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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-26/0067 of 2026/01/27

### 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:**

GMS-Verbundmörtel / GMS-Injection Mortar  
Respectively:  
GMS-Injection Mortar V-PLUS  
GMS-Injection Mortar V-PLUS W  
GMS-Injection Mortar V-PLUS T

**Product family to which the above construction product belongs:**

Bonded anchor for use in masonry under static and seismic load

**Manufacturer:**

GMS-Bautechnik GmbH  
Sonnengasse 13  
A-9020 Klagenfurt am Wörthersee  
Austria

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Fax.: +43 (0)463 481 111 - 20  
Internet: [www.gms-systeme.com](http://www.gms-systeme.com)

**Manufacturing plant:**

GMS-Bautechnik GmbH  
Manufacturing plant 1

**This European Technical Assessment contains:**

37 pages including 32 annexes which form an integral part of the document

**This European Technical Assessment is issued in accordance with Article 95(4) of Regulation (EU) 2024/3110, on the basis of:**

EAD 330076-01-0604 - 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.

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## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product**

The GMS-Injection Mortar V-PLUS, V-PLUS W and V-PLUS T are injection type bonded anchors consisting of an injection mortar cartridge using an applicator gun equipped with a special mixing nozzle and threaded anchor rod and rebar. For use in hollow bricks is prescribed to use plastic or metallic sleeves.

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<sup>1</sup> of this European Technical Assessment.

The intended use specifications of the product are detailed in Annex B1 to B11.

### **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) 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 product is intended to be used in dry and wet condition (category d/d, w/d and w/w) horizontal or vertical perforated ceramic blocks (category c) and solid masonry (category b) and autoclaved aerated concrete (AAC) (category d) in the following service temperature range:

Service temperature 1: 40°C max short-term temperature  
24°C max long-term temperature

Service temperature 2: 80°C max short-term temperature  
50°C max long-term temperature

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.

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<sup>1</sup> 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 Annex C.

##### **Safety in case of fire (BWR 2):**

Reaction to fire: The product is class A1.

Resistance to fire: 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, d/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**

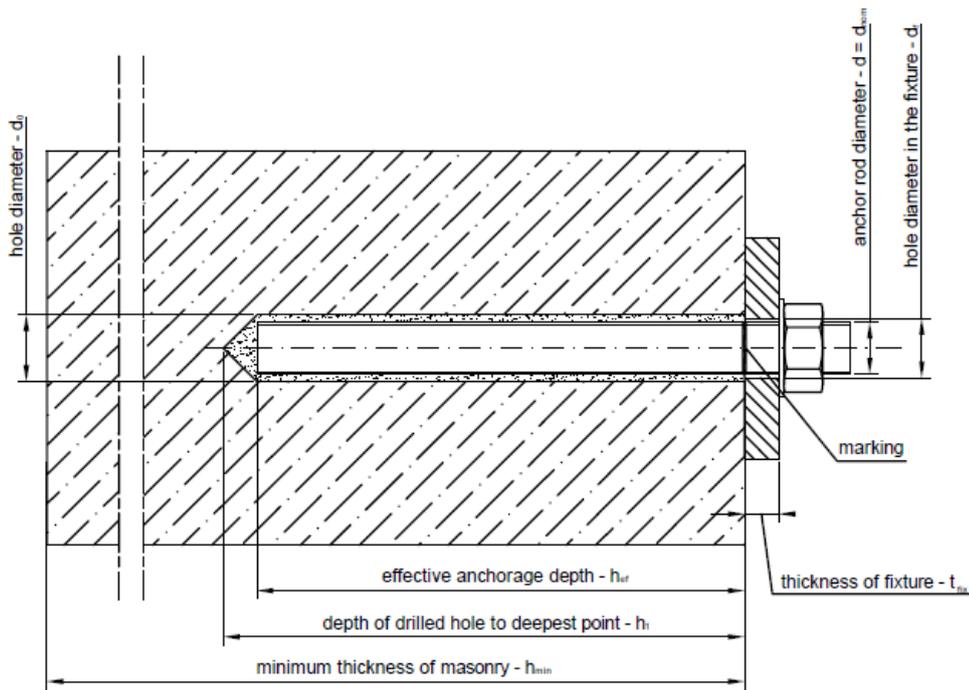
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2026-01-27 by

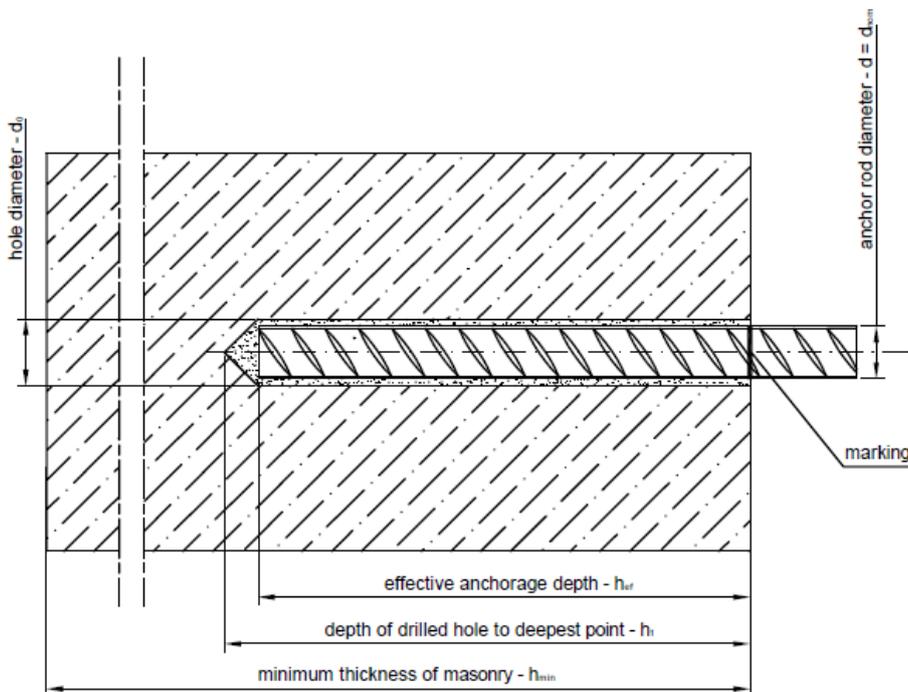


Thomas Bruun  
Manager, ETA-Danmark

**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 Ø16**

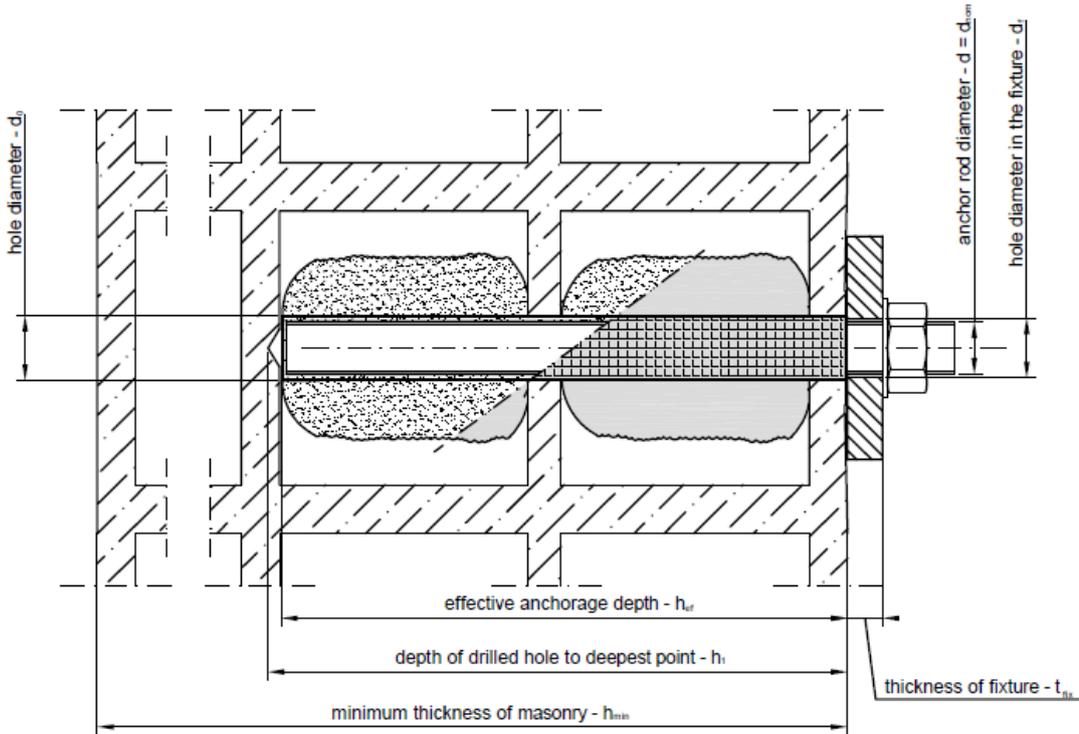


**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Product description**  
Installed condition (1)

**Annex A1**  
of European  
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**Anchor application in hollow masonry with threaded rod from M8 to M16 and GC-GF sleeves**

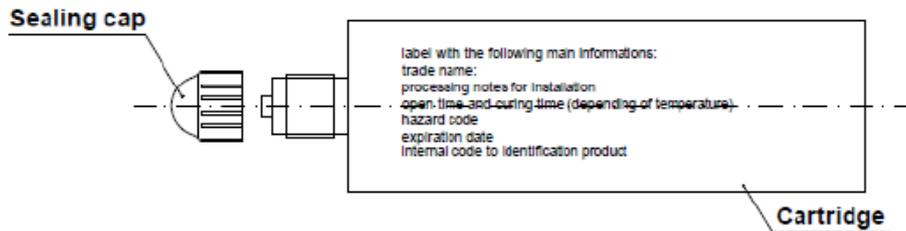


**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

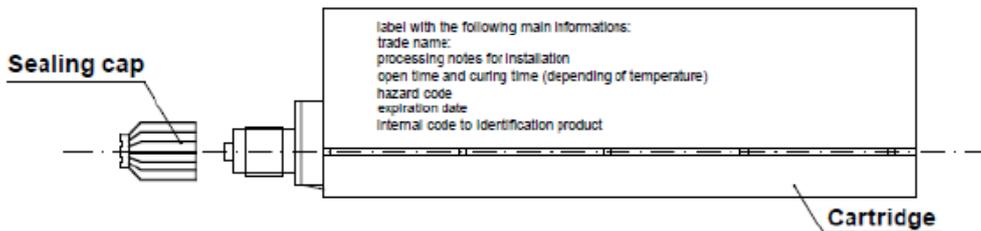
**Product description**  
Installed condition (2)

**Annex A2**  
of European  
Technical Assessment  
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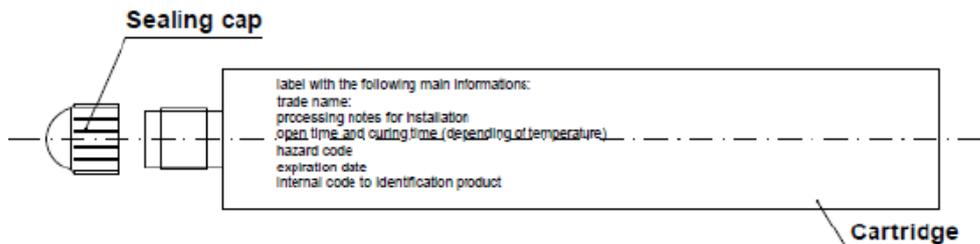
**coaxial cartridge - sizes from 75 ml to 420 ml**



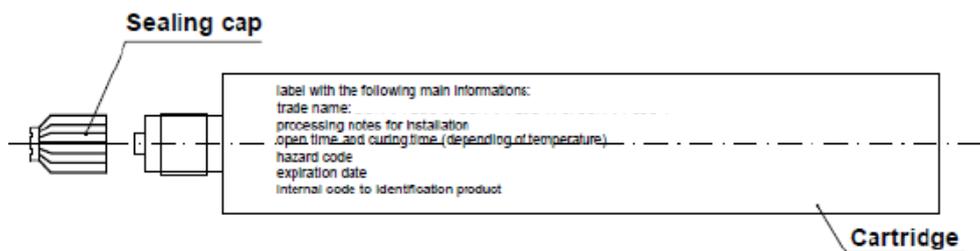
**side by side cartridge - sizes from 345 ml to 825 ml**



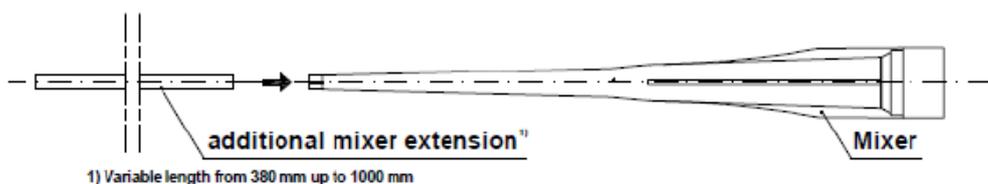
**CIC foil cartridge - sizes from 165 ml to 300 ml**



**coaxial peeler cartridge - size of 280 ml**



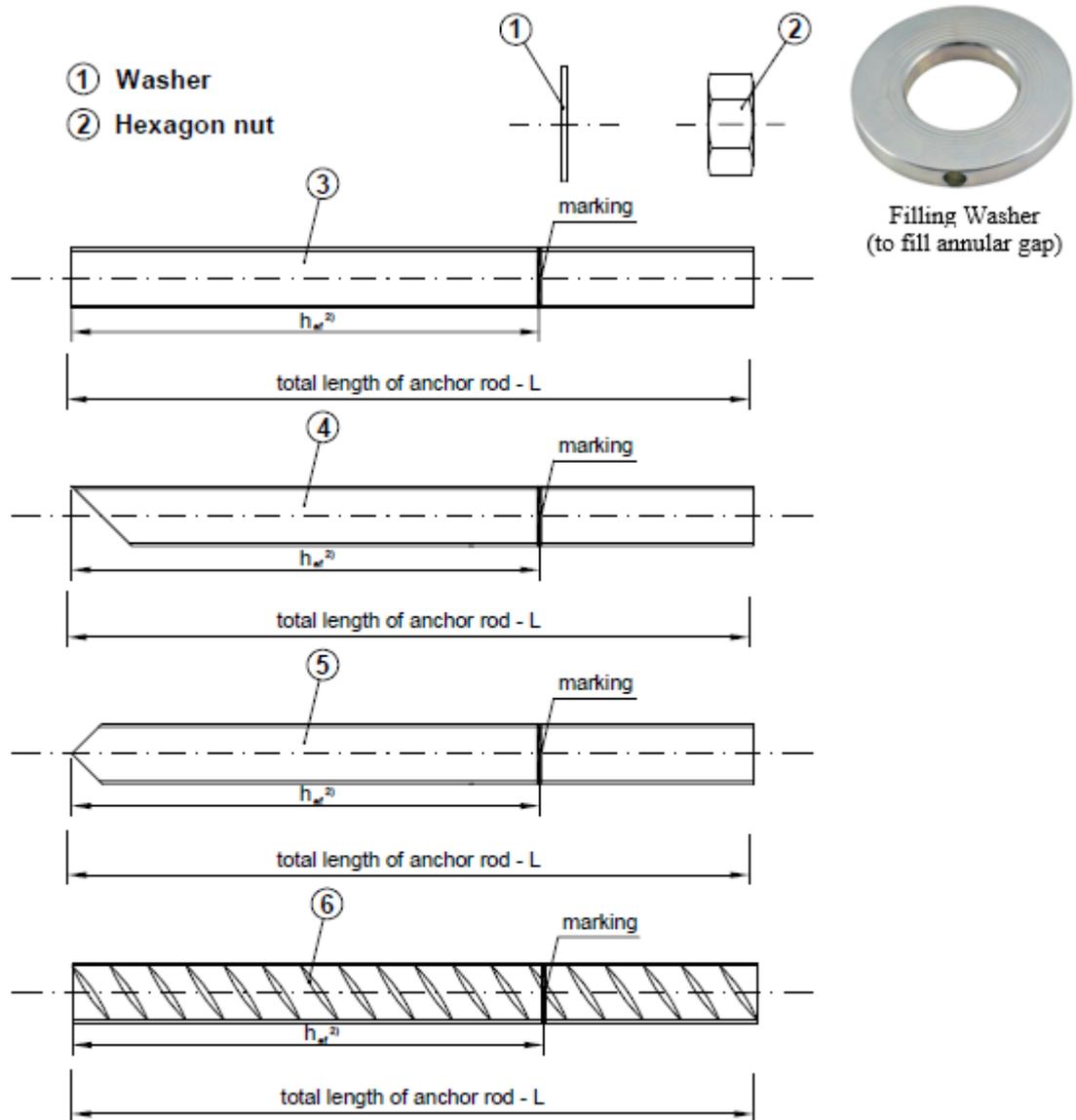
**MIXER - the mixer is suitable for each type of cartridge**



**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Product description**  
 Cartridge types and sizes

**Annex A3**  
 of European  
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GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T

Annex A4  
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Product description  
Steel elements

**Table A1: Threaded rod materials**

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

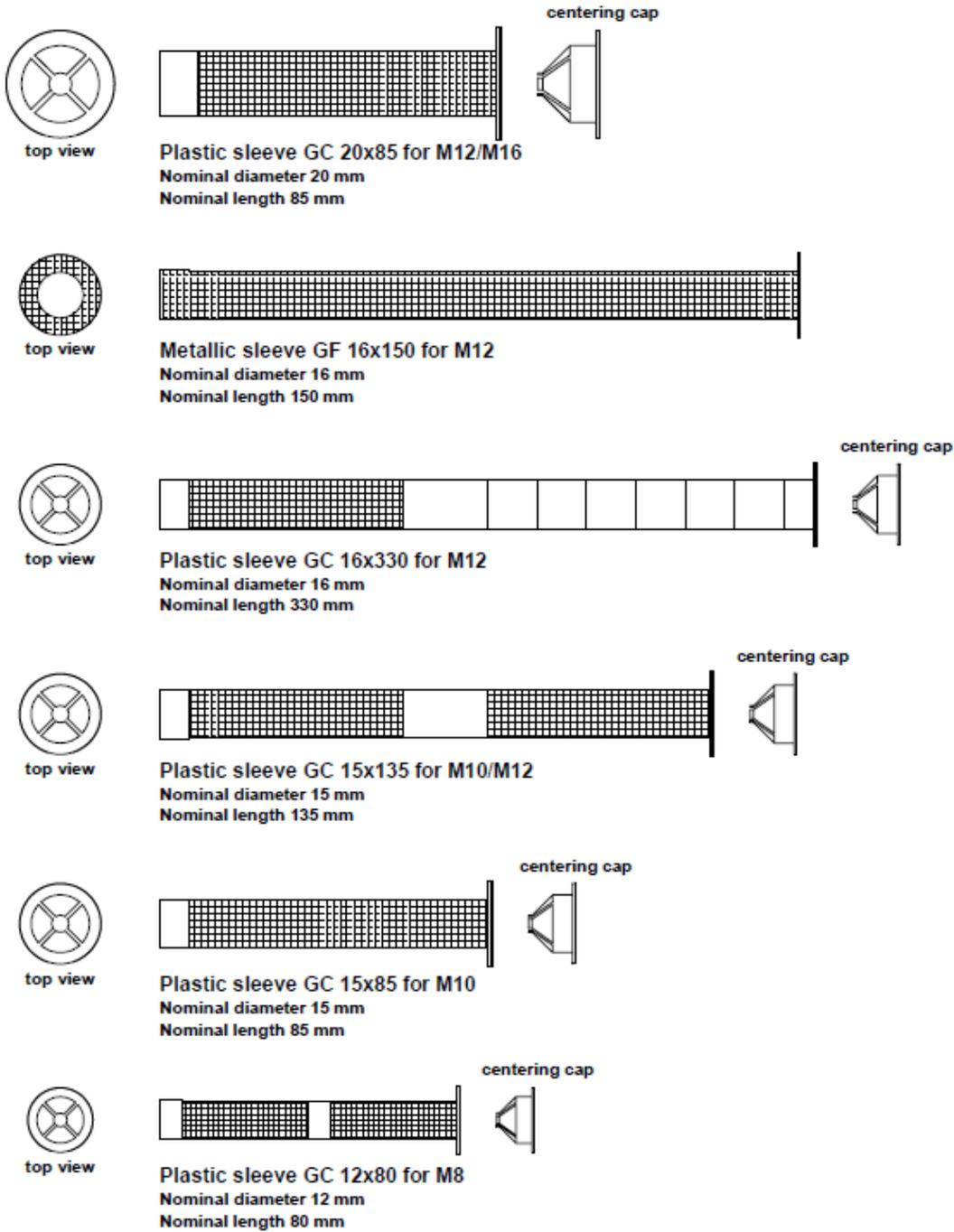
Designation	Material
Rebar according to EN 1992-1-1:2004+AC:2010, Annex C	Bars and de-coiled rods Class B or C With $f_{yk}$ and $k$ according to NDP or NCL or EN 1992-1-1:2004/NA $f_{uk} = f_{tk} = k \times f_{yk}$ - Rib height of the bar ( $h$ ) in the range $0,05d \leq h \leq 0,07d$

**Table A3: Injection mortar**

Product	Composition
GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T two components injection mortar	Mortar resin styrene-free, hardener, filler

<b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b>	<b>Annex A5</b> of European Technical Assessment ETA-26/0067
<b>Product description</b> Materials – Steel elements and injection mortar	

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



**Table A4: Plastic and metallic sleeve materials**

Part	Designation
Metallic sleeve	Zinc plated steel
Plastic sleeve	Polypropylene (PP) / Polyethylene (PE)
Centering cap	Polypropylene (PP) / Polyethylene (PE)

<b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b>	<b>Annex A6</b>
<b>Product description</b> Materials – Plastic and metallic sleeves	of European Technical Assessment ETA-26/0067

**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  $\phi 8$  to  $\phi 16$
- Seismic load: sizes  $\phi 8$  and M16

**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 seismic conditions minimum is M 5,0).

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  $\beta$ -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 +80°C (max. short term temperature +80°C and max. long term temperature +50°C).

**Use conditions (Environmental conditions):**

- Structures subject to dry internal conditions: 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:**

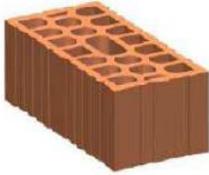
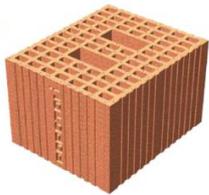
- Condition d/d: installation in dry base material and use in structures subjected to dry conditions.
- Condition w/d: installation in dry or wet base material and use in structures subjected to dry conditions.
- Condition w/w: installation in dry or wet base material and use in structures subjected to wet conditions.
- Perforation with drilling machine: hammer drilling for solid and AAC bricks, rotary drilling for hollow bricks.
- No limitation of anchor position in wall including setting in masonry joints completely filled with mortar.

**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.

<b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b>	<b>Annex B1</b> of European Technical Assessment ETA-26/0067
<b>Intended use</b> Specifications	

**Table B1: Brick types and properties with corresponding fastening elements**

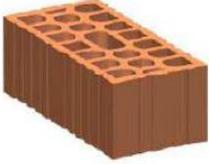
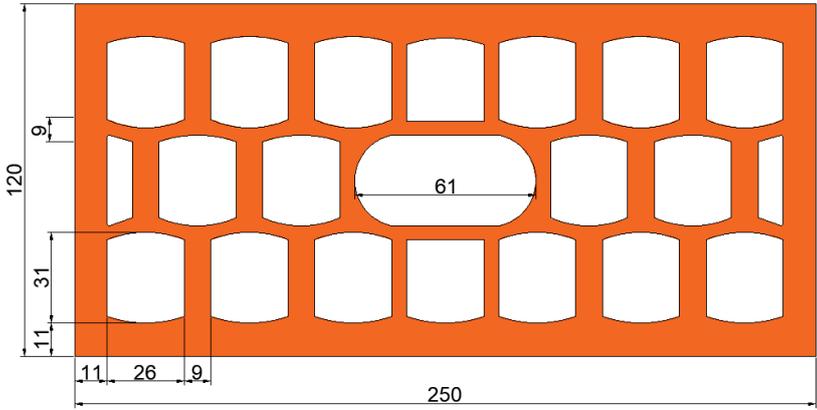
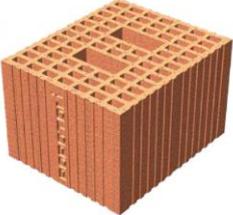
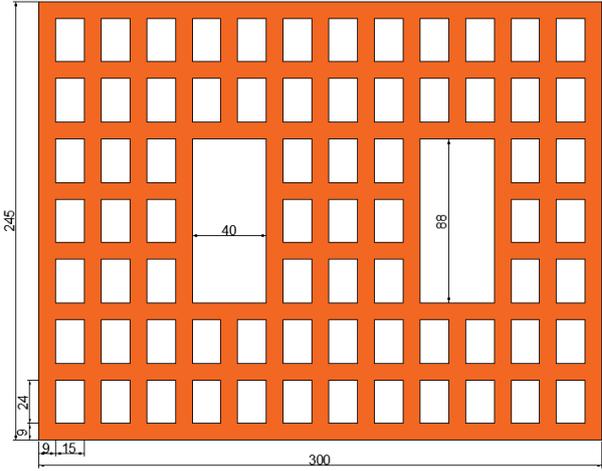
Brick n°	Brick Name - Category Density [kg/m <sup>3</sup> ] Dimension L x B x H [mm]	Brick Picture	Steel element	Sleeve	Annex
1	<b>Solid brick (b) EN 771-1</b> Danesi $\rho=1560$ 120 x 250 x 55		M8 to M16 $\phi 8$ to $\phi 16$	-	C5-C9
2	<b>Hollow brick (c) EN 771-1</b> Mattone Doppio UNI $\rho=810$ 190 x 250 x 120		M8 to M16	GC 12x80 GC 15x85 GC 15x135 GC 16x150 GC 16x330 GC 20x85	C10-C11
3	<b>Hollow brick (c) EN 771-1</b> Poroton $\rho=900$ 300 x 245 x 230		M8 to M16	GC 12x80 GC 15x85 GC 15x135 GC 16x150 GC 16x330 GC 20x85	C12-C13
4	<b>AAC2 (d) EN 771-4</b> Climagold $\rho=300$ 625 x 200 x 360		M8 to M16	-	C14
5	<b>AAC5 (d) EN 771-4</b> Blocco sismico $\rho=575$ 625 x 200 x 300		M8 to M16	-	C15

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Brick types and properties with corresponding fastening elements (1)

**Annex B2**  
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**Table B2: Brick types and properties with corresponding fastening elements**

<p><b>Hollow brick (c)</b>  <b>EN 771-1</b>                  Mattone Doppio UNI</p> 	
<p><b>Hollow brick (c)</b>  <b>EN 771-1</b>                  Poroton P800</p> 	

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
 Details for hollow bricks (1)

**Annex B3**  
 of European  
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**Table B3 Installation data for solid masonry for rod (brick n°1)\***

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	90	100-200	110-200
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 B4 Installation data for solid masonry for rebar (brick n°1)\***

Size		$\phi 8$	$\phi 10$	$\phi 12$	$\phi 16$
Nominal drilling diameter	$d_0$ [mm]	10	12	14	18
Embedment depth	$h_{ef}$ [mm]	80-160	90-180	100-200	110-200
Depth of the drilling hole	$h_1$ [mm]	$h_{ef} + 5$ mm			
Minimum wall thickness	$h_{min}$ [mm]	$h_{ef} + 30$ mm			
Minimum spacing	$S_{min}$ [mm]	50	50	50	60
Minimum edge distance	$C_{min}$ [mm]	50	50	50	60

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Installation data on solid bricks

**Annex B4**  
of European  
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**Table B5: Installation data for hollow/perforated masonry (brick n° 2 to 3)\***

Size		M8	M10	M10	M12	M12	M12	M12	M16
Plastic sleeve		GC 12x80	GC 15x85	GC 15x135	GC 15x135	GF 16x150	GC 16x330	GC 20x85	GC 20x85
Nominal drilling diameter	$d_0$ [mm]	12	16	16	16	16-18	16-18	20-22	20-22
Maximum diameter hole in the fixture	$d_{fix}$ [mm]	9	12	12	14	14	14	14	18
Embedment depth	$h_{ef}$ [mm]	80	85	135	135	150	130-330	85	85
Depth of the drilling hole	$h_1$ [mm]	$h_{ef} + 5 \text{ mm}$							
Minimum wall thickness	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm}$							
Torque moment	$T_{inst}$ [Nm]	4	4	4	4	4	4	4	4
Minimum spacing	$S_{min}$ [mm]	See Annex C10 to C13							
Minimum edge distance	$C_{min}$ [mm]								

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

**Table B6 Installation data for AAC masonry (brick n°4-5)\***

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	90	100	110
Depth of the drilling hole	$h_1$ [mm]	$h_{ef} + 5 \text{ mm}$			
Minimum wall thickness	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm}$			
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

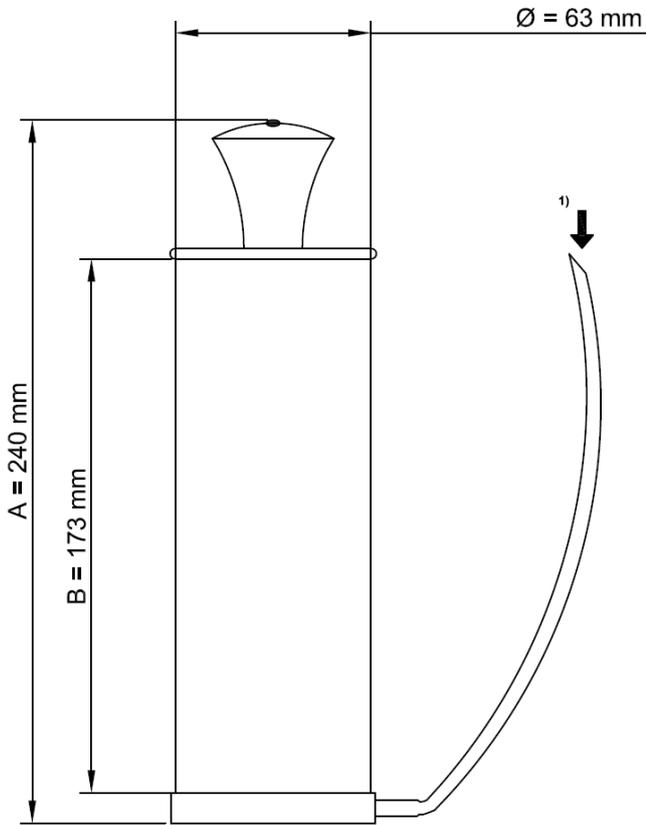
\* Type of bricks are detailed in the Annex B3

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Installation data on hollow bricks and AAC bricks

**Annex B5**  
of European  
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**Manual blower pump: nominal dimensions**



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

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



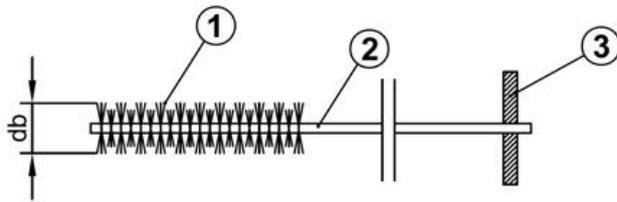
**Suitable min pressure 6 bar at 6 m<sup>3</sup>/h  
Oil-free compressed air  
Recommended air gun with an orifice opening of minimum 3.5 mm in diameter**

1) Position to Insert the mixer extension



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

<b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b>	<b>Annex B6</b> of European Technical Assessment ETA-26/0067
<b>Intended use</b> Cleaning and installation accessories (1)	



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

**Table B7: Brush diameter for solid masonry and AAC**

			Use in solid masonry and AAC			
Type of threaded rod			M8- $\phi$ 8	M10- $\phi$ 10	M12- $\phi$ 12	M16- $\phi$ 16
<b>d<sub>0</sub></b>	Nominal drill hole	[mm]	10	12	14	18
<b>d<sub>b</sub></b>	Brush diameter	[mm]	12	14	16	20

**Table B8: Brush diameter for hollow/perforated masonry**

			Use in hollow/perforated masonry					
Type of plastic sleeve			GC12x80	GC 15x85	GC 15x135	GF 16x150	GC 16x330	GC 20x85
<b>d<sub>0</sub></b>	Nominal drill hole	[mm]	12	16	16	16-18	16-18	20-22
<b>d<sub>b</sub></b>	Brush diameter	[mm]	16	16	16	18	18	20

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Cleaning and installation accessories (2)

**Annex B7**  
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**Table B9: Mortar injection dispenser**

Injection dispensers	Cartridges
 <p><i>Manual</i></p>	420 ml 400 ml 380 ml
 <p><i>Manual</i></p>	345 ml 300 ml 280 ml 165 ml
 <p><i>Manual</i></p>	300 ml 280 ml 165 ml
 <p><i>Pneumatic</i></p>	420 ml 400 ml 380 ml
 <p><i>Battery</i></p>	420 ml 400 ml 380 ml 345 ml 300 ml

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
 Cleaning and installation accessories (3)

**Annex B8**  
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**Table B10: Minimum curing time<sup>1)3)</sup>**

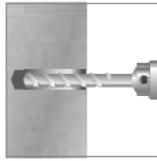
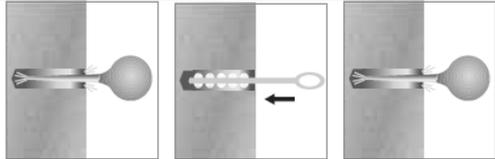
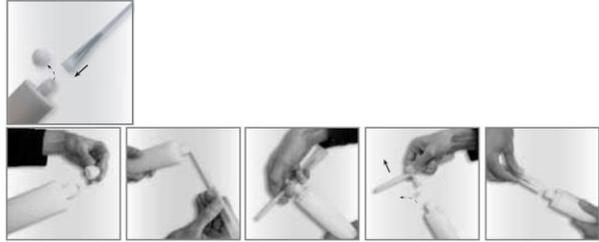
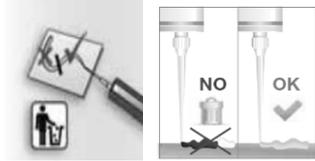
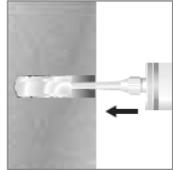
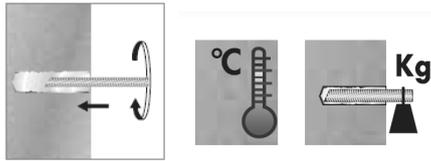
<b>GMS-Injection Mortar V-PLUS</b>		
<b>Masonry temperature</b>	<b>Processing time</b>	<b>Minimum curing time<sup>1)3)</sup></b>
-10°C <sup>2)</sup>	105 min	24 h
-5°C <sup>2)</sup>	65 min	14 h
0°C <sup>2)</sup>	45 min	7 h
5°C <sup>2)</sup>	25 min	1 h 30 min
10°C	16 min	1 h
15°C	11,5 min	45 min
20°C	7,5 min	40 min
25°C	5 min	35 min
30°C	3 min	30 min
35°C	2 min	25 min
40°C	1 min	20 min
<b>GMS-Injection Mortar V-PLUS W</b>		
<b>Masonry temperature</b>	<b>Processing time</b>	<b>Minimum curing time<sup>1)3)</sup></b>
-10°C <sup>2)</sup>	60 min	15 h
-5°C <sup>2)</sup>	40 min	3 h 30 min
0°C <sup>2)</sup>	25 min	1 h 40 min
5°C <sup>2)</sup>	15 min	1 h 10 min
10°C	10 min	50 min
15°C	7 min	35 min
20°C	5 min	30 min
<b>GMS-Injection Mortar V-PLUS T</b>		
<b>Masonry temperature</b>	<b>Processing time</b>	<b>Minimum curing time<sup>1)3)</sup></b>
20°C	14 min	60 min
25°C	11 min	50 min
30°C	8 min	40 min
35°C	6 min	30 min
40°C	4 min	20 min

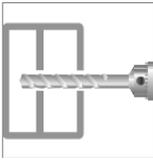
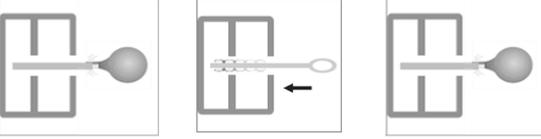
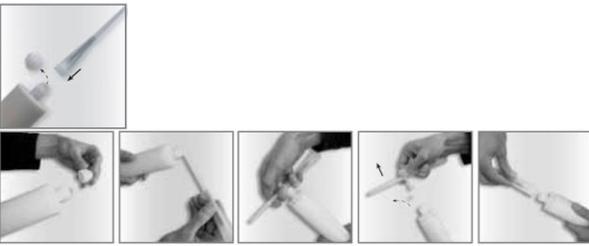
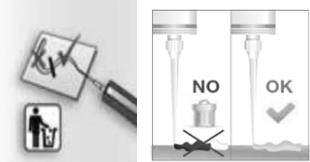
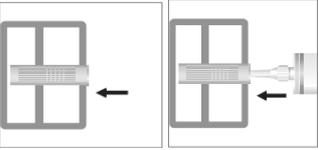
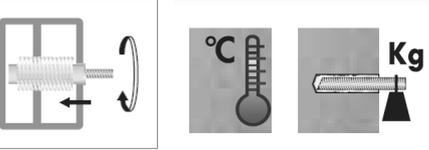
- 1) the minimum time from the end of the mixing to the time when the anchor may be torque or loaded
- 2) minimum resin temperature recommended, for injection between 5°C and -5°C, equal to 10°C.
- 3) minimum curing time for dry and wet conditions.

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Processing time and curing time

**Annex B9**  
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1		<p>Drill the hole with the correct diameter and depth using a <b>rotary-hammer drilling machine</b>. Check the perpendicularity of the hole during the drilling operation.</p>
2	 <p style="text-align: center;">4x                      4x                      4x</p> <p style="text-align: center;"><b>Blower Pump      Brush                      Blower Pump</b></p> <p>(Instead of the blower manual pump it is also possible to use the compressed air free oil)</p>	<p>Clean the hole from drilling dust: The hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations (<b>2x2x2 for AAC</b>). Before brushing clean the brush and check (see Table B7 in Annex B7) if the brush diameter is sufficient. For the blower tools see Annex B6.</p>
3		<p>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:</p> <ul style="list-style-type: none"> <li>- insert the mixer in the eye of the plastic extractor,</li> <li>- pull the extractor to unhook the steel closing clip of the foil.</li> </ul> <p>In the version without extractor cut the foil pack. After that, screw on the mixer and insert the cartridge in the dispenser.</p>
4		<p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two components, comes out from the mixer with a uniform color.</p>
5		<p>Fill the drilled hole uniformly starting from the drilled hole bottom, in order to avoid entrapment of the air; remove the mixer slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth.</p>
6		<p>Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex B11. Wait the curing time according Annex B11.</p>
<b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b>		<b>Annex B10</b> of European Technical Assessment ETA-26/0067
<b>Intended use</b> Procedure for solid masonry and AAC masonry		

1		<p>Drill the hole with the correct diameter and depth using a <b>rotary drilling machine</b>. Check the perpendicularity of the hole during the drilling operation.</p>
2	 <p><b>4x Blower Pump</b>      <b>2x Brush</b>      <b>4x Blower Pump</b>          (Instead of the blower manual pump it is also possible to use the compressed air free oil)</p>	<p>Clean the hole from drilling dust:          The hole shall be cleaned by at least 4 blowing operations, by at least 2 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Table B8 in Annex B7) if the brush diameter is sufficient. For the blower tools see Annex B6.</p>
3		<p>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.</p>
4		<p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two components, comes out from the mixer with a uniform color.</p>
5		<p>Remove the centering cap from the plastic sleeve. Insert in the hole the plastic sleeve (see Annex A6). Fill the sleeve uniformly starting from the sleeve bottom. Remove the mixer slowly bit by bit during pressing-out: remove the mixer about 10 mm for each pressing operation. Filling the sleeve completely.</p>
6		<p>Put on the centering cup on the filled plastic sleeve. Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex B9. Wait the curing time according Annex B9.</p>
<p><b>GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T</b></p>		<p><b>Annex B11</b>          of European          Technical Assessment          ETA-26/0067</p>
<p><b>Intended use</b>          Procedure for hollow/perforated masonry</p>		

**Table C1:  $\beta$ -factors for job-site testing under tension loading**

Brick	Installation and use conditions	Anchor size	$\beta$ -factors
Brick n°1	d/d - w/d - w/w	M8 to M16 and $\phi$ 8 to $\phi$ 16	0,98
Brick n°2-3	d/d - w/d - w/w	M8+GC 12x80 M10+GC 15x85 M10+GC 15x135 M12+GC 15x135 M12+GC 16x150 M12+GC 16x330 M12+GC 20x85 M16+GC 20x85	0,98
Brick n° 4-5	d/d - w/d - w/w	M8 to M16	0,90

**Table C2:  $\alpha_{N,seis}$ -factors for job-site testing under tension loading**

Brick	Installation and use conditions	Temperature range	Anchor size	$\alpha_{N,seis}$
Mattone Danesi	d/d - w/d - w/w	All T° range	$\phi$ 8	0,78
Mattone Danesi	d/d - w/d - w/w	All T° range	M16	0,75

**Table C3:  $\alpha_{V,seis}$ -factors for job-site testing under shear loading**

Brick	Installation and use conditions	Temperature range	Anchor size	$\alpha_{V,seis}$
Mattone Danesi	d/d - w/d - w/w	All T° range	$\phi$ 8	0,54
Mattone Danesi	d/d - w/d - w/w	All T° range	M16	0,41

**Table C4: Group factor  $\alpha_g$** 

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

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
 $\beta$ -factors for job site testing and  $\alpha$  factor for seismic and anchor group

**Annex C1**  
of European  
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**Table C5: Characteristic values for steel: tension resistance and shear resistance for threaded rods and rebar**

Size			M8	M10	M12	M16
<b>Steel failure – characteristic tension resistance</b>						
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
<b>Steel failure – characteristic tension resistance – partial factor</b>						
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			
<b>Steel failure – characteristic shear resistance without lever arm</b>						
Steel class 4.8	$V_{Rk,s}^0$	[kN]	7	12	17	31
Steel class 5.8	$V_{Rk,s}^0$	[kN]	9	14	21	39
Steel class 8.8	$V_{Rk,s}^0$	[kN]	15	23	34	63
Stainless steel A2, A4, HCR class 50	$V_{Rk,s}^0$	[kN]	9	14	21	39
Stainless steel A2, A4, HCR class 70	$V_{Rk,s}^0$	[kN]	13	20	29	55
Stainless steel A4, HCR class 80	$V_{Rk,s}^0$	[kN]	15	23	34	63
<b>Steel failure – characteristic shear resistance with lever arm</b>						
Steel class 4.8	$M_{Rk,s}^0$	[Nm]	15	30	52	133
Steel class 5.8	$M_{Rk,s}^0$	[Nm]	19	37	65	166
Steel class 8.8	$M_{Rk,s}^0$	[Nm]	30	60	105	266
Stainless steel A2, A4, HCR class 50	$M_{Rk,s}^0$	[Nm]	19	37	66	166
Stainless steel A2, A4, HCR class 70	$M_{Rk,s}^0$	[Nm]	26	52	92	233
Stainless steel A4, HCR class 80	$M_{Rk,s}^0$	[Nm]	30	60	105	266
<b>Steel failure – characteristic shear resistance – partial factor</b>						
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			$\phi 8$	$\phi 10$	$\phi 12$	$\phi 16$
<b>Steel failure for reinforced bar (rebar)</b>						
Characteristic tensile resistance	$N_{Rk,s}$	[kN]	$A_s \times f_{uk}^{2)}$			
Cross section area	$A_s$	[mm <sup>2</sup> ]	50	79	113	201
Partial factor	$\gamma_{Ms,N}^{1)}$	[-]	1,4			
Characteristic shear resistance	$V_{Rk,s}^0$	[kN]	$0,5 \times A_s \times f_{uk}^{2)}$			
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5			

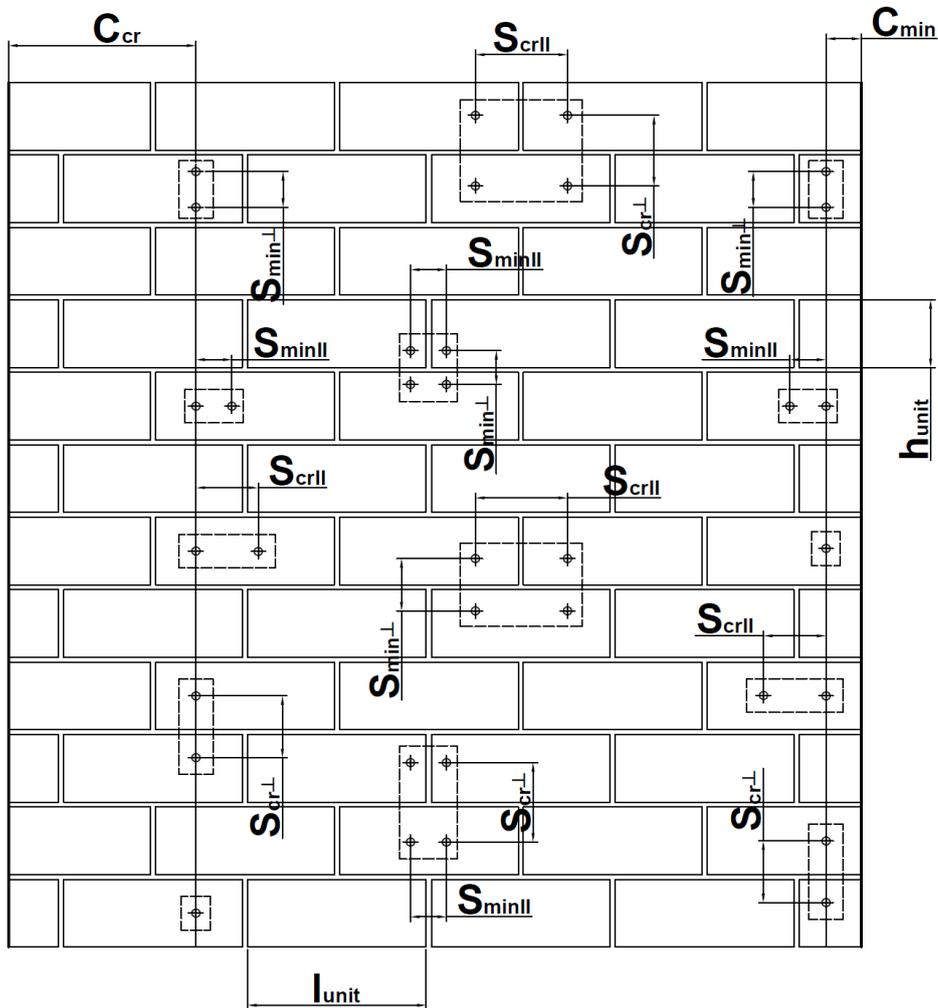
- 1) In the absence of national regulation  
 2)  $f_{uk}$  shall take from the specifications of the reinforcing bars

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
 Performance for static and quasi-static loads: Steel resistances

**Annex C2**  
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**Spacing and edge distance**



$c_{cr}$  = Characteristic edge distance

$c_{min}$  = Minimum edge distance

$s_{cr||}$  = Characteristic spacing for anchors placed parallel to horizontal joint

$s_{cr\perp}$  = Characteristic spacing for anchors placed perpendicular to horizontal joint

$s_{min||}$  = 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

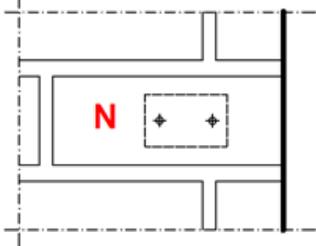
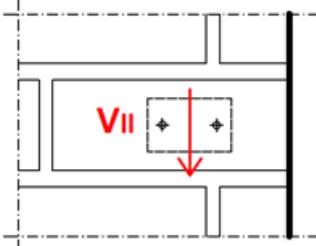
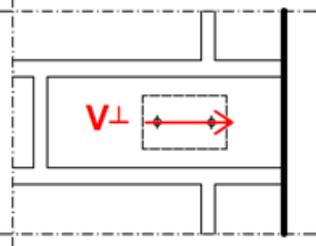
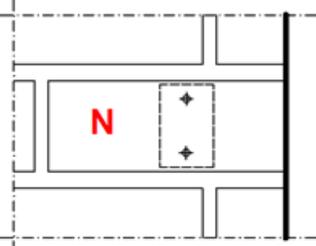
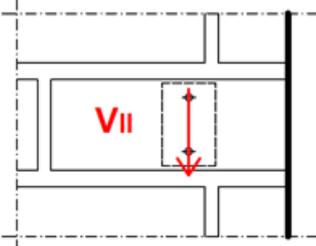
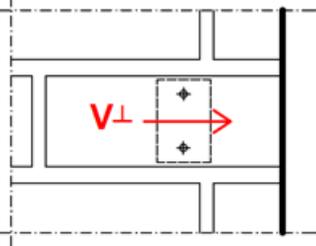
$h_{unit}$  = Height of the masonry unit

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Anchor spacing and edge distance

**Annex C3**  
of European  
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**Group factor**

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

$\alpha_{g \parallel, N}$  = 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:  $N_{Rk}^g = \alpha_{g,N} * N_{Rk,b}$

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

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

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

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

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Intended use**  
Group factor

**Annex C4**  
of European  
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**Brick type: Solid Brick – Mattone Danesi****Table C6: Description**

Brick Type	Mattone Danesi	
Compressive strength [N/mm <sup>2</sup> ]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

**Table C7: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		c <sub>min</sub>	c <sub>cr</sub>	s <sub>min</sub>	s <sub>cr,I</sub> = s <sub>cr,II</sub>
M8	80	50	120	50	240
M10	90	50	135	50	270
M12	100	50	150	50	300
M16	110	60	165	60	330

**Table C8: Characteristic values of resistance under tension and shear loads static action**

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>	c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>
M8	80	3,00	3,00	5,00	5,00
M10	90	4,00	3,00	8,50	9,50
M12	100	4,00	5,00	10,50	12,00
M16	110	4,00	5,50	11,50	14,50

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,c</sub> see TR 054

**Table C9: Displacements**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ <sub>N0</sub> [mm]	δ <sub>N∞</sub> [mm]	F [kN]	δ <sub>V0</sub> [mm]	δ <sub>V∞</sub> [mm]
M8	80	0,89	0,11	0,22	1,51	0,29	0,44
M10	90	0,95	0,12	0,24	2,70	0,33	0,50
M12	100	1,43	0,14	0,28	3,50	0,38	0,57
M16	110	1,60	0,18	0,36	4,19	0,41	0,62

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Performances**  
Performance on solid brick n°1: Resistances and displacements

**Annex C5**  
of European  
Technical Assessment  
ETA-26/0067

**Brick type: Solid Brick – Mattone Danesi**

**Table C10: Description**

Brick Type	Mattone Danesi	
Compressive strength [N/mm <sup>2</sup> ]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

**Table C11: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		c <sub>min</sub>	c <sub>cr</sub>	s <sub>min</sub>	s <sub>cr,I</sub> = s <sub>cr,II</sub>
M12	200	50	300	50	600
M16	200	60	300	60	600

**Table C12: Characteristic values of resistance under tension and shear loads static action**

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>	c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>
M12	200	4,00	5,50	10,00	12,00
M16	200	6,00	7,00	18,00	26,00

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,c</sub> see TR 054

**Table C13: Characteristic values of resistance under tension and shear loads for seismic action**

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+50°C/+80°C			
		N <sub>Rk,eq</sub> [kN]		V <sub>Rk,eq</sub> [kN]	
		c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>	c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>
M16	200	3,20	5,30	7,40	12,20

**Table C14: Displacements**

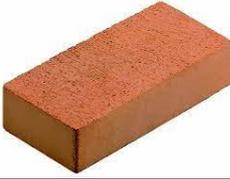
Diameter	Setting depth [mm]	Displacement factors	
		δ <sub>N,eq</sub> [mm/kN]	δ <sub>v,eq</sub> [mm/kN]
M16	200	0,03	0,37

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**Brick type: Solid Brick – Mattone Danesi****Table C15: Description**

Brick Type	Mattone Danesi	
Compressive strength [N/mm <sup>2</sup> ]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

**Table C16: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		c <sub>min</sub>	c <sub>cr</sub>	s <sub>min</sub>	s <sub>cr,I</sub> = s <sub>cr,II</sub>
φ8	80	50	120	50	240
φ10	90	50	135	50	270
φ12	100	50	150	50	300
φ16	110	60	165	60	330

**Table C17: 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/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>	c=c <sub>min</sub> - s=s <sub>min</sub>	c=c <sub>cr</sub> - s=s <sub>cr</sub>
φ8	80	2,50	2,50	5,00	5,00
φ10	90	3,50	3,50	8,50	8,50
φ12	100	4,00	4,00	11,00	12,00
φ16	110	4,50	5,50	11,50	12,50

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,c</sub> see TR 054

**Table C18: Displacement**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ <sub>N0</sub> [mm]	δ <sub>N∞</sub> [mm]	F [kN]	δ <sub>V0</sub> [mm]	δ <sub>V∞</sub> [mm]
φ8	80	0,79	0,12	0,25	1,43	0,32	0,48
φ10	90	1,06	0,13	0,27	2,44	0,35	0,53
φ12	100	1,28	0,15	0,35	3,43	0,41	0,62
φ16	110	1,63	0,15	0,38	3,67	0,45	0,68

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**Brick type: Solid Brick – Mattone Danesi**

**Table C19: Description**

Brick Type	Mattone Danesi	
Compressive strength [N/mm <sup>2</sup> ]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

**Table C20: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		C <sub>min</sub>	C <sub>cr</sub>	S <sub>min</sub>	S <sub>cr,I</sub> = S <sub>cr,II</sub>
φ8	160	50	240	50	480
φ10	180	50	270	50	540
φ12	200	50	300	50	600
φ16	200	60	300	60	600

**Table C21: 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/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		C=C <sub>min</sub> - S=S <sub>min</sub>	C=C <sub>cr</sub> - S=S <sub>cr</sub>	C=C <sub>min</sub> - S=S <sub>min</sub>	C=C <sub>cr</sub> - S=S <sub>cr</sub>
φ8	160	3,50	4,50	6,00	7,00
φ10	180	3,50	4,50	10,00	11,00
φ12	200	5,00	5,50	14,00	14,00
φ16	200	6,00	6,50	17,00	21,00

**Table C22: Characteristic values of resistance under tension and shear loads for seismic action**

Diameter	Setting depth [mm]	Category d/d, w/d and w/w Temperature range -40°C/+24°C/+40°C and -40°C/+50°C/+80°C			
		N <sub>Rk,eq</sub> [kN]		V <sub>Rk,eq</sub> [kN]	
		C=C <sub>min</sub> - S=S <sub>min</sub>	C=C <sub>cr</sub> - S=S <sub>cr</sub>	C=C <sub>min</sub> - S=S <sub>min</sub>	C=C <sub>cr</sub> - S=S <sub>cr</sub>
φ8	160	3,00	3,90	3,45	3,90

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,e</sub> see TR 054

**Table C23: Displacement**

Diameter	Setting depth [mm]	Displacement factors	
		δ <sub>N,eq</sub> [mm/kN]	δ <sub>V,eq</sub> [mm/kN]
φ8	160	0,04	0,55

**Table C24: Factor for annular gap**

Reduction factor for annular gap			
Without annular gap filling	α <sub>gap</sub>	[-]	0,5
With annular gap filling	α <sub>gap</sub>	[-]	1,0

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**Performances**

Performance on solid brick n°1: Resistances and displacements

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**Brick type: Solid Brick – Mattone Danesi****Table C25: Description**

Brick Type	Mattone Danesi	
Compressive strength [N/mm <sup>2</sup> ]	≥ 21	
Brick Dimensions [mm]	≥ 250 x 120 x 55	
Drilling method	Hammer drilling	

**Table C26: Characteristic tensile and shear resistance for threaded rods and rebars for steel failure under seismic action**

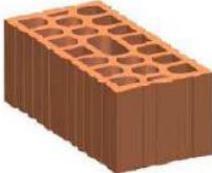
Size			M16
<b>Steel failure – characteristic tension resistance</b>			
Steel class 4.8	N <sub>Rk,s,SEIS</sub>	[kN]	47,3
Steel class 5.8	N <sub>Rk,s,SEIS</sub>	[kN]	58,5
Steel class 8.8	N <sub>Rk,s,SEIS</sub>	[kN]	94,5
Stainless steel A2, A4, HCR class 50	N <sub>Rk,s,SEIS</sub>	[kN]	58,5
Stainless steel A2, A4, HCR class 70	N <sub>Rk,s,SEIS</sub>	[kN]	82,5
Stainless steel A4, HCR class 80	N <sub>Rk,s,SEIS</sub>	[kN]	94,5
<b>Steel failure – characteristic shear resistance</b>			
Steel class 4.8	V <sub>Rk,s,SEIS</sub>	[kN]	12,7
Steel class 5.8	V <sub>Rk,s,SEIS</sub>	[kN]	16,0
Steel class 8.8	V <sub>Rk,s,SEIS</sub>	[kN]	25,8
Stainless steel A2, A4, HCR class 50	V <sub>Rk,s,SEIS</sub>	[kN]	16,0
Stainless steel A2, A4, HCR class 70	V <sub>Rk,s,SEIS</sub>	[kN]	22,6
Stainless steel A4, HCR class 80	V <sub>Rk,s,SEIS</sub>	[kN]	25,8
Size			<b>φ8</b>
<b>Steel failure – characteristic tension and shear resistance</b>			
Reinforced bar type B450C	N <sub>Rk,s,SEIS</sub>	[kN]	21,0
	V <sub>Rk,s,SEIS</sub>	[kN]	7,3

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**Performances**  
Steel resistances for seismic condition

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**Brick type: Hollow/Perforated Brick – Mattone DOPPIO UNI****Table C27: Description**

Brick Type	Mattone DOPPIO UNI	
Compressive strength [N/mm <sup>2</sup> ]	≥ 14,0	
Brick Dimensions [mm]	≥ 190 x 250 x 120	
Drilling method	Rotary drilling	

**Table C28: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C <sub>min</sub>	C <sub>cr</sub>	S <sub>min,II</sub> = S <sub>cr,II</sub>	S <sub>min,⊥</sub> = S <sub>cr,⊥</sub>
M8	80	12x80	100	100	250	120
M10	85	15x85	100	100	250	120
M10	135	15x135	100	100	250	120
M12	135	15x135	100	100	250	120
M12	150	16x150	100	100	250	120
M12	330	16x330	100	100	250	120
M12	85	20x85	100	100	250	120
M16	85	20x85	100	100	250	120

**Table C29: 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/+50°C/+80°C	
			N <sub>Rk</sub> [kN]	V <sub>Rk,b</sub> [kN]
M8	80	12x80	2,00	3,00
M10	85	15x85	3,00	5,00
M10	135	15x135	4,50	5,50
M12	135	15x135	4,00	5,50
M12	150	16x150	5,50	5,00
M12	330	16x330	7,00	6,00
M12	85	20x85	4,00	5,00
M16	85	20x85	4,00	7,50

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

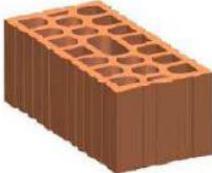
2) For  $V_{Rk,s}$  see Annex C2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see TR 054

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Performances**  
Performance on hollow brick n°2: Resistances and displacements

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**Brick type: Hollow/Perforated Brick – Mattone DOPPIO UNI****Table C30: Description**

Brick Type	Mattone DOPPIO UNI	
Compressive strength [N/mm <sup>2</sup> ]	≥ 14,0	
Brick Dimensions [mm]	≥ 190 x 250 x 120	
Drilling method	Rotary drilling	

**Table C31: Displacement**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	$\delta_{N0}$ [mm]	$\delta_{N\infty}$ [mm]	F [kN]	$\delta_{V0}$ [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,60	0,08	0,16	0,97	0,25	0,50
M10	85	0,86	0,09	0,18	1,53	0,28	0,56
M10	135	1,30	0,19	0,38	1,59	0,28	0,42
M12	135	1,27	0,18	0,36	1,55	0,34	0,68
M12	150	1,21	0,16	0,32	1,47	0,33	0,66
M12	330	1,58	0,21	0,42	1,51	0,37	0,74
M12	85	2,04	0,25	0,50	1,71	0,41	0,82
M16	85	1,25	0,22	0,44	2,21	0,45	0,90

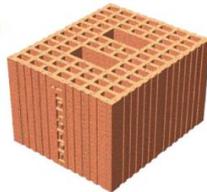
**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Performances**  
Performance on hollow brick n°2: Resistances and displacements

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**Brick type: Hollow/Perforated Brick – Poroton P800**

**Table C32: Description**

Brick Type	Poroton P800	
Compressive strength [N/mm <sup>2</sup> ]	≥ 15,0	
Brick Dimensions [mm]	≥ 300 x 245 x 230	
Drilling method	Rotary drilling	

**Table C33: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Plastic sleeve dxL [mm]	Edge distance [mm]		Spacing [mm]	
			C <sub>min</sub>	C <sub>cr</sub>	S <sub>min,II</sub> = S <sub>cr,II</sub>	S <sub>min,⊥</sub> = S <sub>cr,⊥</sub>
M8	80	12x80	100	100	300	230
M10	85	15x85	100	100	300	230
M10	135	15x135	100	100	300	230
M12	135	15x135	100	100	300	230
M12	150	16x150	100	100	300	230
M12	330	16x330	100	100	300	230
M12	85	20x85	100	100	300	230
M16	85	20x85	100	100	300	230

**Table C34: 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/+50°C/+80°C	
			N <sub>Rk</sub> [kN]	V <sub>Rk,b</sub> [kN]
M8	80	12x80	2,50	4,00
M10	85	15x85	3,00	5,00
M10	135	15x135	4,00	6,00
M12	135	15x135	4,50	7,00
M12	150	16x150	5,50	7,00
M12	330	16x330	7,50	6,50
M12	85	20x85	4,00	6,50
M16	85	20x85	4,50	8,00

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

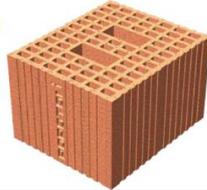
2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,c</sub> see TR 054

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Performance on hollow brick n°3: Resistances and displacements

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**Brick type: Hollow/Perforated Brick – Poroton P800****Table C35: Description**

Brick Type	Poroton P800	
Compressive strength [N/mm <sup>2</sup> ]	≥ 15,0	
Brick Dimensions [mm]	≥ 300 x 245 x 230	
Drilling method	Rotary drilling	

**Table C36: Displacement**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	$\delta_{N0}$ [mm]	$\delta_{N\infty}$ [mm]	F [kN]	$\delta_{V0}$ [mm]	$\delta_{V\infty}$ [mm]
M8	80	0,73	0,11	0,22	1,13	0,23	0,46
M10	85	0,87	0,12	0,24	1,55	0,24	0,48
M10	135	1,29	0,15	0,30	1,73	0,26	0,39
M12	135	1,35	0,15	0,30	1,98	0,32	0,64
M12	150	1,26	0,17	0,34	1,93	0,31	0,62
M12	330	1,68	0,21	0,42	1,99	0,35	0,70
M12	85	2,25	0,24	0,48	1,96	0,34	0,68
M16	85	1,43	0,22	0,44	2,32	0,42	0,84

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

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**Brick type: AAC Solid – AAC2**

**Table C37: Description**

Brick Type	Climagold	
Compressive strength [N/mm <sup>2</sup> ]	≥ 1,8	
Brick Dimensions [mm]	≥ 625 x 200 x 360	
Drilling method	Rotary drilling	

**Table C38: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		C <sub>min</sub>	C <sub>cr,N</sub>	S <sub>min</sub>	S <sub>cr,I</sub> = S <sub>cr,II</sub>
M8	80	50	120	50	240
M10	90	50	135	50	270
M12	100	50	150	50	300
M16	110	60	165	60	330

**Table C39: 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/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		c=C <sub>min</sub> – S=S <sub>min</sub>	c=C <sub>cr</sub> – S=S <sub>cr</sub>	c=C <sub>min</sub> – S=S <sub>min</sub>	c=C <sub>cr</sub> – S=S <sub>cr</sub>
M8	80	2,00	2,00	2,50	2,50
M10	90	2,50	2,00	3,00	3,00
M12	100	3,00	3,00	3,00	3,00
M16	110	3,50	3,50	3,50	3,00

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,e</sub> see TR 054

**Table C40: Displacements**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ <sub>N0</sub> [mm]	δ <sub>N∞</sub> [mm]	F [kN]	δ <sub>V0</sub> [mm]	δ <sub>V∞</sub> [mm]
M8	80	0,83	0,15	0,30	0,88	0,41	0,62
M10	90	0,95	0,18	0,36	1,10	0,45	0,68
M12	100	1,30	0,18	0,36	1,12	0,51	0,77
M16	110	1,43	0,24	0,48	1,21	0,51	0,77

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Performances**  
Performance on AAC2 brick n°4: Resistances and displacements

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**Brick type: AAC Solid Brick – AAC5****Table C41: Description**

Brick Type	Blocco sismico	
Compressive strength [N/mm <sup>2</sup> ]	≥ 5,0	
Brick Dimensions [mm]	≥ 625 x 200 x 300	
Drilling method	Rotary drilling	

**Table C42: Installation parameter (Edge and spacing distances)**

Diameter	Setting depth [mm]	Edge distance [mm]		Spacing [mm]	
		C <sub>min</sub>	C <sub>cr,N</sub>	S <sub>min</sub>	S <sub>cr,I</sub> = S <sub>cr,II</sub>
M8	80	50	120	50	240
M10	90	50	135	50	270
M12	100	50	150	50	300
M16	110	60	165	60	330

**Table C43: 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/+50°C/+80°C			
		N <sub>Rk</sub> [kN]		V <sub>Rk,b</sub> [kN]	
		c=C <sub>min</sub> – S=S <sub>min</sub>	c=C <sub>cr</sub> – S=S <sub>cr</sub>	c=C <sub>min</sub> – S=S <sub>min</sub>	c=C <sub>cr</sub> – S=S <sub>cr</sub>
M8	80	2,00	3,50	2,50	4,00
M10	90	2,50	4,00	3,00	5,00
M12	100	3,00	4,50	3,00	5,50
M16	110	3,50	5,00	3,50	6,00

1) For design according TR 054: N<sub>Rk</sub> = N<sub>Rk,p</sub> = N<sub>Rk,b</sub>; N<sub>Rk,s</sub> according to Table C2 Annex C2; Calculation N<sub>Rk,pb</sub> see TR 054

2) For V<sub>Rk,s</sub> see Annex C2, Table C2; Calculation of V<sub>Rk,pb</sub> and V<sub>Rk,e</sub> see TR 054

**Table C44: Displacements**

Diameter	Setting depth [mm]	Displacement under service load Tensile and shear load					
		F [kN]	δ <sub>N0</sub> [mm]	δ <sub>N∞</sub> [mm]	F [kN]	δ <sub>V0</sub> [mm]	δ <sub>V∞</sub> [mm]
M8	80	1,47	0,10	0,20	1,44	0,43	0,65
M10	90	1,73	0,15	0,30	1,93	0,45	0,68
M12	100	1,84	0,16	0,32	1,97	0,54	0,81
M16	110	2,06	0,21	0,42	2,18	0,55	0,83

**GMS-INJECTION MORTAR V-PLUS / V-PLUS W / V-PLUS T**

**Performances**  
Performance on AAC5 brick n°5: Resistances and displacements

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