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European Technical Assessment

ETA 19/0786 of 06/02/2021

Technical Assessment Body issuing the ETA: Technical and Test Institute for Construction Prague

Trade name of the construction product	AWA Throughbolt
Product family to which the construction product belongs	Product area code: 33 Torque controlled expansion anchor for use in uncracked concrete
Manufacturer	Hexstone Ltd. T/A JCP Construction Products OpalWay, Stone Business Park Stone, Staffordshire, ST15 OSW United Kingdom
Manufacturing plant	JCP Plant 588
This European Technical Assessment contains	9 pages including 7 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 330232-00-0601 Mechanical fasteners for use in concrete

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

1. Technical description of the product

The AWA Throughbolt are through-fixing torque-controlled expansion anchors in sizes of M6, M8, M10, M12, M16, M20 and M24. Each type comprises a nut, bolt, washer and expansion clip. The anchors are made from steel with zinc plating.

The anchor is installed in a drilled hole; tightening the nut draws the cone into the clip. The expansion of this clip applies the anchorage.

The installed anchor is shown in Annex 1.

2. Specification of the intended use in accordance with the applicable EAD

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 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 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 (static and quasi-static loading)	See Annex C 1 and C 2
Displacement	See Annex C 1 and C 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1 according to EN 13501-1
Resistance to fire	No performance assessed

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

According to the Decision 97/463/EC of the European Commission[1], the system 1 of assessment verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) apply.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Technical and Test Institute for Construction Prague.

Issued in Prague on 06.02.2021

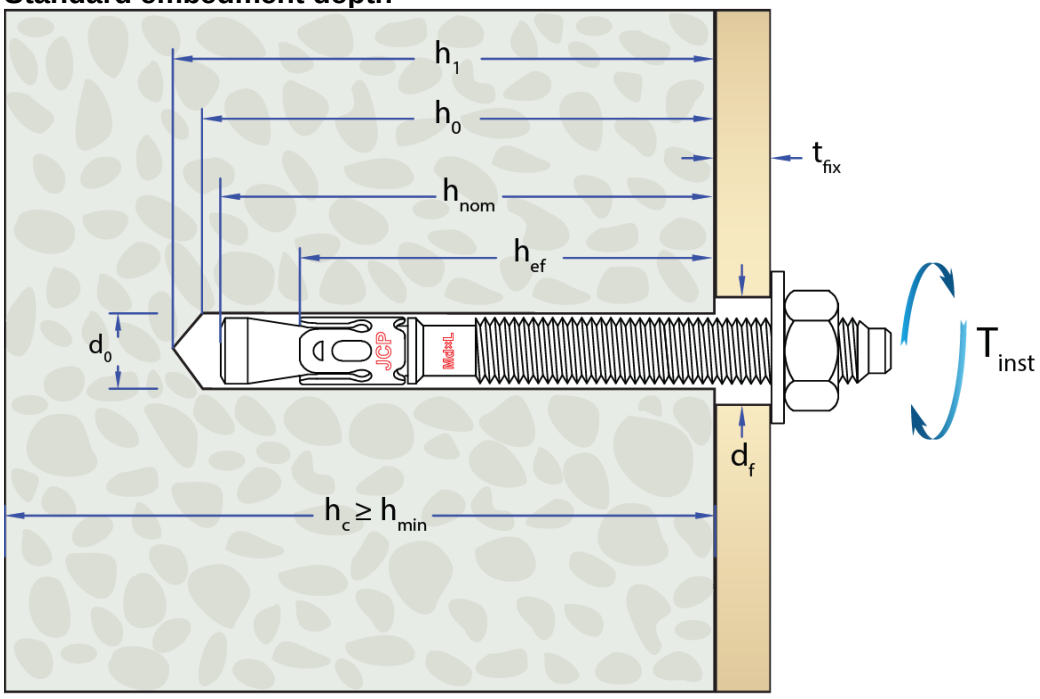
By

Ing. Mária Schaan
Head of the Technical Assessment Body

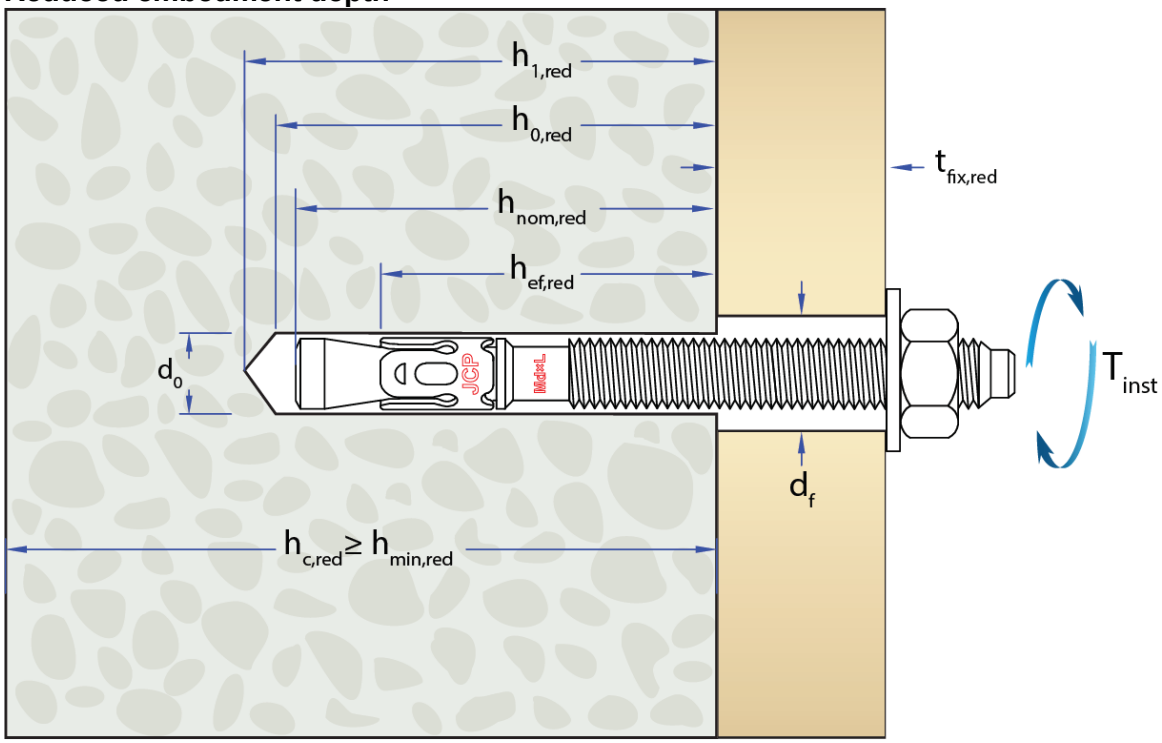
[1] Official Journal of the European Communities L 198/31 25.7.1997

AWA Throughbolt - Installed anchor

Standard embedment depth



Reduced embedment depth



AWA Throughbolt	
Product description Installed conditions	**Annex A 1**

AWA Throughbolt – components

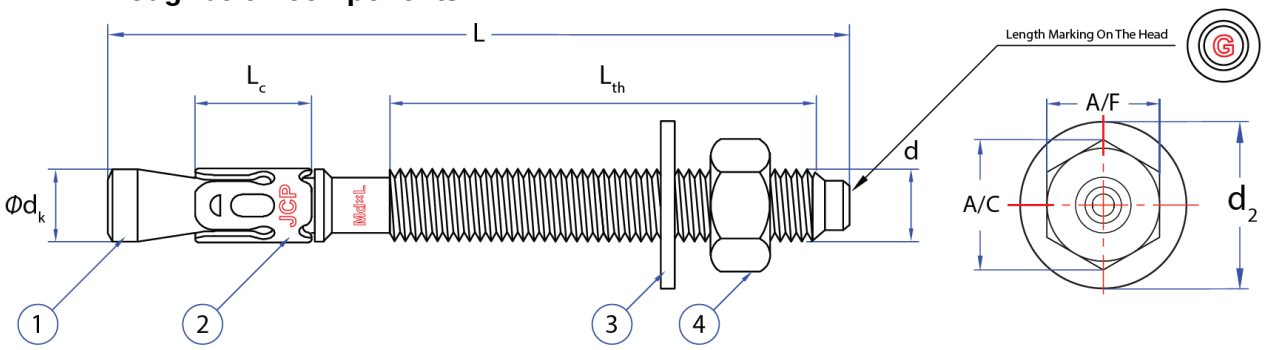


Table A1 – Materials

Component		Material	Coating
1	Bolt	Steel grade Q195, according to S185 (1.0035) according to EN 10025	Zinc plated ≥ 5 µm according EN ISO 4042
2	Expansion clip		
3	Washer		
4	Hexagonal nut		

Table A2 – Material properties

Component	M6 – M16	M20 – M24
Bolt: nominal tensile strength [N/mm²]	315 - 430	
Bolt: yield strength	195	185

Table A3 – Marking

Head mark	Length L [mm]
A	53 - 76
B	77 - 92
C	93 - 105
D	106 - 125
E	126 - 150
F	151 - 180
G	181 - 220
H	221 - 280

Table A4 – Dimensions

Size	Φd_k [mm]	L_c [mm]	A/F[1)] [mm]	d_2 [mm]
M6	$5.85^{\pm 0,3}$	$12.6^{-0,5}$	$10^{-0,5}$	$12^{-0,5}$
M8	$7.85^{\pm 0,3}$	$15.5^{-0,5}$	$13^{-0,5}$	$16^{-0,5}$
M10	$9.85^{\pm 0,3}$	$17.5^{-0,5}$	$17^{-0,5}$	$20^{-0,5}$
M12	$11.85^{\pm 0,3}$	$20.5^{-0,5}$	$19^{-0,5}$	$24^{-0,5}$
M16	$15.85^{\pm 0,3}$	$24.0^{-0,5}$	$24^{-0,5}$	$30^{-0,5}$
M20	$19.85^{\pm 0,3}$	$27.5^{-0,5}$	$30^{-0,5}$	$37^{-0,5}$
M24	$23.85^{\pm 0,3}$	$29.0^{-0,5}$	$36^{-0,5}$	$44^{-0,5}$

[1)] torque wrench width

AWA Throughbolt

Product description
Materials
Marking

Annex A 2

Specifications of intended use

Anchorages subject to:

- Static and quasi-static load.

Base materials

- Uncracked concrete.
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206.

Use conditions (Environmental conditions)

- Structures subject to dry internal conditions.

Design:

- The anchorages are designed in accordance with the EN 1992-4 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.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging any components of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings 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 range given and is not lower than that of the concrete to which the characteristic loads apply.
- Effective anchoring depth, edge distance and spacing not less than the specified values without minus tolerance.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Application of the torque moment using a calibrated torque wrench.
- In case of aborted drill hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.

AWA Throughbolt	**Annex B 1**
Intended use Specifications	

Table B1 - Installation parameters

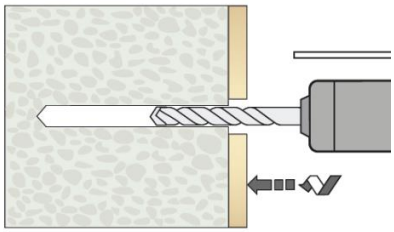
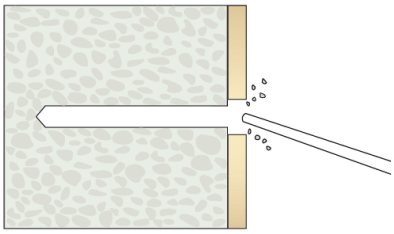
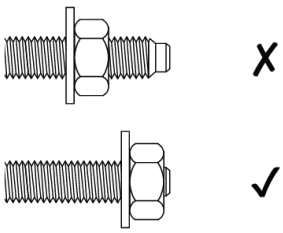
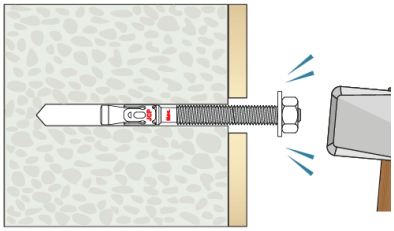
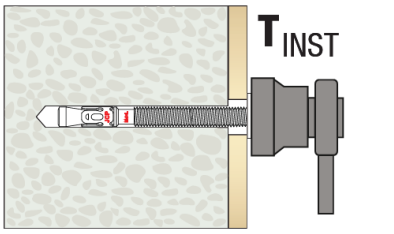
Anchor size			M6	M8	M10	M12	M16	M20	M24
Nominal diameter of drill bit	d_o	[mm]	6	8	10	12	16	20	24
Installation torque	T_{inst}	[Nm]	7	20	35	55	100	150	280
Standard embedment									
Minimum thickness of concrete	h_{min}	[mm]	100	100	110	130	170	210	240
Depth of drilled hole	h_1	[mm]	55	65	75	85	115	135	155
Overall anchor embedment depth	h_{nom}	[mm]	48	60	67	77	105	125	143
Effective anchorage depth	h_{ef}	[mm]	40	50	55	65	85	105	120
Minimum spacing	s_{min}	[mm]	50	65	70	85	110	135	155
Minimum edge distance	c_{min}	[mm]	50	65	70	85	110	135	155
Reduced embedment									
Minimum thickness of concrete	h_{min}	[mm]	-	100	100	100	140	160	185
Depth of drilled hole	h_1	[mm]	-	50	60	70	100	110	125
Overall anchor embedment depth	h_{nom}	[mm]	-	45	52	62	90	100	115
Effective anchorage depth	h_{ef}	[mm]	-	35	40	50	70	80	92
Minimum spacing	s_{min}	[mm]	-	65	70	85	110	135	155
Minimum edge distance	c_{min}	[mm]	-	65	70	85	110	135	155

AWA Throughbolt

Intended use
Installation parameters

Annex B 2

Installation instructions

	Position fixture and drill perpendicularly correct diameter hole to the corresponding depth without damaging the reinforcement.
	Clean hole by blowing to remove drilling debris and dust. Alternatively vacuum clean down to the bottom of the drilled hole.
	Check the nut position.
	Insert anchor through fixture into concrete and lightly hammer into concrete, such that h_{ef} or $h_{ef.red}$ depth is reached. It is achievable if the fixture thickness is not greater than the corresponding maximum fixture thickness mentioned in this document.
	Tighten with a calibrated torque wrench to the recommended torque (T_{inst}).

AWA Throughbolt	**Annex B 3**
Intended use Installation instructions	

Table C1 – Characteristic resistance under tension load

Size				M6	M8	M10	M12	M16	M20	M24
Steel failure										
Characteristic resistance		$N_{Rk,s}$	[kN]	5,7	10,5	16,6	24,2	45,8	70,7	102,0
Partial safety factor		γ_{Ms} [1)]	[-]	1,94					2,04	
Pull-out failure										
Standard embedment depth										
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	-	-	-	24	36	42	55
Reduced embedment depth										
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]		11 [2)]	12	19	32	40	45
Installation safety factor		γ_{inst}	[-]	1,0						
Increasing factor for concrete	C30/37	ψ_c	[-]	1	1,08			1,12		
	C40/50			1	1,15			1,23		
	C50/60			1	1,19			1,30		
Concrete cone failure and splitting failure										
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0						
Installation safety factor		γ_{inst}	[-]	1,0						
Standard embedment depth										
Effective anchorage depth		h_{ef}	[mm]	40	50	55	65	85	105	120
Concrete cone	Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$						
	Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$						
Splitting	Spacing	$s_{cr,sp}$	[mm]	160	200	220	260	340	420	480
	Edge distance	$c_{cr,sp}$	[mm]	80	100	110	130	170	210	240
Reduced embedment depth										
Effective anchorage depth		h_{ef}	[mm]		35 [2)]	40	50	70	80	92
Concrete cone	Spacing	$s_{cr,N}$	[mm]		$3 \cdot h_{ef}$					
	Edge distance	$c_{cr,N}$	[mm]		$1,5 \cdot h_{ef}$					
Splitting	Spacing	$s_{cr,sp}$	[mm]		140	160	200	280	320	370
	Edge distance	$c_{cr,sp}$	[mm]		70	80	100	140	160	184

[1)] in absence of other national regulations
[2)] restricted to anchoring statically indeterminate structural components

Table C2 – Displacement under tension load

Size			M6	M8	M10	M12	M16	M20	M24
Tension load in uncracked concrete	N	[kN]	2,6	5,2	9,0	11,4	17,1	20,0	26,2
Displacement	δ_{N0}	[mm]	0,70	0,25	1,05	1,90	2,13	1,54	1,37
	$\delta_{N\infty}$	[mm]	2,41	2,41	2,41	2,41	2,41	2,41	2,41

AWA Throughbolt

Performances
Characteristic resistance under tension load
Displacement under tension load

Annex C 1

Table C3 – Characteristic resistance under shear load

Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure without lever arm									
Characteristic resistance	$V^0_{Rk,s}$	[kN]	3,2	5,8	9,1	13,3	24,7	38,6	55,6
Ductility factor	k_7	[-]	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Partial safety factor	γ_{Ms} [1)]	[-]	1,62					1,70	
Steel failure with lever arm									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	4,8	11,8	23,6	41,3	104,9	204,5	353,6
Partial safety factor	γ_{Ms} [1)]	[-]	1,62					1,70	
Concrete pry-out failure									
Standard embedment depth									
Concrete pry-out failure factor	k_8	[-]	1,0	1,0	1,0	2,0	2,0	2,0	2,0
Reduced embedment depth									
Concrete pry-out failure factor	k_8	[-]		1,0 [2)]	1,0	1,0	2,0	2,0	2,0
Installation safety factor	γ_{inst}	[-]	1,0						
Concrete edge failure									
Standard embedment depth									
Effective length of anchor	l_f	[mm]	40	50	55	65	85	105	120
Reduced embedment depth									
Effective length of anchor	l_f	[mm]		35 [2)]	40	50	70	80	92
Anchor diameter	d_{nom}	[mm]	6	8	10	12	16	20	24
Installation safety factor	γ_{inst}	[-]	1,0						

[1)] in absence of other national regulations

[2)] restricted to anchoring statically indeterminate structural components

Table C4 – Displacement under shear load

Size			M6	M8	M10	M12	M16	M20	M24
Shear load in uncracked concrete	V	[kN]	1,5	2,7	4,4	6,3	11,8	18,4	26,5
Displacement	δ_{V0}	[mm]	0,57	0,57	0,56	1,19	2,02	3,58	4,29
	$\delta_{V\infty}$	[mm]	0,85	0,85	0,84	1,78	3,03	5,38	6,43

AWA Throughbolt

Performances
Characteristic resistance under shear load
Displacement under shear load

Annex C 2