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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA-01/0009 of 11/12/2024

English translation prepared by CSTB - Original version in French language

General Part

Technical Assessment Body issuing the European Technical Assessment:
Centre Scientifique et Technique du Bâtiment (CSTB)

Trade name:	**FM753 A4**
Product family:	Torque-controlled expansion anchor, made of stainless steel, for use in uncracked concrete: sizes M8, M10, M12, M16.
Manufacturer:	FRIULSIDER Via Trieste, 1 I 33048 San Giovanni al Natisone (UDINE) ITALY
Manufacturing plants:	FRIULSIDER Via Trieste, 1 I 33048 San Giovanni al Natisone (UDINE) ITALY
This European Technical Assessment contains:	11 pages including 7 pages of annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330232-01-0601 “Mechanical fasteners for use in concrete”
This Assessment replaces:	-

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Specific Part

1 Technical description of the product

The FM753 A4 anchor is a torque-controlled expansion anchor made of stainless steel, of sizes M8, M10, M12 and M16, which is placed into a drilled hole and anchored by torque-controlled expansion.

The product description is given in Annexes A.

2 Specification of the intended use

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annexes 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 producer 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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance in case of static and quasi-static loading, displacements	See Annexes C1
Characteristic resistance in case of seismic performance category C1, displacements	No performance determined
Characteristic resistance in case of seismic performance category C2, displacements	No performance determined

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For Basic requirement Safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources, no performance was determined for this product.

3.8 General aspects relating to fitness for use

Durability and Serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

4 Assessment and verification of constancy of performance (AVCP)

According to the Decision 96/582/EC of the European Commission[1], as amended, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or Class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units	—	1

5 Technical details necessary for the implementation of the AVCP system, as planned in the relevant EAD

Technical details necessary for the implementation of the Assessment and verification of constancy of performance (AVCP) system are laid down in the control plan deposited at Centre Scientifique et Technique du Bâtiment.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of anchors for issuing the certificate of conformity CE based on the control plan. https://fr.wikipedia.org/wiki/Loïc

The original French version is signed by:

Loïc PAYET

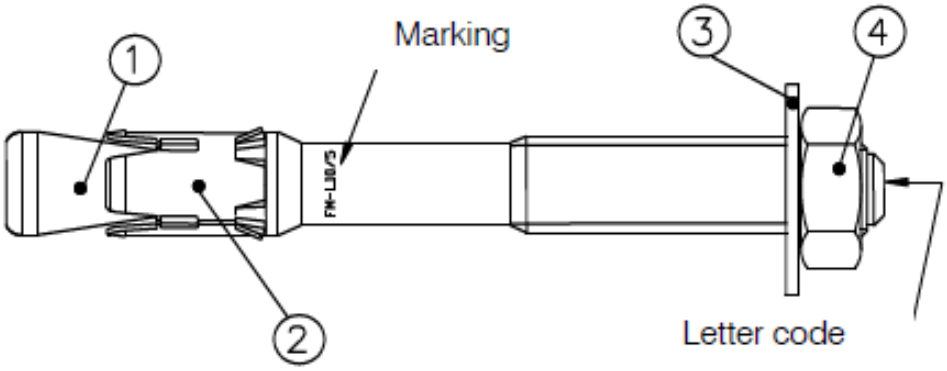
Head of the Structure, Masonry, Partition Division

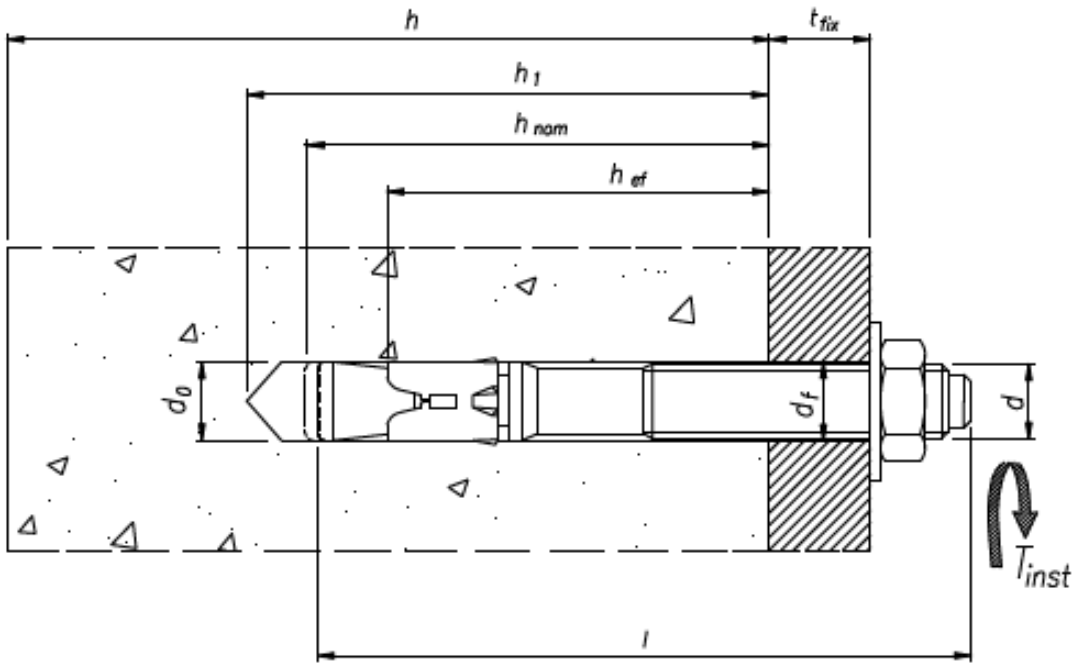
1 Official Journal of the European Communities L 254 of 08.10.1996

Installed condition

Figure A1:

FM753 A4 metal expansion anchor

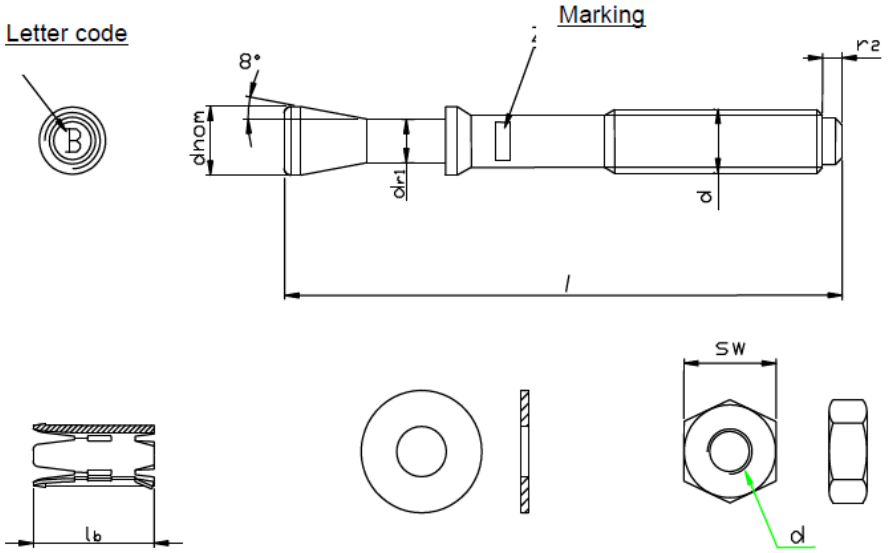




h_{ef}: effective embedment depth
h_{nom}: embedment depth
h_1: drilling hole depth
t_{fix}: fixture thickness

FM753 A4 torque-controlled expansion anchor	
Product description Assembled and in-use anchor.	**Annex A1**

Figure A2:
FM753 A4 assembled anchor: bold and expansion sleeve



Making on the bolt:

FM X/Y A4
With X = thread diameter (d)
Y=fixture thickness (t_{fix})
e.g. FM 10/5 A4 (size $M10 \times 75$)

A letter code corresponding to the total length of the bolt is punched on the head of the bolt.

Table A2:
Materials

Part	Designation	Material
1	Bolt	Stainless steel according to EN 10088-3
2	Expansion sleeve	Stainless steel according to EN 10088-3
3	Washer	A4 – 140 Hv (DIN 125)
4	Hexagonal nut	A4-70 (DIN 934)

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loading: all sizes.

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013+ A1:2016.
- Strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016.
- Uncracked concrete.

Use conditions (Environmental conditions):

- The FM753 A4 anchor may be used in concrete subject to dry internal conditions and also in concrete subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist.

  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads 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.).
- Anchorages under static or quasi-static loading are designed in accordance with EN 1992-4:2018

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use the anchor only as supplied by the manufacturer without exchanging the components of an anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Effective anchorage depth, edge distance and spacing not less than the specified values without minus tolerances.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Application of specified torque moment using 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.

Table B1: Anchor dimensions

	Anchor size	Marking	L [mm]	t_{fix} [mm]	d_r [mm]	d_{nom} [mm]	l_{bague} [MM]	Letter code
M8	M8 × 65	FM 8/7 A4	65	7	5,8	8,0	11,5	B
	M8 × 75	FM 8/15 A4	75	15				C
	M8 × 90	FM 8/30 A4	90	30				D
	M8 × 115	FM 8/55 A4	115	55				E
	M8 × 135	FM 8/75 A4	135	75				F
	M8 × 165	FM 8/105 A4	165	105				G
M10	M10 × 75	FM 10/5 A4	78	5	7,4	10,0	14,0	B
	M10 × 90	FM 10/20 A4	90	20				C
	M10 × 120	FM 10/50 A4	120	50				D
	M10 × 145	FM 10/75 A4	145	75				E
	M10 × 170	FM 10/100 A4	173	100				F
M12	M12 × 100	FM 12/10 A4	100	10	8,8	12,0	17,0	B
	M12 × 110	FM 12/20 A4	110	20				C
	M12 × 135	FM 12/45 A4	135	45				D
	M12 × 160	FM 12/70 A4	160	70				E
	M12 × 185	FM 12/100 A4	188	100				F
M16	M16 × 125	FM 16/10 A4	125	10	12,6	16,0	23	A
	M16 × 145	FM 16/30 A4	145	30				B
	M16 × 175	FM 16/60 A4	175	60				C
	M16 × 215	FM 16/100 A4	215	100				D

Table B2: Installation data

	Anchor type	d_{cut} [mm]	d_f [mm]	T_{inst} [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	S_{min} [mm]	c_{min} [mm]
M8	FM 8/7 A4 FM 8/15 A4 FM 8/30 A4 FM 8/55 A4 FM 8/75 A4 FM 8/105 A4	8	9	15	100	60	48	40	60	60
M10	FM 10/5 A4 FM 10/20 A4 FM 10/50 A4 FM 10/75 A4 FM 10/100 A4	10	12	25	100	70	59	50	75	75
M12	FM 12/10 A4 FM 12/20 A4 FM 12/45 A4 FM 12/70 A4 FM 12/100 A4	12	14	50	120	85	71	60	90	90
M16	FM 16/10 A4 FM 16/30A4 FM 16/60 A4 FM 16/100 A4	16	18	100	170	115	96	85	130	130

FM753 A4 torque-controlled expansion anchor

Annex B2

Product description
Installation parameters

Table C1: Characteristic values of resistance under tension load in case of static and quasi-static loading in uncracked concrete

size			**M8**	**M10**	**M12**	**M16**
Effective anchorage depth	h_{ef}	[mm]	40	50	60	85
Steel failure						
Partial safety factor	γ_{Ms}	[-]	1,59			
Characteristic resistance	$N_{Rk,s}$	[kN]	17,2	28,0	39,5	81,0
Pull-out failure						
Characteristic resistance in concrete C20/25						
Installation safety factor	γ_{inst}	[-]	1,0			
Uncracked concrete	$N_{Rk,p,uncr}$	[kN]	7,5	12	20	35
Increasing factor for $N_{Rk,p}$ for cracked and uncracked concrete $\psi_c = (f_{ck}/20)^{m_{ucr}}$	m_{ucr}	[-]	0,3	0,5		
	C30/37	[-]	1,14	1,22		
	C40/50	[-]	1,25	1,41		
	C50/60	[-]	1,34	1,58		
Concrete cone and splitting failure						
Installation safety factor	γ_{inst}	[-]	1,0			
Factor	$k_1=k_{ucr,N}$	[-]	11,0			
Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$			
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$			
Characteristic resistance in splitting [1]	$N^0_{Rk,sp}$	[kN]	Min ($N_{Rk,p}$; $N^0_{Rk,c}$)[1]			
Spacing (splitting)	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$			
Edge distance (splitting) [5]	$c_{cr,sp}$	[mm]	$3 \cdot h_{ef}$			

[1] $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C2: Characteristic values of resistance under shear load in case of static and quasi-static loading

size			**M8**	**M10**	**M12**	**M16**
Effective anchorage depth	h_{ef}	[mm]	40	50	60	85
Steel failure without lever arm						
Partial safety factor	$\gamma_{Ms,V}$	[-]	1,33			
Characteristic resistance	$V_{Rk,s}$	[kN]	11,9	18,9	27,4	51,0
Steel failure with lever arm						
Partial safety factor	$\gamma_{Ms,V}$	[-]	1,33			
Characteristic resistance	$M^0_{Rk,s}$	[kN]	24	49	85	216
Concrete pry-out failure						
Pry-out factor	k_8	[-]	1,0	1,0	2,0	2,0
Installation safety factor	γ_{inst}	[-]	1,0			
Concrete edge failure						
Effective length of anchor	$l_f = h_{ef}$	[mm]	40	36	43	62
Diameter of anchor	d_{nom}	[mm]	8	10	12	16
Installation safety factor	γ_{inst}	[-]	1,0			

Table C3: Displacements under tension load in case of static and quasi-static loading

Size			**M8**	**M10**	**M12**	**M16**
Effective anchorage depth	h_{ef}	[mm]	40	50	60	85
Tension load in uncracked concrete	N	[kN]	3,6	5,7	11,1	16,7
Corresponding displacement	δ_{N0}	[mm]	0,1	0,2	0,3	1,2
	$\delta_{N\infty}$	[mm]	1,6	1,6	1,6	1,6

Table C4: Displacements under shear load in case of static and quasi-static loading

Size			**M8**	**M10**	**M12**	**M16**
Effective anchorage depth	h_{ef}	[mm]	40	50	60	85
Shear load in uncracked concrete	V	[kN]	6,4	10,1	14,8	27,5
Corresponding displacement	δ_{v0}	[mm]	0,9	2,1	2,2	2,4
	$\delta_{v\infty}$	[mm]	2,0	2,6	2,7	3,0

Note: Additional displacement due to annular gap between anchor and fixture is to be taken into account.