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European Technical Assessment

**ETA-07/0291
of 30/06/2014**

General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M

Product family to which the construction product belongs

Nailed-in plastic anchors for fixing of external thermal insulation composite systems with rendering in concrete and masonry

Manufacturer

RAWLPLUG S.A.
ul. Kwidzyńska 6
PL 51-416 Wrocław
Poland

Manufacturing plant(s)

Manufacturing Plant no. 3

This European Technical Assessment contains

21 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

Guideline for European Technical Approval of "Plastic anchors for fixing of external thermal insulation composite systems with rendering", ETAG 014, Edition February 2011 used as European Assessment Document (EAD)

This version replaces

ETA-07/0291 issued on 26/06/2013

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Specific Part

1 Technical description of the product

The KOELNER KI-10 nailed-in plastic anchor consists of an anchor sleeve with a plate made of polypropylene and an accompanying specific nail as an expansion pin made of the glass fibre reinforced polypropylene.

The KOELNER KI-10PA nailed-in plastic anchor consists of anchor sleeve with a plate made of polypropylene and an accompanying specific nail as an expansion pin made of glass fibre reinforced polyamide.

The KOELNER KI-10M nailed in plastic anchor consists of anchor sleeve with a plate made of polypropylene and an accompanying specific steel nail as an expansion pin.

The plastic anchor sleeve is expanded by hammering a nail, which press the sleeve against the wall of the drilled hole.

The KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M anchors may in addition be combined with the plates KWL-90, KWL-110 and KWL-140.

The illustration and the description of the product are given in Annex A.

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

The performances given in Annex C 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 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Requirements with respect to the mechanical resistance and stability of non load bearing parts of the works are not included in this Basic Works Requirements but are under the Basic Works Requirement safety in use (BWR 4).

3.1.2 Hygiene, health and the environment (BWR 3)

In addition to the clauses relating to dangerous substances contained in this European Technical Assessment, 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 Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.1.3 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance	Annex C1
Edge distances and spacings	Annex B2
Point thermal transmittance	Annex C2
Plate stiffness	Annex C2
Displacements	Annex C3

3.1.4 Sustainable use of natural resources (BWR 7)

No performance determined (NPD).

3.2 Methods used for the assessment

The assessment of fitness of the anchor for the declared intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirement 4 has been made in accordance with the ETAG 014 *“Plastic anchors for fixing of external thermal insulation composite systems with rendering”*.

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 of 27 June 1997 the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table applies:

Product	Intended use	Level or class	Attestation of conformity system
Plastic anchor for use in concrete and masonry	For use in systems, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems	–	2+

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

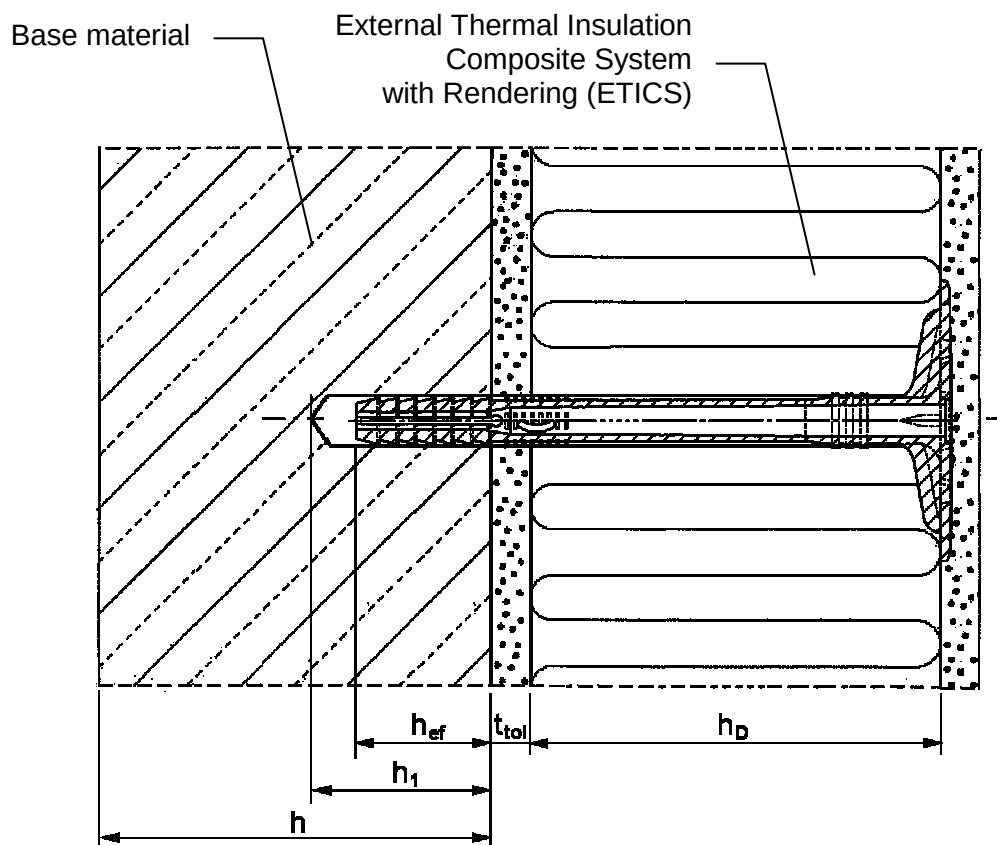
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 30/06/2014 by Instytut Techniki Budowlanej



Jan Bobrowicz
Director of ITB



Intended Use

Fixing of external thermal insulation composite systems in concrete and masonry

Legend

h_{ef} = effective anchorage depth

h_1 = depth of drill hole in base material

h = thickness of base material

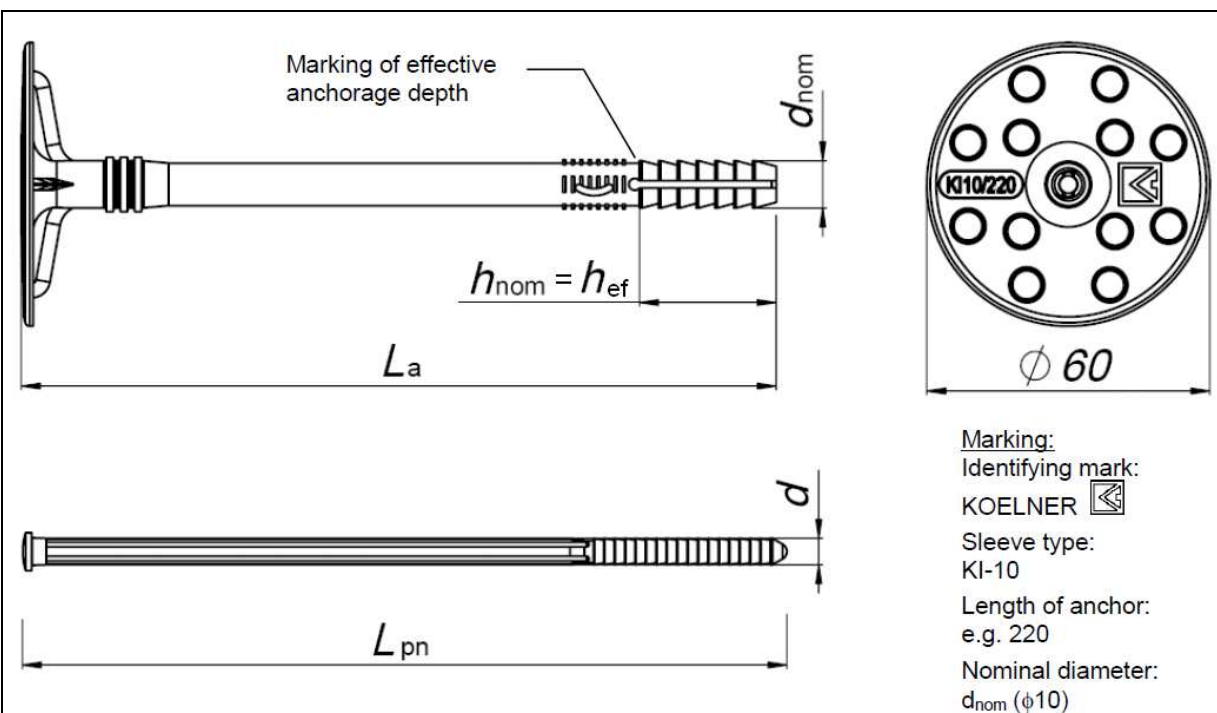
h_D = thickness of insulation material

t_{tol} = thickness of equalizing and/or non-load-bearing layer

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description
Installation conditions

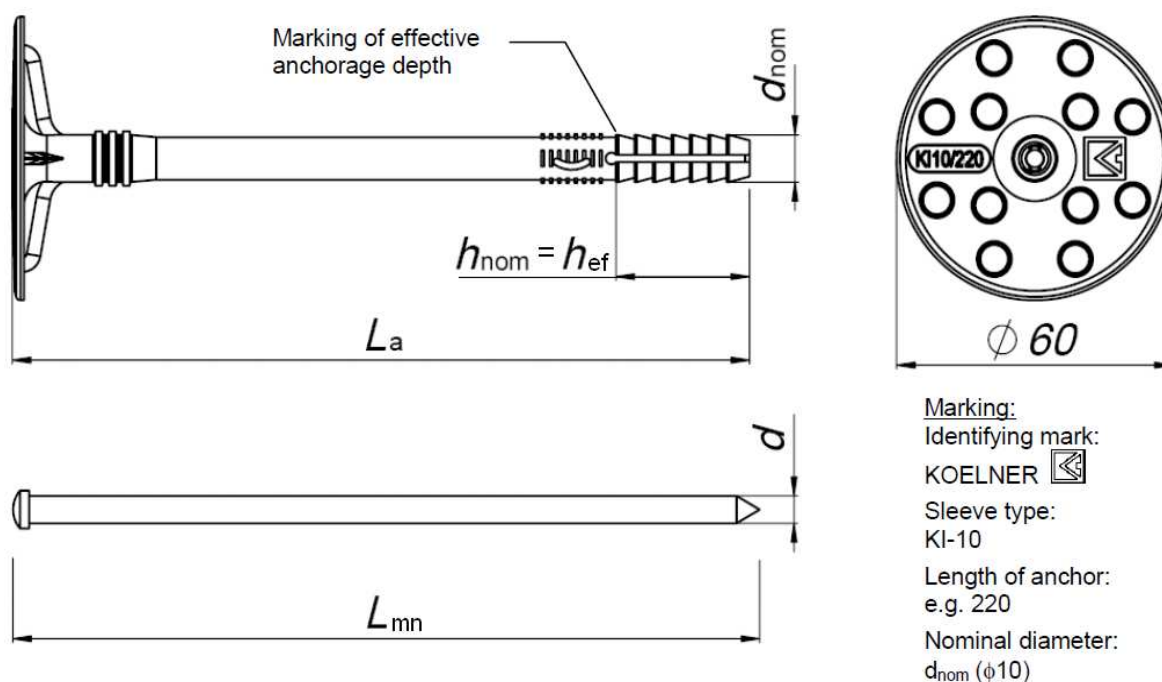
Annex A1
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**Table A1: KOELNER KI-10 and KOELNER KI-10PA anchor types and dimensions [mm]**

Anchor type	Anchor sleeve			Expansion pin	
	d_{nom}	L_a	h_{ef}	d	L_{pn}
KI-10/70 or KI-10PA/70	$10_{\pm 0,5}$	$70_{\pm 2}$	25	$6,2_{\pm 0,2}$	$70_{\pm 2}$
KI-10/90 or KI-10PA/90	$10_{\pm 0,5}$	$90_{\pm 2}$	25	$6,2_{\pm 0,2}$	$90_{\pm 2}$
KI-10/120 or KI-10PA/120	$10_{\pm 0,5}$	$120_{\pm 2}$	25	$6,2_{\pm 0,2}$	$120_{\pm 2}$
KI-10/140 or KI-10PA/140	$10_{\pm 0,5}$	$140_{\pm 2}$	25	$6,2_{\pm 0,2}$	$140_{\pm 2}$
KI-10/160 or KI-10PA/160	$10_{\pm 0,5}$	$160_{\pm 2}$	25	$6,2_{\pm 0,2}$	$160_{\pm 2}$
KI-10/180 or KI-10PA/180	$10_{\pm 0,5}$	$180_{\pm 2}$	25	$6,2_{\pm 0,2}$	$180_{\pm 2}$
KI-10/200 or KI-10PA/200	$10_{\pm 0,5}$	$200_{\pm 2}$	25	$6,2_{\pm 0,2}$	$200_{\pm 2}$
KI-10/220 or KI-10PA/220	$10_{\pm 0,5}$	$220_{\pm 2}$	25	$6,2_{\pm 0,2}$	$220_{\pm 2}$

Determination of maximum thickness of insulation material: $h_D = L_a - t_{tol} - h_{ef}$

KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M	Annex A2 of European Technical Assessment ETA-07/0291
Product description Marking and dimensions of the anchor sleeve and expansion element of the KOELNER KI-10 and KOELNER KI-10PA anchors	

**Table A2: KOELNER KI-10M anchor types and dimensions [mm]**

Anchor type	Anchor sleeve			Expansion pin	
	d_{nom}	L_a	h_{ef}	d	L_{mn}
KI-10M/70	$10_{\pm 0,5}$	$70_{\pm 2}$	25	$4,9_{\pm 0,1}$	70_{+5}
KI-10M/90	$10_{\pm 0,5}$	$90_{\pm 2}$	25	$4,9_{\pm 0,1}$	90_{+5}
KI-10M/120	$10_{\pm 0,5}$	$120_{\pm 2}$	25	$4,9_{\pm 0,1}$	120_{+5}
KI-10M/140	$10_{\pm 0,5}$	$140_{\pm 2}$	25	$4,9_{\pm 0,1}$	140_{+5}
KI-10M/160	$10_{\pm 0,5}$	$160_{\pm 2}$	25	$4,9_{\pm 0,1}$	160_{+5}
KI-10M/180	$10_{\pm 0,5}$	$180_{\pm 2}$	25	$4,9_{\pm 0,1}$	180_{+5}
KI-10M/200	$10_{\pm 0,5}$	$200_{\pm 2}$	25	$4,9_{\pm 0,1}$	200_{+5}
KI-10M/220	$10_{\pm 0,5}$	$220_{\pm 2}$	25	$4,9_{\pm 0,1}$	220_{+5}
KI-10M/260	$10_{\pm 0,5}$	$260_{\pm 2}$	25	$4,9_{\pm 0,1}$	260_{+5}

Determination of maximum thickness of insulation material: $h_D = L_a - t_{tol} - h_{ef}$

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description

Marking and dimensions of the anchor sleeve and expansion element of the KOELNER KI-10M anchors

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Table A3: Materials

Designation	Material
Anchor sleeve	Polypropylene, with different colours ¹⁾
Expansion pin made of steel	Carbon steel ($f_{y,k} = 180 \text{ MPa}$, $f_{u,k} = 300 \text{ MPa}$) galvanised $\geq 5 \text{ }\mu\text{m}$ according to EN ISO 4042
Expansion pin made of plastic	Glass fibre reinforced polypropylene PPHGF30 nature (KOELNER KI-10) or glass fibre reinforced polyamide PA6 GF30, nature (KOELNER KI-10PA)
¹⁾ nature, blue "finke", blue 5010, brown 8017, red 3000, red 2008, white 9003, black, green 6029, yellow 1020, grey 7040, red	

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description
Materials

Annex A4
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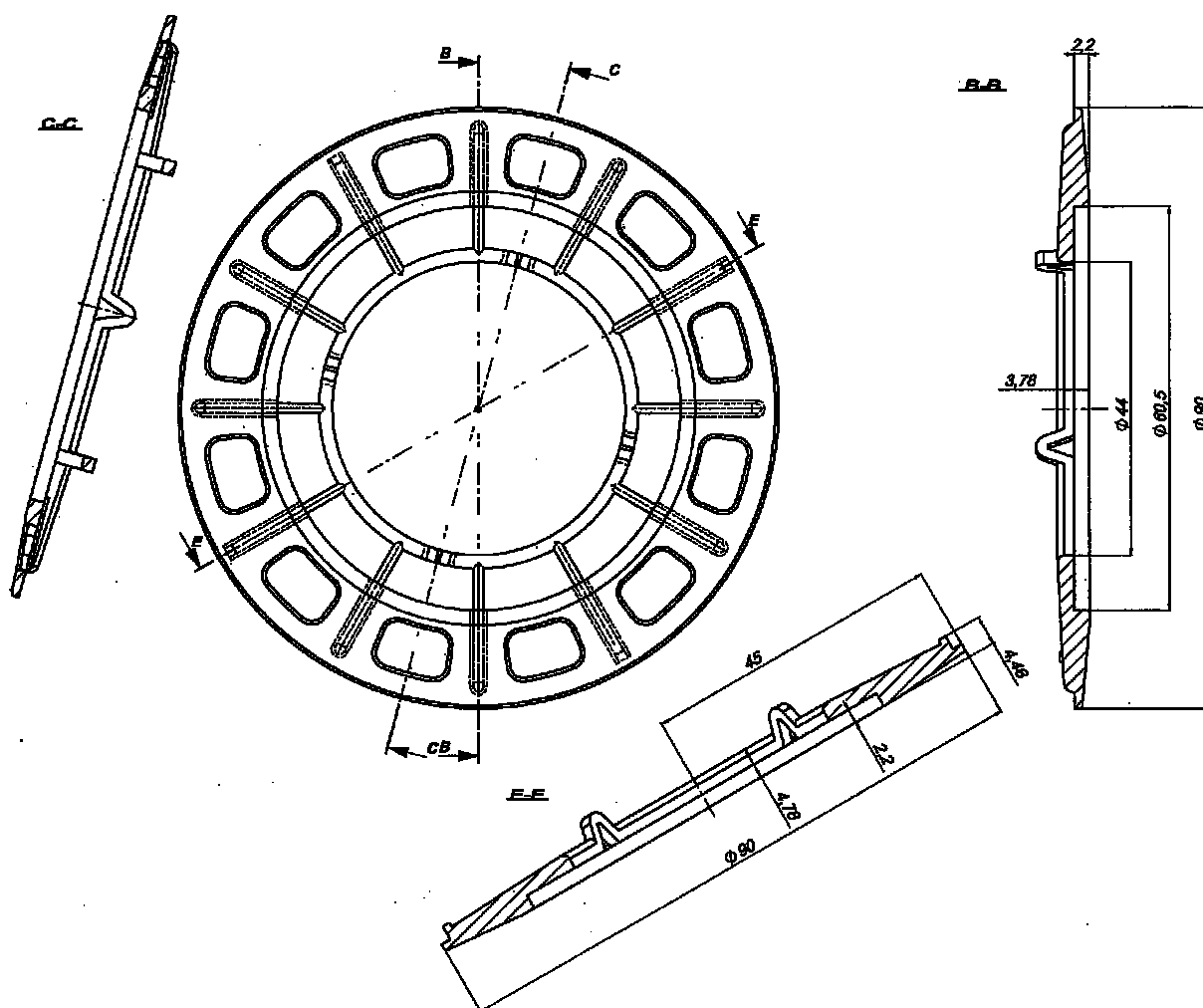


Table A4: Additional plate KWL-90

Plate type	Outer diameter [mm]	Material
KWL-90	90	Glass fibre reinforced polyamide PA6 GF30, nature or polypropylene, nature

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description
Additional plate KWL-90 in combination with anchor sleeve

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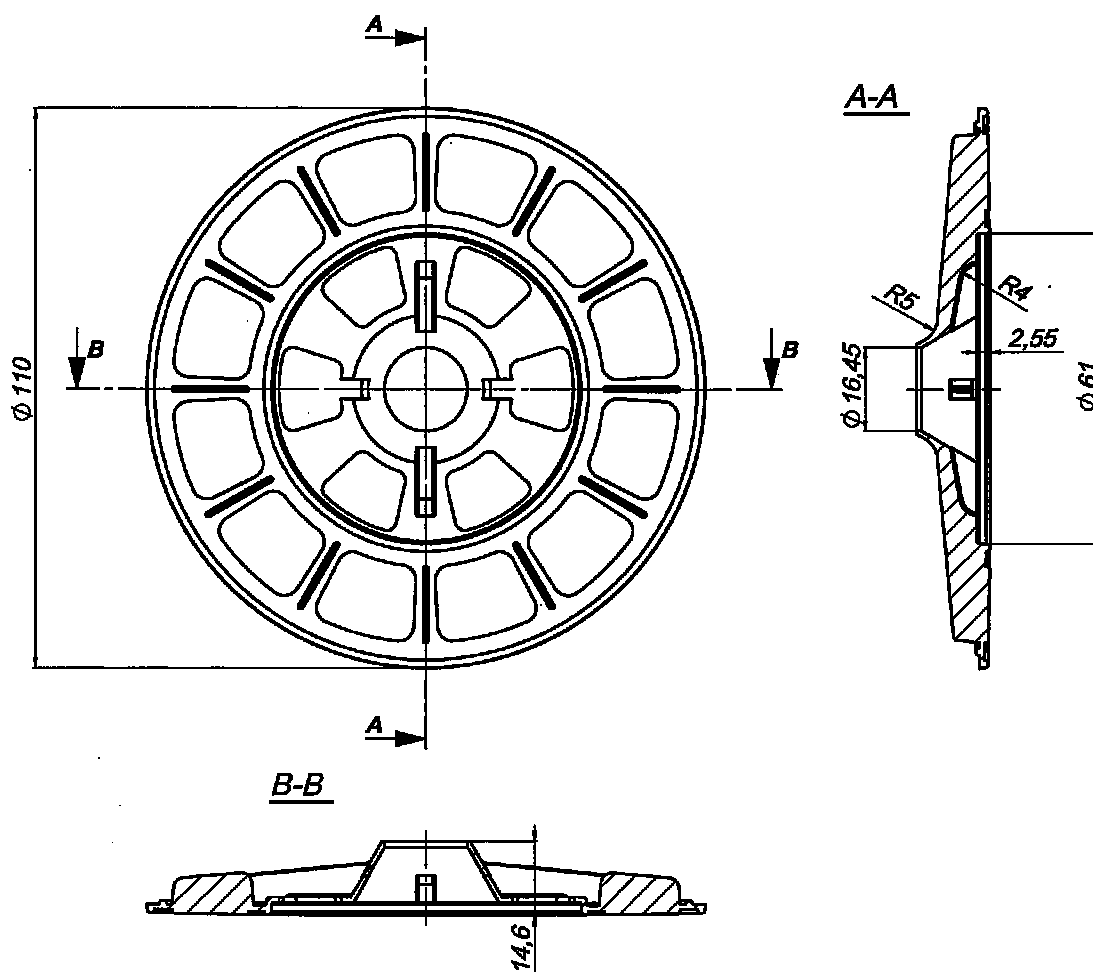


Table A5: Additional plate KWL-110

Plate type	Outer diameter [mm]	Material
KWL-110	110	Glass fibre reinforced polyamide PA6 GF30, nature or polypropylene, nature

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description
Additional plate KWL-110 in combination with anchor sleeve

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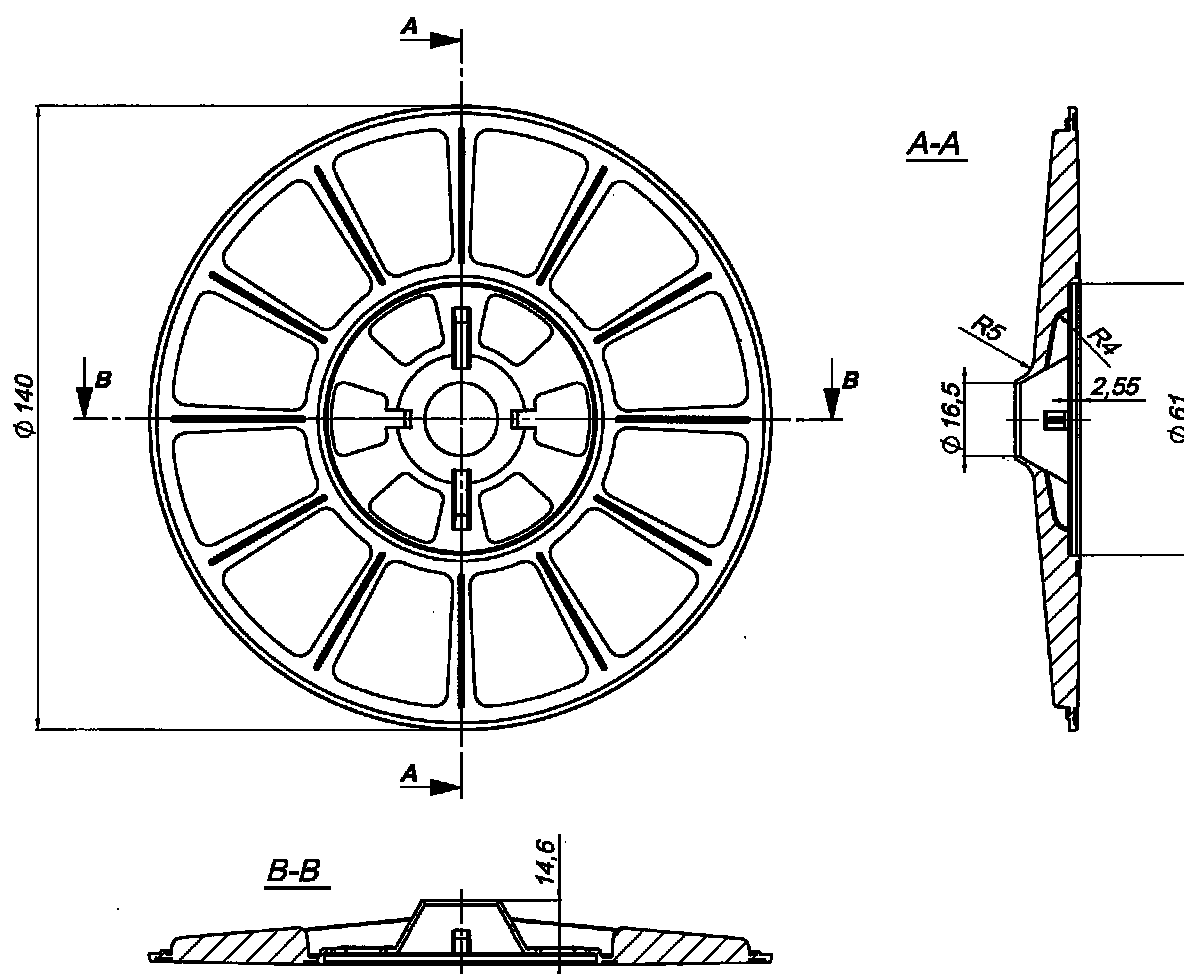


Table A6: Additional plate KWL-140

Plate type	Outer diameter [mm]	Material
KWL-140	140	Glass fibre reinforced polyamide PA6 GF30, nature or polypropylene, nature

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Product description
Additional plate KWL-140 in combination with anchor sleeve

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Specification of intended use

Anchorage subject to:

- Wind suction loads.

Note: Dead loads have to be transmitted by the adhesion of the relevant external thermal insulation composite system.

Base materials:

- Normal weight concrete (use category A), according to Annex C1.
- Solid masonry (use category B), according to Annex C1.
- Hollow or perforated masonry (use category C), according to Annex C1.
- Lightweight aggregate concrete (use category D), according to Annex C1.
- Autoclaved aerated concrete (use category E), according to Annex C1.
- For other base materials of the use categories A, B, C, D or E the characteristic resistance of the anchor may be determined by job site tests according to ETAG 014, edition February 2011, Annex D.

Temperature range:

- 0°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C).

Design:

- The anchorages are designed in accordance with the ETAG 014, edition February 2011, under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings are prepared taking into account of the loads to be anchored. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple fixings for non-structural application, according to ETAG 014, edition February 2011.

Installation:

- Hole shall be drilled by the drill modes according to Annex C1.
- Anchor installation shall be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation shall be executed in temperature from 0°C to +40°C.
- Exposure to UV due to solar radiation of the anchor not protected by rendering by the mortar shall not exceed ≤ 6 weeks.

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

**Intended use
Specifications**

Annex B1
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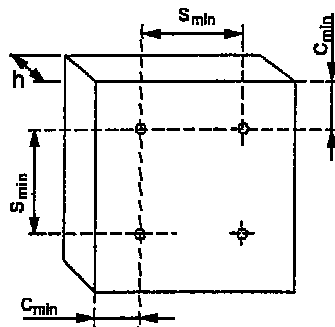
Table B1: Installation characteristics

Anchor type	KI-10, KI-10PA and KI-10M		
Use category for infrequent use	ABC	D	E
Nominal diameter of drill bit d_o [mm]	10		
Cutting diameter of drill bit d_{cut} [mm]	$\leq 10,45$		
Depth of drill hole h_1 [mm]	≥ 35	≥ 50	≥ 70
Effective anchorage depth h_{ef} [mm]	≥ 25	≥ 40	≥ 60

Table B2: Minimum thickness of base material, edge distance and anchor spacing

Anchor type	KI-10, KI-10PA and KI-10M
Minimum thickness of base material h [mm]	100
Minimum spacing s_{min} [mm]	100
Minimum edge distance c_{min} [mm]	100

Diagram of spacing

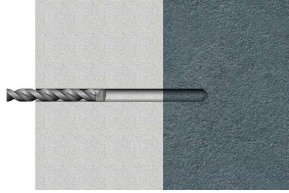


**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

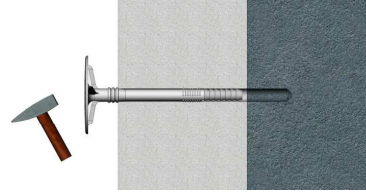
Intended use
Installation characteristics, minimum thickness
of base material, edge distance and spacing

Annex B2
of European
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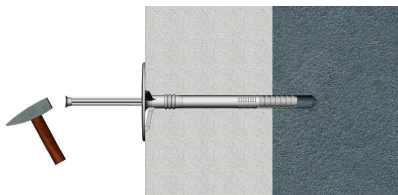
Installation instruction



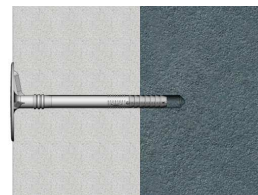
1. Drill hole by corresponding drilling method



2. Set-in anchor manually



3. Set anchor by hammer blows



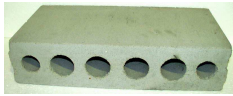
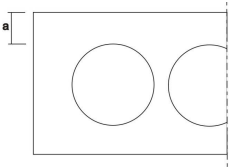
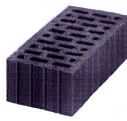
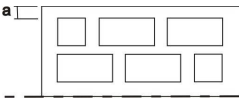
4. Correctly installed anchor

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Intended use
Installation instruction

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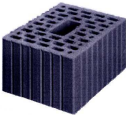
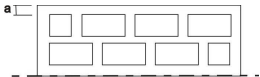
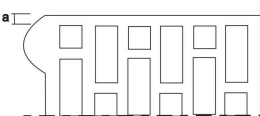
Table C1: Characteristic resistance to tension loads N_{Rk} , kN in concrete and in masonry for single anchor

Base material	Bulk density [kg/dm ³]	Min. compressive strength [N/mm ²]	Referring standard	N_{Rk} [kN]			Drill method
				KI-10	KI-10PA	KI-10M	
Concrete C12/15			EN 206-1	0,5	0,4	0,5	hammer
Concrete C16/20 ÷ C50/60			EN 206-1	0,5	0,4	0,5	
Clay brick 	≥ 1,70	30,0	EN 771-1	0,5	0,4	0,4	
Calcium silicate brick (for example Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106) 	≥ 2,00	20,0	EN 771-2	0,6	0,4	0,6	hammer
Calcium silicate hollow block (for example Kalksandstein KS L-R(P) 8 DF Lochstein according to DIN 106)  $a^{1)} = 30 \text{ mm}$ 	≥ 1,60	12,0	EN 771-2	0,6	0,4	0,5	rotary
Perforated ceramic brick (for example Hlz B – 1.0 1NF 12-1 according to DIN 105)  $a^{1)} = 13 \text{ mm}$ 	≥ 0,95	12,0	EN 771-1	0,4	0,3	0,4	rotary

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Performances
Characteristic resistance

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Extension of Table C1							
Base material	Bulk density [kg/dm ³]	Min. compressive strength [N/mm ²]	Referring standard	N _{Rk} [kN]			Drill method
				KI-10	KI-10PA	KI-10M	
Perforated ceramic brick (for example Hlz B – 1.0 3NF 12-1 according to DIN 105)  a ¹⁾ = 13 mm 	≥ 0,95	12,0	EN 771-1	0,4	0,4	0,4	rotary
Vertically perforated porosited block (for example Porotherm 25 P+W)  a ¹⁾ = 10 mm 	≥ 0,80	15,0	EN 771-1	0,4	0,4	0,3	rotary
Vertically perforated ceramic block (for example MEGA-MAX 250)  a ¹⁾ = 12 mm 	≥ 0,80	15,0	EN 771-1	0,3	0,4	0,3	rotary

KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M

Performances

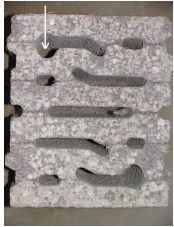
Characteristic resistance

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Base material	Bulk density [kg/dm ³]	Min. compressive strength [N/mm ²]	Referring standard	N _{Rk} [kN]			Drill method
				KI-10	KI-10PA	KI-10M	
Lightweight concrete hollow block (for example Hbl according to DIN 18151) a ¹⁾ = 30 [mm] 	≥ 0,80	2,0	EN 771-3	0,4	0,4	0,4	rotary
Lightweight concrete block	≥ 1,56	20,0	EN 771-3	0,5	0,75	0,6	hammer
Autoclaved aerated concrete block	≥ 0,35	2,0	EN 771-4	0,1	0,1	0,1	rotary
Partial safety factor for anchor resistance, γ _M ²⁾	2,0						
¹⁾ Minimum values "a". For elements with lower value of "a" the load tests on the construction are required ²⁾ Valid in absence of national regulations							

KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M

Performances

Characteristic resistance

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Table C2: Point thermal transmittance according to EOTA Technical Report TR 025

Anchor type	Insulation thickness H_D [mm]	Point thermal transmittance χ [W/K]
KI-10 and KI-10PA	45 – 195	0
KI-10M	45	0,006
	150	0,004
	195	0,004
	235	0,003

Table C3: Plate stiffness according to EOTA Technical Report TR 026

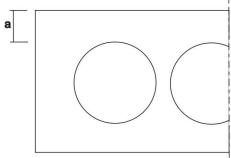
Anchor type	Diameter of the anchor plate d_{plate} [mm]	Load resistance of the anchor plate $N_{u,m}$ [kN]	Plate stiffness $N_{0,m}$ [kN/mm]
KI-10 and KI-10PA	60	2,1	0,5
KI-10M	60	2,6	0,4

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

Performances
Point thermal transmittance and plate stiffness

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Table C4: Displacement behaviour

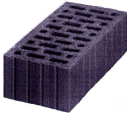
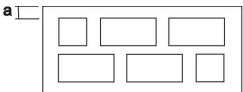
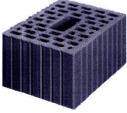
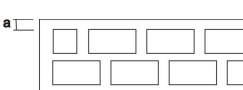
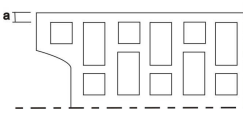
Base material	Bulk density [kg/dm ³]	Compressive strength [N/mm ²]	$\frac{N_{Rk}}{3}$, [kN]			$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]		
			KI-10	KI-10PA	KI-10M	KI-10	KI-10PA	KI-10M
Concrete C20/25	–	–	0,17	0,13	0,17	0,60	0,95	0,63
Concrete C50/60	–	–	0,17	0,13	0,17	0,60	0,95	0,63
Clay brick 	≥ 1,70	≥ 30,0	0,17	0,13	0,13	0,93	1,05	0,76
Calcium silicate brick (for example Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106) 	≥ 2,00	≥ 20,0	0,20	0,13	0,20	0,86	0,96	0,75
Calcium silicate hollow block (for example Kalksandstein KS L-R(P) 8 DF Lochstein according to DIN 106)  a ¹⁾ = 30 mm 	≥ 1,60	≥ 12,0	0,20	0,13	0,17	0,73	0,90	0,57

**KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M**

**Performances
Displacements**

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Extension of Table C4

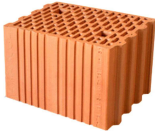
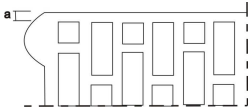
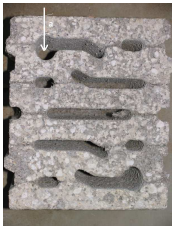
Base material	Bulk density [kg/dm ³]	Compressive strength [N/mm ²]	$\frac{N_{Rk}}{3}$, [kN]			$\delta\left(\frac{N_{Rk}}{3}\right)$, [mm]		
			KI-10	KI-10PA	KI-10M	KI-10	KI-10PA	KI-10M
Perforated ceramic brick (for example Hlz B – 1,0 1NF 12-1 according to DIN 105)  $a^1 = 13 \text{ mm}$ 	≥ 0,95	≥ 12,0	0,13	0,10	0,13	0,84	0,67	0,52
Perforated ceramic brick (for example Hlz B – 1,0 3NF 12-1 according to DIN 105)  $a^1 = 13 \text{ mm}$ 	≥ 0,95	≥ 12,0	0,13	0,13	0,13	0,59	0,84	0,64
Vertically perforated porosited block (for example Porothersm 25 P+W)  $a^1 = 10 \text{ mm}$ 	≥ 0,80	≥ 15,0	0,13	0,13	0,10	0,56	0,60	0,49

KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M

Performances
Displacements

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Base material	Bulk density [kg/dm ³]	Compressive strength [N/mm ²]	$\frac{N_{Rk}}{3}$, [kN]			$\delta\left(\frac{N_{Rk}}{3}\right)$, [mm]		
			KI-10	KI-10PA	KI-10M	KI-10	KI-10PA	KI-10M
Vertically perforated ceramic block (for example MEGA-MAX 250)  $a^1 = 12 \text{ mm}$ 	$\geq 0,80$	$\geq 15,0$	0,10	0,13	0,10	0,61	0,64	0,74
Lightweight concrete hollow block (for example Hbl according to DIN 18151) $a^1 = 30 \text{ [mm]}$ 	$\geq 0,80$	$\geq 2,0$	0,13	0,13	0,13	0,53	0,72	0,57
Lightweight concrete block	$\geq 1,56$	$\geq 20,0$	0,17	0,25	0,20	0,99	0,92	0,61
Autoclaved aerated concrete block	$\geq 0,35$	$\geq 2,0$	0,03	0,03	0,03	0,50	0,41	0,40
¹⁾ Minimum values "a". For elements with lower value of "a" the load tests on the construction are required								

KOELNER KI-10, KOELNER KI-10PA
and KOELNER KI-10M

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