Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

Deutsches Institut für Bautechnik

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-12/0142

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*	Apolo MEA Blitzanker BA plus *Apolo MEA Quick fix anchor BA plus*
Zulassungsinhaber *Holder of approval*	Apolo MEA Befestigungssysteme GmbH Industriestraße 6 86551 Aichach DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Kraftkontrolliert spreizender Dübel aus verzinktem Stahl in den Größen M8, M10, M12 und M16 zur Verankerung im ungerissenen Beton *Torque controlled expansion anchor made of zinc coated steel of sizes M8, M10, M12 and M16 for use in non-cracked concrete*
Geltungsdauer: *Validity:* vom *from* bis *to*	20 June 2013 24 April 2017
Herstellwerk *Manufacturing plant*	Werk 11 Werk 12

Diese Zulassung umfasst *This Approval contains*	13 Seiten einschließlich 6 Anhänge *13 pages including 6 annexes*
Diese Zulassung ersetzt *This Approval replaces*	ETA-12/0142 mit Geltungsdauer vom 24.04.2012 bis 24.04.2017 *ETA-12/0142 with validity from 24.04.2012 to 24.04.2017*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by Article 2 of the law of 8 November 2011[5];*
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];
- Guideline for European technical approval of "Metal anchors for use in concrete - Part 2: Torque controlled expansion anchors ", ETAG 001-02.

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2011*, p. 2178
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The Apolo MEA Quick fix anchor BA plus in the sizes of 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.

An illustration of the product and intended use is given in Annex 1.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences.

The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206:2000-12.

It may be anchored in non-cracked concrete only.

The anchor may only be used in structures subject to dry internal conditions.

The provisions made in this European technical approval 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.

2 Characteristics of the product and methods of verification

2.1 Characteristics of the product

The anchor corresponds to the drawings and provisions given in Annexes 2 and 3. The characteristic material values, dimensions and tolerances of the anchor not given in Annexes 2 and 3 shall correspond to the respective values laid down in the technical documentation[7] of this European technical approval.

The characteristic values for the design of anchorages are given in Annexes 4 and 5.

Each anchor is marked with the trade name, the anchor diameter, the anchor length and the maximum thickness of fixture according to Annex 1.

The anchor shall only be packaged and supplied as a complete unit.

[7] The technical documentation of this European technical approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 2 "Torque-controlled expansion anchors", on the basis of Option 7.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other 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 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 96/582/EG of the European Commission[8] the system 2(i) (referred to as system 1) of attestation of conformity applies.

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

(a) Tasks for the manufacturer:
  (1) factory production control;
  (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed control plan;

(b) Tasks for the approved body:
  (3) initial type-testing of the product;
  (4) initial inspection of factory and of factory production control;
  (5) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial/raw/constituent materials stated in the technical documentation of this European technical approval.

[8] Official Journal of the European Communities L 254 of 08.10.1996.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Deutsches Institut für Bautechnik[9].

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks of manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- use category (ETAG 001-1, Option 7),
- size.

[9] The control plan is a confidential part of the documentation of the European technical approval, but not published together with the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity.
See section 3.2.2.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with the Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Annex C, Method A, under the responsibility of an engineer experienced in anchorages and concrete work.

Verifiable calculation notes and drawings are 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).

4.3 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- 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 the components of an anchor,
- Anchor installation in accordance with the manufacturer's specifications 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 range given and is not lower than that of the concrete to which the characteristic loads apply,
- Check of concrete being well compacted, e.g. without significant voids,
- Edge distances and spacing not less than the specified values without minus tolerances,
- Positioning of the drill holes without damaging the reinforcement,
- In case of aborted 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,
- Cleaning of the hole of drilling dust,
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured when the embedment mark of the anchor does no more exceed the concrete surface,
- Application of the torque moment given in Annex 3 using a calibrated torque wrench.

5 Responsibility of the manufacturer

The manufacturer is responsible to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to as well as sections 4.2 and 4.3 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

- Diameter of drill bit,
- Thread diameter,
- Maximum thickness of the fixture,
- Minimum effective anchorage depth,
- Minimum hole depth,
- Torque moment,
- Information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- Reference to any special installation equipment needed,
- Identification of the manufacturing batch.

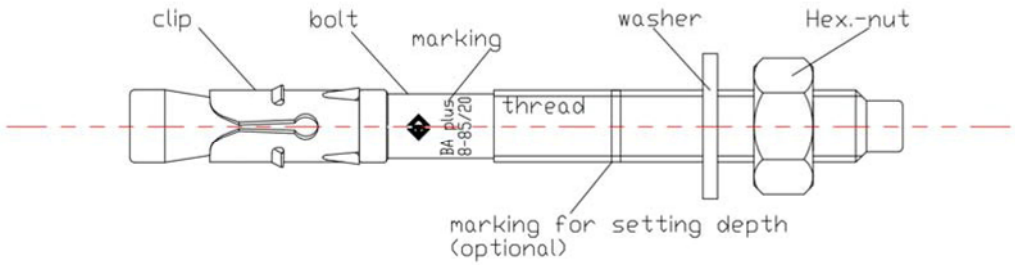
All data shall be presented in a clear and explicit form.

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Tempel

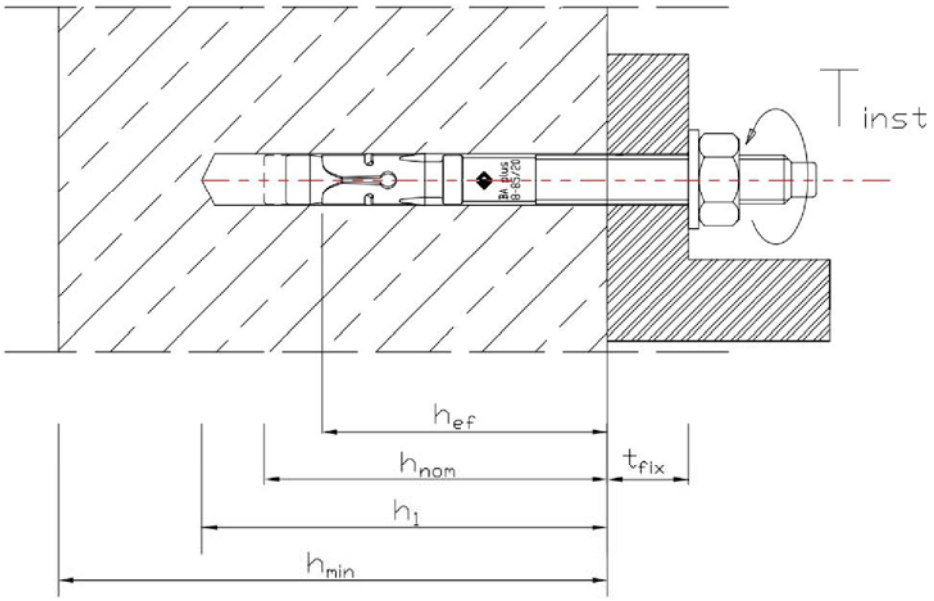
Deutsches Institut für Bautechnik DIBt

Apolo MEA Quick fix anchor BA plus (assembling)



Marking:	brand marking	Logo
	Type	BA plus
	Size	M ... (i.e. M8)
	Length	L (i.e. 85)
	Max. thickness of fixture	t_{fix} (i.e. 20)
Example:	**BA plus 8-85/20**	

Apolo MEA Quick fix anchor BA plus (after installation)



h_{nom}	=	setting depth
h_1	=	depth of drill hole (deepest point)
h_{min}	=	min. thickness of concrete member
t_{fix}	=	thickness of fixture
h_{ef}	=	effective anchorage depth

Apolo MEA Quick fix anchor BA plus	**Annex 1**
Product, marking and intended use	

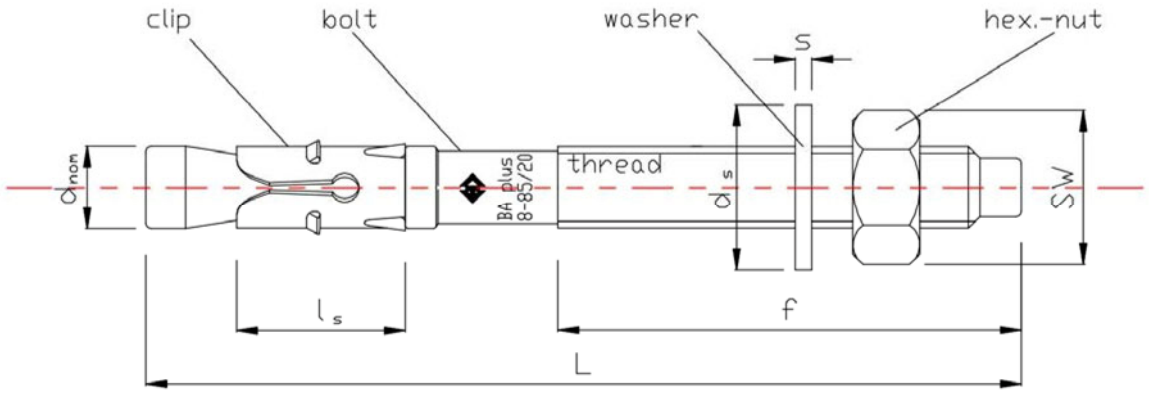


Table 1: parts and materials

Designation	material	strength
bolt	cold form steel or free cutting steel	M8: f_{uk} ≥750 N/mm² , f_{yk} ≥ 650 N/mm² M10: f_{uk} ≥670 N/mm² , f_{yk} ≥ 540 N/mm² M12: f_{uk} ≥630 N/mm² , f_{yk} ≥ 500 N/mm² M16: f_{uk} ≥600 N/mm² , f_{yk} ≥ 510 N/mm²
clip	cold steel strip acc. EN 10130, C490, C1035/C1045	≥128 HV10
washer	cold steel strip	≥140 HV10
nut	steel acc. DIN 934 or EN 4032	class 8

all parts zinc plated and blue passivated ≥ 5 µm acc. EN ISO 4042

Table 2: Dimensions

anchor		length overall	length thread	bolt-Ø	clip	washer		hex-nut
					length	thick-ness	outer-Ø	wrench-size
type	size	L	f	d_{nom}	l_s	s	d_s	SW
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
BA plus	**M8**	65 - 365	acc. drawing	8	16,4	≥ 1,4	≥ 15	13,0
BA plus	**M10**	75 - 375	acc. drawing	10	20,5	≥ 1,7	≥ 19	17,0
BA plus	**M12**	100 - 500	acc. drawing	12	21,4	≥ 2,2	≥ 23	19,0
BA plus	**M16**	120 - 615	acc. drawing	16	28,2	≥ 2,7	≥ 29	24,0

Apolo MEA Quick fix anchor BA plus	**Annex 2**
Materials and anchor dimensions	

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Table 3: Installation data

Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
nominal driller diameter	d_0	[mm]	8	10	12	16
max. cutting diameter of drill bit	$d_{cut,max} \leq$	[mm]	8,45	10,45	12,50	16,50
depth of drill hole (deepest point)	$h_1 \geq$	[mm]	60	65	90	110
effective anchorage depth	$h_{ef} \geq$	[mm]	45	50	70	85
setting depth	$h_{nom} \geq$	[mm]	53	59	82	99
diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14	18
thickness of member	$t_{fix,min...max}$	[mm]	0…300	0…300	0…400	0…500
wrench size of the nut	SW	[mm]	13	17	19	24
Required installation torque moment	T_{inst}	[Nm]	15	30	50	90

Table 4: Minimum thickness of concrete member, spacing and edge distance

Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
minimum thickness of member	h_{min}	[mm]	100	120	140	200
minimum spacing	s_{min}	[mm]	50	120	100	140
minimum edge distance	c_{min}	[mm]	50	90	100	125

Apolo MEA Quick fix anchor BA plus	Annex 3
Installation data, Minimum thickness of concrete member, Spacing and edge distance	

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Table 5: Design method A - Characteristic values for tension loads

Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
Steel failure						
characteristic resistance	$N_{Rk,s}$	[kN]	19,5	27,5	40,5	69,5
partial safety factor	γ_{Ms} [1)]	[-]	1,4	1,49	1,51	1,41
Pull out failure						
characteristic resistance in uncracked concrete C 20/25	$N_{Rk,p}$	[kN]	7,5	16	20	25
increasing factors for $N_{Rk,p}$	Ψ_C	C25/30	1,10			
		C30/37	1,22			
		C40/50	1,41			
		C50/60	1,55			
partial safety factor	γ_{Mp} [1)]	[-]	1,8 [2)]	1,5 [2)]		
Concrete cone failure						
effective anchorage depth	h_{ef}	[mm]	45	50	70	85
spacing	$s_{cr,N}$	[mm]	3 h_{ef}			
edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
partial safety factor	γ_{Mc} [1)]	[-]	1,8 [2)]	1,5 [2)]		
Concrete splitting failure						
spacing (splitting)	$s_{cr,sp}$	[mm]	190	240	390	400
edge distance (splitting)	$c_{cr,sp}$	[mm]	95	120	195	200
partial safety factor	γ_{Msp} [1)]	[-]	1,8 [2)]	1,5 [2)]		

1) In absence of other national regulations.

2) The installation safety factor γ_2 is included.

Table 6: Displacements under tension loads

Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
tension load	N	[kN]	3,0	6,3	9,5	11,9
displacements	δ_{N0}	[mm]	0,1	1,3	1,1	0,5
displacements	$\delta_{N\infty}$	[mm]	0,8	1,9		

Apolo MEA Quick fix anchor BA plus	Annex 4
Design method A: Characteristic values for tension load and displacements	

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Table 7: Design method A - Characteristic values for shear loads

Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
Steel failure without lever arm						
characteristic shear load resistance	$V_{Rk,s}$	[kN]	6,4	19,4	26,6	34,6
partial safety factor	γ_{Ms} [1)]	[-]	1,5	1,5	1,26	1,5
Steel failure with lever arm						
characteristic bending moment	$M^0_{Rk,s}$	[Nm]	28,1	50,1	82,5	199,2
partial safety factor	γ_{Ms} [1)]	[-]	1,5	1,5	1,26	1,5
Concrete pryout failure						
factor in equation (5.6) of the Guideline ETAG 001, Annex C, 5.2.3.3	k	[-]	1,0	1,0	2,0	2,0
partial safety factor	γ_{Mc} [1)]	[-]	1,5 [2)]			
Concrete edge failure						
effective length of anchor under shear load	l_f	[mm]	45	50	70	85
effective external diameter of anchor	d_{nom}	[mm]	8	10	12	16
partial safety factor	γ_{Mc} [1)]	[-]	1,5 [2)]			

[1)] In absence of other national regulations.

[2)] The installation safety factor γ_2 is included.

Table 8: Displacements under shear loads

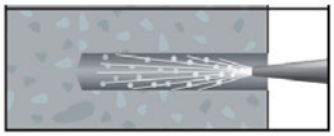
Apolo MEA Quick fix anchor BA plus			size M8	size M10	size M12	size M16
shear load	V	[kN]	3,0	9,2	15,1	16,5
displacements	δ_{V0}	[mm]	0,1	1,9	3,2	3,3
displacements	$\delta_{V\infty}$	[mm]	0,2	2,9	4,8	5,0

Apolo MEA Quick fix anchor BA plus	Annex 5
Design method A: Characteristic values for shear load and displacements	

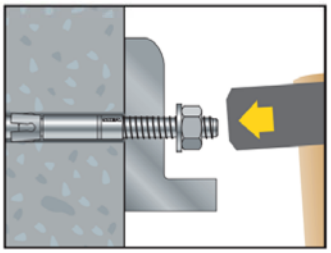
Deutsches Institut für Bautechnik

Installation instruction of the Apolo MEA quick fix anchor BA plus

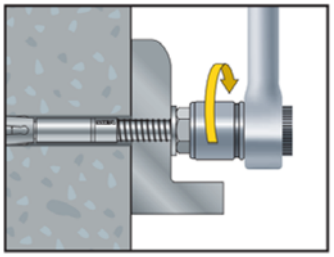
1. Drill the hole with a hammer drill



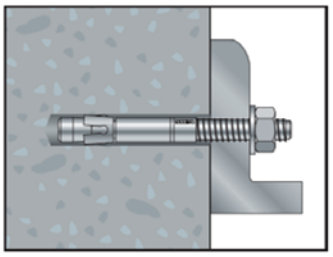
2. Clean the borehole



3. Hammer in the anchor (pay attention to the defined setting depth)



4. Apply the required installation torque T_{inst} by using a torque wrench



5. After installation

Apolo MEA Quick fix anchor BA plus	**Annex 6**
Installation instruction	