Declaration of Performance

KEM-UP + Vinylester

Bonded anchor vinylester resin in cartridge

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Intended use or uses of the construction product acc. to ETAG001 p.1-5-Annex E, TR029 and CEN/TS 1992-4	
Generic type	Bonded anchor for anchorage of threaded rod and reinforcing rebar.
Base material	**Cracked and un-cracked concrete** C20/25 to C50/60 acc. to EN206-1
Use category	> Installation in dry and wet concrete (flooded holes only M8÷M16 and Ø8÷Ø16) > Overhead installation
Material of threaded rod and Durability	> Galvanised steel cl. 4.6, 5.8 and 8.8 acc. to EN ISO898 for dry internal conditions > Stainless steel AISI316 cl. A4-70 acc. to EN ISO3506 for dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist > High resistant corrosion stainless steel cl. 70 acc. to EN ISO3506 for all conditions
Material of reinforcing bar	Class B and C as EN 1992-1-1 Annex C
Loading	Static, quasi-static and seismic load
Temperature Range	> -40 / +40°C max long term temperature +24°C and max short term temperature +40°C > -40°C / +80°C max long term temperature +50°C and max short term temperature +80°C > -40°C to +120°C max long term temperature +72°C and max short term temperature +120°C
Fire Resistance	F120
Fire Reaction	A1 according to EN13501-1
ETA-08/0383 issued by	**DIBT** approval body nr.0756
On the basis of	**ETAG001 p.1-5 and TR029**
Certificate of Conformity **0756-CPD-0248** issued by	**DIBT** notified body nr.0756
Under System (AVCP)	**1**

Intended use or uses of the construction product according to ETAG029	
Generic type	Bonded anchor for anchorage of threaded rod.
Base material	B and C, **solid or hollow masonry** acc. to EN771
Use category	w/w installation and use in dry and wet masonry
Material of threaded rod and Durability	> Galvanised steel cl. 5.8 acc. to EN ISO898 for dry internal conditions > Stainless steel AISI316 cl. A4-70 acc. to EN ISO3506 for dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist
Loading	static, quasi-static
Temperature Range	> -40°C to +40°C max long term temperature +24°C and max short term temperature +40°C > -40°C to +80°C max long term temperature +50°C and max short term temperature +80°C
Fire Reaction	A1 according to EN13501-1
ETA-12/0543 issued by	**DIBT** approval body nr.0756
On the basis of	**ETAG029**
Certificate of Conformity **0756-CPD-0513** issued by	**DIBT** notified body nr.0756
Under System (AVCP)	**1**

Intended use or uses of the construction product according to ETAG001 p.1-5 and TR023	
Generic type	Bonded anchor for anchorage of **post installed rebar connection**.
Base material	Non-carbonated concrete C12/15 to C50/60 acc. to EN206-1 (Cl.0,40 max)
Use category	Installation in dry and wet concrete (not flooded holes)
Material of reinforcing bar	Class B and C as EN1992-1-1 Annex C
Loading	Eurocode 2 EN1992-1-1
Temperature Range	-40°C to +80°C max long term temperature +50°C and max short term temperature +80°C
ETA-12/0553 issued by	**DIBT** approval body nr.0756
On the basis of	**ETAG001 p.1-5 and TR023**
Certificate of Conformity **0756-CPD-0562** issued by	**DIBT** notified body nr.0756
Under System (AVCP)	**1**

Declared performances acc. to ETA-08/0383 (ETAG001 p.1-5)
Design method TR029 or CEN/TS 1992-4

ESSENTIAL CHARACTERISTICS				**PERFORMANCE**							
Installation parameters	**THREADED RODS [d]**			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
d_0	Nominal diameter of drill bit		[mm]	10	12	14	18	24	28	32	35
h_{ef}	Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120
		$h_{ef,std}$	[mm]	80	90	110	125	170	210	240	270
		$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
h_{min}	Minimum thickness of the concrete member		[mm]	$h_{ef} + 30 \geq 100$			$h_{ef} + 2d_0$				
T_{inst}	Torque moment (max)		[Nm]	10	20	40	80	120	160	180	200
s_{min}	Minimum spacing		[mm]	40	50	60	80	100	120	135	150
c_{min}	Minimum edge distance		[mm]	40	50	60	80	100	120	135	150
TENSION Steel failure											
$N_{Rk,s}$	Tension Steel characteristic failure	cl. 4.6	[kN]	15	23	34	63	98	141	184	224
		cl. 5.8	[kN]	18	29	42	78	122	176	230	280
		cl. 8.8	[kN]	29	46	67	125	196	282	368	449
		A4-70 (50)	[kN]	26	41	59	110	171	247	(230)	(281)
$\gamma_{m,sN}$ [1)]	Partial safety factor	cl. 4.6	[-]	2							
		cl. 5.8-8.8	[-]	1,5							
		A4-70 (50)	[-]	1,87						(2,86)	
Combined pull-out and concrete failure:	**"dry and wet concrete"**			M8	M10	M12	M16	M20	M24	M27	M30
$\tau_{Rk,cr}$	Characteristic bond resistance in **cracked concrete C20/25**	40°/24°C	[MPa]			**5,5**	**5,5**	**5,5**	**5,5**	**6,5**	**6,5**
		80°/50°C	[Mpa]			**4**	**4**	**4**	**4**	**4,5**	**4,5**
		120°/72°C	[MPa]			**3**	**3**	**3**	**3**	**3,5**	**3,5**
$\tau_{Rk,ucr}$	Characteristic bond resistance in **un-cracked concrete C20/25**	40°/24°C	[MPa]	**10**	**12**	**12**	**12**	**12**	**11**	**10**	**9**
		80°/50°C	[Mpa]	**7,5**	**9**	**9**	**9**	**9**	**8,5**	**7,5**	**6,5**
		120°/72°C	[MPa]	**5,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6,5**	**5,5**	**5**
γ_2	Partial safety factor		[-]	1,0	1,2						
$\gamma_{m,c}$ [1)]	Partial safety factor		[-]	1,5	1,8						
Combined pull-out and concrete failure:	**"flooded hole"**			M8	M10	M12	M16	M20	M24	M27	M30
$\tau_{Rk,cr}$	Characteristic bond resistance in **cracked concrete C20/25**	40°/24°C	[MPa]			5,5	5,5	not admissible			
		80°/50°C	[MPa]			4	4				
		120°/72°C	[MPa]			3	3				
$\tau_{Rk,ucr}$	Characteristic bond resistance in **un-cracked concrete C20/25**	40°/24°C	[MPa]	7,5	8,5	8,5	8,5				
		80°/50°C	[MPa]	5,5	6,5	6,5	6,5				
		120°/72°C	[MPa]	4	5	5	5				
γ_2	Partial safety factor		[-]	1,4							
$\gamma_{m,c}$ [1)]	Partial safety factor		[-]	2,1							
ψ_c	Increasing factor for concrete	C30/37	[-]	1,04							
		C40/50	[-]	1,08							
		C50/60	[-]	1,10							
$k_{8,cr}$	Factor acc. to CEN/TS 1992-4-5 sec.6.2.2.3 cracked		[-]	7,2							
$k_{8,ucr}$	Factor acc. to CEN/TS 1992-4-5 sec.6.2.2.3 un-cracked		[-]	10,1							
Concrete cone failure											
K_{cr}	Factor acc. to CEN/TS 1992-4-5 sec.6.2.3.1 cracked		[-]	7,2							
K_{ucr}	Factor acc. to CEN/TS 1992-4-5 sec.6.2.3.1 un-cracked		[-]	10,1							
$c_{cr,N}$	Critical edge distance *(single anchor see TR029)*		[mm]	$0{,}5 x S_{cr,N}$							
$s_{cr,N}$	Critical spacing *(single anchor see TR029)*		[mm]	$20 x d x (\tau_{Rk,ucr24°C} / 7{,}5)^{0,5} \leq 3 x h_{ef}$							
Splitting failure											
$c_{cr,sp}$	Critical edge distance (splitting)		[mm]	$1{,}0 x h_{ef} \leq 2 x h_{ef} (2{,}5 - h / h_{ef}) \leq 2{,}4 x h_{ef}$							
$s_{cr,sp}$	Critical spacing (splitting)		[mm]	$2 x C_{cr,sp}$							
$\gamma_{m,sp}$	Partial safety factor		[-]	See $\gamma_{m,c}$							
Displacement under Tension Load in Concrete (δ_N x τ_{Sd} /1,4)				M8	M10	M12	M16	M20	M24	M27	M30
$\delta_{N0,ucr}$	Short term displacement **cracked concrete**	40°/24°C	[mm/MPa]			0,070					
		80°/50°C				0,170					
		120°/72°C				0,170					
$\delta_{N\infty,cr}$	Long term displacement **cracked concrete**	40°/24°C	[mm/MPa]			0,105					
		80°/50°C				0,245					
		120°/72°C				0,245					
$\delta_{N0,ucr}$	Short term displacement **un-cracked concrete**	40°/24°C	[mm/MPa]	0,021	0,023	0,026	0,031	0,036	0,041	0,045	0,049
		80°/50°C		0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
		120°/72°C		0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
$\delta_{N\infty,ucr}$	Long term displacement **un-cracked concrete**	40°/24°C	[mm/MPa]	0,030	0,033	0,037	0,045	0,052	0,060	0,065	0,071
		80°/50°C		0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
		120°/72°C		0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172

[1)] In absence of other national regulations.

SHEAR Steel failure				M8	M10	M12	M16	M20	M24	M27	M30
$V_{Rk,s}$	Shear Steel characteristic failure	cl. 4.6	[kN]	7	12	17	31	49	71	92	112
		cl. 5.8	[kN]	9	15	21	39	61	88	115	140
		cl. 8.8	[kN]	15	23	34	63	98	141	184	224
		A4-70 (50)	[kN]	13	20	30	55	86	124	(115)	(140)
$M^0_{Rk,s}$	Bending Moment characteristic failure	cl. 4.6	[Nm]	15	30	52	133	260	449	666	900
		cl. 5.8	[Nm]	19	37	65	166	324	560	833	1123
		cl. 8.8	[Nm]	30	60	105	266	519	896	1333	1797
		A4-70 (50)	[Nm]	26	52	92	232	454	784	(832)	(1125)
$\gamma_{m,sV}$ [1)]	Partial safety factor	cl. 4.6	[-]	1,67							
		cl. 5.8-8.8	[-]	1,25							
		A4-70 (50)	[-]	1,56						(2,38)	
K_2	Ductility factor acc. to CEN/TS 1992-4-5 sec.6.3.2.1		[-]	0,8							
Concrete Pryout failure											
k	Factor in equation 5.7 of TR029		[-]	2							
K_3	Factor in equation 27 of CEN/TS 1992-4-5 sec.6.3.3		[-]	2							
$\gamma_{m,cp}$ [1)]	Partial safety factor		[-]	1,5							
Concrete Edge failure				*see TR029 Section 5.2.3.4*							
$\gamma_{m,c}$ [1)]	Partial safety factor		[-]	1,5							
Concrete Edge failure				*see CEN/TS 1992-4-5 Section 6.3.4*							
l_f	Effective length of anchor		[-]	$l_f \le \min(h_{ef}; 8xd_{nom})$							
d_{nom}	Outside diameter of anchor		[mm]	8	10	12	16	20	24	27	30
$\gamma_{m,c}$ [1)]	Partial safety factor		[-]	1,5							
Displacement under Shear Load (δ_V x V_d /1,4)				M8	M10	M12	M16	M20	M24	M27	M30
$\delta_{V0,cr}$	Short term displacement **cracked concrete**		[mm/kN]			0,11	0,10	0,09	0,08	0,08	0,07
$\delta_{V\infty,cr}$	Long term displacement **cracked concrete**		[mm/kN]			0,17	0,15	0,14	0,13	0,12	0,10
$\delta_{V0,ucr}$	Short term displacement **un-cracked concrete**		[mm/kN]	0,06	0,06	0,05	0,04	0,04	0,03	0,03	0,03
$\delta_{V\infty,ucr}$	Long term displacement **un-cracked concrete**		[mm/kN]	0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,05

[1)] In absence of other national regulations.

SEISMIC Resistance acc. to ETA-08/0383 (ETAG001 - Annex E)
Design method acc. to TR045

ESSENTIAL CHARACTERISTICS			**PERFORMANCE**							
Reduction factors for seismic design Category C1					**M12 Ø12**	**M16 Ø16 Ø14**	**M20 Ø20**	**M24 Ø25**	**M27 Ø28**	**M30 Ø32**
$\alpha_{N,seis}$	Reduction factor ($N_{rk,s}$) for Tension steel failure	[-]			1,0					
$\alpha_{N,seis}$	Reduction factor ($N_{rk,p}$) for pull-out and concrete failure	[-]			0,68			0,69		
$\alpha_{V,seis}$	Reduction factor ($V_{rk,s}$) for Shear steel failure	[-]			0,70					
Reduction factors for resistance under seismic actions			**Tension failure**					**Shear failure**		
			$N_{Rk,s}$	$N_{Rk,p}$	$N_{Rk,p-c}$	$N_{Rk,c}$	$N_{Rk,sp}$	$V_{Rk,s}$	$V_{Rk,c}$	$V_{Rk,cp}$
α_{gap}	Reduction factor for gap hole fixture and fasteners	[-]	1	1	1	1	1	0,5 [2)]	0,5 [2)]	0,5 [2)]
α_{seis}	Reduction factor for single fasteners	[-]	1	1	1	0,85	1	1	1	0,85
α_{seis}	Reduction factor for fasteners group	[-]	1	0,85	0,85	0,75	0,85	0,85	0,85	0,75

[2)] The limitation for size of the clearance hole is given in TR029 table 4.1, α_{gap} = 1,0 in case of no clearance between fastener and fixture.

FIRE Resistance
Design method acc. to TR020

ESSENTIAL CHARACTERISTICS			**PERFORMANCE**						
Installation parameters	**THREADED RODS**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
d_0	Nominal diameter of drill bit	[mm]	10	12	14	18	24	28	35
h_{ef}	Effective embedment depth	[mm]	80	90	110	125	170	210	280
$N_{Rum,fi,30}$	For Fire resistance duration = 30 minutes	[kN]	≤ 1,6	≤ 2,6	≤ 3,3	≤ 6,3	≤ 9,8	≤ 14,0	≤ 18,3
$N_{Rum,fi,60}$	For Fire resistance duration = 60 minutes	[kN]	≤ 1,1	≤ 1,8	≤ 2,6	≤ 4,8	≤ 7,5	≤ 10,8	≤ 14,1
$N_{Rum,fi,90}$	For Fire resistance duration = 90 minutes	[kN]	≤ 0,6	≤ 0,9	≤ 1,8	≤ 3,4	≤ 5,3	≤ 7,6	≤ 9,9
$N_{Rum,fi,120}$	For Fire resistance duration = 120 minutes	[kN]	≤ 0,3	≤ 0,5	≤ 1,4	≤ 2,7	≤ 4,2	≤ 6,0	≤ 7,9

Declared performances acc. to ETA-08/0383 (ETAG001 p.1-5)
Design method TR029 or CEN/TS 1992-4

ESSENTIAL CHARACTERISTICS				**PERFORMANCE**								
Installation parameters			**REBAR [d]**	**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
d_0	Nominal diameter of drill bit		[mm]	12	14	16	18	20	24	32	35	40
h_{ef}	Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100	112	128
		$h_{ef,std}$	[mm]	80	90	110	115	125	170	210	250	280
		$h_{ef,max}$	[mm]	160	200	240	280	320	400	480	540	640
h_{min}	Minimum thickness of the concrete member		[mm]	$h_{ef} + 30 \geq 100$		$h_{ef} + 2d_0$						
s_{min}	Minimum spacing		[mm]	40	50	60	70	80	100	125	140	160
c_{min}	Minimum edge distance		[mm]	40	50	60	70	80	100	125	140	160
TENSION Steel failure												
$N_{Rk,s}$	Tension Steel characteristic failure		[kN]	$A_s \times f_{uk}$ [3]								
$\gamma_{m,sN}$ [1]	Partial safety factor		[-]	*see TR029 sect. 3.2.2.2 Eq.3.3a* [3] *see CEN/TS 1992-4-1 sect. 4.4.3.1.1 Eq.4* [3]								
Combined pull-out and concrete cone failure:			**"dry and wet"**	Ø8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
$\tau_{Rk,cr}$	Characteristic bond resistance in **cracked concrete C20/25**	40°/24°C	[MPa]			**5,5**	**5,5**	**5,5**	**5,5**	**5,5**	**6,5**	**6,5**
		80°/50°C	[MPa]			**4**	**4**	**4**	**4**	**4**	**4,5**	**4,5**
		120°/72°C	[MPa]			**3**	**3**	**3**	**3**	**3**	**3,5**	**3,5**
$\tau_{Rk,ucr}$	Characteristic bond resistance in **un-cracked concrete C20/25**	40°/24°C	[MPa]	**10**	**12**	**12**	**12**	**12**	**12**	**11**	**10**	**8,5**
		80°/50°C	[MPa]	**7,5**	**9**	**9**	**9**	**9**	**9**	**8**	**7**	**6**
		120°/72°C	[MPa]	**5,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6**	**5**	**4,5**
γ_2	Partial safety factor		[-]	1,0	1,2							
$\gamma_{m,c}$ [1]	Partial safety factor		[-]	1,5	1,8							
Combined pull-out and concrete cone failure:			**"flooded hole"**									
$\tau_{Rk,cr}$	Characteristic bond resistance in **cracked concrete C20/25**	40°/24°C	[MPa]			5,5	5,5	5,5	not admissible			
		80°/50°C	[MPa]			4	4	4				
		120°/72°C	[MPa]			3	3	3				
$\tau_{Rk,ucr}$	Characteristic bond resistance in **un-cracked concrete C20/25**	40°/24°C	[MPa]	7,5	8,5	8,5	8,5	8,5				
		80°/50°C	[MPa]	5,5	6,5	6,5	6,5	6,5				
		120°/72°C	[MPa]	4	5	5	5	5				
γ_2	Partial safety factor		[-]	1,4								
$\gamma_{m,c}$ [1]	Partial safety factor		[-]	2,1								
$k_{8,cr}$	Factor acc. to CEN/TS 1992-4-5 sec.6.2.2.3 cracked		[-]	7,2								
$k_{8,ucr}$	Factor acc. to CEN/TS 1992-4-5 sec.6.2.2.3 un-cracked		[-]	10,1								
Concrete cone failure												
K_{cr}	Factor acc. to CEN/TS 1992-4-5 sec.6.2.3.1 cracked		[-]	7,2								
K_{ucr}	Factor acc. to CEN/TS 1992-4-5 sec.6.2.3.1 un-cracked		[-]	10,1								
$c_{cr,N}$	Critical edge distance *(single anchor see TR029)*		[mm]	$0{,}5 \times S_{cr,N}$								
$s_{cr,N}$	Critical spacing *(single anchor see TR029)*		[mm]	$20 \times d \times (\tau_{Rk,ucr24°C} / 7{,}5)^{0,5} \leq 3 \times h_{ef}$								
Splitting failure												
$c_{cr,sp}$	Critical edge distance (splitting)		[mm]	$1{,}0 \times h_{ef} \leq 2 \times h_{ef} (2{,}5 - h / h_{ef}) \leq 2{,}4 \times h_{ef}$								
$s_{cr,sp}$	Critical spacing (splitting)		[mm]	$2 \times C_{cr,sp}$								
$\gamma_{m,sp}$ [1]	Partial safety factor		[-]	see $\gamma_{m,c}$								
Displacement under Tension Load				Ø8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
$\delta_{N0,cr}$	Short term displacement **cracked concrete**	40°/24°C	[mm/MPa]			0,070						
		80°/50°C				0,170						
		120°/72°C				0,170						
$\delta_{N\infty,cr}$	Long term displacement **cracked concrete**	40°/24°C	[mm/MPa]			0,105						
		80°/50°C				0,245						
		120°/72°C				0,245						
$\delta_{N0,ucr}$	Short term displacement **un-cracked concrete**	40°/24°C	[mm/MPa]	0,021	0,023	0,026	0,028	0,031	0,036	0,043	0,044	0,052
		80°/50°C		0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
		120°/72°C		0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
$\delta_{N\infty,ucr}$	Long term displacement **un-cracked concrete**	40°/24°C	[mm/MPa]	0,030	0,033	0,037	0,041	0,045	0,052	0,061	0,071	0,075
		80°/50°C		0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
		120°/72°C		0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181

[1] In absence of other national regulations.

SHEAR Steel failure			**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
$V_{Rk,s}$	Shear Steel characteristic failure	[kN]	$0,5 \times A_s \times f_{uk}$ [3]								
$M^0_{Rk,s}$	Bending Moment characteristic failure	[Nm]	$1,2 \times W_{el} \times f_{uk}$ [3]								
$\gamma_{m,sV}$ [1]	Partial safety factor	[-]	*see TR029 sect. 3.2.2.2 Eq.3.3b+c* [3] *see CEN/TS 1992-4-1 sect. 4.4.3.1.1 Eq.5+6* [3]								
K_2	Ductility factor acc. to CEN/TS 1992-4-5 sec.6.3.2.1	[-]	0,8								
Concrete Pryout failure											
k	Factor in equation 5.7 of TR029	[-]	2								
K_3	Factor in equation 27 of CEN/TS 1992-4-5 sec.6.3.3	[-]	2								
$\gamma_{m,cp}$ [1]	Partial safety factor	[-]	1,5								
Concrete Edge failure			*see TR029 Section 5.2.3.4*								
$\gamma_{m,c}$ [1]	Partial safety factor	[-]	1,5								
Concrete Edge failure			*see CEN/TS 1992-4-5 Section 6.3.4*								
l_f	Effective length of anchor	[-]	$l_f \le \min(h_{ef}; 8xd_{nom})$								
d_{nom}	Outside diameter of anchor	[mm]	8	10	12	14	16	20	25	28	32
$\gamma_{m,c}$ [1]	Partial safety factor	[-]	1,5								
Displacement under Shear Load			Ø8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
$\delta_{V0,cr}$	Short term displacement **cracked concrete**	[mm/kN]			0,11	0,11	0,10	0,09	0,08	0,08	0,07
$\delta_{V\infty,cr}$	Long term displacement **cracked concrete**	[mm/kN]			0,17	0,16	0,15	0,14	0,12	0,11	0,10
$\delta_{V0,ucr}$	Short term displacement **un-cracked concrete**	[mm/kN]	0,06	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03
$\delta_{V\infty,ucr}$	Long term displacement **un-cracked concrete**	[mm/kN]	0,09	0,08	0,08	0,06	0,06	0,06	0,05	0,04	0,04

[1] In absence of other national regulations; [3] f_{uk} and f_{yk} see relevant Technical Specification for the reinforcing bar

Declared performances acc. to <u>ETA-12/0543</u> (ETAG029)
Design method ETAG029 Annex C

ESSENTIAL CHARACTERISTICS						**PERFORMANCE**					
Installation parameters					**<u>SOLID MASONRY</u>**	**M8**		**M10**		**M12** [5]	
d_0	Nominal diameter of drill bit				[mm]	10		12		12	
h_{ef}	Effective embedment depth				[mm]	80		90		90	
T_{inst}	Nominal torque moment				[Nm]	2					
Characteristic values for tension and shear loads						M8		M10		M12 [5]	
Brick no.[4]	density [Kg/dm³]	compress. [N/mm²]	character. load	Temperature Range	Use	dry	wet	dry	wet	dry	wet
1	ρ ≥ 1,8	$f_b \ge 8$	N_{Rk} (tension)	40°/24°C	[kN]	4	3	5	4	5	4
				80°/50°C	[kN]	3	2,5	4,5	3,5	4,5	3,5
			V_{Rk} (shear)	40°/24°C	[kN]	4	3	5	4	5	4
				80°/50°C	[kN]	3	2,5	4,5	3,5	4,5	3,5
2	ρ ≥ 1,8	$f_b \ge 12$	N_{Rk} (tension)	40°/24°C	[kN]	4	3,5	5	5	5	5
				80°/50°C	[kN]	3	3	4,5	4	4,5	4
			V_{Rk} (shear)	40°/24°C	[kN]	4	3,5	5	5	5	5
				80°/50°C	[kN]	3	3	4,5	4	4,5	4
γ_M [1]	Partial safety factor				[-]	2,5					
Installation parameters					**<u>HOLLOW MASONRY "with sleeve"</u>**	M8		M10		M12 [5]	
d_0	Nominal diameter of drill bit				[mm]	14		16		16	
h_{ef}	Effective embedment depth				[mm]	80		90		90	
T_{inst}	Nominal torque moment				[Nm]	2					
Characteristic values for tension and shear loads						M8		M10		M12 [5]	
Brick no.[4]	density [Kg/dm³]	compress. [N/mm²]	character. load	Temperature Range	Use	dry	wet	dry	wet	dry	wet
4	ρ ≥ 1,2	$f_b \ge 12$	N_{Rk} (tension)	40°/24°C	[kN]	2,5	2	3	2	3	2
				80°/50°C	[kN]	2,5	2	3	2	3	2
			V_{Rk} (shear)	40°/24°C	[kN]	2	1,5	2,5	2	2,5	2
				80°/50°C	[kN]	2	1,5	2,5	2	2,5	2
5	ρ ≥ 0,8	$f_b \ge 12$	N_{Rk} (tension)	40°/24°C	[kN]	2	2	2	2	2	2
				80°/50°C	[kN]	2	2	2	2	2	2
			V_{Rk} (shear)	40°/24°C	[kN]	2,5	2,5	2,5	2,5	2,5	2,5
				80°/50°C	[kN]	2,5	2,5	2,5	2,5	2,5	2,5
γ_M [1]	Partial safety factor				[-]	2,5					

[1] In absence of other national regulations; [4] see ETA-12/0543 for description of Bricks; [5] M10 at bonding area

Declared performances acc. to ETA-12/0553 (ETAG001 p.1-5 and TR023) **Design method EN1992-1-1***											
ESSENTIAL CHARACTERISTICS				**PERFORMANCE**							
Installation parameters	**POST-INSTALLED REBAR CONNECTION**			**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø22**	**Ø24**	**Ø25**
d_0	Nominal diameter of drill bit		[mm]	12	14	16	18	20	25	28	32	32
l	*Anchorage length (Rebar B500)	$l_{b,MIN}$	[mm]	113	142	170	198	227	284	312	340	354
		l_{MAX}	[mm]	1000	1000	1200	1400	1600	2000	2000	2000	2000
$l_{0\,MIN}$	*Overlap joint length (Rebar B500)		[mm]	200	200	200	210	240	300	330	360	375
s_{min}	Minimum spacing		[mm]	≥ 5Ø ≥ 50 mm								
c	Minimum concrete cover min c	hammer drilling	[mm]	30 mm + 0,06 l_v ≥ 2Ø								[6]
		compr. air drilling	[mm]	50 mm + 0,08 l_v								[7]
Design values of ultimate bond resistance				for all drilling methods for good conditions [8]								
f_{bd}	***Bond design value resistance**	C16/20	[MPa]	**2,0**								
		C20/25	[MPa]	**2,3**								
		C25/30	[MPa]	**2,7**								
		C30/37	[MPa]	**3,0**								
		C40/50	[MPa]	**3,7**								
		C45/55	[MPa]	**4,0**								
		C50/60	[MPa]	**4,3**								

[6] 40 mm + 0,06 l_v ≥ 2Ø; [7] 60 mm + 0,08 l_v; [8] for all other bond conditions multiply the values for f_{bd} by 0.7.

We inform you that Friulsider is classified in the EC 1907/2006 Reach Directive as a Downstream-user of substances.
The product supplied does not contain substances classified as SVHC according to the Candidate List in a concentration equal or greater than 0.1% (weight / weight). You can require the safety data sheet of the product at environmental@friulsider.com or download it at www.friulsider.com/sds.

The above performances apply for the following article numbers:

Type of Cartridge	Format	Cod.
Coaxial	150-280-300-330-380-410-420 ml	**94103000**00 /01-02-03-04-05-06-07-08 (420ml)
Side-by-side	235-345-825 ml	**94201000**00/01-02-03-04-05-06-07-08 (345ml)
Silicon gun	165-300 ml	**94301000**00/01-02-03-04-05-06-07-08 (300ml)

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 **Friulsider SpA**.
Signed for and behalf of the manufacturer by:

Name and functions	Place and date of issue	Signature
Eng.Vittorio Pilla General Director	San Giovanni al Natisone, 05-02-2014