

## Declaration of Performance Number 1109-CPR-0088-1

According to Regulation EU No 305/2011

### EHE01 Sinto ST-PE

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



1 - Intended use	
<b>Product type:</b>	Metal anchor for use in concrete
<b>Anchor type:</b>	Bonded capsule anchor for use in non cracked concrete
<b>Technical description of the product:</b>	The Tecfi Chemical Anchor Glass Capsule Sinto-ST EHE adhesive system is a bonded anchor system (capsule type) consisting of glass capsule EHE 01 with a threaded rod with hexagon nut and washer of sizes M8, M10, M12, M14, M16, M20, M22, M24 and M30.
<b>Base material:</b>	Reinforced or unreinforced, non cracked, normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1.
<b>Installation:</b>	Dry or wet concrete.
<b>Materials:</b>	Galvanised steel property class 5.8 Galvanised steel property class 8.8 Hot dipped galvanised steel property class 5.8 Hot dipped galvanised steel property class 8.8 Stainless steel 1.4401, property class 70 Stainless steel 1.4404, property class 70 Stainless steel 1.4529, property class 70 Stainless steel 1.4565, property class 70 Stainless steel 1.4571, property class 70 Stainless steel 1.4401, property class 80 Stainless steel 1.4404, property class 80 Stainless steel 1.4571, property class 80
<b>Loading:</b>	Static and quasi-static loads.
<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).
<b>Temperatura di servizio:</b>	a) <b>-40°C a +40°C</b> (max long term temperature +24°C and max short term temperature +40°C) b) <b>-40°C to +80°C</b> (max long term temperature +50°C and max short term temperature +80°C)
<b>Fire Resistance</b>	NPD
<b>Fire Reaction</b>	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.

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#### 1 - Intended use

ETA	ETA 16/0943, rilasciato da CSTB
On the basis of:	Etag 001 Part 1 and 5 used as EAD
Attestation of Conformity:	EC number B 1109-CPR-0088-01, issued by IFBT
Under system:	1

#### 2 - Anchor's components

##### 2.a: Threaded rods materials

Part	Description	Material			
1	Threaded rod	Carbon steel property class 5.8 or 8.8 EN ISO 898-1		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-1	High corrosion resistant steel  1.4529 or 1.4565 property class 70 EN ISO 3506-1
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvani- sed steel EN ISO 10684		
2	Washer	Carbon steel Classe da 4 ad 8 EN ISO 20898-2		Stainless steel  1.4401, 1.4404 o 1.4571	High corrosion resistant steel  1.4529 o 1.4565
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvani- sed steel EN ISO 10684		
EN ISO 887 or EN ISO 7089 up to EN ISO 7094					
3	Hexagon nut	Carbon steel property class 4 to 8 EN ISO 20898-2		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-2	High corrosion resistant steel  1.4529 or 1.4565 property class 70 EN ISO 3506-2
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvani- sed steel EN ISO 10684		
EN ISO 4032 or EN ISO 4034					
4	Glass capsule	Glass Quartz Resin Hardener			

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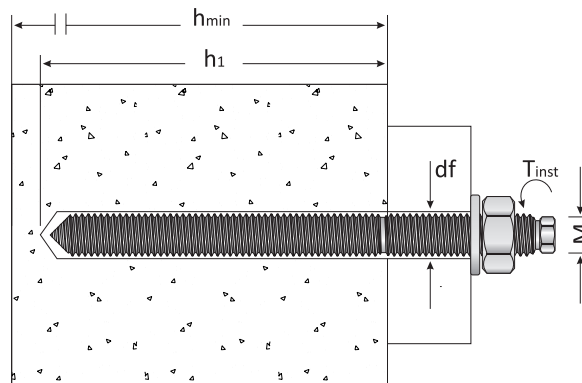
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Figure 1 – Anchor application and installation parameter



#### Installation parameters

Anchor size		M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
$h_{min}$ [mm]		110	120	140	195	150	160	225	220	300	240	260	370	340
$c_{min}$ [mm]		40	45	55	55	60	65	65	85	85	95	105	105	140
$s_{min}$ [mm]		40	45	55	55	60	65	65	85	85	95	105	105	140
Nominal drill hole diameter	$d_0$ [mm]	10	12	14		16	18		22		24	26		32
Cutting diameter	$d_{cut} \leq$ [mm]	10.5	12.5	14.5		16.5	18.5		22.5		24.5	26.5		32.5
Depth of drill hole	$h_0$ [mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Diameter of clearance hole in the fixture	$d_f$ [mm]	9	12	14		16	18		22		24	26		33
Diameter of steel brush	D [mm]	11	13	16		18	20		24		26	28		34
Maximum torque moment	$T_{inst}$ [Nm]	10	20	40		60	80		120		135	180		300

#### Curing time

Temperature in the concrete member	Minimum curing time in dry concrete	Minimum curing time in dry concrete
$\geq 5^\circ\text{C}$	5 hrs.	10 hrs.
$\geq 5^\circ\text{C}$	1 hr.	2 hrs.
$\geq 20^\circ\text{C}$	20 min.	40 min.
$\geq 30^\circ\text{C}$	10 min.	20 min.

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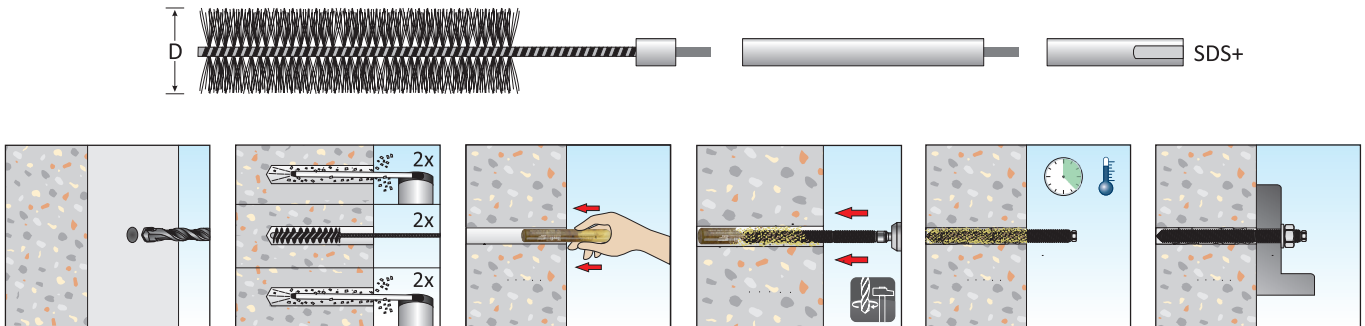
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Figure 2 - Installation sequence and cleaning tools



- 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 - 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
- 3 - Put the capsule into the hole
- 4 - Screw in the rod into the hole
- 5 - Wait the curing time
- 6 - Apply the load

### 3 - Declared performance according to ETAG 001 (design according to TR029)

Anchor size		M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
<b>Steel failure to tension loads</b>														
Characteristic resistance <b>property class 5.8</b>	$N_{Rk,S}$ [kN]	18	29	42	58	78	123	152	177	281				
Characteristic resistance <b>property class 70</b>	$N_{Rk,S}$ [kN]	26	40	59	81	110	172	212	247	393				
Characteristic resistance <b>property class 8.8</b> <b>property class 80</b>	$N_{Rk,S}$ [kN]	29	46	67	92	126	196	242	282	449				
Partial safety factor <b>property class 5.8, 8.8</b> <b>property class 70</b> <b>property class 80</b>	$\gamma_{Ms}^{1)}$ [-]						1.5	1.87	1.60					

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### 3 - Declared performance according to ETAG 001 (design according to TR029)

Anchor size	M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
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#### Combined Pull-out and Concrete cone failure

#### Characteristic bond resistance in non-cracked concrete C20/25

Temperature range I: 40°C/24°C <sup>2)</sup>	$V_{Rk,ucr}$	[N/ mm <sup>2</sup> ]	12						11				10		
Temperature range II: 80°C/50°C <sup>2)</sup>	$V_{Rk,ucr}$	[N/ mm <sup>2</sup> ]	10						9.5				9.0		
Partial safety factor	$N_{Rk,S}$	[-]	1.5 <sup>3)</sup>										1.8 <sup>4)</sup>		
Effective anchorage depth	$V_{Mp} =$ $V_{Mc}^{1)}$	[mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Increasing factors for non-cracked concrete	$\psi_c$	C25/30							1.06						
		C30/37							1.14						
		C35/45							1.22						
		C40/50							1.26						
		C45/55							1.30						
		C50/60							1.34						

#### Splitting failure

Char. edge distance	$c_{cr,sp}$	[mm]	160	135	140	205	150	160	240	215	320	240	265	395	350
Char. spacing	$s_{cr,sp}$	[-]	2 · $c_{cr,sp}$												
Partial safety factor <sup>1)</sup>	$\gamma_{Msp}$	[-]	1.5 <sup>3)</sup>										1.8 <sup>4)</sup>		

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### 3 - Declared performance according to ETAG 001 (design according to TR029)

#### Displacements to tension loads

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Tension load	N	[kN]	9.6	13.5	19.7	29.6	25.1	29.9	45.5	48.3	72.5	59.4	71.6	107.4	94.2
Displacement	$\delta_{N0}$	[mm]	0.17	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.21
	$\delta_{N\infty}$	[mm]	0.50												

#### Steel failure without lever arm to shear loads

Characteristic resistance <b>property class 5.8</b>	$V_{Rk,S}$	[kN]	9	14	21	29	39	61	76	88	140		
Characteristic resistance <b>property class 70</b>	$V_{Rk,S}$	[kN]	13	20	30	40	55	86	106	124	196		
Characteristic resistance <b>property class 8.8</b> <b>property class 80</b>	$V_{Rk,S}$	[kN]	15	23	34	46	63	98	121	141	224		
Coefficienti Parziali di sicurezza <b>property class 5.8, 8.8</b> <b>property class 70</b> <b>property class 80</b>	$\gamma_{Ms}^{1)}$	[-]	1.25									1.56	1.33

#### Concrete pryout failure

Factor in equation (5.7) of TR 029, Section 5.2.3.3	k	[-]	2.0								
Partial safety factor	$\gamma_{MC}^{1)}$	[-]	1.5 <sup>2)</sup>								

#### Concrete edge failure<sup>3)</sup>

Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1.5 <sup>2)</sup>								
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#### Displacements to shear loads

Shear load	V	[kN]	5.2	8.3	12.0	12.0	16.4	22.4	22.4	35.0	35.0	43.3	50.4	50.4	80.1
Displacement	$\delta_{V0}$	[mm]	2.0	2.1	2.2	2.2	2.3	2.5	2.5	2.6	2.6	2.8	2.8	2.8	3.0
	$\delta_{V\infty}$	[mm]	2.9	3.1	3.3	3.3	3.5	3.7	3.7	4.0	4.0	4.1	4.1	4.1	4.4

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#### 4 - Declared performance according to ETAG 001 (design according to CEN/TS 1992-4-5)

##### Steel failure

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Characteristic resistance <b>property class 5.8</b>	$N_{Rk,S}$	[kN]	18	29	42	58	78	123	152	177	281				
Characteristic resistance <b>property class 70</b>	$N_{Rk,S}$	[kN]	26	40	59	81	110	172	212	247	393				
Characteristic resistance <b>property class 8.8</b> <b>property class 80</b>	$N_{Rk,S}$	[kN]	29	46	67	92	126	196	242	282	449				
Partial safety factor <b>property class 5.8, 8.8</b> <b>property class 70</b> <b>property class 80</b>	$\gamma_{Ms}^{1)}$	[-]						1.5	1.87	1.60					

##### Combined Pull-out and Concrete cone failure

##### Characteristic bond resistance in non-cracked concrete C20/25

Temperature range I: 40°C/24°C <sup>2)</sup>	$\gamma_{Rk,ucr}$	[N/mm <sup>2</sup> ]				12						11			10
Temperature range II: 80°C/50°C <sup>2)</sup>	$\gamma_{Rk,ucr}$	[N/mm <sup>2</sup> ]				10						9.5			9.0
Coefficiente parziale di sicurezza	$\gamma_{Mp} = \gamma_{Mc}^{1)}$	[-]						1.5 <sup>3)</sup>							1.8 <sup>4)</sup>
Factor acc. CEN/TS 1992-4-5, § 6.2.2.3	$k_{ucr}$	[-]						10.1							
Effective anchorage depth	$h_{ef}$	[mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Increasing factors for non-cracked concrete	$\psi_c$	C25/30							1.06						
		C30/37							1.14						
		C35/45								1.22					
		C40/50								1.26					
		C45/55								1.30					
		C50/60								1.34					

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#### 4 - Prestazione dichiarata in accordo all'ETAG001 parte 1 e parte 5 (Verifica secondo CEN/TS 1992-4-5)

##### Concrete cone failure

Misura			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Factor acc. CEN/TS 1992-4-5, § 6.2.3.1	$k_{ucr}$	[-]	10.1												
Edge distance	$c_{cr,N}$	[-]	1.5 $h_{ef}$												
Spacing	$s_{cr,N}$	[-]	3 $h_{ef}$												

##### Splitting failure

Char. edge distance	$c_{cr,sp}$	[mm]	160	135	140	205	150	160	240	215	320	240	265	395	350	
Char. spacing	$s_{cr,sp}$	[mm]	2· $c_{cr,sp}$													
Partial safety factor <sup>1)</sup>	$\gamma_{Msp}$	[-]	1.5 <sup>3)</sup>													1.8 <sup>4)</sup>

##### Steel failure without lever arm

Characteristic resistance <b>property class 5.8</b>	$V_{Rk,S}$	[kN]	9	14	21	29	39	61	76	88	140		
Characteristic resistance <b>property class 70</b>	$V_{Rk,S}$	[kN]	13	20	30	40	55	86	106	124	196		
Characteristic resistance <b>property class 8.8</b> <b>property class 80</b>	$V_{Rk,S}$	[kN]	15	23	34	46	63	98	121	141	224		
Partial safety factor <b>property class 5.8, 8.8</b> <b>property class 70</b> <b>property class 80</b>	$\gamma_{Ms}^{1)}$	[-]	1.25									1.56	1.33
Ductility factor acc. CEN/TS 1992-4-5, § 6.3.2.1	$k_2$	[-]	0.8										



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#### 4 - Prestazione dichiarata in accordo all'ETAG001 parte 1 e parte 5 (Verifica secondo CEN/TS 1992-4-5)

##### Steel failure with lever arm

Misura			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Char. bending moment property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	66	105		166		325	448	561		1125	
Char. bending moment property class 70	$M^0_{Rk,s}$	[Nm]	26	52	92	146		233		454	627	786		1574	
Char. bending moment property class 8.8 property class 80	$M^0_{Rk,s}$	[Nm]	30	60	105	168		266		519	716	898		1799	
Partial safety factor property class 5.8, 8.8 property class 70 property class 80	$\gamma_{Ms}^1$	[-]								1.25 1.56 1.33					

##### Concrete pryout failure

Factor in equation (27) of CEN/TS 1992-4-5, § 6.3.3	$k_3$	[-]								2.0					
Partial safety factor	$\gamma_{Mc}^1$	[-]								1.5 <sup>2)</sup>					

##### Concrete edge failure<sup>3)</sup>

##### Concrete Edge failure, see CEN/TS 1992-4-5, § 6.3.4

Partial safety factor	$\gamma_{Mc}^1$	[-]								1.5 <sup>2)</sup>					
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1) In absence of other national regulations

2) The partial safety factor  $\gamma_2 = 1.0$  is included

3) Concrete edge failure see chapter 5.2.3.4 of Technical Report TR 029

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#### 5 - Format of EHE01

Item code	Glass capsule size	Threaded Rod Diameter
EHE 01 08 080	Ø 9 x 80	M8
EHE 01 10 080	Ø 11 x 80	M10
EHE 01 12 095	Ø 13 x 95	M12
EHE 01 12 126	Ø 13 x 125	M12
EHE 01 16 095	Ø 17 x 95	M16
EHE 01 16 125	Ø 17 x 125	M16
EHE 01 20 160	Ø 17 x 160	M20
EHE 01 24 175	Ø 22 x 175	M24
EHE 01 24 245	Ø 22 x 230	M24
EHE 01 30 230	Ø 25 x 230	M30

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## 7 - Label example

**Tecfi** certezze per lavorare bene  
Sistemi di Fissaggio

Art/Item: **EHE 01 08 080**

ISO 9001:2008  
ISO 14001:2004

1 Ancorante chimico vinilestere bicomponente in fiala di vetro  
2 Dual component vinyl ester resin, in glass capsule  
3 Résine vinylester à deux composants, dans capsules de verre  
4 Zweikomponenten vinyl esterharz, in Glaskapsel  
5 Resina vinil ester bicomponente en capsula de vidrio  
6 Двухкомпонентная винилэстеровая смола, в стеклянной капсуле

3 **Tecfi** EHE01 Sinto ST-PE  
M8 10 x 80  
misura/size foro/hole (ØxL)

4 M8 10 x 80  
misura/size foro/hole (ØxL)

6 CE 1109 Tecfi S.p.A. 17  
ETA EHE - Sinto ST-EHE  
ETA0001 part 1, part 3  
16/0943  
DoP No. 1109-CPR-0088-1

7 +25°C  
8  
9  
10  
11

12 Scadenza/Expiry date: mm/yyyy  
13 Lotto/Lot: EHE01xxxxxy

14 Art/Item: **EHE 01 08 080**  
Ancorante chimico vinilestere bicomponente in fiala di vetro  
Dual component vinyl ester resin, in glass capsule  
misura/size: **M8** foro/hole (ØxL): **10 x 80**  
Pz./Pcs. **10**

- |  |  |
|--|--|
| 1 Item Code  | 9 Intended use of the product as laid down in the European standard applied, level of performance declared |
| 2 Descriptions   | 10 DoP Number  |
| 3 Picture  | 11 Link to DoP   |
| 4 Anchor Diameter (d <sub>nom</sub> )                                | 12 Expiring date   |
| 5 Hole size(ØxL)   | 13 Lot Number  |
| 6 Identification number of the Notified Body                         | 14 Number of Pieces per Box  |
| 7 Last two digits of the year in which the marking was first affixed |  |
| 8 European Technical Specification                                   |  |

The performances of the product identified by the above identification code are in conformity with the declared performance.  
This declaration of performance is issued under the sole responsibility of Tecfi S.p.A.

Signed for and behalf of the manufacturer by

Name and function	Place and date of issue	Signature
President Antonio Guarino	Pastorano, December 14 <sup>th</sup> 2016	