G&B Fissaggi S.r.l.
C.so Savona 22
10029 Villastellone (TO), Italia
tel. +39 011 9619433 - fax +39 011 9619382
www.gebfissaggi.com - info@gebfissaggi.com

Declaration of Performance

No. **DPGEB1020** v1.1

1. Unique identification code of the product-type: **Super Hybrid SH-PRO**

2. Intended uses:

Intended use of the construction product according to ETA 18/0179	
Generic type	Bonded injection type anchor for use in non-cracked concrete
Anchorages subject to	Static and quasi-static loads: threaded rod M8, M10, M12, M16, M20, M24
Base materials	- Reinforced or unreinforced normal weight concrete according to EN 206-1:2013 - Strength class C20/25 to C50/60 according to EN 206-1:2013 - Non-cracked concrete
Service temperature range	T1: -40 °C to +40 °C (max. short term temperature +40 °C and max. long term temperature +24 °C) T2: -40 °C to +80 °C (max. short term temperature +80 °C and max. long term temperature +50 °C)
Environmental conditions	- X1: Structures subject to dry internal conditions zinc plated or hot-dip galvanised steel class 5.8 or 8.8 stainless steel A2-70, A4-70 or A4-80 high corrosion resistant steel - X2: Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist stainless steel A2-70, A4-70 or A4-80 high corrosion resistant steel - X3: Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist high corrosion resistant steel Note: 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)
Concrete conditions	I1: installation in dry or wet (water saturated) concrete and use in service in dry or wet concrete I2: installation in water-filled (not sea water) and use in service in dry or wet concrete
Installation	Perforation by hammer drilling Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on job site Installation direction: D3 - downward and horizontal and upwards (e.g. overhead) installation
Design	Anchorages designed in accordance with EN 1992-4 or EOTA Technical Report TR 055 under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.

Intended use of the construction product according to ETA 18/0178	
Generic type	Bonded injection type anchor for use in masonry
Anchorages subject to	Static and quasi-static loads

Intended use of the construction product according to ETA 18/0178

Base materials

Type of base material

b: solid masonry

	type acc. to EN 771	**L/W/H** [mm]	**min. density** ρ [kg/dm^3]	**min. compr. strength** f_b [N/mm^2]
b1. solid clay brick	MZ 12-2,0-NF	240/116/71	2.0	12
b2. solid calcium silicate brick	KS 12-2,0-NF	240/115/70	2.0	12

c: hollow or perforated masonry

	type acc. to EN 771	**L/W/H** [mm]	**min. density** ρ [kg/dm^3]	**min. compr. strength** f_b [N/mm^2]
c1. hollow clay brick	HLZ 12-1,0-2DF	235/112/115	1.0	12
c2. hollow clay brick	HLZW 6-0,7-8DF	250/240/240	0.8	6
c3. hollow clay brick *hueco doble*	-	245/110/88	0.74	2,5
c4. hollow clay brick *Porotherm* (c4)	25 P+W KL15	373/250/238	0.9	12
c5. hollow calcium silicate brick	KSL 12-1,4-3DF	240/175/113	1.4	12
c6. hollow calcium silicate brick	KSL 12-1,4-8DF	250/240/237	1.4	12
c7. lightweight concrete hollow block	HBL 2-0,45-10DF	250/300/248	0.45	2
c8. lightweight concrete hollow block	HBL 4-0,7-8DF	250/240/248	0.7	4
c9. concrete masonry unit	HBN 4-12DF	370/240/238	1.2	4
c10. concrete masonry unit	-	400/200/200	1.7	2.5

Anchor rod in solid masonry with or without plastic sieve sleeve
Internal threaded socket in solid masonry with plastic sieve sleeve
Anchor rod in hollow or perforated masonry with plastic sieve sleeve
Internal threaded socket in hollow or perforated masonry with plastic sieve sleeve
threaded rod M8, M10, M12

Service temperature range

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

Environmental conditions

- X1: Structures subject to dry internal conditions
  zinc plated, hot-dip galvanised or zinc diffusion coated steel class 5.8, 8.8 or 10.9
  stainless steel A2-70, A4-70 or A4-80
  high corrosion resistant steel

Use categories

Installation and use
d/d: Installation and use in structures subject to dry, internal conditions
w/d: Installation in dry or wet substrate and use in structures subject to dry, internal conditions

Installation

Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on job site.

Design

Anchorages designed in accordance with Technical Report EOTA TR 054, method B, under the responsibility of an engineer experienced in anchorages and masonry work.
Verifiable calculation notes and drawings prepared taking account of 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.

3. Manufacturer: **G&B Fissaggi S.r.l.** C.so Savona 22, Villastellone (TO), Italia

5. System of AVCP: 1

6b.
European Assessment Document: EAD 330499-00-0601
European Technical Assessment: ETA 18/0179
Technical Assessment Body: TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Notified Body: 1020 TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.

European Assessment Document: EAD 330076-00-0604
European Technical Assessment: ETA 18/0178
Technical Assessment Body: TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Notified Body: 1020 TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.

7. Declared performances:

Declared performances according to EAD 330499-00-0601, ETA 18/0179

Threaded rod diameter			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Essential characteristics			**Performance**					
Installation parameters								
d	Nominal diameter of bar	[mm]	8	10	12	16	20	24
d_0	Hole diameter	[mm]	10	12	14	18	22	28
d_{fix}	Diameter of steel brush	[mm]	9	12	14	18	22	26
$h_{ef,min}$	Minimum effective anchorage depth	[mm]	64	80	96	128	160	192
$h_{ef,max}$	Maximum effective anchorage depth	[mm]	96	120	144	192	240	288
h_1	Depth of the drilling hole	[mm]	h_{ef}					
h_{min}	Minimum thickness of the concrete member	[mm]	h_{ef} + 30 ≥ 100				h_{ef} + $2d_0$	
d_{fix}	Diameter of clearance hole in the fixture	[mm]	9	12	14	18	22	26
T_{inst}	Maximum installation torque	[Nm]	10	20	40	80	150	200
t_{fix}	Thickness of fixture	[mm]	0 to 1500					
s_{min}	Minimum spacing	[mm]	50	60	70	95	120	145
c_{min}	Minimum edge distance	[mm]	50	60	70	95	120	145
Tension steel failure mode								
$N_{Rk,s}$	Characteristic tension resistance of steel	[kN]	A_s x f_{uk}					
Combined pull-out and concrete failure mode								
$\tau_{Rk,ucr}$	Characteristic bond resistance, service temperature T1, dry and wet concrete and flooded holes	[N/mm²]	8.0	7.0	7.0	7.0	7.0	6.0
$\tau_{Rk,ucr}$	Characteristic bond resistance, service temperature T2, dry and wet concrete and flooded holes	[N/mm²]	6.5	6.0	6.0	6.0	6.0	6.0
$\psi_{c,C25/30}$	Increasing factor for concrete C25/30	[-]	1.04					
$\psi_{c,C30/37}$	Increasing factor for concrete C30/37	[-]	1.08					
$\psi_{c,C35/45}$	Increasing factor for concrete C35/45	[-]	1.13					
$\psi_{c,C40/50}$	Increasing factor for concrete C40/50	[-]	1.15					
$\psi_{c,C45/55}$	Increasing factor for concrete C45/55	[-]	1.17					
$\psi_{c,C50/60}$	Increasing factor for concrete C50/60	[-]	1.19					
Concrete cone failure mode								
k_1	Factor for design according to TR 055	[-]	10.1					
$k_{ucr,N}$	Factor for design according to EN 1992-4	[-]	11					
$s_{cr,N}$	Critical spacing	[mm]	3.0 h_{ef}					
$c_{cr,N}$	Critical edge distance	[mm]	1.5 h_{ef}					

Threaded rod diameter			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Essential characteristics			**Performance**					
Splitting failure mode								
$s_{cr,sp}$	Critical spacing	[mm]	2 $c_{cr,sp}$					
$c_{cr,sp}$	Critical edge distance	[mm]	2.0 h_{ef}			1.5 h_{ef}		
Installation safety factor								
$\gamma_{inst} = \gamma_2$	Safety factor, dry and wet concrete	[-]	1.0					
$\gamma_{inst} = \gamma_2$	Safety factor, flooded holes	[-]	1.2					
Shear steel failure mode without lever arm								
$V_{Rk,s}$	Characteristic shear resistance of steel	[kN]	0.5 x A_s x f_{uk}					
k_7	Ductility factor	[-]	0.8					
Shear steel failure mode with lever arm								
$M^0_{Rk,s}$	Characteristic bending resistance of steel	[Nm]	1.2 x W_{el} x f_{uk}					
Concrete pry-out failure mode								
k / k_8	Factor for resistance to pry-out failure	[-]	2.0					
$\gamma_{inst} = \gamma_2$	Installation safety factor	[-]	1.0					
Concrete edge failure mode								
l_f	Effective length of anchor	[mm]	min(h_{ef}; 8 d_{nom})					
d_{nom}	Outside diameter of anchor	[mm]	8	10	12	16	20	24
$\gamma_{inst} = \gamma_2$	Installation safety factor	[-]	1,0					
Displacement on tension load, non-cracked concrete C20/25								
N	Service tension load	[kN]	6.3	6.3	9.9	19.8	29.8	37.7
δ_{N0}	Short term displacement under tension load	[mm]	0.1	0.1	0.2	0.5	0.6	0.8
$\delta_{N\infty}$	Long term displacement under tension load	[mm]	0.4	0.4	0.4	0.4	0.4	0.4
Displacement on shear load, non-cracked concrete C20/25								
V	Service shear load	[kN]	5.2	8.3	12.0	22.4	35.0	50.4
δ_{V0}	Short term displacement under shear load	[mm]	0.1	0.2	0.3	0.5	0.8	0.9
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	0.2	0.3	0.5	0.8	1.2	1.4

Declared performances according to EAD 330076-00-0604, ETA 18/0178

Threaded rod diameter			**M8**	**M10**	**M12**
Essential characteristics			**Performance**		
Installation parameters					
Anchor rod in solid masonry without sleeve					
d_0	Hole diameter	[mm]	15	15	20
h_{ef}	Effective anchorage depth	[mm]	85	85	85
Anchor rod in solid and hollow or perforated masonry with sleeve					
d_s	Sleeve diameter	[mm]	15 or 16	15 or 16	20
l_s	Sleeve length	[mm]	85	85	85
d_0	Hole diameter	[mm]	15 or 16	15 or 16	20
h_{ef}	Effective anchorage depth	[mm]	85	85	85
h_{nom}	Installation depth of sleeve	[mm]	85	85	85
Internal threaded socket in solid and hollow or perforated masonry with sleeve					
d_t	Diameter of internal threaded socket	[mm]	12	14	16
l_t	Length of internal threaded socket	[mm]	80	80	80

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
d_s	Sleeve diameter		[mm]	15 or 16	20	20
l_s	Sleeve length		[mm]	85	85	85
d_0	Hole diameter		[mm]	15 or 16	20	20
h_{ef}	Effective anchorage depth		[mm]	80	80	80
h_{nom}	Installation depth of sleeve		[mm]	85	85	85
Other installation parameters						
d_{fix}	Diameter of clearance hole in the fixture		[mm]	9	12	14
h_1	Depth of the drilling hole		[mm]	90	90	90
T_{inst}	Maximum installation torque		[Nm]	2	2	2
Spacing and edge distance – anchor rod						
c_{min} c_{cr}	Minimum and critical edge distance	brick b1	[mm]	128	128	128
		brick b2	[mm]	128	128	128
		brick c1	[mm]	100	100	120
		brick c2	[mm]	100	100	120
		brick c3	[mm]	100	100	120
		brick c4	[mm]	100	100	120
		brick c5	[mm]	100	100	120
		brick c6	[mm]	100	100	120
		brick c7	[mm]	100	100	NPD
		brick c8	[mm]	100	100	120
		brick c9	[mm]	100	100	120
		brick c10	[mm]	100	NPD	120
$s_{min,II}$ $s_{cr,II}$	Minimum and critical spacing, parallel to horizontal joint	brick b1	[mm]	255	255	255
		brick b2	[mm]	255	255	255
		brick c1	[mm]	235	235	235
		brick c2	[mm]	250	250	250
		brick c3	[mm]	245	245	245
		brick c4	[mm]	373	373	373
		brick c5	[mm]	240	240	240
		brick c6	[mm]	250	250	250
		brick c7	[mm]	250	250	NPD
		brick c8	[mm]	250	250	250
		brick c9	[mm]	370	370	370
		brick c10	[mm]	400	NPD	400
$s_{min,\perp}$ $s_{cr,\perp}$	Minimum and critical spacing, perpendicular to horizontal joint	brick b1	[mm]	255	255	255
		brick b2	[mm]	255	255	255
		brick c1	[mm]	115	115	115
		brick c2	[mm]	240	240	240
		brick c3	[mm]	110	110	110
		brick c4	[mm]	238	238	238
		brick c5	[mm]	113	113	113
		brick c6	[mm]	237	237	237
		brick c7	[mm]	248	248	NPD
		brick c8	[mm]	248	248	248

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
$s_{min,\perp}$ $s_{cr,\perp}$	Minimum and critical spacing, perpendicular to horizontal joint	brick c9	[mm]	238	238	238
		brick c10	[mm]	200	NPD	200
Spacing and edge distance – internal threaded socket						
c_{min} c_{cr}	Minimum and critical edge distance	brick b1	[mm]	128	128	128
		brick b2	[mm]	128	128	128
		brick c1	[mm]	100	120	120
		brick c2	[mm]	100	120	120
		brick c3	[mm]	NPD	NPD	NPD
		brick c4	[mm]	NPD	NPD	NPD
		brick c5	[mm]	100	120	120
		brick c6	[mm]	NPD	120	120
		brick c7	[mm]	100	120	120
		brick c8	[mm]	NPD	120	120
		brick c9	[mm]	100	120	120
		brick c10	[mm]	NPD	NPD	NPD
$s_{min,II}$ $s_{cr,II}$	Minimum and critical spacing, parallel to horizontal joint	brick b1	[mm]	255	255	255
		brick b2	[mm]	255	255	255
		brick c1	[mm]	235	235	235
		brick c2	[mm]	250	250	250
		brick c3	[mm]	NPD	NPD	NPD
		brick c4	[mm]	NPD	NPD	NPD
		brick c5	[mm]	240	240	240
		brick c6	[mm]	NPD	250	250
		brick c7	[mm]	250	250	250
		brick c8	[mm]	NPD	250	250
		brick c9	[mm]	370	370	370
		brick c10	[mm]	NPD	NPD	NPD
$s_{min,\perp}$ $s_{cr,\perp}$	Minimum and critical spacing, perpendicular to horizontal joint	brick b1	[mm]	255	255	255
		brick b2	[mm]	255	255	255
		brick c1	[mm]	115	115	115
		brick c2	[mm]	240	240	240
		brick c3	[mm]	NPD	NPD	NPD
		brick c4	[mm]	NPD	NPD	NPD
		brick c5	[mm]	113	113	113
		brick c6	[mm]	NPD	237	237
		brick c7	[mm]	248	248	248
		brick c8	[mm]	NPD	248	248
		brick c9	[mm]	238	238	238
		brick c10	[mm]	NPD	NPD	NPD

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
Resistance under tension and shear loading						
N_{Rk} V_{Rk}	Characteristic resistance under tension and shear loading for anchor rod	brick b1	[kN]	1.5	1.5	3.0
		brick b2	[kN]	0.75	0.9	1.5
		brick c1	[kN]	2.5	2.0	2.0
		brick c2	[kN]	1.2	1.2	0.9
		brick c3	[kN]	0.75	0.5	0.75
		brick c4	[kN]	1.5	1.5	1.5
		brick c5	[kN]	0.75	1.2	0.5
		brick c6	[kN]	0.75	1.2	0.5
		brick c7	[kN]	0.6	0.3	NPD
		brick c8	[kN]	0.6	1.5	1.2
		brick c9	[kN]	2.5	1.5	2.5
		brick c10	[kN]	0.75	NPD	0.6
N_{Rk} V_{Rk}	Characteristic resistance under tension and shear loading for internal threaded socket	brick b1	[kN]	2.0	3.0	4.0
		brick b2	[kN]	2.0	1.5	0.9
		brick c1	[kN]	1.5	2.5	2.5
		brick c2	[kN]	0.9	1.5	0.6
		brick c3	[kN]	NPD	NPD	NPD
		brick c4	[kN]	NPD	NPD	NPD
		brick c5	[kN]	0.6	0.75	0.9
		brick c6	[kN]	NPD	0.75	0.4
		brick c7	[kN]	0.5	0.3	0.75
		brick c8	[kN]	NPD	0.4	0.6
		brick c9	[kN]	0.6	1.2	0.9
		brick c10	[kN]	NPD	NPD	NPD
$M_{Rk,s}$	Characteristic bending moment		[Nm]	$1.2 \times W_{el} \times f_{uk}$		
Displacement under tension load						
N	Service tension load		[kN]	$N_{Rk}/(1.4 \cdot \gamma_M)$		
δ_{N0}	Short term displacement under tension load	solid bricks	[mm]	0.6		
		hollow or perforated bricks		0.14		
$\delta_{N\infty}$	Long term displacement under tension load	solid bricks	[mm]	1.2		
		hollow or perforated bricks		0.28		
Displacement under shear load						
V	Service shear load		[kN]	$V_{Rk}/1.4 \cdot \gamma_M$		
δ_{V0}	Short term displacement under shear load [1]	solid bricks	[mm]	1.0		
		hollow or perforated bricks		1.0		
$\delta_{V\infty}$	Long term displacement under shear load [1]	solid bricks	[mm]	1.5		
		hollow or perforated bricks		1.5		

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
β-factor for job site tests according to TR 053						
β	β-factor	brick b1	[-]	0.48		
		brick b2	[-]	0.26		
		brick c1	[-]	0.62		
		brick c2	[-]	0.43		
		brick c3	[-]	0.65		
		brick c4	[-]	0.65		
		brick c5	[-]	0.28		
		brick c6	[-]	0.22		
		brick c7	[-]	0.42		
		brick c8	[-]	0.36		
		brick c9	[-]	0.60		
		brick c10	[-]	0.59		

[1] the hole gap between bolt and fixture shall be considered additionally

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:

Andrea Maggioni, General manager

G&B fissaggi s.r.l.
Corso Savona, n°22
10029 VILLASTELLONE (TO)
Tel. 011 9619433 - Fax 011 9619382

Villastellone, 11 January 2019