Declaration of Performance

FM-753 Crack A4

Throughbolt anchor made of stainless steel A4

1. Identification of the product: **FM-753 Crack A4**

2. Identification code (art. 11.4), for the batch or serial number see packaging:

d [1]	L [2] [mm]	t_{fix} [3] [mm]	Marking	ID	Cod.
M8	68	4	FM-C 8/4 A4	A	75350008068
	75	10	FM-C 8/10 A4	B	75350008075
	90	25	FM-C 8/25 A4	C	75350008090
	115	50	FM-C 8/50 A4	D	75350008115
	135	70	FM-C 8/70 A4	E	75350008135
	165	100	FM-C 8/100 A4	G	75350008165
M10	90	10	FM-C 10/10 A4	A	75350010090
	105	25	FM-C 10/25 A4	B	75350010105
	115	35	FM-C 10/35 A4	C	75350010115
	135	55	FM-C 10/55 A4	D	75350010135
	155	75	FM-C 10/75 A4	E	75350010155
	185	105	FM-C 10/105 A4	F	75350010185
M12	110	10	FM-C 12/10 A4	A	75350012110
	120	20	FM-C 12/20 A4	B	75350012120
	145	45	FM-C 12/30 A4	P	75350012130
	170	70	FM-C 12/45 A4	C	75350012145
	200	100	FM-C 12/70 A4	D	75350012170
M16	130	10	FM-C 12/100 A4	E	75350012120
	150	30	FM-C 16/10 A4	A	75350016130
	185	60	FM-C 16/30 A4	B	75350016150
	220	100	FM-C 16/60 A4	C	75350016185

[1] Nominal diameter of thread; [2] Length of anchor; [3] Thickness fixture max.

3. Intended use:

Generic type	Torque controlled expansion anchor throughbolt type
Base material	Cracked and un-cracked concrete C20/25 to C50/60 acc. to EN 206-1
Material	Stainless steel AISI316 (cl. A4 70 for bolt acc.to EN ISO 3506-1)
Durability	Internal dry conditions and 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 and Seismic
Fire Resistance	F120
Fire Reaction	A1 according to EN 13501-1

4. Manufacturer (art. 11.5): **Friulsider** SpA via trieste,1 - 33048 San Giovanni al Natisone (UD) - Italy

5. Authorised representative (art. 12.2): Not Relevant

6. System of Assessment AVCP (annex V): **System 1**

7/8. Harmonised Specification & Notified Body:

	Name of Body	System of Assessment	Reference	EAD / hEN Document
Technical Specification Document	ZAG [TAB]	1	**ETA-10/0293**	**ETAG001 p.1-2-Annex E**
Constancy of Performance & FPC	ZAG nr.1404 [NB]	1	1404-CPR-2550	ETAG001 p.1

9. Declared Performance: **See Annexes**

10. The performance of the product identified in points 1 and 2 is in conformity with declared performance in point 9.
This declaration of performance is issued under the sole responsibility of Friulsider SpA.
Signed for and behalf of the manufacturer by:

Name and functions	Signature	Place and date of issue
Fabrizio Fasan Sales Manager		San Giovanni al Natisone, 23-06-2017

ANNEX I°

Declared Performances acc. to ETA-10/0293 - ETAG001 p.1 and 2

Design Method acc.to ETAG001-Annex C or CEN/TS 1992-4

ESSENTIAL CHARACTERISTICS			PERFORMANCE			
Installation parameters			**M8**	**M10**	**M12**	**M16**
d_0	Nominal diameter of drill bit	[mm]	8	10	12	16
h_{nom}	Minimum installation depth	[mm]	54	67	81	97
h_{ef}	Effective anchorage depth	[mm]	48	60	72	86
h_{min}	Minimum thickness of the concrete member	[mm]	100	120	150	170
T_{inst}	Nominal torque moment	[Nm]	20	40	60	120
s_{min}	Minimum spacing	[mm]	50	55	60	70
for c ≥	Edge distance	[mm]	50	70	80	100
c_{min}	Minimum edge distance	[mm]	50	50	60	70
for s ≥	Anchor spacing	[mm]	50	110	120	130
TENSION Steel failure			M8	M10	M12	M16
$N_{Rk,s}$	Tension Steel characteristic failure	[kN]	21	34	49	88
$\gamma_{m,sN}$ [1)]	Partial safety factor for tension steel failure	[-]	1,5			
Pull-out failure			M8	M10	M12	M16
$N_{Rk,p,cr}$	Tension characteristic load in **cracked concrete** C20/25	[kN]	**5**	**9**	**12**	**25**
$N_{Rk,p,ucr}$	Tension characteristic load in **un-cracked concrete** C20/25	[kN]	**9**	**16**	**20**	**35**
γ_2	Partial safety factor	[-]	1,0			
γ_{mc} [1)]	Partial safety factor	[-]	1,5			
$\psi_{c\ C30/37}$	Increasing factor for concrete C30/37	[-]	1,22			
$\psi_{c\ C40/50}$	Increasing factor for concrete C40/50	[-]	1,41			
$\psi_{c\ C50/60}$	Increasing factor for concrete C50/60	[-]	1,55			
Concrete cone failure and Splitting failure			M8	M10	M12	M16
K_{cr}	Factor for cracked concrete ref. CEN/TS 1992-4-4 §. 6.2.1.4	[-]	7,2			
K_{ucr}	Factor for un-cracked concrete ref. CEN/TS 1992-4-4 §. 6.2.1.4	[-]	10,1			
$s_{cr,N}$	Critical spacing for concrete cone failure	[mm]	144	180	220	260
$c_{cr,N}$	Critical edge distance for concrete cone failure	[mm]	72	90	110	130
$s_{cr,sp}$	Critical spacing for splitting failure	[mm]	144	180	220	260
$c_{cr,sp}$	Critical edge distance for splitting failure	[mm]	72	90	110	130
$\gamma_{mc} = \gamma_{msp}$ [1)]	Partial safety factor	[-]	1,5			
Displacement on Tension Load			M8	M10	M12	M16
N_{cr}	Service tension load in **cracked concrete** C20/25	[kN]	**2,4**	**4,3**	**5,7**	**11,9**
$\delta_{N0,cr}$	Short term displacement under tension load	[mm]	0,7	0,6	0,7	0,7
$\delta_{N\infty,cr}$	Long term displacement under tension load	[mm]	1,4	1,5	0,9	1,4
N_{ucr}	Service tension load in **un-cracked concrete** C20/25	[kN]	**4,3**	**7,6**	**9,5**	**16,7**
$\delta_{N0,ucr}$	Short term displacement under tension load	[mm]	0,3	0,4	0,4	0,3
$\delta_{N\infty,ucr}$	Long term displacement under tension load	[mm]	1,4	1,5	0,9	1,4
SHEAR Steel failure			**M8**	**M10**	**M12**	**M16**
$V_{Rk,s}$	Shear Steel characteristic failure	[kN]	**11,9**	**18,8**	**27,4**	**51,0**
K_2	Ductility factor acc.to CEN/TS 1992-4-5 Section § 6.3.2.1	[-]	0,8			
$M^0_{Rk,s}$	Bending Moment characteristic failure	[Nm]	24	49	85	216
$\gamma_{m,sV}$ [1)]	Partial safety factor	[-]	1,3			
Shear Concrete Pry-out failure			M8	M10	M12	M16
k	Factor equation (5.6) of ETAG 001-Annex C, § 5.2.3.3	[-]	1,0	2,0		
k_3	Factor equation (16) of CEN/TS 1992-4-4, § 6.2.2.3	[-]	1,0	2,0		
γ_{mc} [1)]	Partial safety factor	[-]	1,5			
Shear Concrete Edge failure			M8	M10	M12	M16
l_f	Effective anchorage length	[mm]	48	60	72	86
d_{nom}	Nominal diameter of anchor	[mm]	8	10	12	16
γ_{mc} [1)]	Partial safety factor	[-]	1,5			
Displacement on Shear Load			M8	M10	M12	M16
V	Service shear load in concrete	[kN]	**6,5**	**10,4**	**15,1**	**28,0**
δ_{V0}	Short term displacement under shear load	[mm]	0,8	0,9	1,2	2,5
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	1,3	1,3	1,8	3,8

[1)] In absence of other national regulations.

ANNEX II°

SEISMIC RESISTANCE Declared Performances acc. to ETA-10/0293 - ETAG001 Annex E Design Method according to TR045						
ESSENTIAL CHARACTERISTICS			**PERFORMANCE**			
SEISMIC RESISTANCE Category C1			**M8**	**M10**	**M12**	**M16**
$N_{rk,p,seis\ C1}$	Tension charact. load in concrete C20/25 for Seismic Category **C1**	[kN]	**4,1**	**9**	**12**	**25**
$\gamma_{mpN,seis}$ [2]	Partial safety factor for seismic actions under tension load	[-]	1,5			
$V_{rk,s,seis\ C1}$	Shear Steel characteristic failure Seismic for Category **C1**	[kN]	**8**	**12,3**	**15,8**	**36,6**
$\gamma_{msV,seis}$ [2]	Partial safety factor for seismic actions under shear load	[-]	1,3			
SEISMIC RESISTANCE Category C2			M8	M10	M12	M16
$N_{rk,p,seis\ C2}$	Tension charact. load in concrete C20/25 for Seismic Category **C2**	[kN]	-	**2,4**	**8,8**	**21,9**
$\gamma_{mpN,seis}$ [2]	Partial safety factor for seismic actions under tension load	[-]	1,5			
$\delta_{N,seis(DSL)}$ [3] [4]	Displacement at DSL	[mm]	-	2,9	4,9	6,3
$\delta_{N,seis(USL)}$ [3] [4]	Displacement at USL	[mm]	-	15,8	15,7	21,0
$V_{rk,s,seis\ C2}$	Shear Steel characteristic failure for Seismic Category **C2**	[kN]	-	**12,3**	**15,8**	**36,6**
$\gamma_{msV,seis}$ [2]	Partial safety factor for seismic actions under shear load	[-]	1,3			
$\delta_{V,seis(DSL)}$ [3] [4]	Displacement at DSL	[mm]	-	2,4	5,2	6,0
$\delta_{V,seis(USL)}$ [3] [4]	Displacement at USL	[mm]	-	4,1	9,7	10,7

[2] The recommended partial safety factors under seismic action ($\gamma_{m,seis}$) are the same as for static loading.
[3] The listed displacement represent mean values
[4] A smaller displacement may be required in the design in the case of displacement sensitive fastenings or "rigid" supports.
The characteristic resistance associated with such smaller displacement may be determined by linear interpolation or proportional reduction.

FIRE RESISTANCE Declared Performances acc. to ETA-10/0293 Design Method according to TR020						
ESSENTIAL CHARACTERISTICS			**PERFORMANCE**			
Tension steel failure mode			**M8**	**M10**	**M12**	**M16**
$N_{Rk,s,fi,R30}$	Characteristic Tension Resistance = 30 min.	[kN]	0,5	1,1	1,8	3,3
$N_{Rk,s,fi,R60}$	Characteristic Tension Resistance = 60 min.	[kN]	0,4	0,9	1,5	2,7
$N_{Rk,s,fi,R90}$	Characteristic Tension Resistance = 90 min.	[kN]	0,3	0,7	1,2	2,2
$N_{Rk,s,fi,R120}$	Characteristic Tension Resistance = 120 min.	[kN]	0,3	0,6	1,0	1,8
$S_{cr,N,fi}$	Critical spacing under fire exposure	[mm]	192	240	288	384
$C_{cr,N,fi}$	Critical edge distance under fire exposure	[mm]	96	120	144	192
S_{min}	Minimum spacing	[mm]	50	50	60	70
c_{min}	Minimum edge distance	[mm]	$c_{min} = 2\ h_{ef}$; if fire attack from more than one side, the edge distance of the anchor has to be $\geq$ 300mm and $\geq 2\ h_{ef}$			
$\gamma_{M,fi}$ [5]	Partial safety factor under fire exposure	[-]	1,0			
Shear steel failure without lever arm						
$V_{Rk,s,fi,R30}$	Characteristic Shear Resistance = 30 min.	[kN]	0,7	1,5	2,5	4,7
$V_{Rk,s,fi,R60}$	Characteristic Shear Resistance = 60 min.	[kN]	0,6	1,2	2,1	3,9
$V_{Rk,s,fi,R90}$	Characteristic Shear Resistance = 90 min.	[kN]	0,4	0,9	1,7	3,1
$V_{Rk,s,fi,R120}$	Characteristic Shear Resistance = 120 min.	[kN]	0,4	0,8	1,4	2,5
Shear steel failure with lever arm						
$M^0_{Rk,s,fi,R30}$	Characteristic Bending Moment = 30 min.	[Nm]	0,7	1,9	3,9	10
$M^0_{Rk,s,fi,R60}$	Characteristic Bending Moment = 60 min.	[Nm]	0,6	1,5	3,3	8,3
$M^0_{Rk,s,fi,R90}$	Characteristic Bending Moment = 90 min.	[Nm]	0,4	1,2	2,6	6,7
$M^0_{Rk,s,fi,R120}$	Characteristic Bending Moment = 120 min.	[Nm]	0,4	1,0	2,1	5,3
Shear concrete pry-out failure						
k	Factor in equation (5.6) of ETAG Annex C § 5.2.3.3	[-]	1,0	2,0		
Shear concrete edge failure						
The characteristic resistance $V^0_{Rk,c,fi}$ in C20/25 to C50/60 concrete is determined by: $V^0_{Rk,c,fi} = 0,25 \times V^0_{Rk,c}$ ($\leq$ R90) and $V^0_{Rk,c,fi} = 0,20 \times V^0_{Rk,c}$ (R120) with $V^0_{Rk,c}$ initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature acc. ETAG 001-Annex C, 5.2.3.4.						

[5] In absence of other national regulations, under fire exposure is recommended the safety factor $\gamma_{M,fi} = 1,0$.