



# Declaration of Performance

## FRP

Bonded anchor Vinylester resin in capsules

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Intended use or uses of the construction product according to ETAG 001 p.1-5	
Generic type	Bonded anchor in capsules for anchorage of threaded rod
Base material	Un-cracked concrete C20/25 to C50/60 acc. to EN 206-1
Use category	Installation in dry or wet concrete or in flooded holes (not sea water)
Material of threaded rod and Durability	> Galvanised steel cl. 5.8 to 12.9 acc. to EN ISO 898 for dry internal conditions > Stainless steel AISI316 cl. A4-70 and A4-80 acc. to EN ISO 3506 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 ISO 3506 for all conditions
Loading	Static, quasi-static
Temperature Range	-40°C to +80°C max long term temperature +50°C and max short term temperature +80°C
Fire Reaction	A1 according to EN 13501-1
ETA-11/0155 issued by	ITB approval body nr.1488
On the basis of	ETAG 001 p.1-5 and TR029
Certificate of Conformity 1488-CPD-0241/W issued Under System (AVCP)	ITB notified body nr.1488 1

Declared performances acc. to ETA-11/0155 (ETAG 001 p.1-5)										
Design method ETAG001 Annex C and TR029										
ESSENTIAL CHARACTERISTICS				PERFORMANCE						
Installation parameters		Threaded rods	M8	M10	M12	M16	M20	M24	M30	
$d_0$	Nominal diameter of drill bit	[mm]	10	12	15	18	24	28	35	
$h_{ef}$	Effective embedment depth	[mm]	80	90	110	125	170	210	270	
$h_{min}$	Minimum thickness of the concrete member	[mm]	120	130	140	180	230	270	340	
$T_{inst}$	Torque moment (max)	[Nm]	10	20	40	80	120	180	300	
$s_{min}$	Minimum spacing	[mm]	40	45	55	63	85	105	135	
$c_{min}$	Minimum edge distance	[mm]	40	45	55	63	85	105	135	
<b>Tension Steel failure mode</b>										
$N_{Rk,s}$	Tension Steel characteristic failure	cl. 5.8 [kN]	18	29	42	78	122	179	280	
		cl. 8.8 [kN]	29	46	67	126	196	282	449	
		cl. 10.9 [kN]	37	58	84	157	245	353	561	
		cl. 12.9 [kN]	44	70	101	188	294	424	673	
		A4-70 / HCR-70 [kN]	26	41	59	110	171	247	393	
	A4-80 [kN]	29	46	67	126	196	282	449		
$\gamma_{m,sN}^{1)}$	Partial safety factor	cl. 5.8 - 8.8 [-]	1,5							
		cl. 10.9 - 12.9 [-]	1,4							
		A4-70 / HCR-70 [-]	1,87							
		A4-80 [-]	1,6							
<b>Combined pull-out and concrete cone failure mode</b>										
$N_{Rk,ucr}$	Characteristic bond resistance in un-cracked concrete C20/25	[kN]	25	30	50	60	95	140	200	
$\gamma_2$	Partial safety factor dry and wet concrete	[-]	1,4		1,2					
$\gamma_{m,c}^{1)}$	Partial safety factor for dry and wet concrete	[-]	2,1		1,8					
$\gamma_2$	Partial safety factor for flooded holes	[-]	1,4							
$\gamma_{m,c}^{1)}$	Partial safety factor for flooded holes	[-]	2,1							
<b>Splitting failure mode <sup>2)</sup></b>										
$c_{cr,sp}$	Critical edge distance	[mm]	200	225	220	250	255	315	405	
$s_{cr,sp}$	Critical spacing for	[mm]	400	450	440	500	510	630	810	
$c_{cr,sp}$	Critical edge distance (= $S_{cr,N}$ )	[mm]	120	135	165	190	255	315	340	
$s_{cr,sp}$	Critical spacing (= $C_{cr,N}$ )	[mm]	240	270	330	375	510	630	675	
$\gamma_{m,sp}$	Partial safety factor	[-]	See $\gamma_{m,c}$							
<b>Displacement under Tension Load in Concrete</b>			M8	M10	M12	M16	M20	M24	M30	
$N_{cr}$	Service tension load in un-cracked concrete C20/25	[kN]	8,5	10,2	19,8	23,8	37,7	55,5	79,4	
$\delta_{N0}$	Short term displacement	[mm]	0,3	0,3	0,35	0,35	0,4	0,45	0,5	
$\delta_{N\infty}$	Long term displacement	[mm]	0,65							

Shear Steel failure mode		M8	M10	M12	M16	M20	M24	M30		
$V_{Rk,s}$	Shear Steel characteristic failure	cl. 5.8 [kN]	9	14	21	39	61	88	140	
		cl. 8.8 [kN]	15	23	34	63	98	141	224	
		cl. 10.9 [kN]	18	29	42	78	122	176	280	
		cl. 12.9 [kN]	22	35	51	94	147	212	337	
		A4-70 / HCR-70 [kN]	13	20	29	55	86	124	196	
		A4-80 [kN]	15	23	34	63	98	141	224	
$M_{Rk,s}^0$	Bending Moment characteristic failure	cl. 5.8 [Nm]	19	37	65	166	324	561	1124	
		cl. 8.8 [Nm]	30	60	105	266	519	898	1799	
		cl. 10.9 [Nm]	37	75	131	333	649	1123	2249	
		cl. 12.9 [Nm]	45	90	157	400	779	1347	2699	
		A4-70 / HCR-70 [Nm]	26	52	92	233	454	786	1574	
		A4-80 [Nm]	30	60	105	266	519	898	1799	
$\gamma_{m,sV}^{1)}$	Partial safety factor	cl. 5.8 - 8.8 [-]	1,25							
		cl. 10.9 - 12.9 [-]	1,5							
		A4-70 / HCR-70 [-]	1,56							
		A4-80 [-]	1,33							
<b>Concrete Pryout failure mode</b>										
<b>k</b>	Factor in equation 5.7 of TR029	[-]						2		
$\gamma_{m,cp}^{1)}$	Partial safety factor	[-]						1,5		
<b>Concrete Edge failure mode</b>		See section 5.2.3.4 of TR029 for the design of Bonded Anchors								
$\gamma_{m,c}^{1)}$	Partial safety factor	[-]						1,5		
<b>Displacement under Shear Load</b>		M8	M10	M12	M16	M20	M24	M30		
<b>V</b>	Service shear load in concrete	cl. 5.8	[kN]	<b>5</b>	<b>8</b>	<b>12</b>	<b>22</b>	<b>35</b>	<b>50</b>	<b>80</b>
$\delta_{V0}$	Short term displacement	[mm]						2,5		
$\delta_{V\infty}$	Long term displacement	[mm]						3,7		

<sup>1)</sup> In absence of other national regulations; <sup>2)</sup>  $C_{cr,sp}$  from linear interpolation for  $h_{min} < h < 2x_{hef}$

We inform you that Friulside 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@friulside.com](mailto:environmental@friulside.com) or download it at [www.friulside.com/sds](http://www.friulside.com/sds).

The above performances apply for the following article numbers:

d <sup>3)</sup>	L <sub>c</sub> <sup>4)</sup> [mm]	Marking	Cod. capsules
M8	85	<i>friulside FRP 8</i>	93200008000
M10	85	<i>friulside FRP 10</i>	93200010000
M12	95	<i>friulside FRP 12</i>	93200012000
M16	95	<i>friulside FRP 16</i>	93200016000
M20	180	<i>friulside FRP 20</i>	93200020000
M24	215	<i>friulside FRP 24</i>	93200024000
M30	270	<i>friulside FRP 30</i>	93200030000

d <sup>3)</sup>	L <sup>5)</sup> [mm]	t <sub>fix</sub> <sup>6)</sup> [mm]	Cod. threaded rod cl. 5.8 galvanised	[mm]	t <sub>fix</sub> <sup>6)</sup> [mm]	Cod. threaded rod cl. A4-70
M8	110	15	21911b08110	110	15	21911x08110
M10	130	25	21911b10130	130	25	21911x10130
M12	160	30	21911b12160	160	30	21911x12160
M16	190	40	21911b16190	190	40	21911x16190
M20	260	60	21911b20260	260	60	21911x20260
M24	290	50	21911b24290	300	60	21911x24300
M30	380	70	21911b30380	380	70	21911x30380

<sup>3)</sup> Diameter of threaded bar; <sup>4)</sup> Length of capsules; <sup>5)</sup> Length of threaded bar BFK; <sup>6)</sup> Thickness fixture max.

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 **Friulside 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, 25-10-2013	