

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-19/0128
of 13 May 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Product family
to which the construction product belongs

Fastener for the rear fixing of facade panels made of
selected natural stones in accordance with EN 1469:2015

Manufacturer

EJOT Baubefestigungen GmbH
In der Stockwiese 35
57334 Bad Laasphe
DEUTSCHLAND

Manufacturing plant

EJOT Plant 40

This European Technical Assessment
contains

14 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

EAD 330030-00-0601

European Technical Assessment

ETA-19/0128

English translation prepared by DIBt

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Specific Part**1 Technical description of the product**

The EU-E is a fastener of sizes M6 and M8 which consist of a threaded bolt with external thread, an expansion ring and a tube. The fastener is put into an undercut drill hole and by driving-in of the expansion ring with the tube it is fixed.

The product description is given in Annex A. The material values, dimensions and tolerances of the components of the fastener not indicated in the annexes shall correspond to the values laid down in the technical documentation¹.

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 fastener 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 fasteners 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 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 its assessment**3.1 Mechanical resistance and stability (BWR 1)**

Essential characteristic	Performance
Characteristic resistance to breakout or pull-out failure under tension load	See Annex C 1
Characteristic resistance to breakout or pull-out failure under shear load	See Annex C 1
Characteristic resistance to breakout or pull-out failure under combined tension and shear load	See Annex C 1
Edge distance and spacing	See Annex B 2 and B 3
Durability	Corrosion Resistance Class (CRC) III in accordance with EN 1993-1-4:2015
Characteristic resistance to steel failure under tension and shear loads	See Annex C 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

¹ The technical documentation comprises all information of the holder of this ETA necessary for the production, installation and maintenance of the fastener; these are in particular design drawings. The part to be treated confidentially is deposited with Deutsches Institut für Bautechnik and, as far as this is relevant to the tasks of the approved bodies involved in the procedure of attestation of conformity, shall be handed over to the approved body.

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

In accordance with EAD No. 330030-00-0601 the applicable European legal act is: [97/161/EG].
The system to be applied is: 2+

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

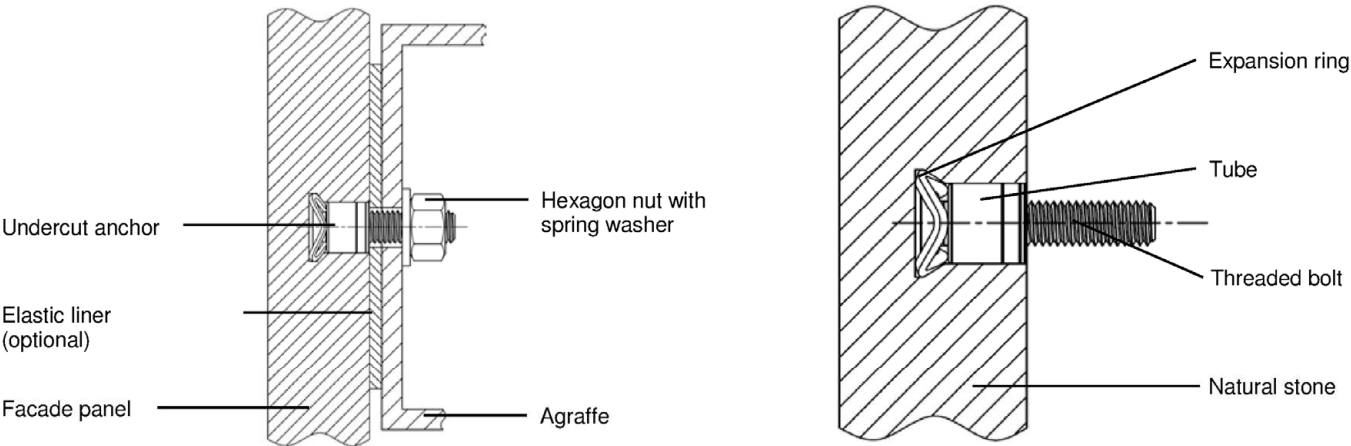
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 13 May 2020 by Deutsches Institut für Bautechnik

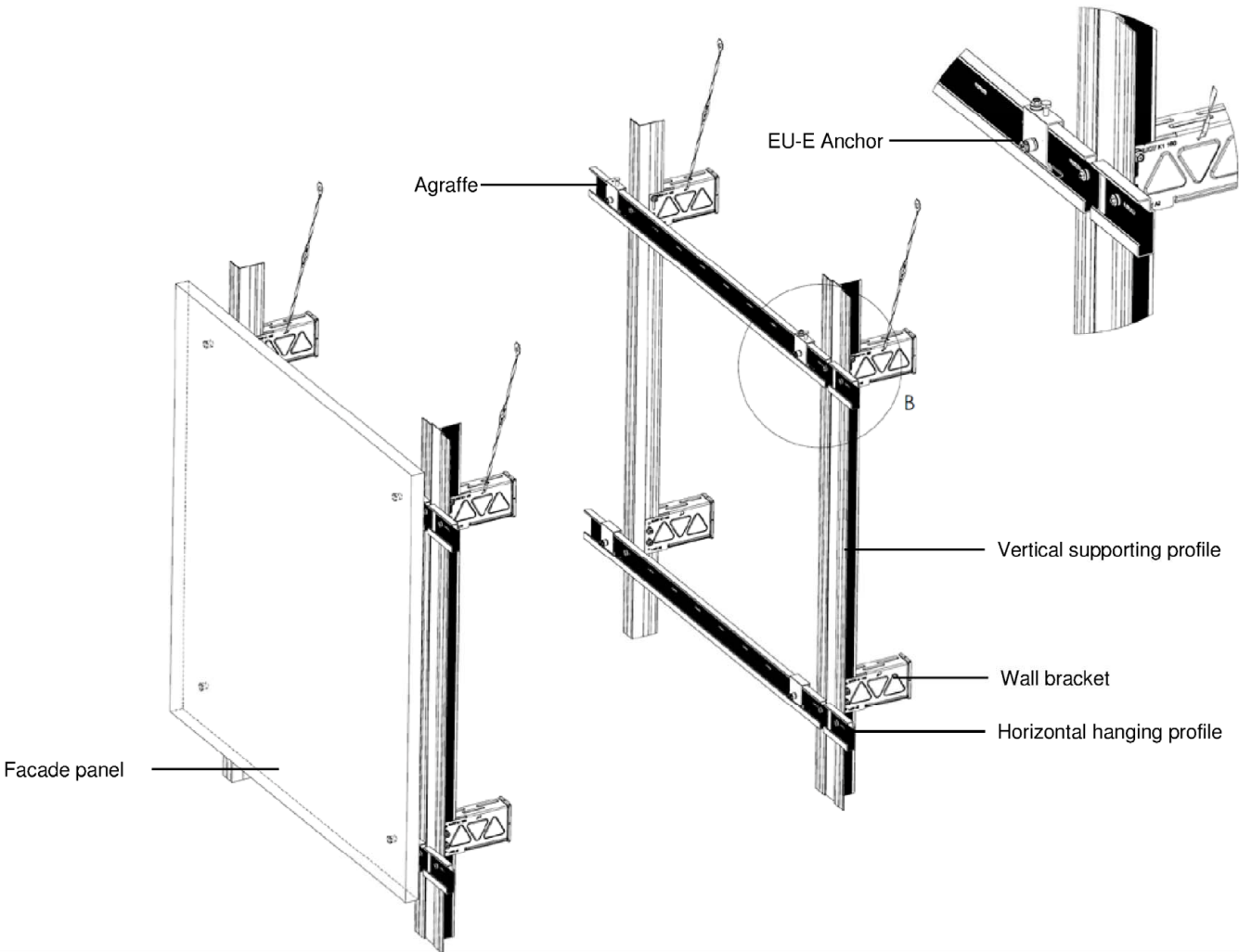
BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Aksünger

Installation condition



Installation example



EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Product description
Installation condition and installation example

Annex A1

Anchor components

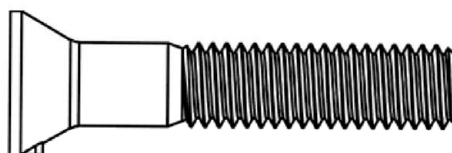
Threaded bolt

Marking



Material A4

External thread M6 or M8



Torsion protection

Expansion ring



Tube



Product designation
e.g. EJOT 11x12

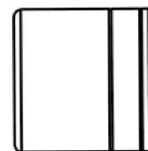


Table A1: Material of the anchor components

Component	Material
Thread bolt	Stainless steel A4 - 70 in accordance with EN ISO 3506:2009
Expansion ring	Stainless steel A4 - 70 in accordance with EN ISO 3506:2009
Tube	Stainless steel A4 - 70 in accordance with EN ISO 3506:2009

Anchor types



EU-E Anchor with external thread



EU-I Anchor with internal thread

Designation key

	EU	-	E	-	13	x	15	A4	-	M8
EJOT Undercut Anchor	_____		_____		_____		_____	_____		_____
Thread type			_____		_____		_____	_____		_____
Hole diameter d_0					_____		_____	_____		_____
Hole depth h_1							_____	_____		_____
Material								_____		_____
Thread size										_____

EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Product description

Anchor components, materials and designation key

Annex A2

Specifications of intended use

Anchorage is subject to:

- Static and quasi static loads

Base material:

- Facade panels made of natural stone according EN 1469:2015.
- Natural stone free of fractures, mechanically effective cracks and aging.
- Natural stone of the natural stone groups according to Table B1.
- Characteristic values of the panels according to Table B2

Table B1: Natural stone classification

Group of stone		Natural stones	Conditions
I	High-quality intrusive rocks (plutonic rocks)	granite, granitite, tonalite, diorite, monzonite, gabbro, other magmatic plutonic	Bending tensile strength: $\geq 10,6$ MPa

¹⁾ In the case of natural stone façade panels having anisotropic layers, the difference between the flexural strengths determined parallel to the stratification and perpendicular to the edges of the stratification shall not be more than 50 %.

Use conditions (Environmental conditions):

- In accordance with EN 1993-1-4:2015 dependent on Corrosion Resistancy Class (see ETA sect 3.1).

Design:

- The facade anchorage must be dimensioned for the respective application under the responsibility of an engineer experienced in the field of facade construction.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored.
- Anchorages under static or quasi-static loading are designed in accordance with: EOTA Technical Report TR062 "Design of fasteners for facade panels made of natural stone".

Installation:

- The undercut drill holes are drilled in the factory or on the construction site under workshop conditions; if they are drilled on the construction site, their execution is supervised by the responsible site manager or a competent representative of the site manager.
- The undercut holes are drilled with the special drill according to Annex B4. The drill should be used in combination with a special drill rig. Other suitable drilling machines may also be used.
- The drill dust shall be removed from the borehole.
- In the case of a wrong drilling, a new drill hole must be arranged at a distance of twice the depth of the wrong drilling.
- The geometry of the boreholes must be checked at 1% of all boreholes. The following dimensions must be checked and documented in accordance with the manufacturer's specifications and test instructions using the measuring aid in accordance with Annex B5:
 - Diameter of the cylindrical borehole.
 - Diameter of the undercut.
 - Depth of the borehole.
 - Panel thickness

EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Intended use
Specifications

Annex B1

If the specified tolerances are exceeded, the geometry of the borehole must be checked on 25% of the created holes. The tolerances must not be exceeded for any further drill holes, otherwise all boreholes must be checked. Drill holes with tolerances above or below the specified limits must be discarded.

Note: Checking the geometry of the borehole at 1% of all holes means that one in 25 plates (equivalent to 100 holes for plates with 4 undercut anchors) must be checked for one hole. If the tolerances specified in Annex B4 are exceeded, increase the scope of inspection to 25% of the holes, i.e. check one hole at each of the 25 plates.

- The façade panels are protected from damage during transport and storage on the building site; the façade panels are not hooked in jerkily (lifting devices are used for hooking in the façade panels if necessary); façade panels with cracks are not assembled.
- The anchors are mounted in a controlled way. Suitable setting tools in accordance with Appendix B5 must be used for this purpose. The anchor is set correctly if the sleeve does not protrude beyond the panel surface.
- Overhead installation is allowed

Table B2: Characteristic values for facade panels made of natural stone

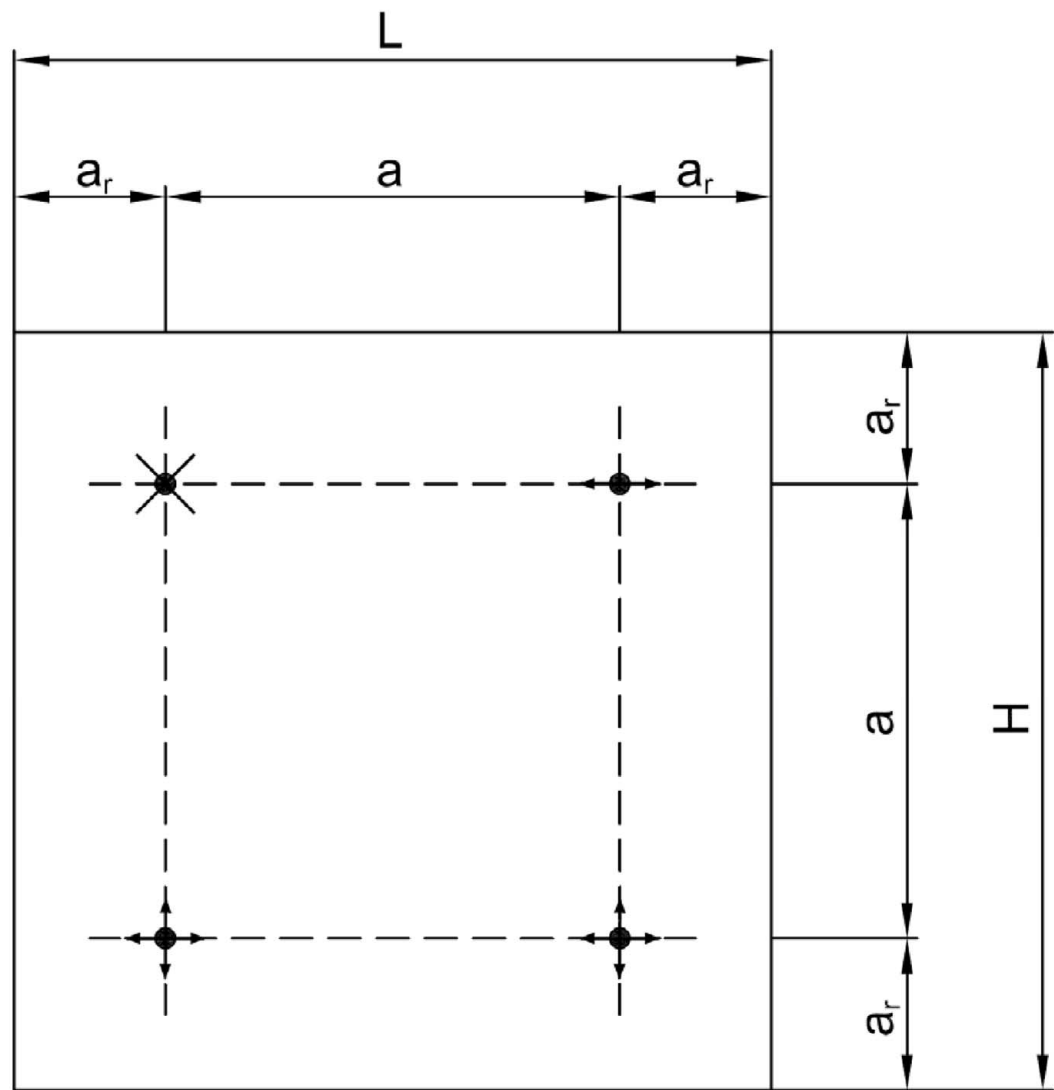
Natural stone facade panels				EU-E 11x12 A4-M6	EU-E 11x15 A4-M8	EU-E 13x15 A4-M8
Nominal panel thickness (stone group I (Tab. B1))	$h_{nom} \geq$	[mm]	20 (30) < h_{nom} < 70			
max. panel format	$A \leq$	[m²]	3,0			
max. side length	$H \text{ bzw. } L \leq$	[m]	3,0			
Number of anchors (rectangular arrangement)	n	[-]	4			
Anchor edge distance	a_r	[mm]	$50 \text{ mm} \leq a_r \leq 0,25L \text{ bzw. } 0,25H$			
Axial spacing	$a \geq$	[mm]	$8 h_s$			
Remaining wall thickness	$h_r \geq$	[mm]	$0,4 \times h_s$			
Minimum characteristic bending tensile strength acc. EN 12372						
Flossenbürger Granit, Deutschland	Group of stone I	$\sigma_{5\%} \geq$	[MPa]	11,1	10,6	

EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Intended use
Specifications

Annex B2

Geometry of the façade panels



a_r = Edge distance - Distance of the Anchor towards the panel edge

a = Axial spacing - Distance between two anchors

H = Length of the facade panel in horizontal direction

L = Length of the facade panel in vertical direction

✱ = Fixed point

•→ = Horizontal sliding point

•↕ = Horizontal and vertical sliding point

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EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4	
Intended use Façade panel geometry and anchor layout	Annex B3

Drill bit geometry

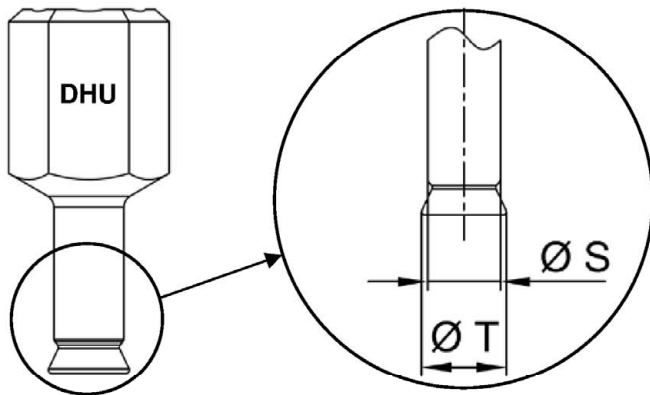


Table B3: Dimensions [mm] of the drill bits

Type	Ø T Head diameter	Ø S Shaft diameter
DHU 11	9	6,5
DHU 13	11	8,5

Borehole geometry

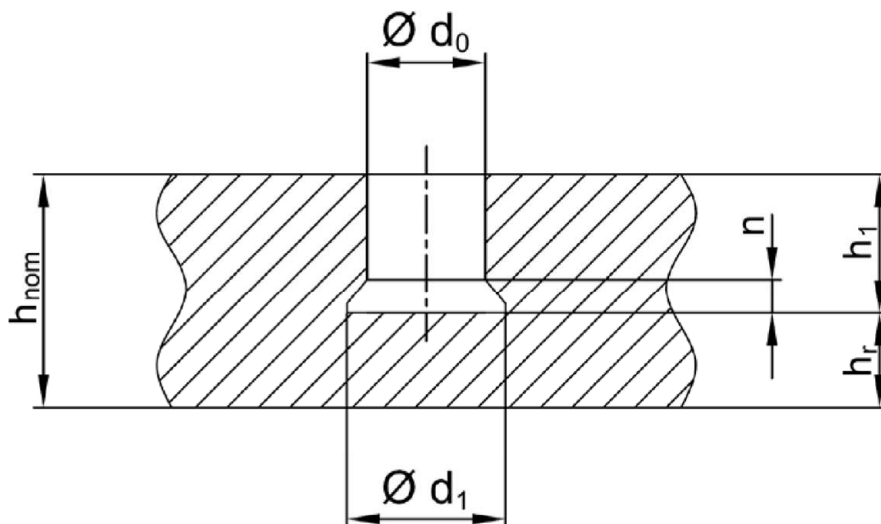


Table B4: Borehole geometry

Drill	Nominal diameter Ø d₀	Undercut Ø d₁	Hole depth h₁	Undercut height n	Remaining wall thickness hᵣ
DHU 11	11 +0,4 -0,2	13,5 ±0,3	hₛ +0,4 -0,1	≈ 4	0,4 * hₛ
DHU 13	13 +0,4 -0,2	15,5 ±0,3	hₛ +0,4 -0,1		0,4 * hₛ

(Measurements can be checked with the corresponding measuring aids, see annex B5.)

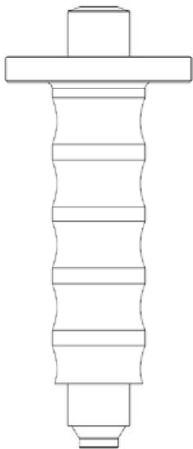
EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Intended use

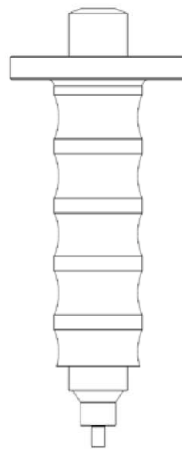
Drill bit and borehole geometry, tolerances for borehole inspection

Annex B4

Setting tool

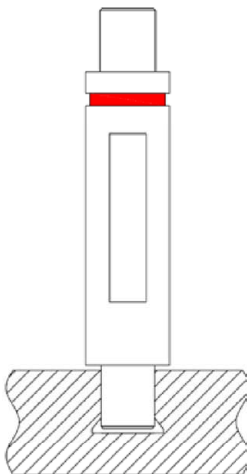


HUE 11 & HUE 13
(Anchor with external thread)

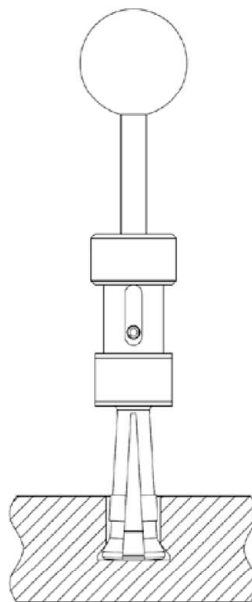


HUI 13
(Anchor with internal thread)

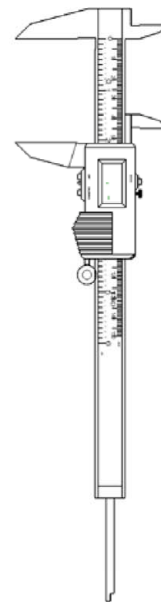
Measuring aids



MSD – Borehole diameter d_0



MBD - Undercut diameter d_1
Undercut height n



Calipers - Borehole depth h_1

Table B5: Drill bits, measuring aids and setting tools

Anchor	Drill	Measurement aids		Setting tool
		Nominal diameter	Undercut geometry	
EU-E 11x12 A4-70 M6	DHU 11	MSD 11	MBD 11	HUE 11
EU-E 11x15 A4-70 M8				
EU-E 13x15 A4-70 M8	DHU 13	MSD 13	MBD 13	HUE 13

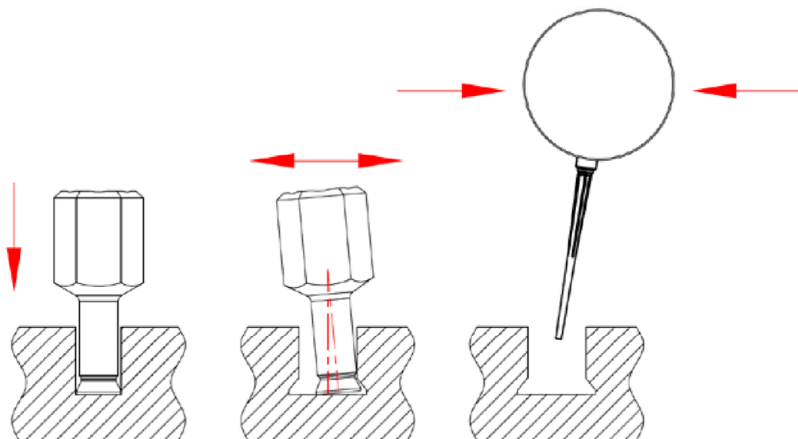
EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Intended use
Setting tool and measuring aids

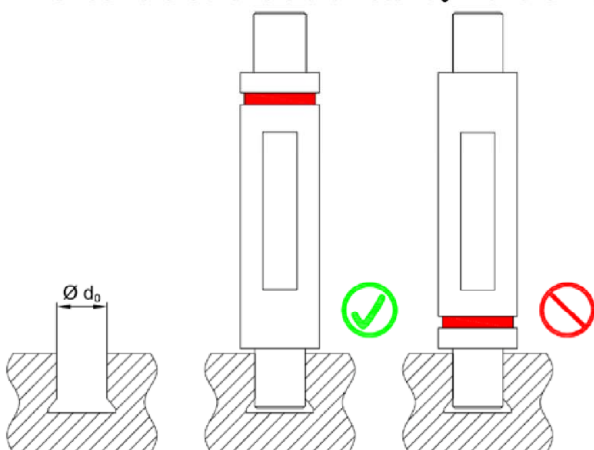
Annex B5

Installation instruction

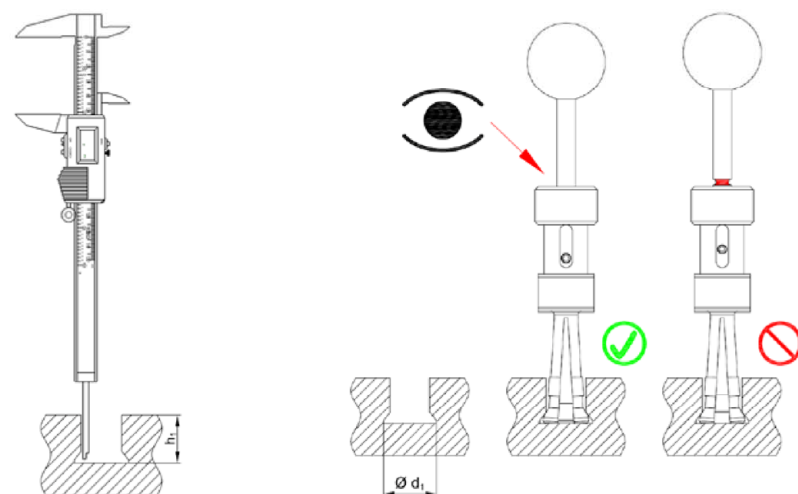
1. Drilling and cleaning the borehole



2. Check the borehole diameter d_0 with the measuring aid MSD



3. Checking the borehole depth h_1 and the undercut diameter d_1

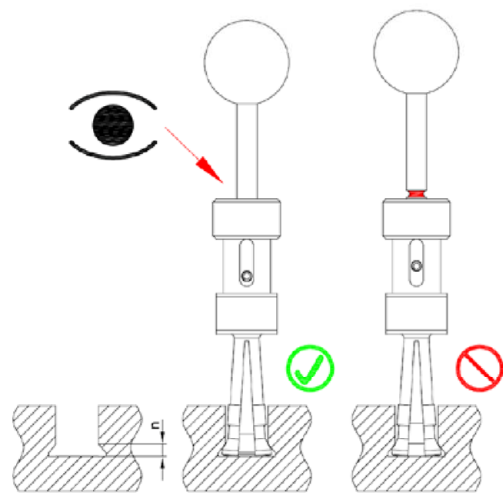


EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

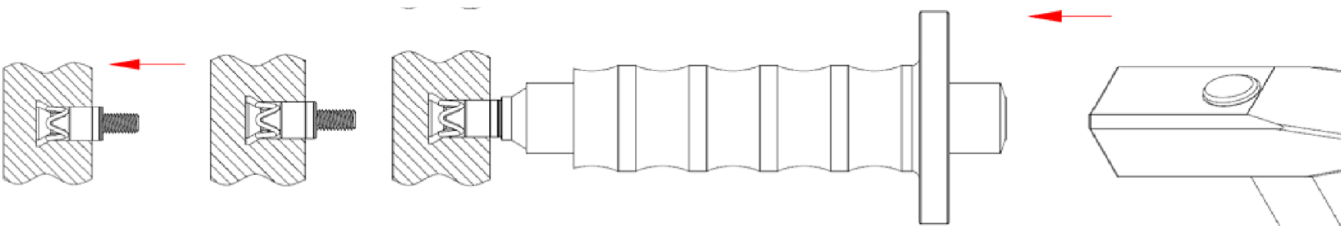
Intended use
Installation instruction

Annex B6

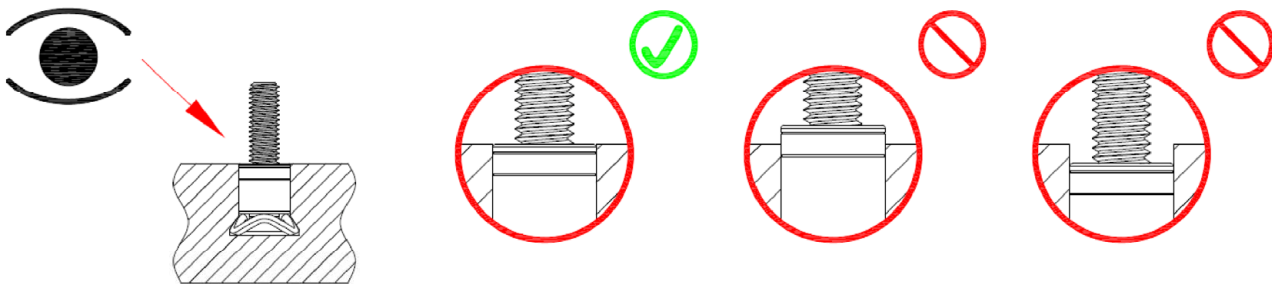
4. Check the undercut height n



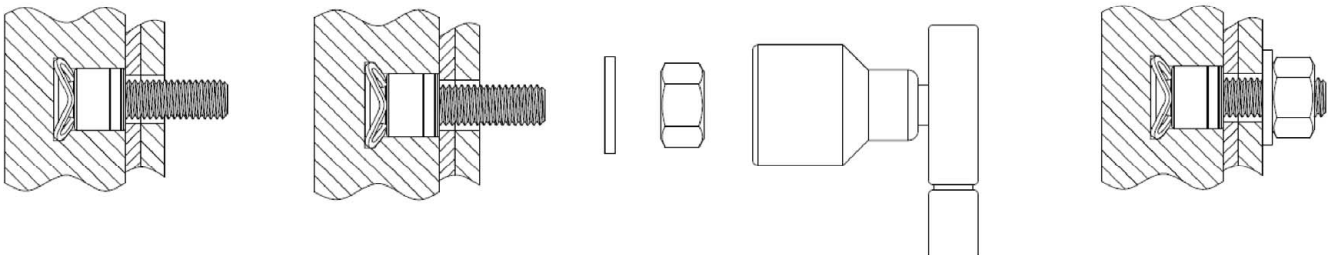
5. Mounting the undercut anchor



6. Checking the setting depth



7. Assembly of the Agraffe



EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Intended use
Installation instruction

Annex B7

Characteristic load capacity of the anchor

Table C1: Characteristic anchor values for facade panels ¹⁾

Anchor type		EU-E 11 – M6		EU-E 13 – M8
Trade name natural stone		Flossenbürger Granit		
Country of origin		Germany		
Panel thickness	[mm]	20	30	30
Embedment depth	$h_s =$ [mm]	12	15	15
Remaining panel thickness	$R \geq$ [mm]	0,4 x h_{nom}		
Edge distance	$a_r =$ [mm]	50 mm $\leq a_r \leq$ 0,25L bzw. 0,25H		
Axial spacing	$a \geq$ [mm]	8 x h_s		
Installation type		Flush mounting		
Characteristic resistance				
under tension load	$N_{Rk} =$ [kN]	2,9	4,7	4,4
under shear load	$V_{Rk} =$ [kN]	2,5	4,5	3,0
Combined tension and shear load				
Value for tri-linear function	X [-]	1,0		
Value for exponential function	Y [-]	1,0		

¹⁾ For other natural stones according to Table B1, the resistance may be determined according to Technical Report "Design of fasteners for facade panels made of natural stone (without slate)".

**Table C2: Characteristic resistance to steel failure for
A4-70 in accordance with EN ISO 3506:2009**

size			M6	M8
Characteristic resistance under tension load	$N_{Rk,s}$	[kN]	14,1	25,6
Characteristic resistance under shear load	$V_{Rk,s}$	[kN]	7,0	12,8

EU-E 11x12 A4; EU-E 11x15 A4; EU-E 13x15 A4

Performance

Characteristic load bearing capacities of the anchor

Annex C1