD

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Table C6: Terminology and symbols

TERMINOLOGY AND SYMBOLS	
d	Diameter of anchor bolt or thread diameter
d_0	Drill hole diameter
d_{fix}	Diameter of clearance hole in the fixture
h_{ef}	Effective anchorage depth
h_1	Depth of the drilling hole
T_{inst}	Torque moment to installation
t_{fix}	Thickness to be fixed
s_{min}	Minimum allowable spacing
c_{min}	Minimum allowable edge distance
N_{Rk}	Characteristic tensile resistance for single anchor
V_{Rk}	Characteristic shear resistance for single anchor
γ_{Mm}	Partial safety factors
$s_{cr,N}$	Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects
$c_{cr,N}$	Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects
β	Factor according to ETAG 029 Annex B
F	Service load
δ_0	Short term displacement under service load
δ_∞	Long term displacement under service load
NPD	No performance declared

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Terminology and symbols

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