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European Technical Assessment

ETA-22/0792 of 29.5.2023

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General Part Technical Assessment Body issuing the ZAG **European Technical Assessment** Trade name of the construction product FM 753 evo Product family to which the construction **Torque controlled expansion** 33: anchor made of zinc coated steel product belongs for use in non-cracked concrete Manufacturer FRIULSIDER S.p.A. via Trieste 1 33048 San Giovanni al Natisone (UD) Italy www.friulsider.com **Manufacturing plant** FRIULSIDER S.p.A. via Trieste 1 33048 San Giovanni al Natisone (UD) Italy This European Technical Assessment 9 pages including 3 annexes, which form an contains integral part of the document This European Technical Assessment is EAD 330232-01-0601, issued in according to Regulation (EU) edition December 2019 No 305/2011, on the basis of

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Specific Parts

1 Technical description of the product

The FM-753 evo of sizes M6, M8, M10, M12 and M16 is an anchor made of galvanised steel, which is placed into a drilled hole and anchored by torque-controlled expansion.

The product description is given in Annex A (1/2) and A (2/2).

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The performances given in Chapter 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for this assessment

3.1 Mechanical resistance and stability (BWR 1)

The basic work requirements for mechanical resistance and stability are listed in Annexes C (1/2) and C (2/2).

3.2 Safety in case of fire (BWR 2)

No performance assessed.

3.8 General aspects relating to fitness for use

Durability and serviceability are only ensured if specifications of intended use according to Annex B (1/2), B(2/3) and B(3/3) are kept.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the decision 96/582/EC of the European Commission¹ the system of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) **1** apply.

5 Technical details necessary for the implementation of the AVCP system, as provided for on the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in chapter 3 of EAD 330232-01-0601.

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Signed by: Franc Capuder, M.Sc., Research Engineer *Head of Service of TAB*

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Part	Component	Material ¹⁾
1	Bolt	Carbon steel, turned and cold formed
2	Sleeve	Carbon steel streep, cold formed
3	Washer	Steel; DIN 125 (EN ISO 7089), DIN 440 (EN ISO 7094) DIN 9021 (EN ISO 7093)
4	Hexagonal nut	Steel DIN 934 (EN ISO 4032,. Property class 8 acc. EN 20898-2

¹⁾ zinc electroplated \ge 5 μ m according to EN ISO 4042; passivated



Table A2: Dimensions

Anchor type /									
size	L	М	d _c	d _N	I _s	S	d ₂	m	SW
	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
FM 753 evo/6	t _{fix} +55	M6	6,00	4,3	12,5	≥1,6	≥12	5,0	10
FM 753 evo/8	t _{fix} +63	M8	8,00	5,9	15,0	≥1,6	≥16	6,5	13
FM 753 evo/10	t _{fix} +73	M10	10,00	7,6	16,8	≥2,0	≥20	8,0	17 (16)
FM 753 evo/12	t _{fix} +99	M12	11,95	8,8	20,0	≥2,5	≥24	10,0	19 (18)
FM 753 evo/16	t _{fix} +121	M16	15,95	12,0	22,6	≥3,0	≥30	13,0	24

FM 753 e	vo
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Product description

Dimensions and materials

Annex A (2/2)

Specifications of intended use

Anchorages subjected to:

• Static and quasi static action.

Base materials:

- Non-cracked concrete.
- Reinforced and unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according to EN 206:2013+A2:2021.

Use conditions (Environmental conditions):

• The anchor may be used in concrete subject to dry internal conditions.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Anchorages under static and quasi-static actions are designed in accordance EN 1992-4:2018.
- Verifiable calculation notes and drawings are prepared taking into account of the load to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).

Installation:

- Anchor installation carried out by appropriately qualified personnel and under supervision of the person responsible for technical matters of the site.
- Use of the anchor only supplied by the manufacturer without exchanging the components of an anchor.
- Anchor installation in accordance with the manufacturer's specification and drawings and using the appropriate tools.
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the rang given and is not lower that of the concrete to which the characteristic loads apply for.
- Check of concrete being well compacted, e.g. without significant voids.
- Effective anchorage depth, edge distances and spacing not less than the specified values without minus tolerances.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Positioning of the drill holes without damaging the reinforcement.
- Application of specified torque moment using a calibrated torque wrench.
- In case of aborted hole, drilling of new hole at a minimum distance of twice the depth of the aborted hole, or smaller distance provided the aborted drill hole is filled with high strength mortar and no shear or oblique tension loads in the direction of aborted hole.

FM 753 evo	
Intended use	Annex B (1/3)
Specifications	

EM 752 ava		Anchor size						
			M6	M8	M10	M12	M16	
Max. total length	L	[mm]	100	163	233	369	321	
Diameter of drill bit	d_0	[mm]	6	8	10	12	16	
Cutting diameter at the upper tolerance limit	$d_{cut,max} \leq$	[mm]	6,45	8,45	10,45	12,50	16,50	
Effective anchorage depth	h _{ef}	[mm]	40	45	50	65	80	
Depth of drilled hole	$h_1 \leq$	[mm]	55	65	70	90	110	
Diameter of clearance hole	$d_{\rm f} \leq$	[mm]	7	9	12	14	18	
Maximum thickness of the fixture	t _{fix,max}	[mm]	45	100	160	270	200	
Installation torque	T _{inst}	[Nm]	8	15	30	50	100	
Width across flats	SW	[mm]	10	13	17(16)	19(18)	24	
Minimum thickness of concrete member	h _{min}	[mm]	100	100	100	130	160	
Minimum spacing	S _{min}	[mm]	30	40	50	70	90	
Minimum edge distance	C _{min}	[mm]	40	40	50	70	90	

Table B1: Installation data

FM 753 evo

Intended use

Annex B (2/3)

Installation data minimum spacing and edge distance



	ve eteriotice			Р	erformanc	e			
Essential cha	aracteristics		M6 M8 M10 M12			M16			
Installation p	arameters								
d ₀	Nominal diameter of drill bit	[mm]	6	8	10	12	16		
h _{ef}	Effective anchorage depth	[mm]	40	45	50	65	80		
h _{min}	Minimum thickness of concrete member	[mm]	100	100	100	130	160		
Tinst	Torque moment	[Nm]	8	15	30	50	100		
Smin	Minimum spacing	[mm]	30	40	50	70	90		
Cmin	Minimum edge distance	[mm]	40	40	50	70	90		
N _{Rk,s}	Characteristic tension steel failure	[kN]	10,9	20,5	32,3	45,6	79,2		
γMsN	Partial safety factor	[-]			1,4				
Pull-out failu	re mode								
N _{Rk,p}	Characteristic pull-out failure in non-cracked concrete	[kN]	6,0	12,0	17,4	25,8	35,2		
γinst		[-]	1,0						
ΥΜp	Partial safety factor	[-]	1,5						
Scr,N	Characteristic spacing	[mm]			3 x h _{ef}				
Ccr,N	Characteristic edge distance	[mm]			1,5 x h _{ef}				
Ψc C30/37		[-]	1,01	1,04	1,22	1,21	1,15		
wc C40/50	Increasing factor for NRk,p in	[-]	1.01	1.06	1.41	1.39	1.27		
wc C50/60	non-cracked concrete	[-]	1.02	1.09	1.58	1.55	1.38		
Concrete Co	ne failure mode		7-	1	,	1	,		
k _{ucr}	Factor for un-cracked concrete EN 1992-4:2018 § 7.2.1.4	[-]			11				
ΎΜc	Partial safety factor	[-]			1,5				
Splitting failu	ire mode								
Scr,sp	Characteristic spacing	[mm]	160	225	250	360	400		
C _{cr,sp}	Characteristic edge distance	[mm]	80	112,5	125	180	200		
γMsp	Partial safety factor	[-]		•	1,5				
Displacemen	t under tension load				<u> </u>				
Non-cracked	concrete C20/25								
N	Service tension load	[kN]	3,1	6,1	8,9	13,2	18,0		
δηο	Short term displacement	[mm]	0,08	0,14	0,15	1,15	0,14		
· · · · · · · · · · · · · · · · · · ·			2.40	2.10	2.40	2.40	2.10		

Table C1: Characteristic values for tension loads in case of static and quasi-static loading for design method A acc. to EN 1992-4:2018

FM 753 evo

Performance

Characteristic resistance under tension load

Annex C (1/2)

 Table C2:
 Characteristic values for shear loads in case of static and quasi-static loading for design method A acc. to EN 1992-4:2018

Eccontial characteristics			Performance					
			M6	M8	M10	M12	M16	
Steel failur	e without lever arm							
V _{Rk,s}	Characteristic resistance	[kN]	6,4	9,9	17,4	25,1	46,9	
γMs	Partial safety factor	[Nm]			1,25			
ŀ	Factor for considering	F 1			1.0			
K 7	ductility	[-]			1,0			
Steel failur	e with lever arm							
M ⁰ Rk,s	Characteristic resistance	[Nm]	11	28	56	98	233	
γMs	Ms Partial safety factor [mr				1,25			
Concrete p	oryout failure							
k 8	k-factor	[-]		1,0		2	,0	
γMc	Partial safety factor	[-]			1,5			
Concrete e	dge failure							
۱.	Effective length of anchor	[mm]	40	45	50	65	80	
let	under shear load	[]	40	40	50	05	00	
d _{nom}	Outside diameter of anchor	[mm]	6	8	10	12	16	
γMc	Partial safety factor	[-]			1,5			
Displacem	ent under shear load							
٧	Service shear load	[kN]	3,6	5,6	9,9	16,4	26,	
δνο	Short term displacement	[mm]	0,84	1,06	3,40	1,56	2,1	
δν	Long term displacement	[mm]	1,26	1,59	5,10	2,34	3,2	

FM 753 evo

Performance

Annex C (2/2)

Characteristic resistance under shear load