

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-11/0145  
of 1 July 2018

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

fischer-Zykon-panel anchor FZP II

Product family  
to which the construction product belongs

Fastener for the rear fixing of façade panels made of  
selected natural stones according to EN 1469

Manufacturer

fischerwerke GmbH & Co. KG  
Klaus-Fischer-Straße 1  
72178 Waldachtal  
DEUTSCHLAND

Manufacturing plant

fischerwerke

This European Technical Assessment  
contains

15 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-11/0145**  
English translation prepared by DIBt

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## Specific Part

### 1 Technical description of the product

The fischer-Zykon-panel anchor FZP II is a special anchor of sizes M 6, M 8 and M 10 which consists of a cone bolt (with external thread or internal thread), an expansion part, a sleeve and, if need be, a nut. Cone bolt and expansion part are made of stainless steel. The sleeve is made of stainless steel or carbon. The nut is made of stainless steel or aluminium. The anchor is put into an undercut drill hole and by driving-in of the sleeve it is placed form-fit.

The product description is given in Annex A.

### 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 anchors 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 for tension and shear loads	See Annex C 1
Anchor distances and spacing	See Annex B 3 and Annex C 1
Durability	Corrosion Resistance Class (CRC) III in accordance with EN 1993-1-4:2015

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

### 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 1 July 2018 by Deutsches Institut für Bautechnik

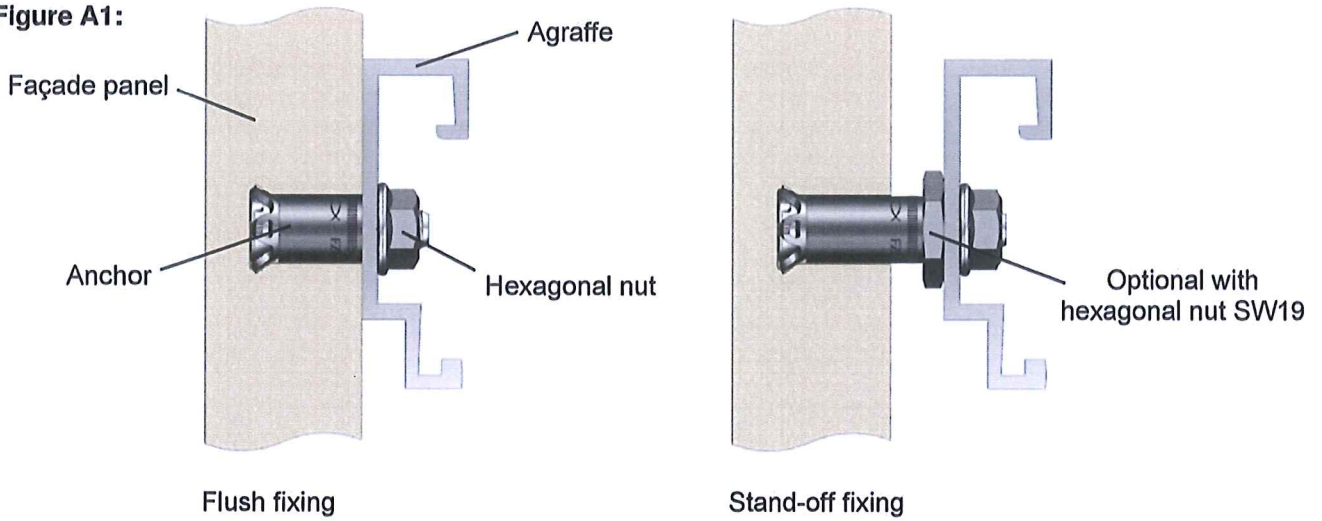
BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Aksünger



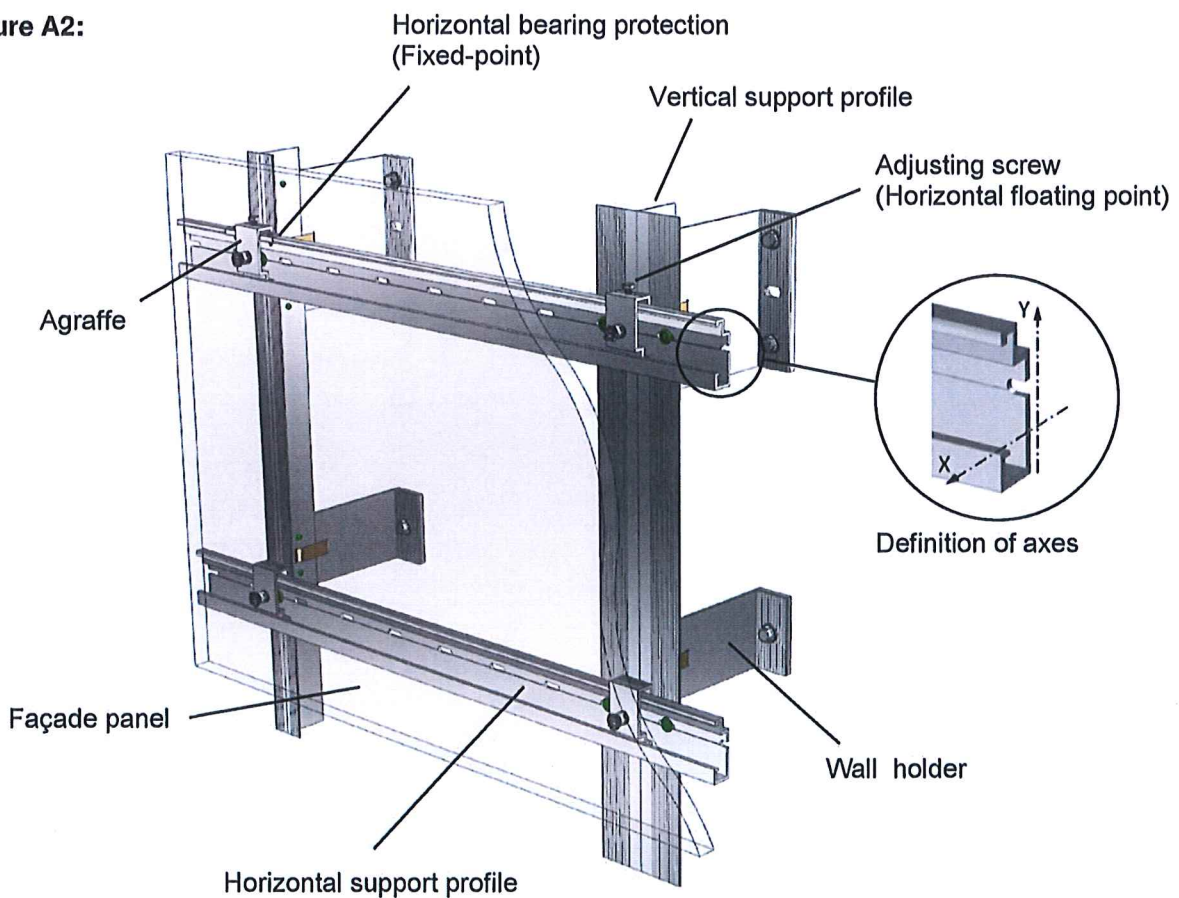
**Mounting condition**

**Figure A1:**



**Example of façade panel on substructure**

**Figure A2:**



**fischer Zykon panel anchor FZP**

**Product description**  
Product and built-in state

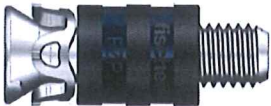
**Annex A 1**

## Type of anchor

### Anchor with external thread

Figure A3:

With carbon fibre sleeve



With steel sleeve



With carbon fibre sleeve and sleeve flange



With Steel sleeve and hex nut SW19



With steel sleeve and hex nut ES <sup>1)</sup>



<sup>1)</sup> Hex nut ES for suspension systems

### Anchor with internal thread

Figure A4:

With carbon fibre sleeve



With steel sleeve



### Identification system

Example. FZP II 13 x 26 M8 / SO / 17 Al

- Material of the hexagon nut SW19
- Free thread length **b** after mounting
- Stand Off fixing
- Thread diameter
- Drill hole depth  $h_v$  (for FZP  $h_v = h_1 = h_s$ )
- Ø Cylindrical drill hole  $d_0$
- Fischer Zykon Panel anchor II

fischer Zykon panel anchor FZP

Product description  
Type of anchor and identification system

Annex A 2

### Parts of anchor and materials

#### Cone bolt

Figure A5:

With external thread  
M6 / M8 / M10

With internal thread  
M6 / M8



Material identification

Option:  
Anti rotation lock  
Nose or frontal profiling

Option:  
Identifying mark, drive, e.g.: Slot;  
polygonal (Outside; inside);  
spanner flats

#### Expansion part

Figure A6:



#### Sleeve

Figure A7:

Carbonfibre

Stainless steel



Type designation e.g. FZP...

#### Supplementary components

Figure A8:

Hex nut SW 19

Hex nut ES



Identifying mark of the producer

Marking: Al = Aluminum  
Optional: A4 = stainless steel

Table A1: Material of anchor parts

Anchor parts	Material
Cone bolt	Stainless steel, EN 10088 :2014
Expansion part	Stainless steel, EN 10088 :2014
Sleeve	Stainless steel, EN 10088 :2014
Carbonsleeve	Polyamide 6.6 CF
Hexagonal nut SW19	Aluminium, EN 755 :2016, Stainless steel, EN 10088 :2014
Hexagonal nut ES	Aluminium, EN 755 :2016, Stainless steel, EN 10088 :2014

### fischer Zykon panel anchor FZP

Product description  
Parts of anchor and material

Annex A 3



English translation prepared by DIBt

### Specifications of intended use

#### Anchorage subject to:

- Static and quasi-static loads.

#### Anchorage ground:

- Natural stone facade panels according to EN 1469:2015.
- The used material is free of crevices and mechanically effective cracks and alterations.
- Natural stone classified in accordance with Table B1.
- Characteristic values of the panels correspond to Table B2.

**Table B1: Stone groups for façade panels made of natural stone**

Stone group		Natural stone type	Boundary conditions
I	High quality intrusive rocks (plutonic rocks)	Granite, granitite, tonalite, diorite, monzonite, gabbro, other magmatic plutonic rocks	None
II	Metamorphic rocks with „hard stone characteristics“	Quarzite, granulite, gneiss, migmatite	None
III	High quality extrusive rocks (volcanic rocks)	Basalt and basaltic lava without harmful ingredients (like sun burner basalt)	Minimum density $\rho$ : basalt: 2,7 kg/dm <sup>3</sup> basaltic lava: 2,2 kg/dm <sup>3</sup>
IV	Sedimentary rocks with „hard stone characteristics“ <sup>1)</sup>	Sandstone, limestone and marble	Sandstone: 2.1 kg/dm <sup>3</sup>

<sup>1)</sup> For façade panels made of natural stones with planes of anisotropies, the difference between the flexural strength determined parallel to the planes of anisotropy and perpendicular to the edges of the planes of anisotropy shall not be more than 50 %.

#### Use conditions (Environmental conditions):

- In accordance with EN 1993-1-4:2015 dependent on Corrosion Resistancy Class (CRC) (ETA Section 3.1)

**fischer Zykon panel anchor FZP**

Intended use  
Specifications

**Annex B 1**



**Design:**

- The design of anchorages under static and quasistatic load is carried out in accordance with: EOTA Technical Report TR 062 "Design of fasteners for façade panels made of natural stone".
- The façade panels, their fixings as well as the substructure including its connection to wall brackets and their connection to the construction works are designed for the respective case of application under the responsibility of an engineer skilled in the field of façade construction.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.

**Installation:**

- The drillings are done at the factory or on site under workshop conditions; when making the drillings on site the execution is supervised by the responsible project supervisor or a skilled representative of the project supervisor.
- Making of the undercut drilling is done with a special drill bit or a special CNC drill bit according to Annex B 4 and a special drilling device in accordance with the information deposited with Deutsches Institut für Bautechnik.
- The drilling residues are removed from the drill hole.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole.
- The geometry of the drill hole is checked on 1 % of all drillings. The following dimensions shall be checked and documented according to manufacturer's information and testing instructions by means of a control aids according to Annex B 7, Figure B5, B6 and B7.

- Diameter of the cylindrical drill hole.
- Diameter of the undercut.

- Remaining wall thickness (drill hole depth and panel thickness respectively).

- If the tolerance given in Annex B 4, Table B2 is exceeded, the geometry of the drill hole shall be checked on 25 % of the drillings performed. No further drill hole may exceed the tolerances otherwise all the drill holes shall be controlled. Drilling holes falling below or exceeding the tolerances shall be rejected.

Note: Checking the geometry of the drill hole on 1 % of all drillings means that on one of the 25 panels (this corresponds to 100 drillings for panels with 4 undercut anchors) one drilling shall be checked. If the tolerances given in Annex B 4 Table B2 are exceeded the extent of the control shall be increase to 25 % of the drillings, i.e. one drilling each shall be checked on all the 25 panels.

- The anchors are installed in a deformation controlled manner. For this purpose suitable installation tools per Annex B 5, Figure B4 shall be used. The anchor is set correctly if the bolt projection "b" in accordance to Annex A 2 (designation system) according to Annex B 6 Figure B9 and B10 is observed. For flush mounting, the sleeve must not project beyond the plate surface. Internal thread anchors are mounted flush or recessed according to Annex B 6.
- During transport and storage on site the façade panels are protected from damages; the façade panels are not to be hung up jerkily (if need be lifters shall be used for hanging up the façade panels); façade panels and reveal panels respectively with incipient cracks are not be installed.
- The façade panels are arranged in a "reclined" or "upright" position, they also may be fixed at façade soffits.
- The façade are installed by skilled specialists and the laying instructions of the manufacturer shall be paid attention to.
- The façade panels must not be used for the transmission of scheduled impact loads and for the protection against falling.
- Overhead installation is allowed (e.g.: fastening cladding of ceilings)

**fischer Zykon panel anchor FZP**

**Intended use**  
Specifications

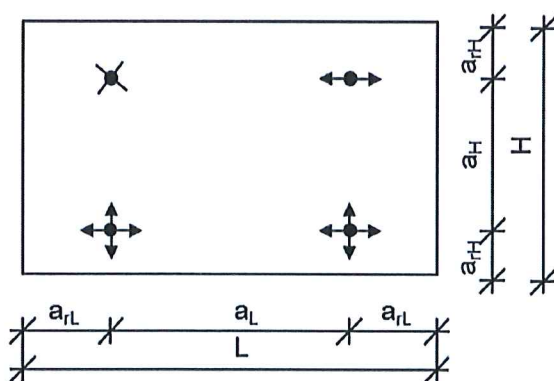
**Annex B 2**

**Table B2: Characteristic values of façade and reveal panels made of nature stones**

Façade panels				
Nominal panel thickness	$h_{nom}$	[mm]		$20 (30)^1 \leq h_{nom}$
Maximum panel size	A	[m <sup>2</sup> ]		3,0
Maximum side length	H bzw. L	[m]		3,0
Number of anchors (rectangular arrangement)	N	[-]		4
Embedment depth <sup>2)</sup>	$h_s$	[mm]		$12 \leq h_s \leq 38$
Minimum edge distance <sup>3)</sup>	$a_{rL}$ or $a_{rH}$	[m]		50
Maximum edge distance	$a_{rL}$ or $a_{rH}$	[mm]		0,25 L bzw. 0,25 H
Minimum spacing <sup>3)</sup>	$a_L$ or $a_H$	[mm]		$8 h_s$
Minimum residual wall thickness <sup>4)</sup>	$h_r$	[mm]		$0,4 h_{nom}$
Minimum characteristic flexural strength in accordance with EN 12372				
Padang Cristallo G603, China	Stone group I	$\sigma_{5\%} \geq$	[N/mm <sup>2</sup> ]	13,4
Jura Limestone (yellow), Germany	Stone group IV	$\sigma_{5\%} \geq$	[N/mm <sup>2</sup> ]	12,4

- 1) For sandstone, limestone and basaltlava: panel thickness  $h \geq 30$  mm, if the bending strength of the material  $\sigma_{5\%} < 8$  N/mm<sup>2</sup>.
- 2)  $h_s = (h_1) = (h_v)$  in 1 mm steps only (12, 13, 14 mm ... 38 mm) - tolerances see Annex B 4, Table B3, footnote <sup>3)</sup>
- 3) For small fitting, differential or fill in pieces, the minimum edge distance or spacing shall be chosen constructively. In case of design under static loading using FEM, smaller edge distances are allowed.
- 4) Only for stand-off fixing.

**Figure B1: Definition of edge and centre distance**



**Legende:**

- $a_{rL}, a_{rH}$  = Edge distance – anchor distance to the panel edge
- $a_L, a_H$  = Spacing – Distance between the anchors
- L = Length of the panel in horizontal direction
- H = Length of the panel in vertical direction
- = Fixed bearing (fixed support)
- = Horizontal slide bearing (slide support)
- = Horizontal and vertical slide bearing (slide support)

<b>fischer Zykon panel anchor FZP</b>	<b>Annex B 3</b>
Intended use Requirements of façade panels	



**Table B3: Drill hole dimensions**

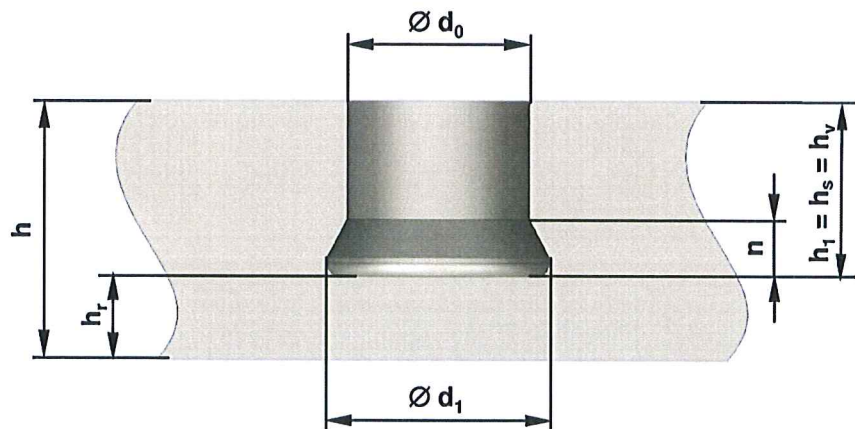
Drill hole						
Drill bit $\varnothing f$ <sup>1)</sup>	$\varnothing d_0$ [mm] <sup>2)</sup>	$\varnothing d_1$ [mm] <sup>2)</sup>	FZPII	n	$h_1$ [mm] <sup>2) 3)</sup>	$h_r$ [mm] <sup>4)</sup>
FZPB 9	11 +0,4 -0,2	13,5 ±0,3	M6	≈ 4	12 ≤ $h_1$ ≤ 38	≥ 0,4 h
FZPB 11						
FZPB 11	13 +0,4 -0,2	15,5 ±0,3	M8 / M6i			
FZPB 13						
FZPB 13	15 +0,4 -0,2	17,5 ±0,3	M10 / M8i			
FZPB 15						

- 1) Drill bits for various drilling methods.
- 2) Dimensions can be checked with the appropriate control equipment in accordance with (Annex B 5).
- 3) Tolerances flush mounting:  $h_1 = h_v$  <sup>+0,4</sup><sub>-0,1</sub>
- 4) Only for stand off fixing.

**Figure B2: Drill bit example**



**Figure B3: Geometrie of drill hole**



**fischer Zykon panel anchor FZP**

**Intended use**  
Drill bit, geometry of the drill hole and installation parameters

**Annex B 4**



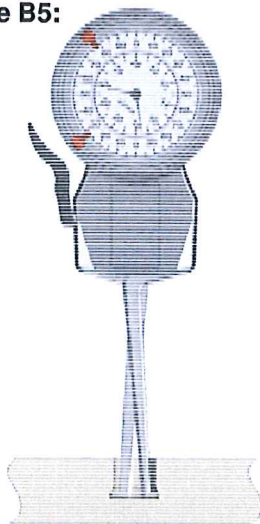
**Setting tools**

**Figure B4:**

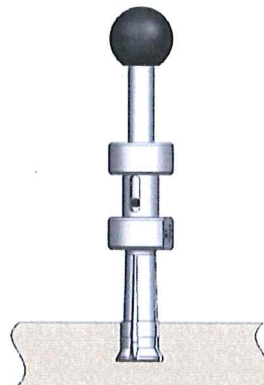


**Means for undercut control  $\varnothing d_1$**

**Figure B5:**



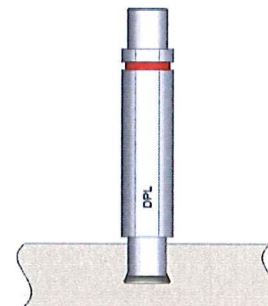
Internal quicktest



HVL (Undercut minimum volume gauge)

**Go / no Go gauge for  
checking cylindrical drill hole diameter  $\varnothing d_0$**

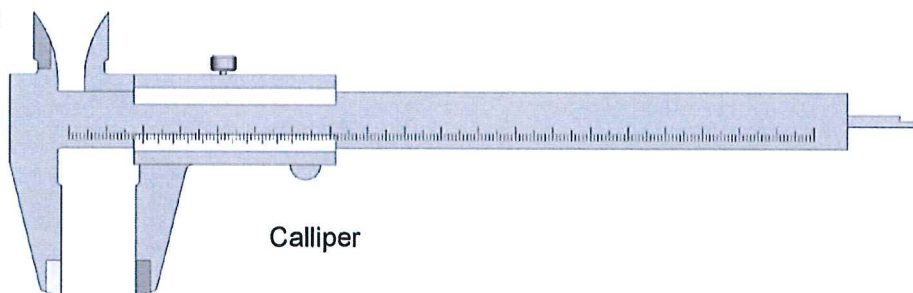
**Figure B6:**



DPL (Diameter gauge)

**Means for measuring borehole depth  $h_1$  and borehole diameter  $h_0$**

**Figure B7:**



Calliper

**fischer Zykon panel anchor FZP**

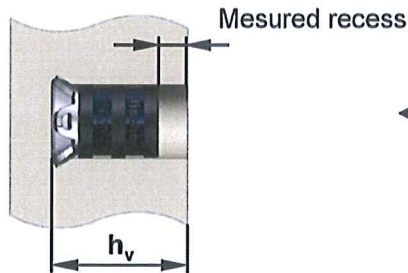
**Intended use**  
Setting devices and testing equipment

**Annex B 5**

### Type of mounting and dimensional definition

#### Recessed fixing

Figure B8:



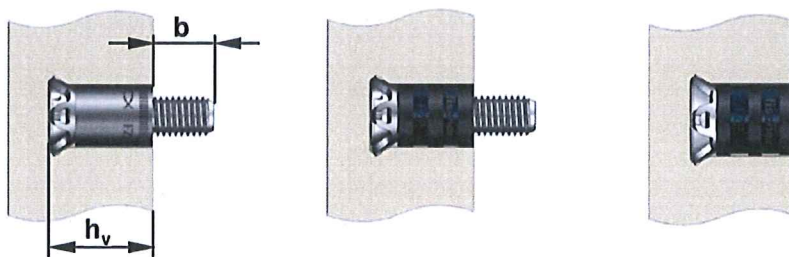
#### Examples of an adaptation for stand off fixing

Figure B9:



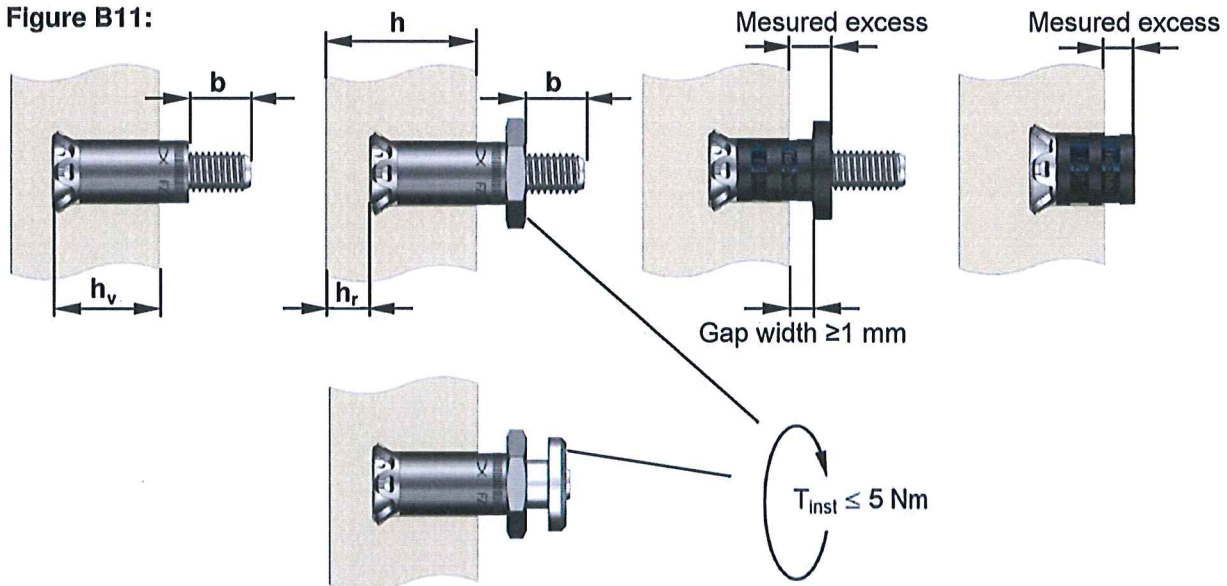
#### Flush fixing

Figure B10:



#### Stand off fixing

Figure B11:



fischer Zykon panel anchor FZP

Intended use  
Mounting types and dimension definitions

Annex B 6

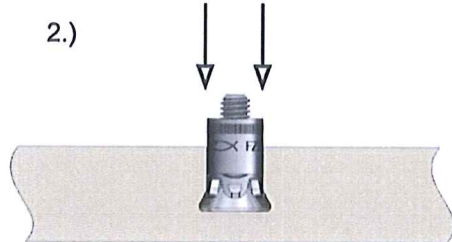
### Installation instructions

Example: Set with SGA

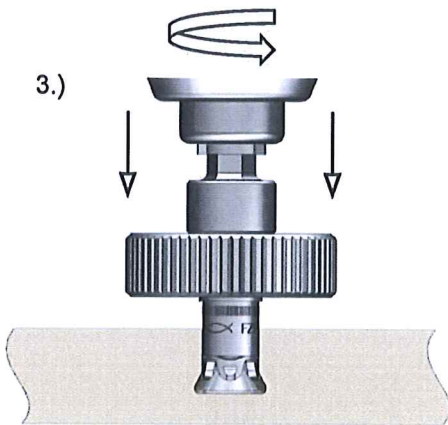
1.)



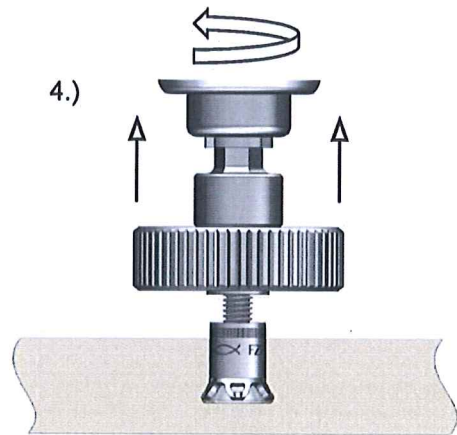
2.)



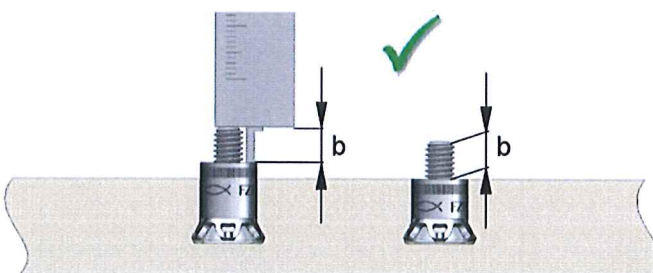
3.)



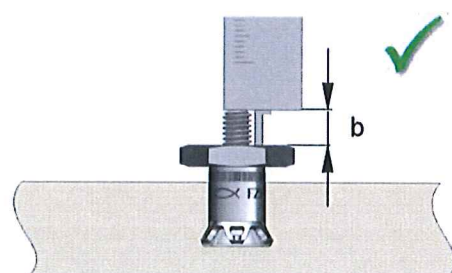
4.)



5.1)



5.2)



**fischer Zykon panel anchor FZP**

Intended use  
Installation instructions

**Annex B 7**



**Table C1: Characteristic resistance**

Diameter of drill hole	$\varnothing d_0$	[mm]	11 (FZP M6)		13 (FZP M8 / M6i)	
Designation of natural stone			Padang Cristallo G603	Jura Limestone (yellow)	Padang Cristallo G603	Jura Limestone (yellow)
Country of origin			China	Germany	China	Germany
Petrographic description			Granite	Limestone	Granite	Limestone
Panel thickness	h	[mm]	30	40	30	40
Edge distance	$a_r$	[mm]	100	100	100	100
Embedment depth	$h_s$	[mm]	15	17	17	25
<b>Characteristic resistance</b>						
Tension load	$N_{RK}^{1) 2)}$	[kN]	6,2	4,8	7,8	8,0
Sher load	$V_{RK}^{1) 2)}$	[kN]	7,8	7,9	7,0	9,1
Partial safety factor	$\gamma_M$	[-]	1,8			
<b>Combined tension and shear load</b>						
Trilinear limit value	X	[-]	1,2			

- 1) Reduction factor  $\alpha$  based on stone class is already included in these values. Reduction factor  $\alpha$  in accordance with Technical Report 062 "Design of fasteners for façade panels made of natural stone".
- 2) For other natural stones according to Table B1, the resistance is determined in accordance with EAD 33-0030-0601 and Technical Report "Design of fasteners for façade panels made of natural stone".

**Table C2: Characteristic resistance for steel failure**

Diameter of drill hole and Anchor	$\varnothing d_0$	[mm]	11	13	15	13 <sup>2)</sup>	15 <sup>2)</sup>
			FZP M6	FZP M8	FZP M10	FZP M6i	FZP M8i
Characteristic resistance under tension load	$N_{RK,s}$	[kN]	15,1	27,5		14,1	
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5		1,87		
Characteristic resistance under shear load	$V_{RK,s}$	[kN]	7,5	13,7		7,0	
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,25		1,56		

- 1) In absence of national regulations
- 2) For the anchor with internal thread only a fixing screw of size M6 or M8 made of stainless steel 1.4401 or 1.4571 EN ISO 10088-3 with a minimum strength class 70 according to EN ISO 3506-1 ( $f_{uk} = 700 \text{ N/mm}^2$ ,  $f_{yk} = 450 \text{ N/mm}^2$ ) can be used

**fischer Zykon panel anchor FZP**

**Performances**

Characteristic resistance in natural stone and steel resistance

**Annex C 1**