



Declaration of Performance

DoP no. 0793-CPR-8.1-20



1. Unique Identification code of the product-type: **KEIL undercut anchor for fixing in façade panels made of Dinamic CCC manufactured stone**
2. Type number: **KH 15**
3. Intended use or uses of the construction product: **Fastener of external wall claddings. Special anchor for the rear fixing of façade panels made of Dinamic CCC manufactured stone**
4. Manufacturer: **Fydro B.V., Morsestraat 9-11, NL-6716 AH Ede, NETHERLANDS**
5. Authorised representative: -
6. System or systems of assessment and verification of constancy of performance: **System 2+**
7. Harmonised Standard: -
8. European evaluation document: **EAD 330030-00-0601**
European Technical Assessment: **ETA-17/0987**
Technical Assessment Body: **ETA-Danmark A/S**
Notified Body: **0793 – Güteschutz Beton**
9. Declared Performance:

Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic load bearing capacity and displacements	The anchor corresponds to the drawings and specifications given in Annex A2-A3. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annex A2-A3 shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment. The characteristic values for the design of the façade panels with rear fixing by the anchor are given in Annex C1-C2.
Durability	The anchors are made from stainless steel (material no. 1.4401, 1.4571 or 1.4404)

Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	The anchors are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4. Signed for and on behalf of the manufacturer by:

KEIL Befestigungstechnik GmbH

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Christian Schmidt

Managing Director

Engelskirchen, 10.10.2019

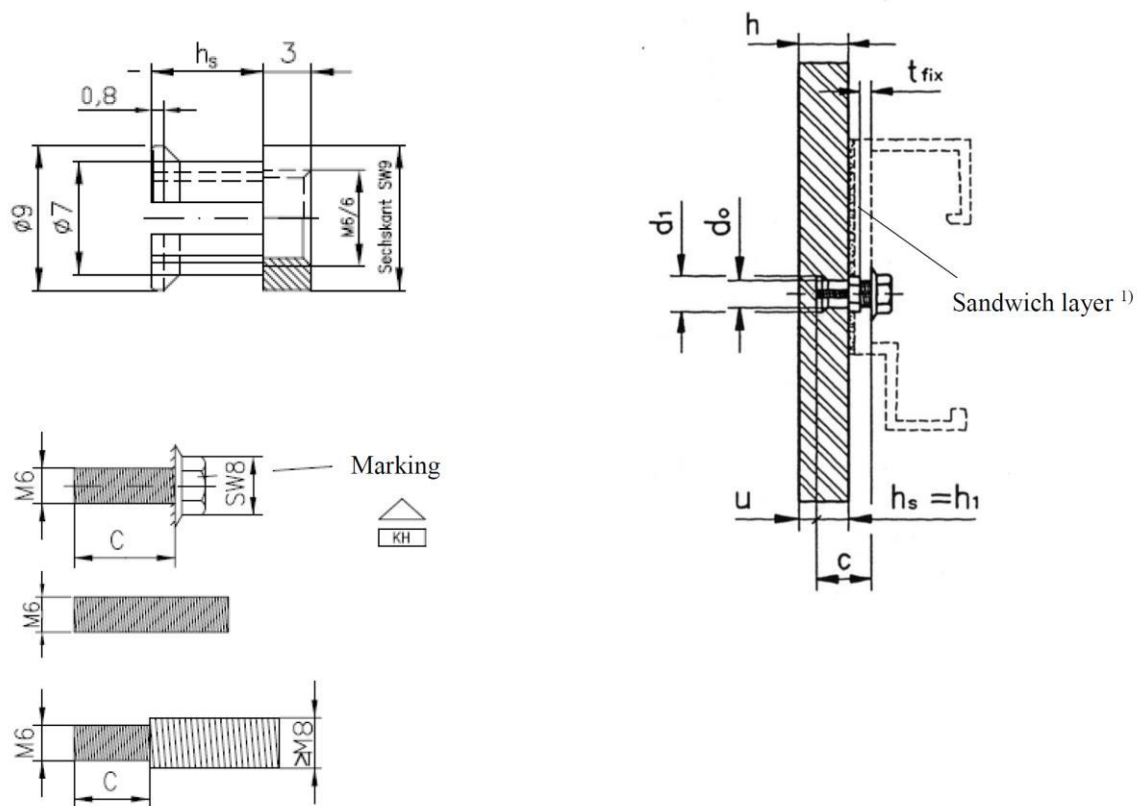
KEIL Befestigungstechnik GmbH

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Dipl.-Ing. Georg Miebach

Product Manager

Anchors sleeve dimension



1) Elastic sandwich layer (e.g. EPDM) – thickness 1,0mm to 3,0 mm

Characteristic values of installation		KH 7,0 mm
Thickness of facade plate	d [mm] =	$20 < h < 22$
Embedment depth / drill hole depth	h_s =	15 (14,5)
Diameter of drill hole	$\varnothing d_0$ [mm] =	7
Diameter of undercut	$\varnothing d_1$ [mm] =	9
Coverage drill hole	u [mm] $\geq$	4-5
Thickness of agraffe material	t_{fix} [mm] $\geq$	$2 \leq t_{fix} \leq 3$
Threaded length of screw	c [mm] =	$17,5 + t_{fix}$

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Parts of anchor and characteristic values for anchor installation

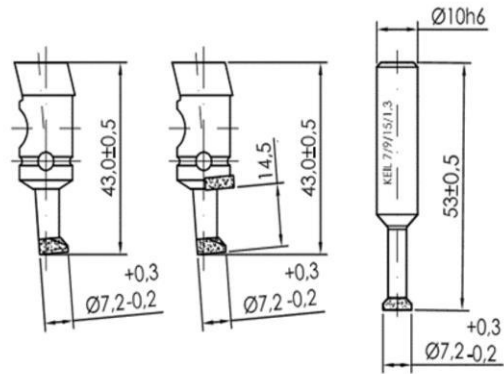
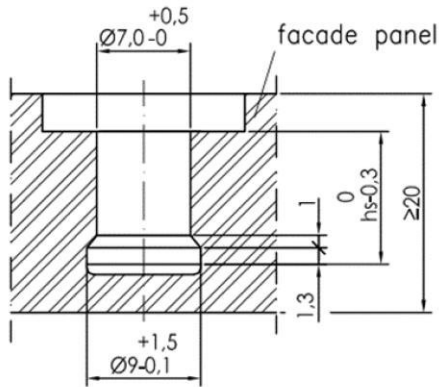
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Geometry of the KEIL facade drill for KEIL facade drill bit 7/9

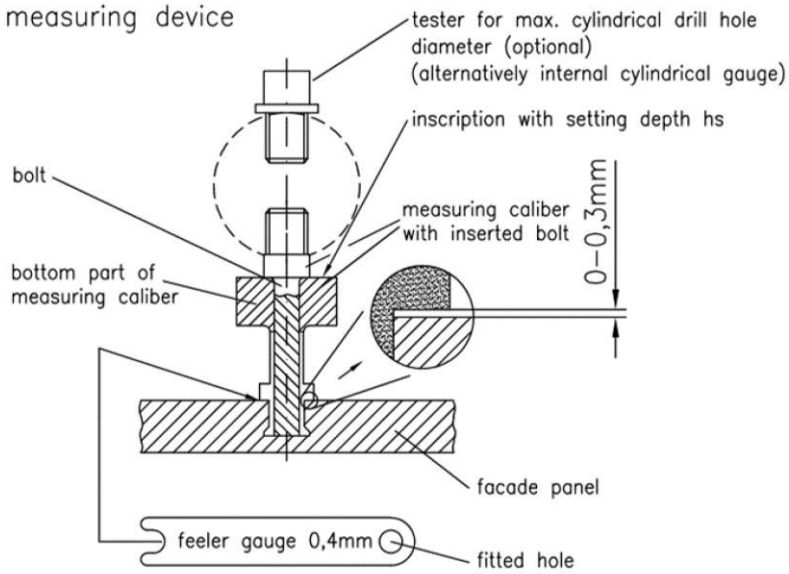
DIA 15/1,3

DIA 15/1,3
with countersink

CNC 15/1,3



KEIL measuring device



KEIL undercut anchor for fixing in facade panels made of Dinamic•CCC

Drill hole dimensions
Setting tools and testing equipment

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Table C1 Characteristic values for the design of the anchor and façade panel

Characteristic values of facade pane	panel thickness		h =	mm	20 < h < 22
	characteristic resistance to bending stress		$\sigma_{rk, 5\%} =$	N/mm ²	6,22
	partial safety factor ¹⁾		$\gamma_M =$	-	1,8
	modulus of elasticity		E =	N/mm ²	9000
	thermal coefficient		$\alpha_T =$	1/°C	1,0 * 10 ⁻⁵
	density		$\gamma =$	g/m ³	2,20
Characteristic values of the anchor	characteristic resistance to	tension load ²⁾	$N_{rk, 5\%} =$	kN	2,82
		shear ²⁾	$V_{rk, 5\%} =$	kN	5,56
	setting depth		$h_s =$	mm	15 (14,5)
	edge distance ³⁾		a_{rx} or $a_{ry} \geq$	mm	100
	spacing		a_x or $a_y \geq$	mm	200 ⁴⁾
	partial safety factor ¹⁾		$\gamma_M =$	-	2,0

¹⁾ In absence of other national regulations.

²⁾ In case of coincident stress of an anchor due to tension and shear load following equation shall be observed:

$$\frac{N_{Ed}}{N_{Rd}} + \frac{V_{Ed}}{V_{Rd}} \leq 1,0$$

³⁾ For small fitted pieces, differential and fill-in pieces the edge distance and spacing shall be chosen constructively

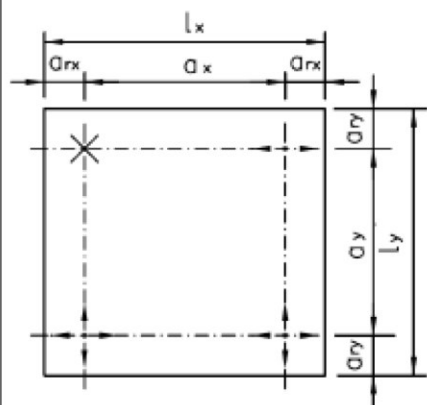
⁴⁾ The maximum of distance is governed by the load bearing capacity of the panel and determined through the static calculation

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Characteristic values for the design of the anchor and façade panel

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Definition of edge distance and spacing



Legend:

- $a_{rx,y}$ = edge distance – distance of an anchor to the panel edge
- $a_{x,y}$ = spacing – distance between anchors
- L_x = greater length of the façade panel
- L_y = smaller length of the façade panel
- = fixed point (fixed bearing)
- = horizontal skid (loose bearing)
- = horizontal and vertical skid (loose bearing)

Torsion of the load-bearing profile due to dead loads of the façade panel

In case of flush fixing of the anchor and when using horizontal load-bearing profiles:

Due to torsion of the load-bearing profile resulting from dead load of the façade panel the following load $N_{sk,v}$ shall be considered in direction to the anchor axes:

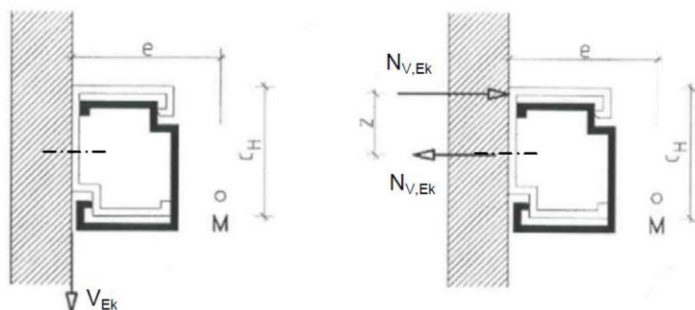
$$N_{V,Ek} = V_{Ek} \cdot 2e/c_H$$

Where

V_{Ek} = shear load due to dead load of the façade panel

e and c_H [mm] see figure

M shear centre



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Definition of edge distance and spacing
Torsion of load-bearing profile

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