ZAVOD ZA GRADBENIŠTVO SLOVENIJE
SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

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

Member of www.eota.eu

Dimičeva 12,
1000 Ljubljana, Slovenija
Tel.: +386 (0)1 280 44 72, +386 (0)1-280 45 37
Fax: +386 (0)1 280 44 84
e-mail: info.ta@zag.si
http://www.zag.si

European Technical Assessment

ETA-24/0346 of 5.7.2024

English version prepared by ZAG

General Part

Technical Assessment Body issuing the European Technical Assessment	**ZAG**
Trade name of the construction product	**MFT Ekspansjonsbolt**
Product family to which the construction product belongs	**33: Torque controlled expansion anchor made of zinc coated steel for use in non-cracked concrete**
Manufacturer	**Hikoki Power Tools Norway AS** **Kjeller vest 7** **NO-2007 KJELLER**
Manufacturing plant	**Plant 1**
This European Technical Assessment contains	9 pages including 3 annexes, which form an integral part of the document
This European Technical Assessment is issued in according to Regulation (EU) No 305/2011, on the basis of	EAD 330232-01-0601, edition December 2019

Specific Parts

1 Technical description of the product

The MFT Ekspansjonsbolt 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 Commission[1] 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.

Issued in Ljubljana on 5.7.2024

Signed by:

Franc Capuder, M.Sc., Research Engineer

[1] Official Journal of the European Communities L 254 of 8.10.1996

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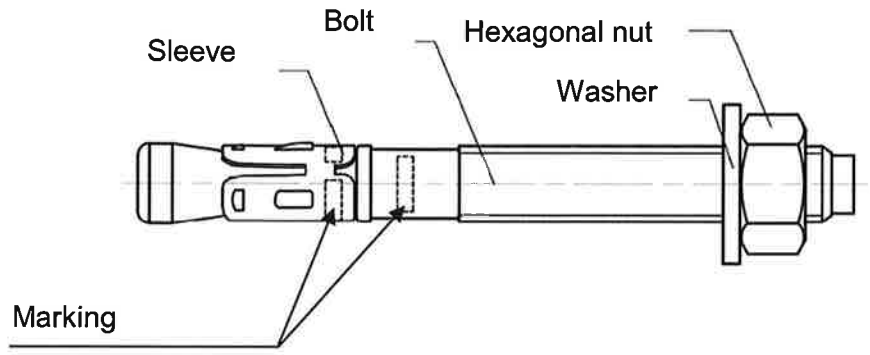


Sleeve:	Identifying mark: Size	≠ M..... (M12)
Bolt:	FM Diameter/Thickness of fixture - e:	FM 12/50 e

Figure A1: MFT Ekspansjonsbolt anchor

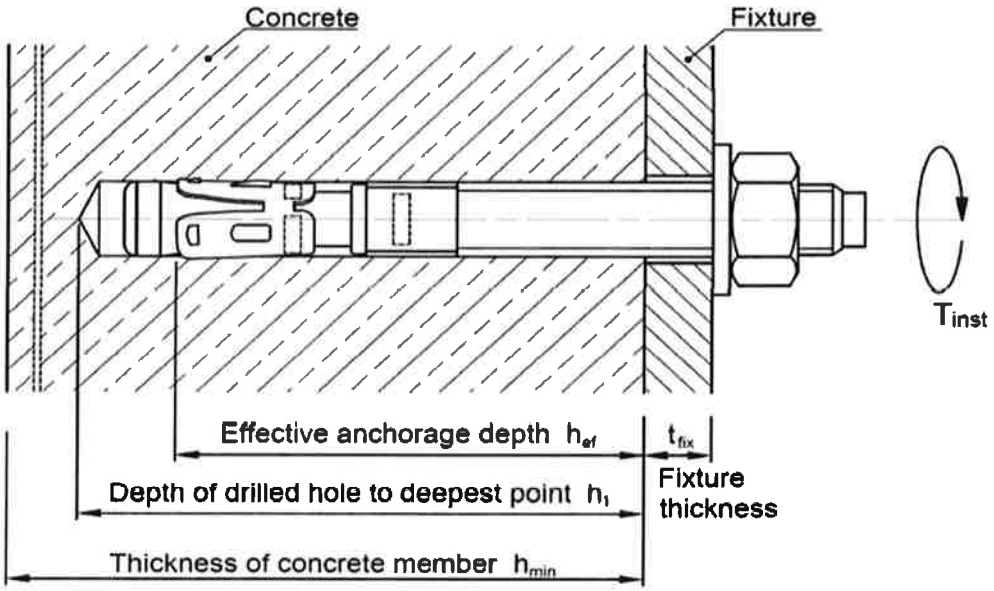


Figure A2: Installed MFT Ekspansjonsbolt anchor

MFT Ekspansjonsbolt	
Product description Product, marking and installation condition	**Annex A (1/2)**

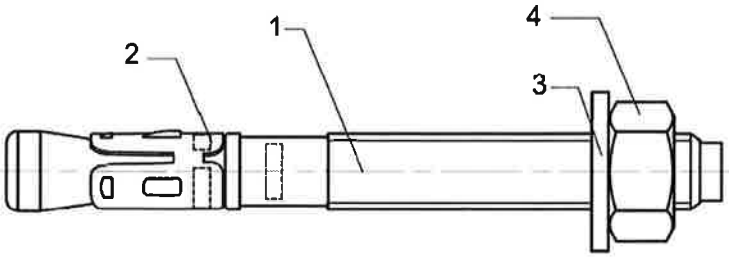


Table A1: Materials

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 ≥ 5 µm according to EN ISO 4042; passivated

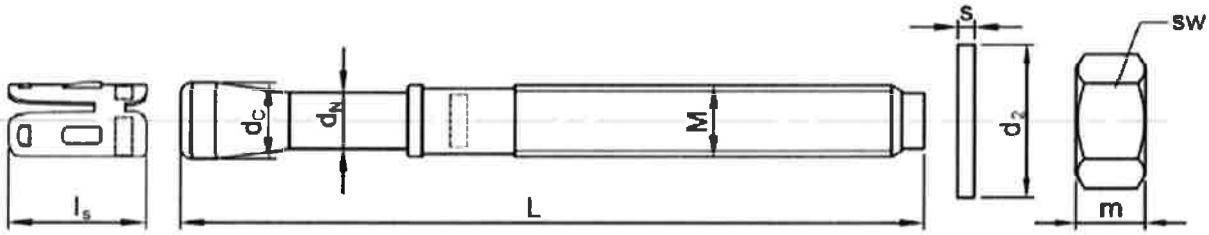


Table A2: Dimensions

Anchor type / size	L [mm]	M	d_c [mm]	d_N [mm]	l_s [mm]	s [mm]	d_2 [mm]	m [mm]	SW [mm]
MFT Ekspansjonsbolt/6	t_{fix}+55	M6	6,00	4,3	12,5	≥1,6	≥12	5,0	10
MFT Ekspansjonsbolt/8	t_{fix}+63	M8	8,00	5,9	15,0	≥1,6	≥16	6,5	13
MFT Ekspansjonsbolt/10	t_{fix}+73	M10	10,00	7,6	16,8	≥2,0	≥20	8,0	17 (16)
MFT Ekspansjonsbolt/12	t_{fix}+99	M12	11,95	8,8	20,0	≥2,5	≥24	10,0	19 (18)
MFT Ekspansjonsbolt/16	t_{fix}+121	M16	15,95	12,0	22,6	≥3,0	≥30	13,0	24

MFT Ekspansjonsbolt	Annex A (2/2)
Product description Dimensions and materials	

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:

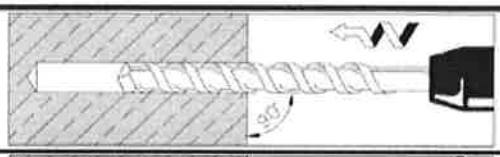
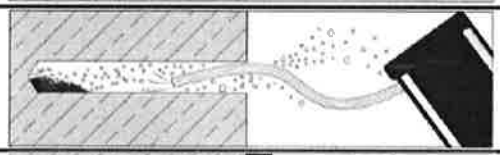
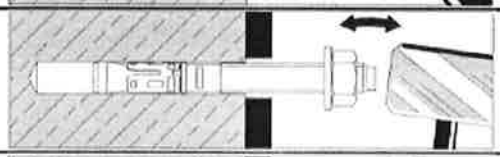
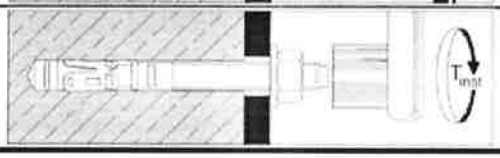
- Anchor installation carried out by appropriately qualified personnel and under supervision of the person responsible for technical matters of the site.
- Use of the anchor only supplied by the manufacturer without exchanging the components of an anchor.
- Anchor installation in accordance with the 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.

MFT Ekspansjonsbolt	**Annex B (1/3)**
Intended use Specifications	

Table B1: Installation data

MFT Ekspansjonsbolt			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	$d_f \leq$	[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

MFT Ekspansjonsbolt	
Intended use Installation data minimum spacing and edge distance	**Annex B (2/3)**

	Drill hole perpendicular to concrete surface.
	Blow out dust. Alternatively vacuum cleaning down to the bottom of the hole.
	Insert the anchor through the fixture.
	Apply installation torque T_{inst} using an calibrated torque-wrench.

MFT Ekspansjonsbolt	**Annex B (3/3)**
Intended use Installation instructions	

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

Essential characteristics			Performance				
			M6	M8	M10	M12	M16
Installation parameters							
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
T_{inst}	Torque moment	[Nm]	8	15	30	50	100
s_{min}	Minimum spacing	[mm]	30	40	50	70	90
c_{min}	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
γ_{MsN}	Partial safety factor	[-]	1,4				
Pull-out failure mode							
$N_{Rk,p}$	Characteristic pull-out failure in non-cracked concrete	[kN]	6,0	12,0	17,4	25,8	35,2
γ_{inst}	Partial safety factor	[-]	1,0				
γ_{Mp}		[-]	1,5				
$s_{cr,N}$	Characteristic spacing	[mm]	$3 \times h_{ef}$				
$c_{cr,N}$	Characteristic edge distance	[mm]	$1,5 \times h_{ef}$				
ψ_c C30/37	Increasing factor for $N_{Rk,p}$ in non-cracked concrete	[-]	1,01	1,04	1,22	1,21	1,15
ψ_c C40/50		[-]	1,01	1,06	1,41	1,39	1,27
ψ_c C50/60		[-]	1,02	1,09	1,58	1,55	1,38
Concrete Cone failure mode							
k_{ucr}	Factor for un-cracked concrete EN 1992-4:2018 § 7.2.1.4	[-]	11				
γ_{Mc}	Partial safety factor	[-]	1,5				
Splitting failure mode							
$s_{cr,sp}$	Characteristic spacing	[mm]	160	225	250	360	400
$c_{cr,sp}$	Characteristic edge distance	[mm]	80	112,5	125	180	200
γ_{Msp}	Partial safety factor	[-]	1,5				
Displacement under tension load							
Non-cracked concrete C20/25							
N	Service tension load	[kN]	3,1	6,1	8,9	13,2	18,0
δ_{N0}	Short term displacement	[mm]	0,08	0,14	0,15	1,15	0,14
$\delta_{N\infty}$	Long term displacement	[mm]	3,19	3,19	3,19	3,19	3,19

MFT Ekspansjonsbolt	
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

Essential characteristics			Performance				
			M6	M8	M10	M12	M16
Steel failure without lever arm							
$V_{Rk,s}$	Characteristic resistance	[kN]	6,4	9,9	17,4	25,1	46,9
γ_{Ms}	Partial safety factor	[Nm]	1,25				
k_7	Factor for considering ductility	[-]	1,0				
Steel failure with lever arm							
$M^0_{Rk,s}$	Characteristic resistance	[Nm]	11	28	56	98	233
γ_{Ms}	Partial safety factor	[mm]	1,25				
Concrete pryout failure							
k_8	k-factor	[-]	1,0			2,0	
γ_{Mc}	Partial safety factor	[-]	1,5				
Concrete edge failure							
l_{ef}	Effective length of anchor under shear load	[mm]	40	45	50	65	80
d_{nom}	Outside diameter of anchor	[mm]	6	8	10	12	16
γ_{Mc}	Partial safety factor	[-]	1,5				
Displacement under shear load							
V	Service shear load	[kN]	3,6	5,6	9,9	16,4	26,8
δ_{V0}	Short term displacement	[mm]	0,84	1,06	3,40	1,56	2,18
$\delta_{V\infty}$	Long term displacement	[mm]	1,26	1,59	5,10	2,34	3,27

MFT Ekspansjonsbolt	**Annex C (2/2)**
Performance Characteristic resistance under shear load	