

## Declaration of Performance No 1109-CPD-008202

According to the Regulation EU No 305/2011

Item code: **SWE01 Sinto ST-EE**

Manufacturer: **Tecfi S.p.A. - S.S. Appia, km 193 - 81050 Pastorano (CE), Italy**

<b>1. Intended use</b>	
<b>Product-type:</b>	Metal anchor for use in concrete
<b>Anchor type:</b>	Bonded anchor with anchor rod for use in concrete under static, quasi-static or seismic action (performance category C2)
<b>Technical description of the product:</b>	The SWE01 Sinto ST-EE is a bonded anchor (injection type) consisting of an injection mortar cartridge equipped with a special mixing nozzle and threaded anchor rod of the sizes M8 to M30 made of: - galvanized carbon steel - stainless steel A4-70, A4-80 or high corrosion resistant stainless steel with hexagon nut and washer.
<b>Specification of the intended use in accordance with the applicable EAD:</b>	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.
<b>Base material:</b>	Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1. - Non cracked concrete: sizes from M8 to M30. - Cracked concrete: sizes from M12 to M24.
<b>Installation:</b>	The anchors may be installed in: - Dry or wet concrete (use category 1): sizes from M8 to M30. - Flooded holes with the exception of seawater (use category 2): sizes from M8 to M30. - All the diameters may be used overhead: sizes from M8 to M30. - The anchor is suitable for hammer drilled holes: sizes from M8 to M30.
<b>Loading:</b>	- Static and quasi-static loads: sizes from M8 to M30. - Seismic loads performance category C2: sizes from M16 to M24
<b>Durability:</b>	<b>Elements made of galvanized steel</b> may be used in structures subject to dry internal conditions only. <b>Elements made of stainless steel</b> may be used in structures subject to dry internal conditions and also in concrete subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used). <b>Elements made of high corrosion resistant steel</b> may be used in structures subject to dry internal conditions and also in concrete subject to external atmospheric exposure or exposure in permanently damp internal conditions or in other particular aggressive conditions. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

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1. Intended use	
<b>Service temperature:</b>	The anchors may be used in the following temperature range: <b>a) -40°C to +40°C</b> (max. short term temperature +40°C and max. long term temperature +24°C). <b>b) -40°C to +80°C</b> (max. short term temperature +80°C and max. long term temperature +50°C).
<b>Resistance to fire:</b>	No Performance Declared (NPD).
<b>Reaction to fire:</b>	Once the anchor is installed the thickness of the mortar layer is about 1 or 2 [mm] and most of the mortar is material classified 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 cement) in connection with the metal anchor doesn't make any contribution to fire growth and to the smoke hazard.
<b>Information referred to in article 31 of Regulation (EC) No 1907/2006 (REACH):</b>	See MSDS
<b>European Assessment Document:</b>	ETAG001, part 1, part 5 and Annex E, April 2013 edition
<b>European Technical Assessment:</b>	ETA 12/0253
<b>Technical Assessment Body:</b>	ETA-Danmark A/S, Kollegievej 6, DK-2920 Charlottenlund (Danmark)
<b>Design methods:</b>	- Static and quasi-static load: EOTA Technical Report TR029 (September 2010) or CEN/TS 1992-4:2009. - Seismic load: EOTA Technical Report TR045 (February 2013).
<b>Assessment and Verification of Constancy of Performance:</b>	EC Certificate No. 1109-CPD-008202
<b>Notified Body:</b>	IFBT GmbH, Hans-Weigel-Straße 2b, D - 04319 Leipzig, (Germany)
<b>Under the system:</b>	1

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### 2. Anchor's components

Table 2.a: Threaded rod materials

Part	Designation		
	Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042	Stainless steel	High corrosion resistance stainless steel (HRC)
Threaded rod	Steel property class 5.8, 8.8, acc. to EN ISO 898-1	Material 1.4401/1.4571 acc. to EN 10088; property class 70 and 80 (A4-70 and A4- 80) acc. to EN ISO 3506	Material 1.4529/1.4565/1.4547 acc. to EN 10088; property class 70 acc. to EN ISO 3506
Hexagonal nut	Steel property class 5, 8, acc. to EN 20898-2; corresponding to threaded rod material	Material 1.4401/1.4571 acc. to EN 10088; property class 70 and 80 (A4-70 and A4- 80) acc. to EN ISO 3506	Material 1.4529/1.4565/1.4547 acc. to EN 10088; property class 70 acc. to EN ISO 3506
Washer	Steel acc. to EN ISO 7089; corresponding to threaded rod material	Material 1.4401/1.4571 acc. to EN 10088; corresponding to threaded rod material	Material 1.4529/1.4565/1.4547 acc. to EN 10088; corresponding to threaded rod material

Commercial standard threaded rods with:

- material and mechanical properties according to the previous table
- 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
- Minimum rupture elongation,  $A_1$ , equal to 12% according to EN ISO 898 for use under seismic action

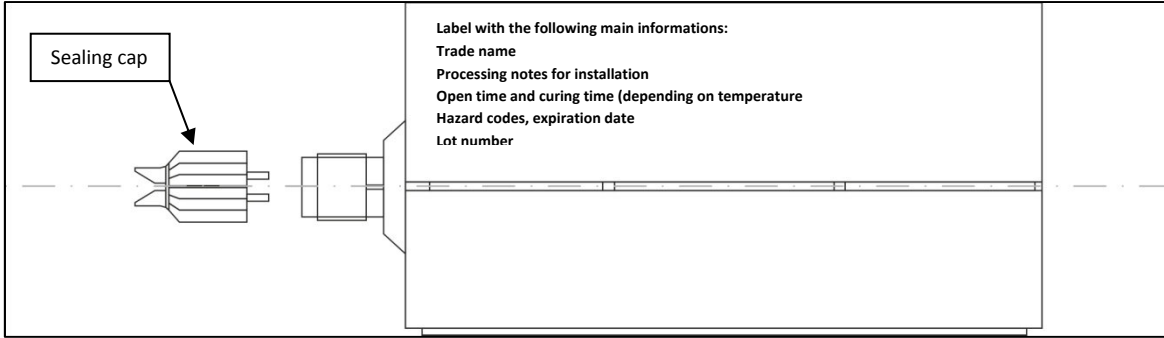
Table 2.b: Injection mortar

Injection mortar	Composition
SWE01 Sinto ST-EE: two components injection mortar	Additive: quartz Bonding agent: epoxy resin

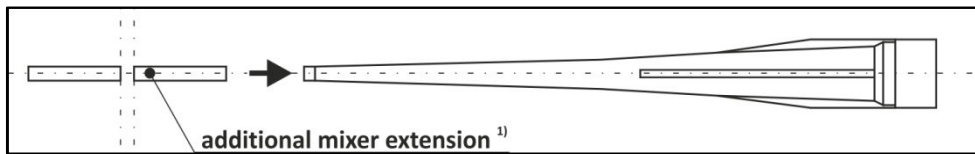
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**2. Anchor's components**

**Cartridge from 400 to 900 ml – side by side**

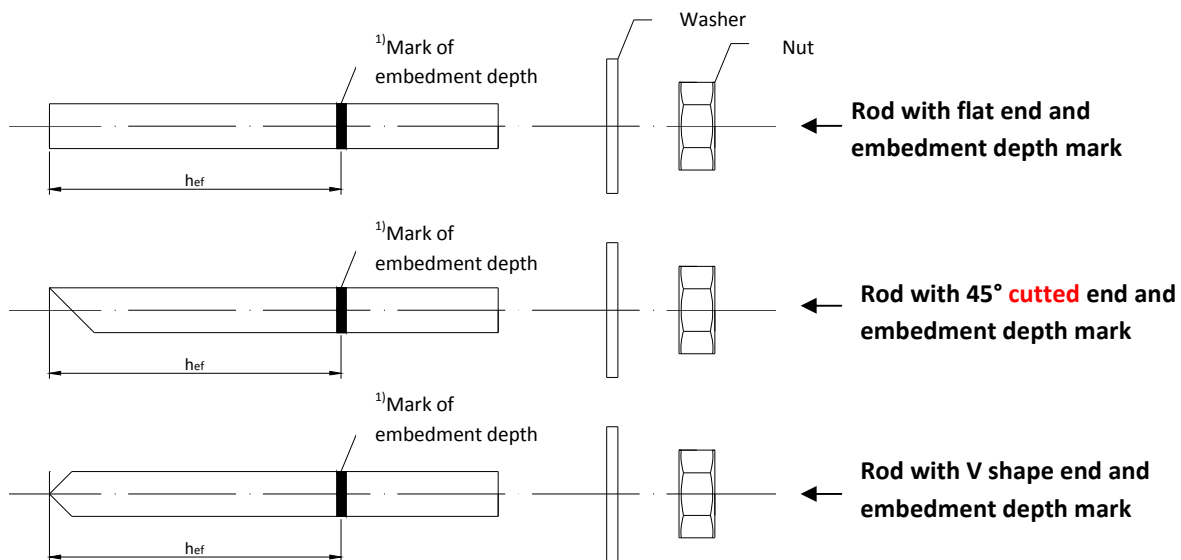


**Mixer – the mixer is suitable for each type of cartridge**



<sup>1)</sup>Variable length from 380 [mm] to 1000 [mm]

**Threaded rod types:**

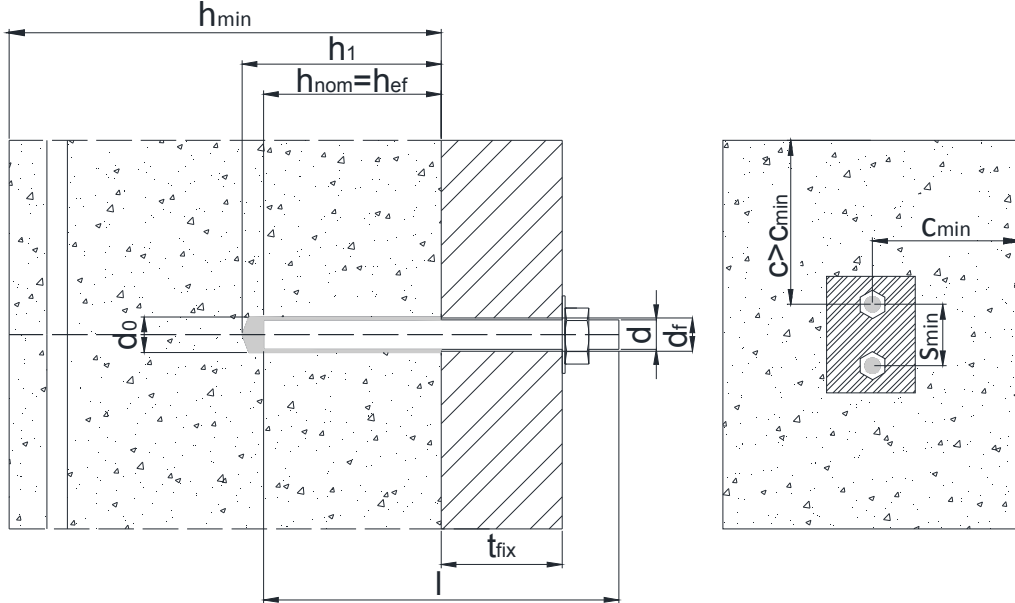


<sup>1)</sup>Marking according to clause 2.1.2 of ETAG 001 - 5

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**3. Installation**

**3.1 Installation information**



**Table 3.a: Installation details**

Symbol	Details description
d	Thread diameter
l	Rod's length
d <sub>0</sub>	Drill hole diameter
d <sub>f</sub>	Diameter of clearance hole in the fixture
t <sub>fix</sub>	Thickness of fixture
h <sub>min</sub>	Minimum thickness of concrete member
h <sub>1</sub>	Depth of the drill hole
h <sub>nom</sub>	Overall anchor embedment depth
h <sub>ef</sub>	Effective anchorage depth
T <sub>inst</sub>	Required torque moment
s <sub>min</sub>	Minimum allowable spacing
c <sub>min</sub>	Minimum allowable edge distance

**Table 3.b: Installation data**

Rod's size	d [mm]	d <sub>0</sub> [mm]	d <sub>f</sub> [mm]	h <sub>1</sub> [mm]	h <sub>min</sub> [mm]	h <sub>ef,min</sub> [mm]	h <sub>ef,max</sub> [mm]	T <sub>inst</sub> [Nm]	t <sub>fix</sub> [mm]	s <sub>min</sub> [mm]	c <sub>min</sub> [mm]
M8	8	10	9	h <sub>ef</sub> +5	h <sub>ef</sub> +30≥100	60	160	10	< 1500	40	40
M10	10	12	12	h <sub>ef</sub> +5	h <sub>ef</sub> +30≥100	60	200	20	< 1500	50	50
M12	12	14	14	h <sub>ef</sub> +5	h <sub>ef</sub> +30≥100	70	240	40	< 1500	60	60
M16	16	18	18	h <sub>ef</sub> +5	h <sub>ef</sub> +2 d <sub>0</sub>	80	320	80	< 1500	80	80
M20	20	24	22	h <sub>ef</sub> +5	h <sub>ef</sub> +2 d <sub>0</sub>	90	400	130	< 1500	100	100
M24	24	28	26	h <sub>ef</sub> +5	h <sub>ef</sub> +2 d <sub>0</sub>	96	480	200	< 1500	120	120
M27	27	30	29	h <sub>ef</sub> +5	h <sub>ef</sub> +2 d <sub>0</sub>	110	540	270	< 1500	135	135
M30	30	35	33	h <sub>ef</sub> +5	h <sub>ef</sub> +2 d <sub>0</sub>	120	600	300	< 1500	150	150

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### 3. Installation

Table 3.c: Minimum curing time<sup>1)</sup>

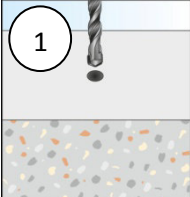
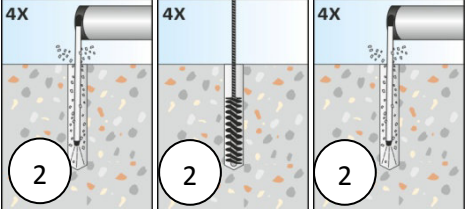
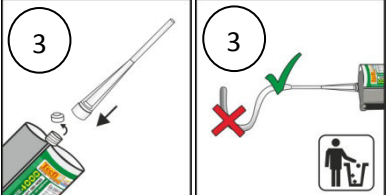
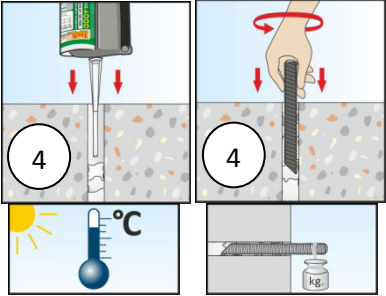
Concrete temperature [°C]	Processing time	Minimum curing time <sup>3)</sup>
0 <sup>2)</sup>	3 h 20 min	54 h
5 <sup>2)</sup>	2 h 30 min	41 h
10	1 h 40 min	28 h
15	1 h 10 min	22 h
20	50 min	16 h
25	30 min	14 h
30	20 min	12 h

<sup>1)</sup>The minimum time from the end of the mixing to the time when the anchor may be torque or loaded

<sup>2)</sup>The minimum recommended resin temperature is 10[°C]

<sup>3)</sup>The minimum curing time for dry, wet and flooded hole conditions

Table 3.d: Installation procedure up to 300 [mm] embedment depth

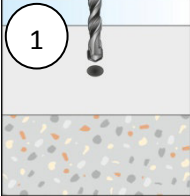
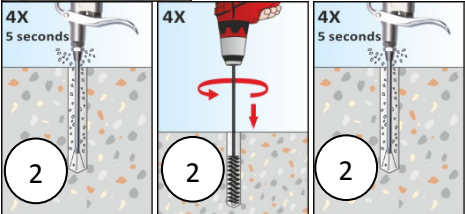
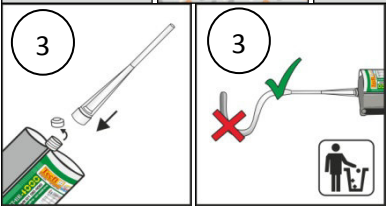
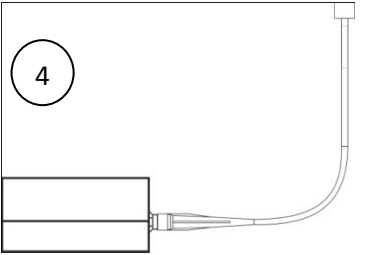
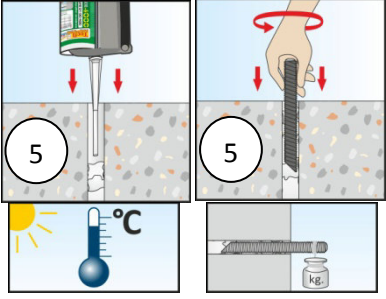
	<p><b>1</b> – Drill the hole with the correct diameter and depth using a rotary percussive machine.</p>
	<p><b>2</b> – Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing, clean the brush and check if the brush diameter is sufficient.</p>
	<p><b>3</b> – Unscrew the front cap of the cartridge, screw in the mixer and insert the cartridge in the extruder. 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 the mixing of the two components, comes out from the mixer with an uniform color.</p>
	<p><b>4</b> – Fill the drill hole uniformly starting from the bottom, in order to avoid entrapment of the air; remove the mixer slowly during the extrusion. Fill the drill hole with a quantity of injection mortar corresponding to 2/3 of the drill hole depth. 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 and the curing time before torque or load the anchor. (the rod must be free from oil or other contaminations)</p>

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Table 3.e: Installation procedure up to 600 [mm] embedment depth

	<p><b>1</b> – Drill the hole with the correct diameter and depth using a rotary percussive machine.</p>
	<p><b>2</b> – 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 brushing operations; before brushing, clean the brush and check if the brush diameter is sufficient.</p>
	<p><b>3</b> – Unscrew the front cap of the cartridge, screw in the mixer and insert the cartridge in the proper pneumatic-pump. 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 the mixing of the two components, comes out from the mixer with an uniform color.</p>
	<p><b>4</b> – Before starting the injection insert the mixer extension and the injection plug (see paragraph 3.3.2.2).</p>
	<p><b>5</b> – Fill the drill hole uniformly starting from the bottom, in order to avoid entrapment of the air; remove the mixer slowly during the extrusion. Fill the drill hole with a quantity of injection mortar corresponding to 2/3 of the drill hole depth. 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 and the curing time before torque or load the anchor (the rod must be free from oil or other contaminations)</p>

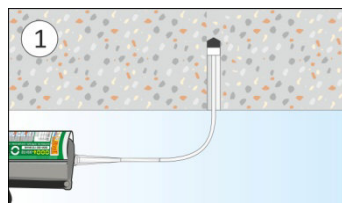
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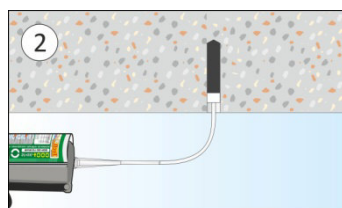
### 3. Installation

**Table 3.f: Overhead application**

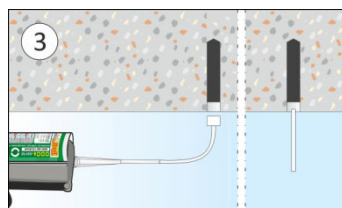
In addition to standard procedure, for overhead installation, follow the instructions below



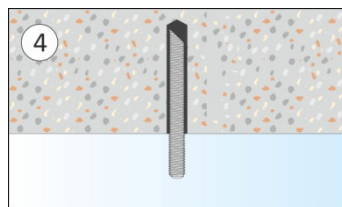
**1** – Start injection: Inject from the bottom of the hole using the proper pneumatic-pump. Hold this position during the injection phase.



**2** – Injection phase: inject the product about 2/3 of the hole depth. During the injection hold this position to assure the correct installation.



**3** – End injection: remove the injection plug. Insert immediately the rod (turn the rod during the insertion).



**4** – End installation: to avoid the slipping of the rod during the open time of the product (due to the rod own weight) use a temporary interlocking element (e.g. wedge of wood)



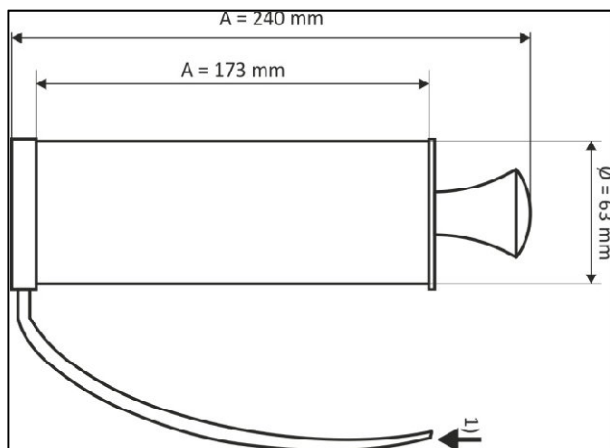
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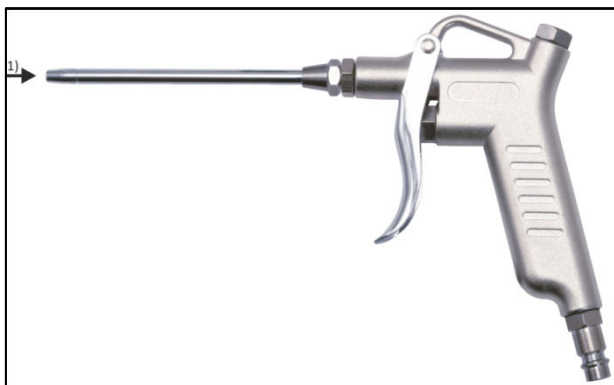
#### 3.2: Cleaning tools

##### - Manual blower pump



*It's possible to use the mixer extension with the manual blower pump*

##### - Mechanical air system (compressed air)



*The use of the mixer extension is also allowed if using the compressor (compressed air)*

- *Minimum suitable pressure 6 [bar] at 6 [m3/h].*
- *Oil free compressed air.*
- *Recommended air gun with an orifice opening minimum 3,5 [mm] in diameter.*

**1)Position to insert the mixer extension2)**

**2)Mixer extension (from 380 [mm] to 1000 [mm]) with nominal diameter equal to 8 [mm]**

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#### - Standard brush

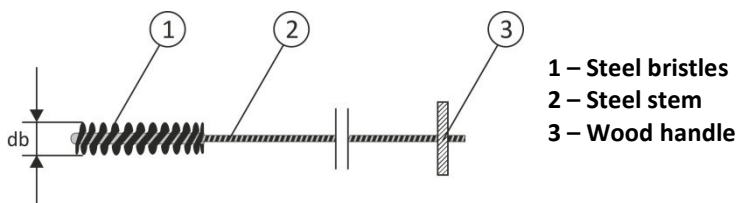


Table 3.g: Standard brush diameter

Threaded rod diameter - d		M8	M10	M12	M16	M20	M24	M27	M30
d <sub>0</sub>	Nominal drill hole [mm]	10	12	14	18	24	28	30	35
d <sub>b</sub>	Brush diameter [mm]	12	14	16	20	26	30	32	37

#### - Special brush

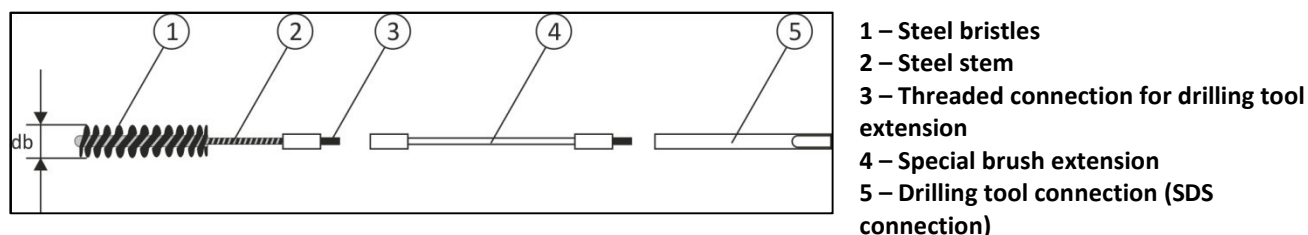


Table 3.h: Special brush diameter (mechanical brush)

Threaded rod diameter - d		M16	M20	M24	M27	M30
d <sub>0</sub>	Nominal drill hole [mm]	18	24	28	30	35
d <sub>b</sub>	Brush diameter [mm]	20	26	30	32	37

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### 3. Installation

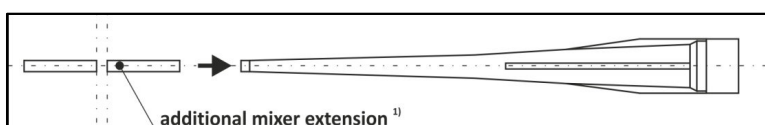
#### 3.3: Tools for injection

##### 3.3.1 Standard installation conditions:

Installation procedure up to 300 [mm] embedment depth (no overhead installation)

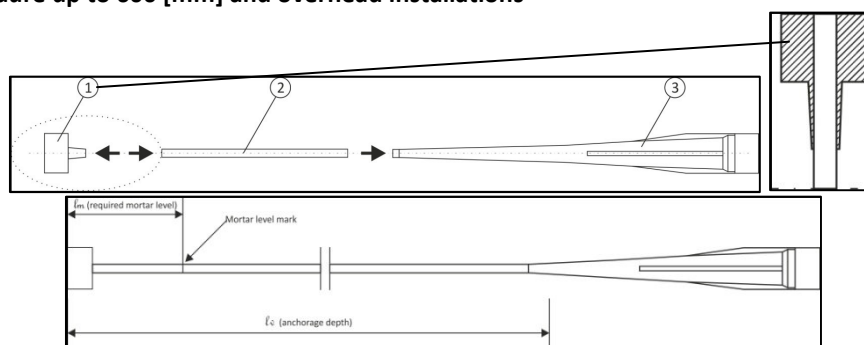
##### 3.3.2 Special installation conditions:

3.3.2.1 Use the mixer extension (assembled on the standard mixer) in the installation procedure up to 300 [mm] embedment depth if needed



<sup>1)</sup> Variable length from 380 [mm] to 1000 [mm]

3.3.2.2 Use the mixer extension (assembled on the standard mixer) with the injection plug for installation procedure up to 600 [mm] and overhead installations



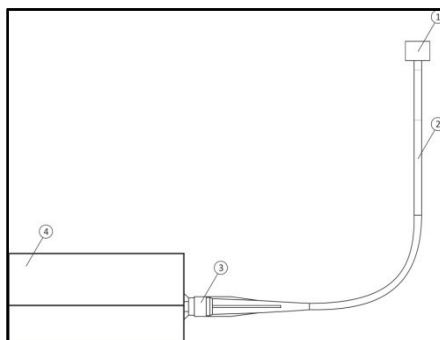
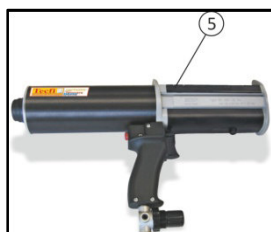
1 – Injection plug (nominal diameter according to the nominal diameter of the drill hole)

2 – Special mixer extension (variable length, with nominal diameter 10 [mm])

Mark the required mortar level  $l_m$  and embedment depth  $l_v$  with tape or marker on the injection extension.  
 Quick estimation  $l_m = 1/3 l_v$ . Continue the injection until the mortar level mark  $l_m$  become visible.

3 – Standard mixer (suitable for all cartridges size)

- System assembled







- 1 – Injection plug
- 2 – Special mixer extension
- 3 – Standard mixer
- 4 – Cartridge
- 5 – Injection pneumatic pump

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### 3. Installation

Table 3.i: Resin injection pump details

Pump example	Cartridge size	Type
<b>DHP 01 00 900</b> 	900 ml	Pneumatic <sup>1)</sup>
<b>DHP 01 00 400</b> 	400 ml	Pneumatic <sup>1)</sup>
<b>DH 03 00 400</b> 	400 ml	Pneumatic <sup>1)</sup>
<b>DH 04 00 400</b> 	400 ml	Manual (up to 300 [mm] embedment depth)

<sup>1)</sup>The pneumatic injection pump is recommended for all special applications

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### 4. Declared performance according to ETAG001 part 1, part 5 and Annex E

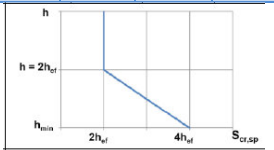
**Table 4.a: Combined pull-out and concrete cone failure to tension load in non-cracked concrete**

Size		M8	M10	M12	M16	M20	M24	M27	M30
Concrete C20/25, temperature range [-40°C ; +40°C] (T <sub>mlp</sub> =24°C)	$\tau_{Rk,ucr}$ [N/mm <sup>2</sup> ]	12,0	11,0	11,0	11,0	10,0	10,0	10,0	10,0
Concrete C20/25, temperature range [-40°C ; +80°C] (T <sub>mlp</sub> =50°C)	$\tau_{Rk,ucr}$ [N/mm <sup>2</sup> ]	9,0	8,5	8,5	8,5	7,0	7,0	7,0	7,0
Concrete C30/37 amplification factor	$\Psi_c$ C30/37	1,08							
Concrete C40/50 amplification factor	$\Psi_c$ C40/50	1,15							
Concrete C50/60 amplification factor	$\Psi_c$ C50/60	1,19							
Installation safety factor for use category 1	$\gamma_2$	1,00							
Installation safety factor for use category 2	$\gamma_2$	1,20							

**Table 4.b: Combined pull-out and concrete cone failure to tension load – cracked concrete**

Size									
Concrete C20/25, temperature range [-40°C ; +40°C] (T <sub>mlp</sub> =24°C)	$\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]	7,0		7,0		7,0		7,0	
Concrete C20/25, temperature range [-40°C ; +80°C] (T <sub>mlp</sub> =50°C)	$\tau_{Rk,cr}$ [N/mm <sup>2</sup> ]	5,5		5,5		5,5		5,5	
Concrete C30/37 amplification factor	$\Psi_c$ C30/37	1,00							
Concrete C40/50 amplification factor	$\Psi_c$ C40/50	1,00							
Concrete C50/60 amplification factor	$\Psi_c$ C50/60	1,00							
Installation safety factor for use category 1	$\gamma_2$	1,00							
Installation safety factor for use category 2	$\gamma_2$	1,20							

**Table 4.c: Splitting failure to tension load**

Size		M8	M10	M12	M16	M20	M24	M27	M30	
spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure (design method A)	$S_{cr,sp}$ [mm]					$h = h_{min} \Rightarrow S_{cr,sp} = 4 h_{ef}$ $h_{min} \leq h < 2 h_{ef} \Rightarrow S_{cr,sp} =$ interpolate $h \geq 2 h_{ef} \Rightarrow S_{cr,sp} = 2 h_{ef}$				
Edge distance	$C_{cr,sp}$ [mm]	0,5 $S_{cr,sp}$								

**Table 4.d: Concrete pryout failure to shear load – cracked and non-cracked concrete**

Size		M8	M10	M12	M16	M20	M24	M27	M30
Equation 5.7 of the EOTA TR029 factor	k [-]	2							

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### 4. Declared performance according to ETAG001 part 1, part 5 and Annex E

**Table 4.e: Characteristic resistance to tension and shear load for seismic performance category C2**

Size		M16	M20	M24
Steel failure to tension load (standard 8.8 rod with $A \geq 12\%$ )	$N_{Rk, seismic} [kN]$	126	196	282
Partial safety factor	$\gamma_{M, seismic} [mm]$	1,50		
Resistance for combined pull-out and concrete cone failure, concrete class C20/25, temperature range [-40°C ; +40°C] ( $T_{mp}=24^\circ C$ )	$\tau_{Rk, seismic} [N/mm^2]$	2,9	2,8	2,6
Resistance for combined pull-out and concrete cone failure, concrete class C20/25, temperature range [-40°C ; +80°C] ( $T_{mp}=50^\circ C$ )	$\tau_{Rk, seismic} [N/mm^2]$	2,2	2,1	2,0
Concrete C30/37 amplification factor	$\Psi_c C30/37$	1,00		
Concrete C40/50 amplification factor	$\Psi_c C40/50$	1,00		
Concrete C50/60 amplification factor	$\Psi_c C50/60$	1,00		
Steel failure to shear load without lever arm (standard 8.8 rod with $A \geq 12\%$ )	$V_{Rk, seismic} [kN]$	25	39	56
Partial safety factor	$\gamma_{M, seismic} [mm]$	1,25		

**Table 4.f: Displacement under tension and shear service load – non-cracked concrete**

Size		M8	M10	M12	M16	M20	M24	M27	M30
Service load in non-cracked concrete from C20/25 to C50/60	$F_{ucr} [kN]$	7,6	9,5	14,3	19,0	23,8	35,7	45,2	54,8
Short term displacement	$\delta_{0, ucr} [mm]$	0,29	0,31	0,36	0,37	0,38	0,54	0,67	0,80
Long term displacement	$\delta_{\infty, ucr} [mm]$	0,80							

**Table 4.g: Displacement under tension and shear service load – cracked concrete**

Size		M12	M16	M20	M24
Service load in cracked concrete from C20/25 to C50/60	$F_{cr} [kN]$	9,5	14,3	19,0	23,8
Short term displacement	$\delta_{0, cr} [mm]$	0,36			
Long term displacement	$\delta_{\infty, cr} [mm]$	1,85			

**Table 4.h: Displacement under tension and shear service seismic load – performance category C2**

Size		M16	M20	M24
Short term displacement to tension load (DLS)	$\delta_{N, seis(DLS)} [mm]$	0,26	0,25	0,34
Short term displacement to tension load (ULS)	$\delta_{N, seis(ULS)} [mm]$	0,37	0,45	0,56
Short term displacement to shear load (DLS)	$\delta_{V, seis(DLS)} [mm]$	2,41	2,39	2,21
Short term displacement to shear load (ULS)	$\delta_{V, seis(ULS)} [mm]$	8,30	7,29	7,42

## Declaration of Performance No 1109-CPD-008202

According to the Regulation EU No 305/2011

### 5. Label

**1** Item Code  
**2** Descriptions  
**3** Cartridge capacity (ml)  
**4** EAN 13 code  
**5** Installation sequence  
**6** Expiring date  
**7** Lot Number  
**8** Warnings  
**9** Danger symbols  
**10** Identification number of the Notified Body  
**11** Last two digits of the year in which the marking was first affixed  
**12** European standard applied and intended use  
**13** DoP number  
**14** Link to DoP  
**15** European Assessment Document's number  
**16** Declared level of performance

## Declaration of Performance No 1109-CPD-008202

According to the Regulation EU No 305/2011

### 6. Item codes

**Table 6.a: Item codes**

Cartridge capacity	Cartridge type	Item code
400 ml	Side by side (shuttle)	SWE 01 00 400
900 ml	Side by side (shuttle)	SWE 01 00 900

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Name and function	Place and date of issue	Signature
President Antonio Guarino	Pastorano, April 30 <sup>th</sup> 2014	