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## European Technical Assessment

**ETA-07/0291  
of 28/12/2017**

### 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**

European Assessment Document EAD 330196-01-0604 *"Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering"*

**This version replaces**

ETA-07/0291 issued on 30/06/2014

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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 European Assessment Document (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 Safety and accessibility in use (BWR 4)

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

##### 3.1.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	Annex C2

### **3.2 Methods used for the assessment**

The assessment of the product for the declared intended use has been made in accordance with the EAD 330196-01-0604 *"Plastic anchors made of virgin or non-virgin material 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 the system 2+ of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) applies.

### **5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document (EAD)**

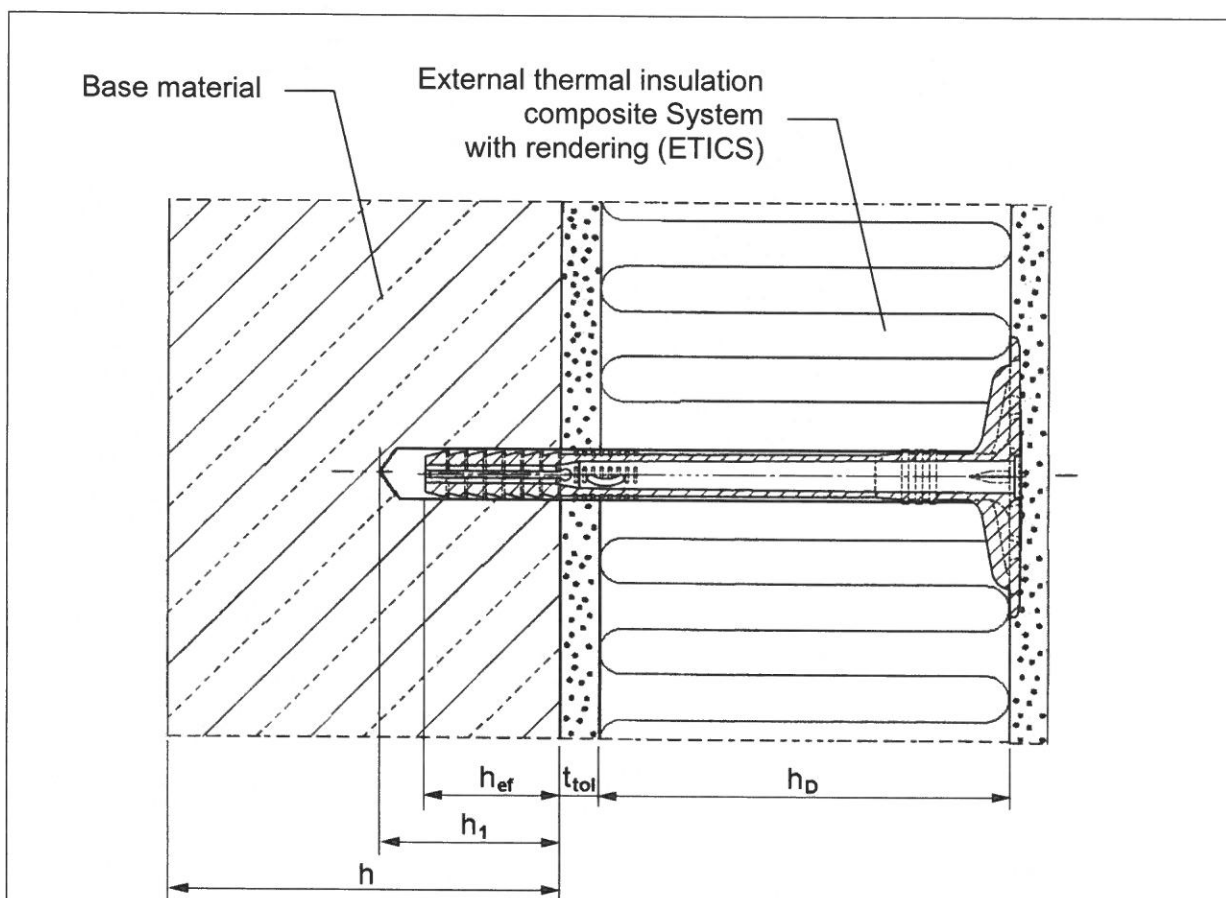
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

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 28/12/2017 by Instytut Techniki Budowlanej



Anna Panek, MSc  
Deputy Director of ITB



**Intended Use**

Fixing of external thermal insulation composite systems in concrete and masonry

**Legend**

$h_{ef}$  = effective anchorage depth

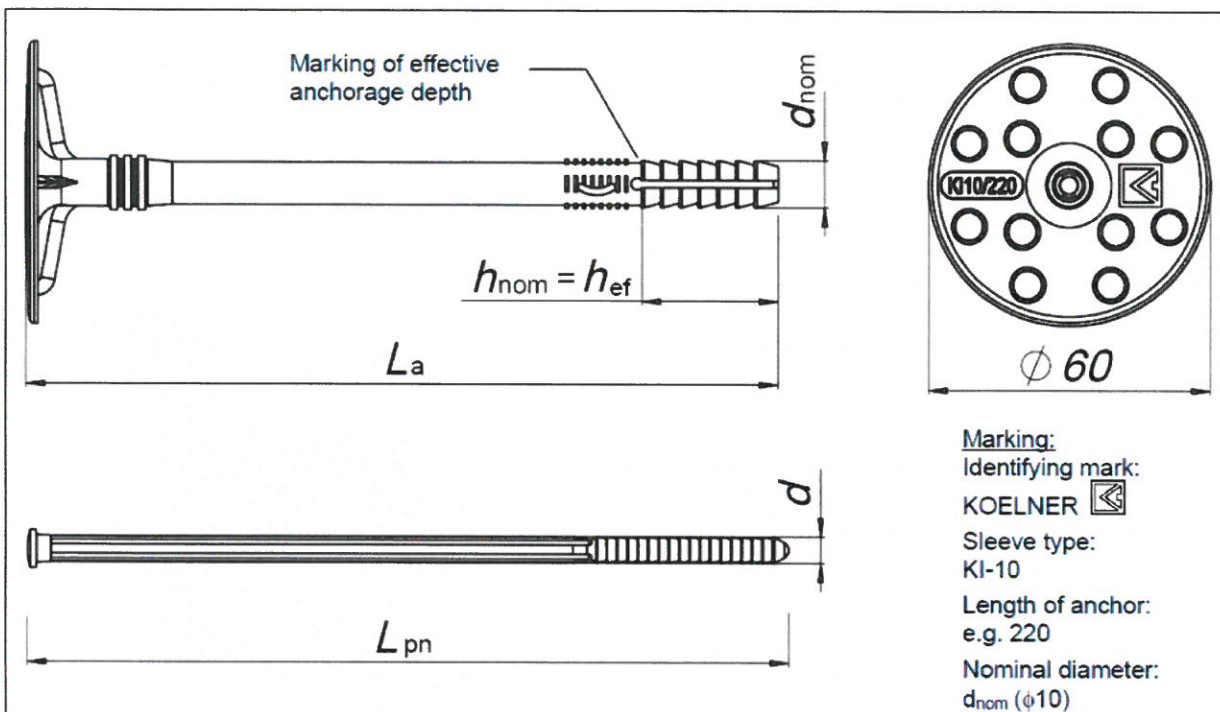
$h_1$  = depth of drill hole in base material

$h$  = thickness of base material

$h_D$  = thickness of insulation material

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

<p><b>KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M</b></p>	<p><b>Annex A1</b></p>
<p><b>Product description</b> Installation conditions</p>	<p>of European Technical Assessment ETA-07/0291</p>

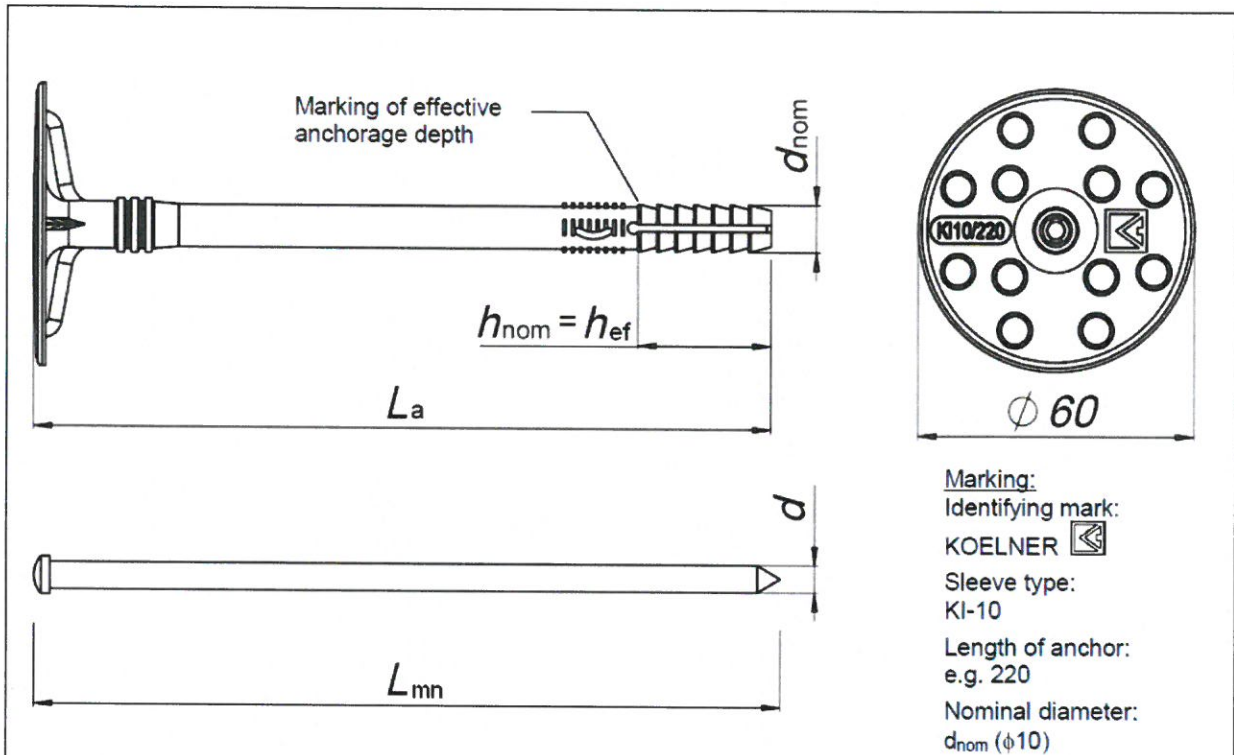


**Table A1: KOELNER KI-10 and KOELNER KI-10PA anchor types and dimensions [mm]**

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:  $h_D = L_a - t_{tol} - h_{ef}$

<b>KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M</b>	<b>Annex A2</b> of European Technical Assessment ETA-07/0291
<b>Product description</b> 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:  $h_D = L_a - t_{tol} - h_{ef}$

<b>KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M</b>	<b>Annex A3</b> of European Technical Assessment ETA-07/0291
<b>Product description</b> Marking and dimensions of the anchor sleeve and expansion element of the KOELNER KI-10M anchors	

**Table A3: Materials**

<b>Designation</b>	<b>Material</b>
Anchor sleeve	Virgin plastic: polypropylene, with different colours <sup>1)</sup>
Expansion pin made of steel	Carbon steel ( $f_{y,k} = 180 \text{ MPa}$ , $f_{u,k} = 300 \text{ MPa}$ ) galvanised $\geq 5 \mu\text{m}$ according to EN ISO 4042
Expansion pin made of plastic	Virgin plastic: glass fibre reinforced polypropylene PPHGF30 nature (KOELNER KI-10) or glass fibre reinforced polyamide PA6 GF30, nature (KOELNER KI-10PA)
<sup>1)</sup> nature, blue, brown, red, white, black, green, yellow, grey	

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

**Product description**  
Materials

**Annex A4**  
of European  
Technical Assessment  
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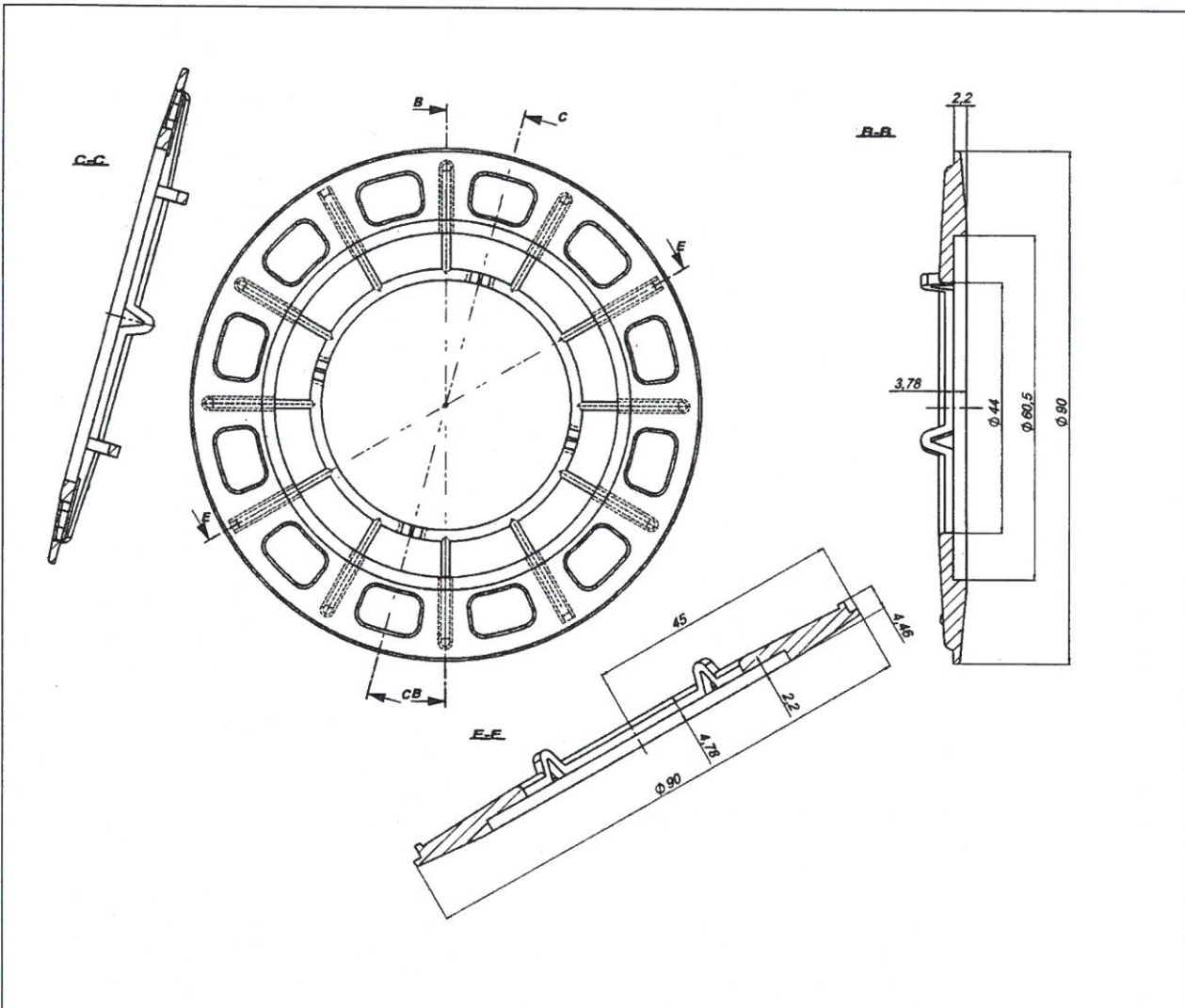


Table A4: Additional plate KWL-90

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

<b>KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M</b>	<b>Annex A5</b> of European Technical Assessment ETA-07/0291
<b>Product description</b> Additional plate KWL-90 in combination with anchor sleeve	

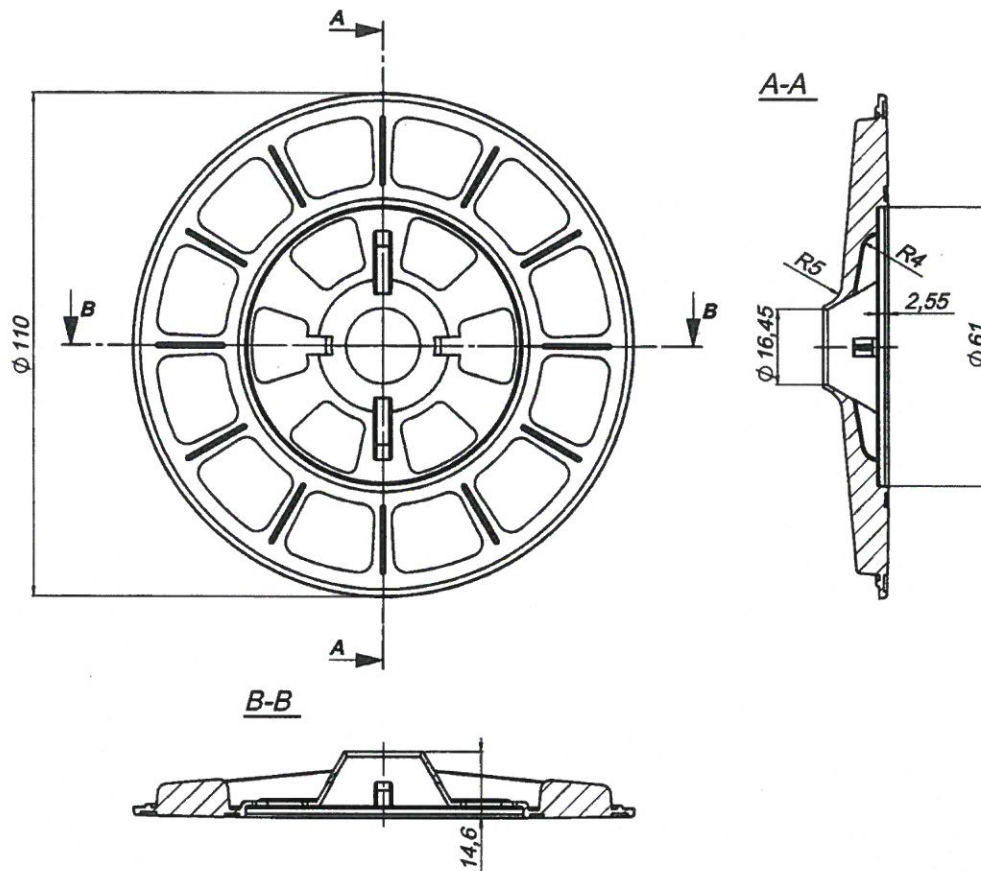


Table A5: Additional plate KWL-110

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

**Annex A6**  
of European  
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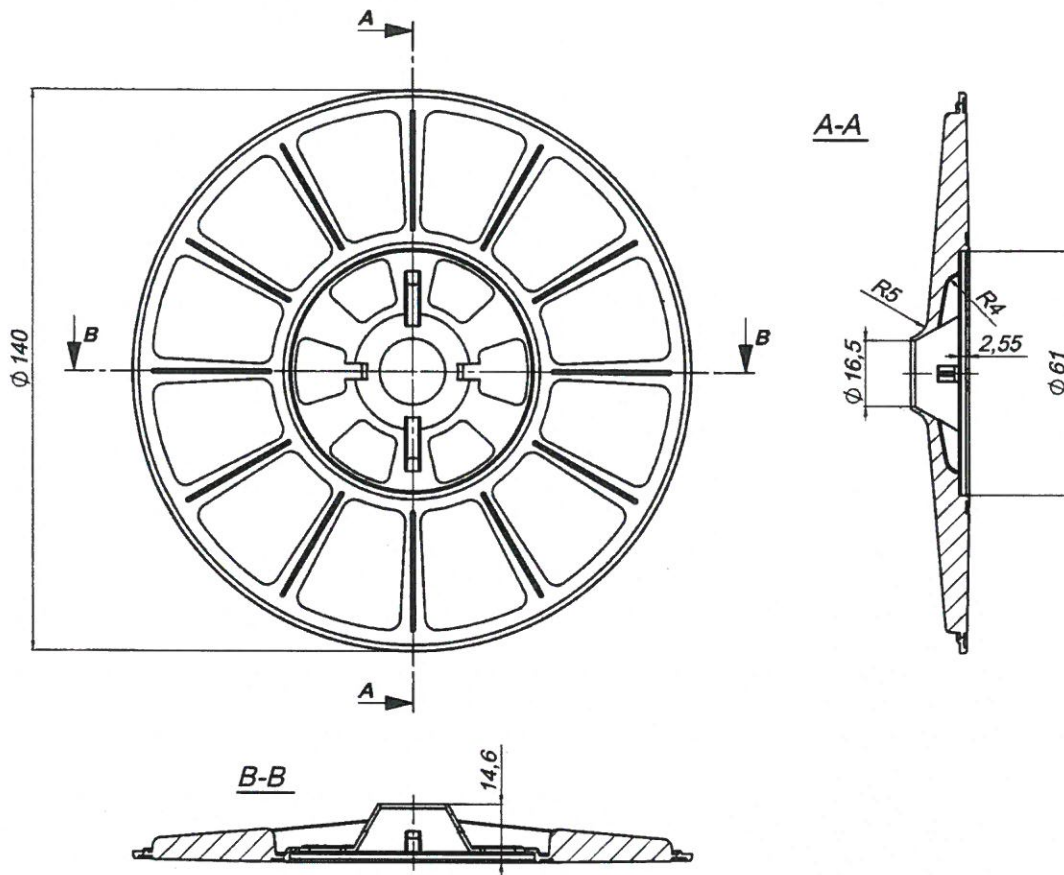


Table A6: Additional plate KWL-140

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

**Annex A7**  
of European  
Technical Assessment  
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**Specification of intended use**

**Anchorage subject to:**

- Wind suction loads.

Note: The anchor shall not be used for the transmission of dead loads of the external thermal insulation composite system (ETICS).

**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 EOTA Technical Report TR 051, edition December 2016.

**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 under the responsibility of an engineer experienced in anchorages and masonry work with the partial safety factors  $\gamma_M = 2,0$  and  $\gamma_F = 1,5$ , if there are no other national regulations.
- Verifiable calculation notes and drawings with anchor positions are prepared taking into account of the loads to be anchored.
- Fasteners are only to be used for multiple fixings of external thermal insulation composite system.

**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  $\leq 6$  weeks.

<b>KOELNER KI-10, KOELNER KI-10PA and KOELNER KI-10M</b>	<b>Annex B1</b> of European Technical Assessment ETA-07/0291
<b>Intended use Specifications</b>	

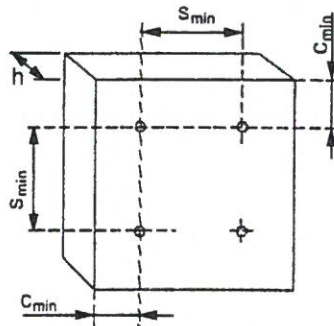
**Table B1: Installation characteristics**

Anchor type		KI-10, KI-10PA and KI-10M		
Use category for infendent use		A, B, C	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]	$\geq 35$	$\geq 50$	$\geq 70$
Effective anchorage depth	$h_{ef}$ [mm]	$\geq 25$	$\geq 40$	$\geq 60$

**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

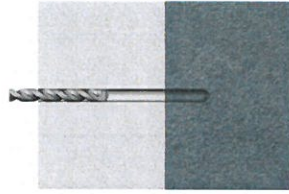


**KOELNER KI-10, KOELNER KI-10PA  
and KOELNER KI-10M**

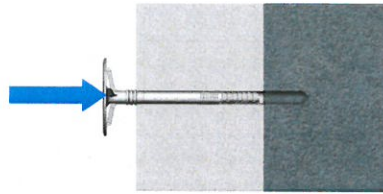
**Intended use**  
Installation characteristics, minimum thickness  
of base material, edge distance and spacing

**Annex B2**  
of European  
Technical Assessment  
ETA-07/0291

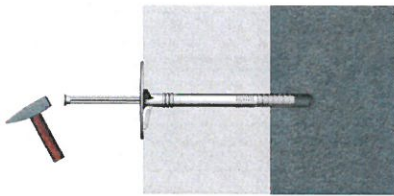
Installation instruction



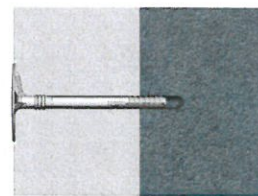
1. Drill hole using method acc. Annex C1



2. Set-in sleeve manually



3. Set expansion element by hammer blows






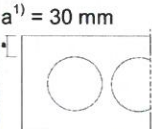

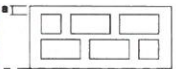
4. Correctly installed anchor

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

**Intended use**  
Installation instruction

**Annex B3**  
of European  
Technical Assessment  
ETA-07/0291

**Table C1-1: Characteristic resistance to tension loads  $N_{Rk}$ , kN in concrete and in masonry for single anchor**


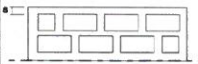



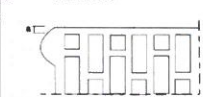
Category	Base material	Bulk density [kg/dm <sup>3</sup> ]	Min. compressive strength [N/mm <sup>2</sup> ]	Referring standard	$N_{Rk}$ [kN]			Drill method
					KI-10	KI-10PA	KI-10M	
A	Concrete C12/15			EN 206-1	0,5	0,4	0,5	
	Concrete C16/20 ÷ C50/60			EN 206-1	0,5	0,4	0,5	
B	Clay brick 	≥ 1,70	30,0	EN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

**Annex C1**  
of European  
Technical Assessment  
ETA-07/0291

**Table C1-2: Characteristic resistance to tension loads  $N_{Rk}$ , kN in concrete and in masonry for single anchor**

Category	Base material	Bulk density [kg/dm <sup>3</sup> ]	Min. compressive strength [N/mm <sup>2</sup> ]	Referring standard	$N_{Rk}$ [kN]			Drill method
					KI-10	KI-10PA	KI-10M	
C	Perforated ceramic brick (for example HLz B – 1.0 3NF 12-1 according to DIN 105)  $a^1 = 13 \text{ mm}$ 	$\geq 0,95$	12,0	EN 771-1	0,4	0,4	0,4	rotary
	Vertically perforated porous block (for example Porotherm 25 P+W)  $a^1 = 10 \text{ mm}$ 	$\geq 0,80$	15,0	EN 771-1	0,4	0,4	0,3	rotary
	Vertically perforated ceramic block (for example MEGA-MAX 250)  $a^1 = 12 \text{ mm}$ 	$\geq 0,80$	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

**Annex C1**  
of European  
Technical Assessment  
ETA-07/0291



**Table C1-3: Characteristic resistance to tension loads  $N_{Rk}$ , kN in concrete and in masonry for single anchor**

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

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

**Performances**  
Characteristic resistance

**Annex C1**  
of European  
Technical Assessment  
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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 $\chi$ [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**




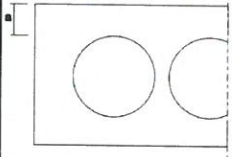
Anchor type	Diameter of the anchor plate $d_{plate}$ [mm]	Load resistance of the anchor plate $N_{u,m}$ [kN]	Plate stiffness $N_{0,m}$ [kN/mm]
KI-10 and KI-10PA	60	2,1	0,5
KI-10M	60	2,6	0,4

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

**Performances**  
Point thermal transmittance and plate stiffness

**Annex C2**  
of European  
Technical Assessment  
ETA-07/0291

**Table C4-1: Displacement behavior**


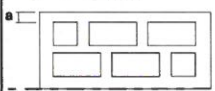

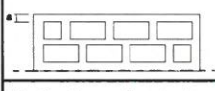

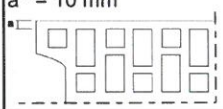
Category	Base material	Bulk density [kg/dm <sup>3</sup> ]	Compressive strength [N/mm <sup>2</sup> ]	$\frac{N_{Rk}}{3}$ [kN]			$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]		
				KI-10	KI-10PA	KI-10M	KI-10	KI-10PA	KI-10M
A	Concrete C20/25	–	–	0,17	0,13	0,17	0,60	0,95	0,63
	Concrete C50/60	–	–	0,17	0,13	0,17	0,60	0,95	0,63
B	Clay brick 	≥ 1,70	≥ 30,0	0,17	0,13	0,13	0,93	1,05	0,76
B	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
C	Calcium silicate hollow block (for example Kalksandstein KS L-R(P) 8 DF Lochstein according to DIN 106)  a <sup>1)</sup> = 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**

**Annex C3**  
of European  
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ETA-07/0291

**Table C4-2: Displacement behavior**


Category	Base material	Bulk density [kg/dm <sup>3</sup> ]	Compressive strength [N/mm <sup>2</sup> ]	$\frac{N_{RK}}{3}$ [kN]			$\delta\left(\frac{N_{RK}}{3}\right)$ [mm]		
				KI-10	KI-10PA	KI-10M	KI-10	KI-10PA	KI-10M
C	Perforated ceramic brick (for example Hlz B – 1,0 1NF 12-1 according to DIN 105)  a <sup>1)</sup> = 13 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 <sup>1)</sup> = 13 mm 	≥ 0,95	≥ 12,0	0,13	0,13	0,13	0,59	0,84	0,64
	Vertically perforated porosited block (for example Porothem 25 P+W)  a <sup>1)</sup> = 10 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**

**Annex C3**  
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**Table C1-3: Characteristic resistance to tension loads  $N_{Rk}$  in concrete and in masonry for single anchor**

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

**Annex C2**  
of European  
Technical Assessment  
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