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European Technical Assessment

**ETA 24/0936
of 27/09/2024**

English translation prepared by IETcc. Original version in Spanish language

General Part

**Technical Assessment Body issuing
the ETA designated according to Art.
29 of Regulation (EU) 305/2011:**

Instituto de Ciencias de la Construcción Eduardo
Torroja (IETcc)

**Trade name of the construction
product:**

Masonmate Heavy Duty Anchor AU

**Product family to which the
construction product belongs:**

Torque controlled expansion anchor made of
galvanized steel of sizes M6, M8, M10, M12, M16
and M20 for use in concrete.

Manufacturer:

Dormole Ltd
Long Reach, Galleon Boulevard,
Crossways Business Park
Dartford, Kent, DA2 6QE
website: www.dormole.net

Manufacturing plants:

Dormole plant 2

**This European Technical
Assessment contains:**

11 pages including 3 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:**

European Assessment Document EAD 330232-
01-0601 "Mechanical Fasteners for use in
concrete", ed. December 2019



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This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to article 25 (3) of Regulation (EU) No 305/2011.

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FIRMANTE(1) : ANGEL CASTILLO TALAVERA | FECHA : 04/10/2024 08:07 | Sin acción específica



SPECIFIC PART

1. Technical description of the product

The Masonmate Heavy Duty Anchor AU heavy duty anchor product in the range of M6, M8, M10, M12, M16 and M20 is an anchor made of galvanised steel. AUH anchor includes has a hexagonal head; AUC anchor has a countersunk head. The anchor is installed into a predrilled cylindrical hole and anchored by torque-controlled expansion. The anchorage is characterised by friction between the expansion tube and the concrete.

Product and installation descriptions are given in annex A1.

2. Specification of the intended use in accordance with the applicable European Assessment Document.

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

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 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 mean to 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 its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension loads	See annexes C2
Characteristic resistance to shear loads	See annexes C3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for class A1 according to EN 13501-1
Resistance to fire	See annex C4

4. Assessment and Verification of Constancy of Performances (hereinafter AVCP) system applied, with reference to its legal base

The applicable European legal act for the system of Assessment and Verification of Constancy of Performances (see annex V to Regulation (EU) No 305/2011) is 96/582/EC.

The system to be applied is 1.



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5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document.

The technical details necessary for the implementation of the AVCP system are laid down in the quality plan deposited at Instituto de Ciencias de la Construcción Eduardo Torroja.



Instituto de Ciencias de la Construcción Eduardo Torroja
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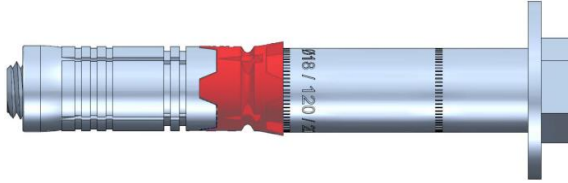
On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 27th of September 2024

Mr. Ángel Castillo Talavera
Director

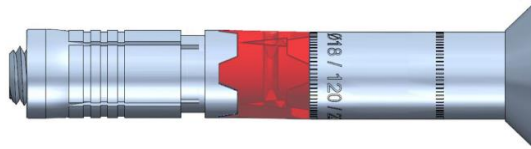


Product and installed condition

AUH anchor

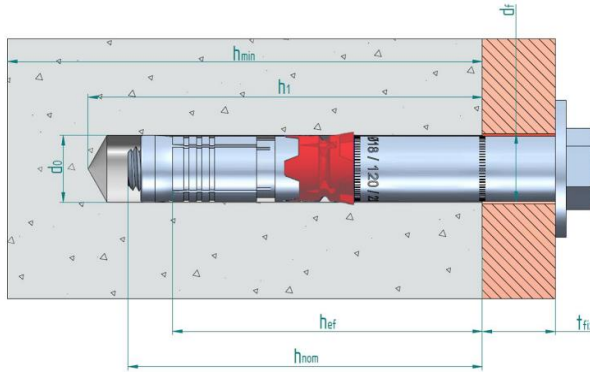


AUC anchor

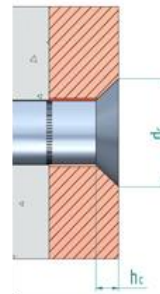


Identification on anchor:

- Sleeve: outer diameter / total length / maximum fixture thickness to be fixed.
- Plastic ring: anchor name “AU”, company logo



- d₀: Nominal diameter of drill bit
d₁: Fixture clearance hole diameter
h_{ef}: Effective anchorage depth
h₁: Depth of drilled hole
h_{nom}: Overall anchor embedment depth in the concrete
h_{min}: Minimum thickness of concrete member
t_{fix}: Fixture thickness



AU anchor

Product description

Installed condition

Annex A1



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Table A1: Materials

Item	Designation	Material for AUH	Material for AUC
1	Bolt	DIN 931 ISO 898-1 class 8.8. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0	DIN 7991 ISO 898-1 class 10.9. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0 ---
2	Washer	DIN 9021. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0	Special conical washer. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0
3	Sleeve	Carbon steel. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0	
4	Plastic ring	POM	
5	Expansion sleeve	Carbon steel. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0	
6	Cone	Hardened carbon steel. Galvanized $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0	

AU anchor

Product description

Materials

Annex A2



Specifications of intended use

Anchorage subjected to:

- Static or quasi static loads.
- Resistance to fire exposure up to 120 minutes.

Base materials:

- Reinforced or unreinforced normal weight concrete without fibres according to EN 206-1:2013 + A2:2021.
- Strength classes C20/25 to C50/60 according to EN 206-1:2013 + A2:2021.
- Cracked or uncracked concrete

Use conditions (environmental conditions):

- Temperature range of the anchorage base material during the working life: -40 °C to +80 °C
- Anchorages subjected to dry internal conditions.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete.
- Verifiable calculation rules and drawings are prepared taking into considering 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 actions are designed for design method A in accordance with EN 1992-4:2018
- Anchorages under fire exposure are designed in accordance with EN 1992-4:2018. It must be ensured that local spalling of the concrete cover does not occur.

Installation:

- Hole drilling by rotary plus hammer mode.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

AU anchor

Intended use

Specifications

Annex B1

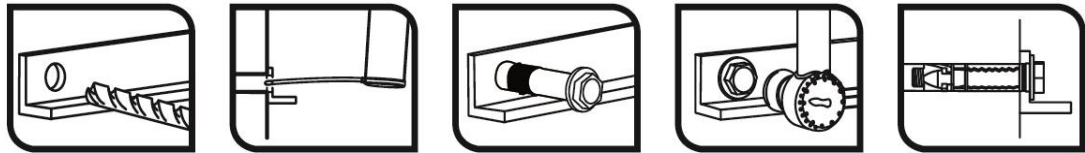


Table C1: Installation parameters AUH, AUC

Installation parameters			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
d ₀	Nominal diameter of drill bit:	[mm]	10	12	16	18	24	28
d _f	Fixture clearance hole diameter ≤	[mm]	12	14	18	20	26	31
T _{inst}	Nominal installation torque:	[Nm]	15	30	50	80	160	240
h _{min}	Minimum thickness of concrete member:	[mm]	100	120	140	170	200	250
h ₁	Depth of drilled hole ≥	[mm]	70	85	95	110	130	160
h _{nom}	Overall anchor embedment depth in the concrete:	[mm]	59	72	83	97	117	146
h _{ef}	Effective anchorage depth:	[mm]	50	60	70	85	100	125
t _{fix}	Thickness of fixture ¹⁾ ≤	[mm]	L - 60	L - 75	L - 85	L - 100	L - 120	L - 150
S _{min}	Minimum allowable spacing:	[mm]	100	120	175	200	220	320
C _{min}	Minimum allowable edge distance:	[mm]	50	60	70	80	100	160
d _c	Diameter of countersunk head in the fixture:	[mm]	16.4	20.6	26.8	30.8	38.8	44.8
h _c	Height of countersunk head in the fixture:	[mm]	3.2	4.3	5.4	6.4	7.4	8.4
SW	AUH socket size:	[--]	10	13	17	19	24	30
SW	AUC hexagonal recess:	[--]	4	5	6	8	10	12

¹⁾ L = total anchor length

Installation process



AU anchor

Performances

Installation parameters and installation procedure

Annex C1



Table C2: Characteristic values to tension loads of design method A according to EN 1992-4 for AUH, AUC anchors

Characteristic values of resistance to tension loads of design according to design method A			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Tension loads: steel failure								
N _{Rk,s}	Characteristic resistance:	[kN]	16.1	29.3	46.4	67.4	126.0	196.0
γ _{Ms}	Partial safety factor ²⁾ :	[-]	1.5					
Tension loads: pull-out failure in concrete								
N _{Rk,p,ucr}	Characteristic resistance in C20/25 uncracked concrete:	[kN]	15.0	20.0	... ¹⁾			
N _{Rk,p,cr}	Characteristic resistance in C20/25 cracked concrete:	[kN]	... ¹⁾					
γ _{ins}	Installation safety factor:	[-]	1.0	1.0	1.0	1.0	1.2	1.2
Ψ _c	Increasing factor for N ⁰ _{Rk,p} :	C30/37 [-]	1.22	1.22	1.22	1.22	1.08	1.08
		C40/50 [-]	1.41	1.41	1.41	1.41	1.15	1.15
		C50/60 [-]	1.58	1.58	1.58	1.58	1.20	1.20
Tension loads: concrete cone and splitting failure								
h _{ef}	Effective embedment depth:	[mm]	50	60	70	85	100	125
k _{ucr,N}	Factor for uncracked concrete:	[-]	11.0					
k _{cr,N}	Factor for cracked concrete:	[-]	7.7					
γ _{ins}	Installation safety factor:	[-]	1.0	1.0	1.0	1.0	1.2	1.2
S _{cr,N}	Concrete cone failure:	[mm]	3 x h _{ef}					
C _{cr,N}		[mm]	1.5 x h _{ef}					
S _{cr,sp}	Splitting failure:	[mm]	205	245	285	345	410	510
C _{cr,sp}		[mm]	105	125	145	175	205	255

¹⁾ The pull-out failure mode is not decisive

²⁾ In absence of other national regulations

Table C3: Displacements under tension load for AUH, AUC anchors

Displacements under tension loads		Performances					
		M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
N	Service tension load in uncracked concrete C20/25 to C50/60: [kN]	7.43	10.24	13.71	18.38	19.52	27.30
δ _{N0}	Short term displacement: [mm]	1.18	2.02	1.79	1.15	2.46	2.12
δ _{N∞}	Long term displacement: [mm]	2.68	2.68	2.68	2.68	2.68	2.68
N	Service tension load in cracked concrete C20/25 to C50/60: [kN]	5.81	7.62	9.62	12.86	13.65	19.09
δ _{N0}	Short term displacement: [mm]	1.75	2.69	2.57	3.53	1.76	2.41
δ _{N∞}	Long term displacement: [mm]	3.75	4.69	4.57	5.53	3.76	4.41

AU anchor

Performances

Characteristic values for tension loads

Annex C2



Table C4: Characteristic values to shear loads of design method A according to EN 1992-4 for AUH, AUC anchors

Characteristic values of resistance to shear loads of design according to design method A			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Shear loads: steel failure without lever arm								
V _{Rk,s}	Characteristic resistance:	[kN]	20.2	33.0	62.2	75.1	111.2	141.7
k ₇	Ductility factor:	[-]	1.0					
γ _{Ms}	Partial safety factor ¹⁾ :	[-]	1.25					
Shear loads: steel failure with lever arm								
M ⁰ _{Rk,s}	Characteristic bending moment:	[Nm]	12.2	30.0	59.8	104.8	266.4	519.3
γ _{Ms}	Partial safety factor ¹⁾ :	[-]	1.25					
Shear loads: concrete pryout failure								
k ₈	Pryout factor:	[-]	1.0	2.0	2.0	2.0	2.0	2.0
γ _{ins}	Installation safety factor:	[-]	1.0					
Shear loads: concrete edge failure								
l _f	Effective length of anchor under shear loads:	[mm]	50	60	70	85	100	125
d _{nom}	Outside anchor diameter:	[mm]	10	12	16	18	24	28
γ _{ins}	Installation safety factor:	[-]	1.0					

¹⁾ In absence of other national regulations

Table C5: Displacements under shear load for AUH, AUC anchors

Displacements under shear loads		Performances					
		M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
V	Service shear load in uncracked and cracked concrete C20/25 to C50/60: [kN]	9.62	15.71	29.62	35.76	44.13	56.23
$\bar{\delta}_{V0}$	Short term displacement: [mm]	2.15	1.22	1.31	1.72	1.41	1.96
$\bar{\delta}_{V\infty}$	Long term displacement: [mm]	3.23	1.83	1.96	2.58	2.11	2.93

AU anchor	Annex C3
Performances	
Characteristic values for shear load.	



Table C6: Characteristic values for resistance under fire exposure for AUH, AUC anchors

Characteristic values under fire exposure				Performances					
				M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Steel failure									
N _{Rk,s,fi}	Characteristic tension resistance:	R30	[kN]	0.2	0.4	0.9	1.7	3.1	4.9
		R60	[kN]	0.2	0.3	0.8	1.3	2.4	3.7
		R90	[kN]	0.1	0.3	0.6	1.1	2.0	3.2
		R120	[kN]	0.1	0.2	0.5	0.8	1.6	2.5
V _{Rk,s,fi}	Characteristic shear resistance:	R30	[kN]	0.2	0.4	0.9	1.7	3.1	4.9
		R60	[kN]	0.2	0.3	0.8	1.3	2.4	3.7
		R90	[kN]	0.1	0.3	0.6	1.1	2.0	3.2
		R120	[kN]	0.1	0.2	0.5	0.8	1.6	2.5
M ⁰ _{Rk,s,fi}	Characteristic bending resistance:	R30	[Nm]	0.2	0.4	1.1	2.6	6.7	13.0
		R60	[Nm]	0.1	0.3	1.0	2.0	5.0	9.7
		R90	[Nm]	0.1	0.3	0.7	1.7	4.3	8.4
		R120	[Nm]	0.1	0.2	0.6	1.3	3.3	6.5
Pull out failure									
N _{Rk,p,fi}	Characteristic resistance:	R30 to R120	[kN]	-- 1)					
Concrete cone failure ²⁾									
N _{Rk,c,fi}	Characteristic resistance:	R30	[kN]	3.0	4.8	7.1	11.5	17.2	30.1
		R60							
		R90							
		R120							
Scr,N,fi	Critical spacing:	R30 to R120	[mm]	4 x h _{ef}					
Ccr,N,fi	Critical edge distance:	R30 to R120	[mm]	2 x h _{ef}					
Smin,fi	Minimum spacing:	R30 to R120	[mm]	100	120	175	200	220	320
Cmin,fi	Minimum edge distance:	R30 to R120	[mm]	Cmin = 2 x h _{ef} ; if fire attack comes from more than one side, the edge distance of the anchor has to be ≥ 300 mm and ≥ 2 x h _{ef}					
Concrete pryout failure									
k ₈	Pryout factor:	R30 to R120	[-]	1.0	2.0	2.0	2.0	2.0	2.0

- 1) The pull-out failure mode is not decisive.
2) As a rule, splitting failure can be neglected since cracked concrete and reinforcement is assumed.
3) In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{m,fi} = 1,0$ is recommended

AU anchor

Performances

Characteristic values for resistance to fire

Annex C4

