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Declaration of Performance

No. **DPGEB1034** v1

1. Unique identification code of the product-type: **Gebofix PRO VE-SF SISMIK**

2. Intended uses:

Intended use of the construction product according to ETA 19/0699	
Generic type	Bonded injection type anchor for use in non-cracked and cracked concrete
Anchorages subject to	Static and quasi-static loads: threaded rod M8, M10, M12, M16, M20, M24, M27, M30 reinforcing bar Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32 Seismic actions for Performance Category C1: threaded rod M10, M12, M16, M20, M24, steel with rupture elongation $A_5 \geq 19$ % Seismic actions for Performance Category C2: threaded rod M12, M16, M20, M24, steel with rupture elongation $A_5 \geq 19$ %
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 threaded rod M8, M10, M12, M16, M20, M24, M27, M30 reinforcing bar Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32 - Cracked concrete threaded rod M10, M12, M16, M20, M24
Service temperature	I: -40 °C to +40 °C (max. short term temperature +40 °C and max. long term temperature +24 °C) II: -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 4.6, 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 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 threaded rod M8, M10, M12, M16, M20, M24, M27, M30 reinforcing bar Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32 I2: Installation in water-filled holes (not sea water) and use in service in dry or wet concrete threaded rod M8, M10, M12, M16 reinforcing bar Ø8, Ø10, Ø12, Ø16
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

Intended use of the construction product according to ETA 19/0699	
Design	Anchorages designed in accordance with EN 1992-4 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. Anchorages under seismic actions (cracked concrete) designed in accordance with EN 1992-4.

Intended use of the construction product according to ETA 16/0599	
Generic type	Injection system for post-installed connections of reinforcing bars in existing structures
Anchorages subject to	Static and quasi-static loads: reinforcing bar Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, Ø28, Ø32
Base materials	- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000 - Strength class C12/15 to C50/60 according to EN 206-1:2000 - Non-carbonated concrete - Maximum chloride content 0.40% (CL 0.40) according to EN 206-1:2000
Service temperature	-40 °C to +80 °C (max. short term temperature +80 °C and max. long term temperature +50 °C)
Concrete condition	Installation in dry or wet concrete
Installation	Dry or wet concrete. Installation in flooded holes is not allowed. Hole drilling by hammer drill or compressed air drill. The installation of post-installed rebars shall be done only by suitable trained installer and under supervision on site. The conditions under which an installer may be considered as suitable trained and the conditions for supervision on site are up to the Member States in which the installation is done. Check the position of the existing rebars.
Design	Anchorages designed under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings prepared taking account of the forces to be transmitted. Design according to EN 1992-1-1:2004 The position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Intended use of the construction product according to ETA 16/0919	
Generic type	Bonded injection type anchor for use in masonry
Anchorages subject to	Static and quasi-static loads
Base materials	Type of base material c: solid masonry

	type acc. to EN 771-1 and 2	**L/W/H** [mm]	**min. density** ρ [kg/dm^3]	**min. compr. strength** f_b [N/mm^2]
b1. solid clay brick	MZ-NF	240/115/71	1.9	20
b2. solid calcium silicate brick	KSV-NF	240/115/71	1.8	25

c: hollow masonry

	type acc. to EN 771-1 and 2	**L/W/H** [mm]	**min. density** ρ [kg/dm^3]	**min. compr. strength** f_b [N/mm^2]
c1. hollow clay brick	Porotherm P+W	373/250/238	0.9	12

Intended use of the construction product according to ETA 16/0919	
	c2. hollow clay brick | Hueco Doble | 245/110/88 | 0.74 | 2.5 c3. hollow calcium silicate brick | KSL-R-12-1,2-16DF | 239/248/239 | 1.3 | 15 Anchor rod in hollow or perforated masonry with plastic sieve sleeve threaded rod M8, M10, M12
Service temperature	T_b: -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, 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 330499-01-0601
European Technical Assessment: ETA 19/0699
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: ETAG 001 Part 1 and Part 5, edition 2013, used as EAD
European Technical Assessment: ETA 16/0599
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 16/0919
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 330499-01-0601, ETA 19/0699

Threaded rod diameter			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Essential characteristics			**Performance**							
Installation parameters										
d	Nominal diameter of bar	[mm]	8	10	12	16	20	24	27	30
d_0	Nominal diameter of drill bit	[mm]	10	12	14	18	22	26	30	35
d_b	Diameter of the steel brush	[mm]	12	14	16	20	26	30	35	43
d_{fix}	Diameter of clearance hole in the fixture	[mm]	9	12	14	18	22	26	30	33
$h_{ef,min}$	Minimum effective anchorage depth	[mm]	64	80	96	128	160	192	216	240

Threaded rod diameter					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Essential characteristics					**Performance**							
$h_{ef,max}$	Maximum effective anchorage depth			[mm]	160	200	240	320	400	480	540	600
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} + $2d_0$			
T_{inst}	Maximum installation torque			[Nm]	10	20	40	80	150	200	240	275
t_{fix}	Thickness of fixture			[mm]	0 to 1500							
s_{min}	Minimum spacing			[mm]	35	40	50	65	80	96	110	120
c_{min}	Minimum edge distance			[mm]	35	40	50	65	80	96	110	120
Tension steel failure mode												
$N_{Rk,s}$ $N_{Rk,s,seis,C1}$ $N_{Rk,s,seis,C2}$	Characteristic tension resistance of steel			[kN]	A_s x f_{uk}							
Combined pull-out and concrete failure mode												
Characteristic bond resistance												
non-cracked concrete	temp. I	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10.0	9.0	8.5	8.0	7.5	7.0	5.5	5.0
		flooded holes	$\tau_{Rk,ucr}$	[N/mm²]	8.0	7.0	6.5	6.0	NPD			
	temp. II	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9.0	8.5	8.0	7.5	7.0	6.5	5.0	4.5
		flooded holes	$\tau_{Rk,ucr}$	[N/mm²]	7.5	6.5	6.0	5.5	NPD			
cracked concrete	temp. I	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	NPD	5.0	5.0	5.0	5.0	5.0	NPD	
			$\tau_{Rk,cr,seis,C1}$	[N/mm²]	NPD	3.1	3.7	3.7	3.7	3.8	NPD	
			$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD		1.1	1.3	1.5	NPD		
		flooded holes	$\tau_{Rk,cr}$	[N/mm²]	NPD	4.0	5.0	5.0	NPD			
			$\tau_{Rk,cr,seis,C1}$	[N/mm²]	NPD	3.1	3.7	3.7	NPD			
			$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD							
	temp. II	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm²]	NPD	3.5	4.0	4.0	4.0	4.0	NPD	
			$\tau_{Rk,cr,seis,C1}$	[N/mm²]	NPD	2.2	2.7	2.7	2.7	2.8	NPD	
			$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD		1.0	1.2	1.4	NPD		
		flooded holes	$\tau_{Rk,cr}$	[N/mm²]	NPD	3.0	4.0	4.0	NPD			
			$\tau_{Rk,cr,seis,C1}$	[N/mm²]	NPD	1.9	2.7	2.7	NPD			
			$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD							
$\psi_{c,C30/37}$	Increasing factor for concrete C30/37			[-]	1.04							
$\psi_{c,C40/50}$	Increasing factor for concrete C40/50			[-]	1.08							
$\psi_{c,C50/60}$	Increasing factor for concrete C50/60			[-]	1.10							
Concrete cone failure mode												
$k_{ucr,N}$	Factor for non-cracked concrete			[-]	11.0							
$k_{cr,N}$	Factor for cracked concrete			[-]	NPD	7.7						
$s_{cr,N}$	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**	**M27**	**M30**
Essential characteristics			**Performance**							
Splitting failure mode										
$s_{cr,sp}$	Critical spacing for splitting	[mm]	2 $c_{cr,sp}$							
$c_{cr,sp}$	Critical edge distance for splitting for $h/h_{ef} \geq 2.0$	[mm]	1.0 h_{ef}							
	Critical edge distance for splitting for $2.0 > h/h_{ef} > 1.3$	[mm]	4.6 h_{ef} – 1.8 h							
	Critical edge distance for splitting for $h/h_{ef} \leq 1.3$	[mm]	2.26 h_{ef}							
Installation safety factor										
γ_{Mc},	Safety factor, dry and wet concrete	[-]	1.2						1.4	
γ_{Mp}, γ_{Msp}	Safety factor, flooded holes	[-]	1.4				NPD			
Shear steel failure mode without lever arm										
$V_{Rk,s}$	Characteristic shear resistance of steel	[kN]	0.5 x A_s x f_{uk}							
$V_{Rk,s,seis,C1}$	Characteristic shear resistance of steel under seismic actions cat. C1	[kN]	NPD	0.35 x A_s x f_{uk}					NPD	
$\alpha_{v,hdg,C1}$	Reduction factor for hot-dip galvanized rods	[-]	NPD	0.57	0.56	0.49	0.56	0.61	NPD	
$V_{Rk,s,seis,C2}$	Characteristic shear resistance of steel under seismic actions cat. C2	[kN]	NPD		0.26 x A_s x f_{uk}			NPD		
$\alpha_{v,hdg,C2}$	Reduction factor for hot-dip galvanized rods	[-]	NPD		0.46	0.61	0.61	NPD		
α_{gap}	Factor for annular gap	[-]	0.5							
k_7	Ductility factor	[-]	1.0 for steel with rupture elongation $A_5 > 8$ %							
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}							
$M^0_{Rk,s,seis,C1}$ $M^0_{Rk,s,seis,C2}$	Characteristic bending resistance of steel under seismic actions	[Nm]	NPD							
Concrete pry-out failure mode										
k_8	Factor for resistance to pry-out failure	[-]	2.0							
γ_{inst}	Installation safety factor	[-]	1.0							
Concrete edge failure mode										
l_f	Effective length of anchor	[mm]	min(h_{ef}; 8 d)							
d_{nom}	Outside diameter of anchor	[mm]	8	10	12	16	20	24	27	30
γ_{inst}	Installation safety factor	[-]	1.0							
Displacement on tension load, non-cracked concrete										
δ_{N0}	Short term displacement under tension load	[mm/kN]	0.05	0.04	0.03	0.02	0.02	0.02	0.01	0.01
$\delta_{N\infty}$	Long term displacement under tension load	[mm/kN]	0.11	0.09	0.06	0.04	0.03	0.02	0.02	0.02
Displacement on tension load, cracked concrete										
δ_{N0}	Short term displacement under tension load	[mm/kN]	NPD	0.08	0.09	0.05	0.03	0.02	NPD	

Threaded rod diameter			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$\delta_{N\infty}$	Long term displacement under tension load	[mm/kN]	NPD	0.51	0.32	0.18	0.13	0.11	NPD	
Displacement on tension load, seismic actions cat. C2										
$\delta_{N,eq(DLS)}$	Displacement Damage Limit State	[mm]	NPD		0.57	0.35	0.85	NPD		
$\delta_{N,eq(ULS)}$	Displacement Ultimate Limit State	[mm]	NPD		7.62	6.75	7.28	NPD		
Displacement on shear load, non-cracked and cracked concrete										
δ_{V0}	Short term displacement under shear load	[mm/kN]	0.48	0.30	0.20	0.11	0.10	0.08	0.06	0.05
$\delta_{V\infty}$	Long term displacement under shear load	[mm/kN]	0.72	0.45	0.30	0.17	0.14	0.12	0.10	0.08
Displacement on shear load, seismic actions cat. C2										
$\delta_{N,eq(DLS)}$	Displacement Damage Limit State	[mm]	NPD		5.29	4.12	4.94	NPD		
$\delta_{N,eq(ULS)}$	Displacement Ultimate Limit State	[mm]	NPD		10.20	9.05	10.99	NPD		

Reinforcing bar diameter					**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Essential characteristics					**Performance**						
Installation parameters											
d	Nominal diameter of bar			[mm]	8	10	12	16	20	25	32
d_0	Nominal diameter of drill bit			[mm]	12	14	16	20	25	32	40
d_b	Diameter of the steel brush			[mm]	14	16	18	22	31	35	43
$h_{ef,min}$	Minimum effective anchorage depth			[mm]	64	80	96	128	160	200	256
$h_{ef,max}$	Maximum effective anchorage depth			[mm]	160	200	240	320	400	480	640
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} + $2d_0$		
s_{min}	Minimum spacing			[mm]	35	40	50	65	80	100	130
c_{min}	Minimum edge distance			[mm]	35	40	50	65	80	100	130
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											
Characteristic bond resistance											
non-cracked concrete	temp. I	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	8,5	9,0	9,0	8,0	8,0	8,0	5,0
		flooded holes	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,5	8,5	8,0	NPD		
	temp. II	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,0	8,0	7,5	7,5	7,0	4,5
		flooded holes	$\tau_{Rk,ucr}$	[N/mm²]	6,5	7,0	7,0	6,5	NPD		
ψ_c	Increasing factor for concrete up to C50/60			[-]	1.0						
Concrete cone failure mode											
$k_{ucr,N}$	Factor for non-cracked concrete			[-]	11.0						
$s_{cr,N}$	Critical spacing			[mm]	3.0 h_{ef}						
$c_{cr,N}$	Critical edge distance			[mm]	1.5 h_{ef}						
Splitting failure mode											
$s_{cr,sp}$	Critical spacing for splitting			[mm]	2 $c_{cr,sp}$						

Reinforcing bar diameter			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Essential characteristics			**Performance**						
$c_{cr,sp}$	Critical edge distance for splitting for $h/h_{ef} \geq 2.0$	[mm]	$1.0\ h_{ef}$						
	Critical edge distance for splitting for $2.0 > h/h_{ef} > 1.3$	[mm]	$4.6\ h_{ef} - 1.8\ h$						
	Critical edge distance for splitting for $h/h_{ef} \leq 1.3$	[mm]	$2.26\ h_{ef}$						
Installation safety factor									
γ_{inst}	Safety factor, dry and wet concrete	[-]	1.2						
	Safety factor, flooded holes	[-]	1.4				NPD		
Shear steel failure mode without lever arm									
$V_{Rk,s}$	Characteristic shear resistance of steel	[kN]	$0.5 \cdot A_s \cdot f_{uk}$						
k_7	Ductility factor	[-]	1.0 for steel with rupture elongation $A_5 > 8$ %						
Shear steel failure mode with lever arm									
$M^0_{Rk,s}$	Characteristic bending resistance of steel	[Nm]	$1.2 \cdot W_{el} \cdot f_{uk}$						
Concrete pry-out failure mode									
k_8	Factor for resistance to pry-out failure	[mm]	2.0						
γ_{inst}	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	25	32
γ_{inst}	Installation safety factor	[-]	1.0						
Displacement on tension load, non-cracked concrete									
δ_{N0}	Short term displacement under tension load	[mm/kN]	0.04	0.03	0.02	0.02	0.01	0.01	0.01
$\delta_{N\infty}$	Long term displacement under tension load	[mm/kN]	0.09	0.07	0.05	0.03	0.02	0.01	0.01
Displacement on shear load, non-cracked concrete									
δ_{V0}	Short term displacement under shear load	[mm/kN]	0,05	0,04	0,03	0,02	0,01	0,01	0,01
$\delta_{V\infty}$	Long term displacement under shear load	[mm/kN]	0,08	0,06	0,05	0,03	0,02	0,01	0,01

Declared performances according to ETAG 001:2013 Part 1 and Part 5, 16/0599

Reinforcing bar diameter			**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
Essential Characteristics			**Performance**								
Installation parameters											
d_s	Nominal diameter of bar	[mm]	8	10	12	14	16	20	25	28	32
d_0	Nominal diameter of drill bit	[mm]	12	14	16	18	20	25	32	35	40

Reinforcing bar diameter				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
Essential characteristics				**Performance**								
min c	Minimum concrete cover	hammer drilling without drilling aid	[mm]	$30 + 0.06 \cdot l_v \geq 2 \cdot d_s$						$40 + 0.06 \cdot l_v \geq 2 \cdot d_s$		
		hammer drilling with drilling aid	[mm]	$30 + 0.02 \cdot l_v \geq 2 \cdot d_s$						$40 + 0.02 \cdot l_v \geq 2 \cdot d_s$		
		compressed air drilling without drilling aid	[mm]	$50 + 0.08 \cdot l_v$						$60 + 0.08 \cdot l_v$		
		compressed air drilling with drilling aid	[mm]	$50 + 0.02 \cdot l_v$						$60 + 0.02 \cdot l_v$		
$l_{b,min}$	Factor for $l_{b,min}$ and $l_{0,min}$ related to concrete class and drilling method		[-]	1.0								
$l_{v,max}$	Maximum installation length		[mm]	400	500	600	700	800	1000	1000	1000	1000
Bond resistance												
f_{bd}	Design ultimate bond resistance for all drilling methods and good conditions	C12/15	[N/mm²]	1.6							1.6	
		C16/20	[N/mm²]	2.0							2.0	
		C20/25	[N/mm²]	2.3							2.3	
		C25/30	[N/mm²]	2.7							2.3	
		C30/37	[N/mm²]	3.0							2.3	
		C35/45	[N/mm²]	3.0							2.3	
		C40/50	[N/mm²]	3.0							2.3	
		C45/55	[N/mm²]	3.0							2.3	
		C50/60	[N/mm²]	3.0							2.3	

Declared performances according to EAD 330076-00-0604, ETA 16/0919

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
Installation parameters						
d_s	Sleeve diameter		[mm]	16	16	20
l_s	Sleeve length		[mm]	85	85	85
d_0	Nominal diameter of drill bit		[mm]	16	16	20
h_{ef}	Effective anchorage depth		[mm]	85	85	85
h_{nom}	Installation depth of sleeve		[mm]	85	85	85
h_1	Depth of the drilling hole		[mm]	90	90	90
d_{fix}	Diameter of clearance hole in the fixture		[mm]	9	12	14
T_{inst}	Maximum installation torque		[Nm]	2	2	2
Edge distances and spacings						
c_{min} c_{cr}	Minimum and critical edge distance	b1 brick	[mm]	128	128	128
		b2 brick	[mm]	128	128	128
		c1 brick	[mm]	100	100	120
		c2 brick	[mm]	100	100	120
		c3 brick	[mm]	100	100	120

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
$s_{min,II}$ $s_{cr,II}$	Minimum and critical spacing, parallel to horizontal joint	b1 brick	[mm]	255	255	255
		b2 brick	[mm]	255	255	255
		c1 brick	[mm]	373	373	373
		c2 brick	[mm]	245	245	245
		c3 brick	[mm]	239	239	239
$s_{min,\perp}$ $s_{cr,\perp}$	Minimum and critical spacing, perpendicular to horizontal joint	b1 brick	[mm]	255	255	255
		b2 brick	[mm]	255	255	255
		c1 brick	[mm]	238	238	238
		c2 brick	[mm]	110	110	110
		c3 brick	[mm]	248	248	248
Tension and shear resistance, use category d/d and w/d						
N_{Rk}	Characteristic tension resistance	b1 brick	[kN]	3.0	3.0	3.0
		b2 brick	[kN]	3.0	3.0	3.0
		c1 brick	[kN]	2.0	2.0	2.5
		c2 brick	[kN]	0.9	1.2	1.5
		c3 brick	[kN]	2.0	2.0	2.5
V_{Rk}	Characteristic shear resistance	b1 brick	[kN]	3.0	3.0	3.0
		b2 brick	[kN]	3.0	3.0	3.0
		c1 brick	[kN]	2.0	2.0	2.5
		c2 brick	[kN]	0.9	1.2	1.5
		c3 brick	[kN]	2.0	2.0	2.5
$V_{Rk,s}$	Characteristic shear resistance of steel		[kN]	$0.5 \times A_s \times f_{uk}$		
$M_{Rk,s}$	Characteristic bending resistance of steel		[Nm]	$1.2 \times W_{el} \times f_{uk}$		
Displacement on tension load						
N	Service tension load		[kN]	$N_{Rk}/(1.4 \cdot \gamma_M)$		
δ_{N0}	Short term displacement under tension load	b1 brick	[mm]	0.06		
		b2 brick		0.12		
		c1 brick		0.5		
		c2 brick		0.5		
		c3 brick		0.1		
$\delta_{N\infty}$	Long term displacement under tension load	b1 brick	[mm]	0.12		
		b2 brick		0.24		
		c1 brick		1.0		
		c2 brick		1.0		
		c3 brick		0.2		
Displacement on shear load						
V	Service shear load		[kN]	$V_{Rk}/1.4 \cdot \gamma_M$		
δ_{V0}	Short term displacement under shear load	b1 brick	[mm]	0.7		
		b2 brick		0.8		
		c1 brick		1.0 [1]		
		c2 brick		1.0 [1]		
		c3 brick		0.9		

Threaded rod diameter				**M8**	**M10**	**M12**
Essential characteristics				**Performance**		
$\delta_{V\infty}$	Long term displacement under shear load	b1 brick	[mm]	1.0		
		b2 brick		1.4		
		c1 brick		1.5 [1]		
		c2 brick		1.5 [1]		
		c3 brick		1.4		
β-factor for job site tests according to ETAG 029, Annex B						
β	β-factor	b1 brick	[-]	0.85		
		b2 brick		0.85		
		c1 brick		0.83		
		c2 brick		0.78		
		c3 brick		0.85		

[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

Villastellone, 24 June 2022

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