Declaration of Performance

DoP nr. fm753crack

Throughbolt anchor made of galvanised steel

FRIULSIDER YOUR FIXING FACTORY | SIMPSON Strong-Tie

1. Identification of the product: **FM753 Crack**

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

d [1]	L [2] [mm]	$t_{fix,1}$ [3] [mm]	$t_{fix,2}$ [4] [mm]	Marking	ID	Cod.
M8	68	4	18	FM-C 8/4	A	75350b08068
	75	10	24	FM-C 8/10	B	75350b08075
	90	25	39	FM-C 8/25	C	75350b08090
	115	50	64	FM-C 8/50	D	75350b08115
	135	70	84	FM-C 8/70	E	75350b08135
	165	100	114	FM-C 8/100	G	75350b08165
M10	90	10	30	FM-C 10/10	A	75350b10090
	105	25	45	FM-C 10/25	B	75350b10105
	115	35	55	FM-C 10/35	C	75350b10115
	135	55	75	FM-C 10/55	D	75350b10135
	155	75	95	FM-C 10/75	E	75350b10155
	185	105	125	FM-C 10/105	F	75350b10185
M12	110	10	30	FM-C 12/10	A	75350b12110
	120	20	40	FM-C 12/20	B	75350b12120
	145	45	65	FM-C 12/45	C	75350b12145
	170	70	90	FM-C 12/70	D	75350b12170
	200	100	120	FM-C 12/100	E	75350b12120
M16	130	10	30	FM-C 16/10	A	75350b16130
	150	30	50	FM-C 16/30	B	75350b16150
	185	60	80	FM-C 16/60	C	75350b16185
	220	100	120	FM-C 16/100	D	75350b16220

[1] Nominal diameter of thread; [2] Length of anchor; [3] Thickness fixture max for standard embedment; [4] Thickness fixture max for low embedment.

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 206:2013+A1:2016
Material	Steel galvanised ≥8µm acc. to EN ISO 4042 (bolt M8-M10 acc. to EN 10269 and M12-M16 acc. to EN 10263-4)
Durability	Internal dry conditions
Loading	Static, quasi-static and Seismic C1-C2
Fire Resistance	R120
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 / EN Document
Technical Specification Document	CSTB [TAB]	1	**ETA-09/0056**	**EAD 330232-01-0601**
Constancy of Performance & FPC	ZAG nr.1404 [NB]	1	1404-CPR-3583	EAD 330232-01-0601

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:

Function	Name	Signature	Place and date of issue
Technical Manager	Raffaele Palmieri	Raffaele Palmieri	San Giovanni al Natisone, 30-10-2023

ANNEX I°

Declared Performances acc. to ETA-09/0056 - EAD 330232-01-0601

Design Method acc. to EN 1992-4

ESSENTIAL CHARACTERISTICS			PERFORMANCE							
Installation parameters			**M8**		**M10**		**M12**		**M16**	
h_{ef}	Effective anchorage depth	[mm]	**34**	**48**	**40**	**60**	**52**	**72**	**66**	**86**
d_0	Nominal diameter of drill bit	[mm]	8		10		12		16	
h_{nom}	Minimum installation depth	[mm]	40	54	47	67	61	81	77	97
h_{min}	Minimum thickness of the concrete member	[mm]	80	100	100	120	120	150	150	170
T_{inst}	Nominal torque moment	[Nm]	20		40		60		120	
s_{min}	Minimum spacing	[mm]	102	50	180	60	200	70	120	80
for c ≥	Edge distance	[mm]	51	65	100	80	100	90	120	120
c_{min}	Minimum edge distance	[mm]	51	50	100	60	100	70	120	85
for s ≥	Anchor spacing	[mm]	102	75	180	120	200	150	120	170
TENSION Steel failure			M8		M10		M12		M16	
$N_{Rk,s}$	Tension Steel characteristic failure	[kN]	23,7		38,7		54,7		98,4	
γ_{Ms} [1)]	Partial safety factor for tension steel failure	[-]	1,5							
Pull-out failure			M8		M10		M12		M16	
h_{ef}	Effective anchorage depth	[mm]	34	48	40	60	52	72	66	86
$N_{Rk,p,cr}$	Tension characteristic load in **cracked concrete** C20/25	[kN]	**1,5**	**6**	**4,5**	**12**	**6,5**	**16**	**19**	**20**
$N_{Rk,p,ucr}$	Tension characteristic load in **un-cracked concrete** C20/25	[kN]	**7,5**	**9**	**10**	**16**	**20**	**20**	**30**	**35**
γ_{inst}	Installation safety factor	[-]	1,0							
$\psi_{c\ C30/37}$	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	
$K_{cr,N}$	Factor for cracked concrete ref. EN 1992-4 § 7.2.1.4	[-]	7,7							
$K_{ucr,N}$	Factor for un-cracked concrete ref. EN 1992-4 § 7.2.1.4	[-]	11,0							
$s_{cr,N}$	Critical spacing for concrete cone failure	[mm]	102	144	120	180	156	216	198	258
$c_{cr,N}$	Critical edge distance for concrete cone failure	[mm]	51	72	60	90	78	108	99	129
$s_{cr,sp}$	Critical spacing for splitting failure	[mm]	204	290	240	360	354	430	396	520
$c_{cr,sp}$	Critical edge distance for splitting failure	[mm]	102	145	120	180	177	215	198	260
γ_{inst}	Installation safety factor	[-]	1,0							
Displacement on Tension Load (C20/25)			M8		M10		M12		M16	
N_{cr}	Service tension load in **cracked concrete** C20/25	[kN]	**0,71**	**2,86**	**2,14**	**5,71**	**3,10**	**7,62**	**9,05**	**9,52**
$\delta_{N0,cr}$	Short term displacement under tension load	[mm]	0,50	1,40	0.41	1,20	1,05	0,90	2,05	0,60
$\delta_{N\infty,cr}$	Long term displacement under tension load	[mm]	1,45	1,40	1,63	1,20	1,63	1,30	2,05	0,60
N_{ucr}	Service tension load in **un-cracked concrete** C20/25	[kN]	**3,57**	**4,29**	**4,76**	**7,62**	**9,52**	**9,52**	**14,29**	**16,67**
$\delta_{N0,ucr}$	Short term displacement under tension load	[mm]	0,03	0,10	0,12	0,10	1,71	0,10	0,06	0,10
$\delta_{N\infty,ucr}$	Long term displacement under tension load	[mm]	1,45	0,50	1,63	0,50	1,66	0,50	2,05	0,50
SHEAR Steel failure			**M8**		**M10**		**M12**		**M16**	
h_{ef}	Effective anchorage depth	[mm]	34	48	40	60	52	72	66	86
$V_{Rk,s}$	Shear Steel characteristic failure	[kN]	**12,9**		**24,2**		**33,8**		**66,4**	
k_7	Ductility factor acc.to CEN/TS 1992-4-5 Section § 6.3.2.1	[-]	1,0							
$M^0_{Rk,s}$	Bending Moment characteristic failure	[Nm]	33,4		66,9		117,7		299,1	
γ_{Ms} [1)]	Partial safety factor	[-]	1,5							
Shear Concrete Pry-out failure			M8		M10		M12		M16	
k_8	Factor acc. to EN 1992-4 § 7.2.2.4	[-]	1,0		1,0	2,0	1,0	2,0	2,0	
γ_{inst}	Installation safety factor	[-]	1,0							
Shear Concrete Edge failure			M8		M10		M12		M16	
l_f	Effective anchorage length	[mm]	34	48	40	60	52	72	66	86
d_{nom}	Nominal diameter of anchor	[mm]	8		10		12		16	
γ_{inst}	Installation safety factor	[-]	1,0							
Displacement on Shear Load			M8		M10		M12		M16	
V	Service shear load in concrete	[kN]	**6,14**		**11,52**		**16,10**		**31,62**	
δ_{V0}	Short term displacement under shear load	[mm]	2,50		1,77		1,05		2,19	
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	3,75		2,66		1,58		3,28	

[1)] In absence of other national regulations.

[2)] Additional displacement due to anular gap between fastener and is to be taken into account.

ANNEX II°

SEISMIC RESISTANCE Declared Performances acc. to ETA-09/0056 - EAD 330232-01-0601 Design Method according to EN 1992-4						
ESSENTIAL CHARACTERISTICS			**PERFORMANCE**			
SEISMIC RESISTANCE Category C1			**M8**	**M10**	**M12**	**M16**
h_{ef}	Effective anchorage depth	[mm]	48	60	72	86
$N_{Rk,p,C1}$	Tension charact. load in concrete C20/25 for Seismic Category **C1**	[kN]	**6**	**12**	**16**	**20**
γ_{inst}	Installation safety factor	[-]	1,0			
$V_{Rk,s,C1}$	Shear Steel characteristic failure Seismic for Category **C1**	[kN]	**7,7**	**17,0**	**30,4**	**57,6**
$\gamma_{Ms,C1}$ 3)	Partial safety factor for seismic actions	[-]	1,5			
SEISMIC RESISTANCE Category C2			M8	M10	M12	M16
$N_{Rk,p,C2}$	Tension charact. load in concrete C20/25 for Seismic Category **C2**	[kN]	-	**3,3**	**11,8**	**20**
γ_{inst}	Installation safety factor	[-]	1,0			
$\delta_{N,C2\ (DSL)}$	Displacement at DSL	[mm]	-	2,5	5,0	4,4
$\delta_{N,C2\ (USL)}$	Displacement at USL	[mm]	-	10,7	20,4	17,8
$V_{Rk,s,C2}$	Shear Steel characteristic failure Seismic for Category **C2**	[kN]	-	**11,9**	**19,3**	**31,2**
$\gamma_{Ms,C2}$ 3)	Partial safety factor for seismic actions under shear load	[-]	1,5			
$\delta_{V,C2\ (DSL)}$	Displacement at DSL	[mm]	-	5,0	7,0	7,0
$\delta_{V,C2\ (USL)}$	Displacement at USL	[mm]	-	7,1	9,1	6,6

3) In absence of other national regulations

ANNEX III°

FIRE RESISTANCE Declared Performances acc. to ETA-09/0056

Design Method according to EN 1992-4

ESSENTIAL CHARACTERISTICS			PERFORMANCE							
FIRE RESISTANCE [4]			**M8**		**M10**		**M12**		**M16**	
h_{ef}	Effective anchorage depth	[mm]	34	48	40	60	52	72	66	86
TENSION Steel failure										
$N_{Rk,s,fi,R30}$	Characteristic Tensile Resistance = 30 min.	[kN]	0,26	2,00	0,65	2,30	1,22	4,29	2,19	7,99
$N_{Rk,s,fi,R60}$	Characteristic Tensile Resistance = 60 min.	[kN]	0,24	1,41	0,56	1,81	0,91	3,15	1,64	5,86
$N_{Rk,s,fi,R90}$	Characteristic Tensile Resistance = 90 min.	[kN]	0,18	0,82	0,43	1,31	0,79	2,00	1,42	3,73
$N_{Rk,s,fi,R120}$	Characteristic Tensile Resistance = 120 min.	[kN]	0,13	0,52	0,34	1,07	0,61	1,43	1,09	2,67
Pull-out failure										
$N_{Rk,p,fi,R30}$	Characteristic Tensile Resistance = 30 min.	[kN]	0,38	1,50	1,13	3,00	1,63	4,00	4,75	5,00
$N_{Rk,p,fi,R60}$	Characteristic Tensile Resistance = 60 min.	[kN]								
$N_{Rk,p,fi,R90}$	Characteristic Tensile Resistance = 90 min.	[kN]								
$N_{Rk,p,fi,R120}$	Characteristic Tensile Resistance = 120 min.	[kN]	0,30	1,20	0,90	2,40	1,30	3,20	3,80	4,00
Concrete cone failure and Splitting failure [5]										
$N^0_{Rk,c,fi,R30}$	Characteristic Tensile Resistance = 30 min.	[kN]	1,16	2,75	1,74	4,80	3,36	7,57	6,09	11,81
$N^0_{Rk,c,fi,R60}$	Characteristic Tensile Resistance = 60 min.	[kN]								
$N^0_{Rk,c,fi,R90}$	Characteristic Tensile Resistance = 90 min.	[kN]								
$N^0_{Rk,c,fi,R120}$	Characteristic Tensile Resistance = 120 min.	[kN]	0,93	2,20	1,39	3,84	2,69	6,06	4,87	9,45
$S_{cr,N,fi}$	Critical spacing under fire exposure	[mm]	136	192	160	240	208	288	264	344
$C_{cr,N,fi}$	Critical edge distance under fire exposure	[mm]	68	96	80	120	104	144	132	172
SHEAR Steel failure										
$V_{Rk,s,fi,R30}$	Characteristic Shear Resistance = 30 min.	[kN]	0,37	2,00	0,87	2,30	1,69	4,29	3,14	7,99
$V_{Rk,s,fi,R60}$	Characteristic Shear Resistance = 60 min.	[kN]	0,33	1,41	0,75	1,81	1,26	3,15	2,36	5,86
$V_{Rk,s,fi,R90}$	Characteristic Shear Resistance = 90 min.	[kN]	0,26	0,82	0,58	1,31	1,10	2,00	2,04	3,73
$V_{Rk,s,fi,R120}$	Characteristic Shear Resistance = 120 min.	[kN]	0,18	0,52	0,46	1,07	0,84	1,43	1,57	2,67
$M^0_{Rk,s,fi,R30}$	Characteristic Bending Moment = 30 min.	[Nm]	0,37	2,05	1,12	2,97	2,62	6,66	6,65	16,94
$M^0_{Rk,s,fi,R60}$	Characteristic Bending Moment = 60 min.	[Nm]	0,33	1,44	0,97	2,33	1,96	4,89	4,99	12,43
$M^0_{Rk,s,fi,R90}$	Characteristic Bending Moment = 90 min.	[Nm]	0,26	0,84	0,74	1,69	1,70	3,11	4,32	7,91
$M^0_{Rk,s,fi,R120}$	Characteristic Bending Moment = 120 min.	[Nm]	0,19	0,54	0,60	1,38	1,31	2,22	3,32	5,65
Shear Concrete Pry-out failure										
k_8	Pry-out factor	[-]	1,0		1,0	2,0	1,0	2,0	2,0	
$V_{Rk,cp,fi,R30}$	Characteristic Shear Resistance = 30 min.	[kN]	1,16	2,75	1,74	4,80	3,36	7,57	12,19	23,62
$V_{Rk,cp,fi,R60}$	Characteristic Shear Resistance = 60 min.	[kN]								
$V_{Rk,cp,fi,R90}$	Characteristic Shear Resistance = 90 min.	[kN]								
$V_{Rk,cp,fi,R120}$	Characteristic Shear Resistance = 120 min.	[kN]	0,93	2,20	1,39	3,84	2,69	6,06	9,75	18,89
Shear Concrete Edge failure										
l_f	Effective length of fastener	[mm]	34	48	40	60	52	72	66	86
d_{nom}	Nominal diameter of anchor	[mm]	8		10		12		16	

[4] EN 1992-4 covers design for fire exposure from one side. For fire attack from more than one side the edge distance must be increased to $c_{min} \geq 300mm$ and $s_{min} \geq 2 \cdot h_{ef}$.

[5] As a rule, splitting failure can be neglected when cracked concrete and reinforcement is assumed.

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