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Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

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European Technical Assessment

ETA-07/0291 of 19/04/2022

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	KOELNER KI-10 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	Manufacturing Plant no. 3
This European Technical Assessment contains	22 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 28/12/2017

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 virgin polypropylene and an accompanying specific nail as an expansion pin made of the glass fibre reinforced polypropylene.

The KOELNER KI-10M nailed in plastic anchor consists of anchor sleeve with a plate made of virgin 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 and KOELNER KI-10M anchors may in addition be combined with the plates R-KWL-90, KWL-090PP, KWL-110PP and R-KWL-140.

The description of the products is 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 under tension load	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 has been made in accordance with EAD 330196-01-0604.

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

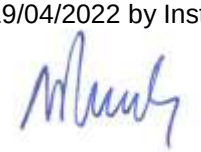
According to the Decision 97/463/EC of the European Commission the system 2+ of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) applies.

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.

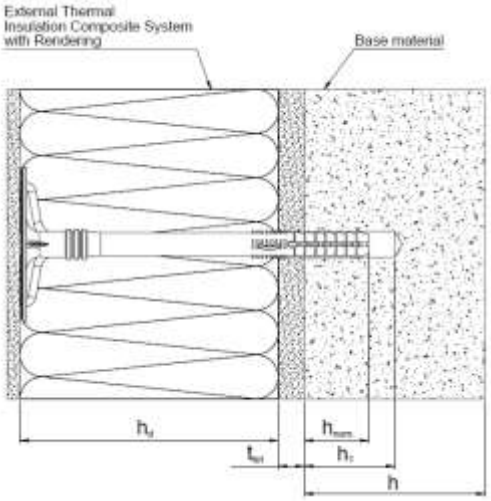
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 19/04/2022 by Instytut Techniki Budowlanej

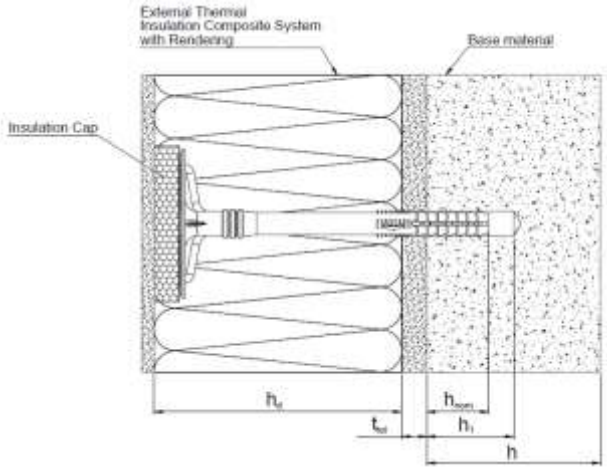


Anna Panek, MSc
Deputy Director of ITB

Surface assembly:



Countersunk assembly:



Intended Use:

Fixing of external thermal insulation composite systems in concrete and masonry

Legend:

$h_{nom} = h_{ef}$ = effective anchorage depth

h_1 = depth of drill hole in base material

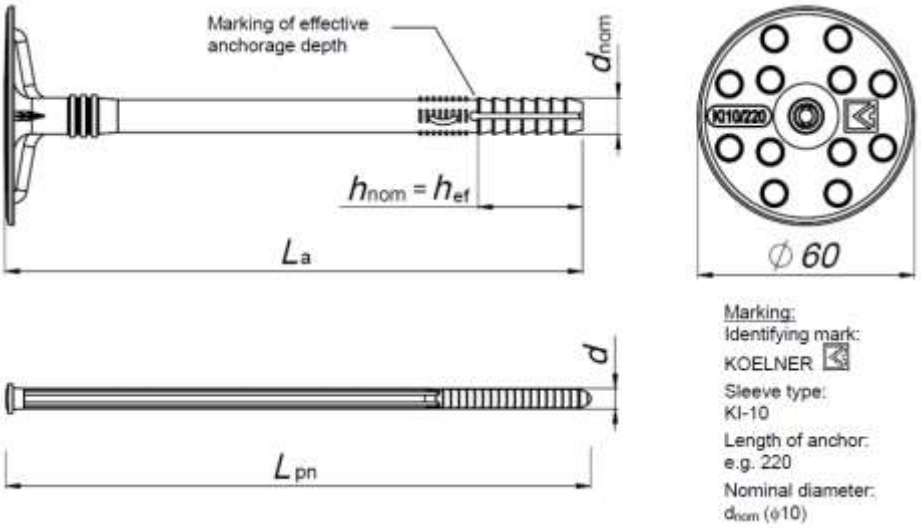
h = thickness of base material

h_d = thickness of insulation material

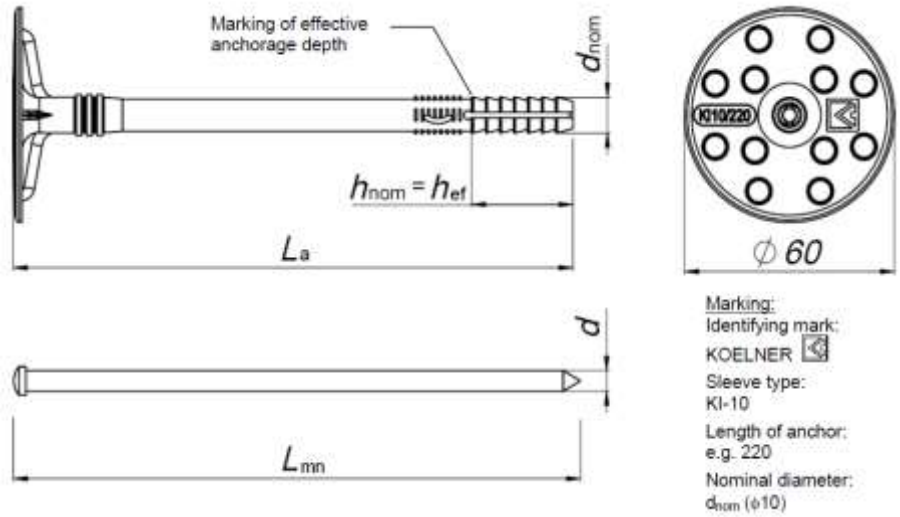
t_{tol} = thickness of equalizing and/or non-load-bearing layer

KOELNER KI-10 and KOELNER KI-10M	**Annex A1** of European Technical Assessment ETA-07/0291
Product description Installation conditions	

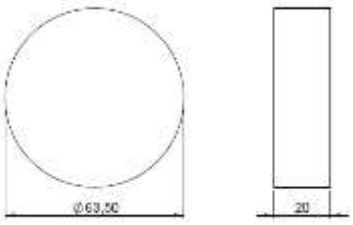
KOELNER KI-10:



KOELNER KI-10M:



Insulation cap:



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

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

Anchor type	Anchor sleeve			Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	$h_{ef} = h_{nom}$	D ± 0,1	L_{mn} / L_{mn} ± 2
KI-10 (d_{nom}) x L_a	10	70 - 220	25	6,2	70 - 220
KI-10M (d_{nom}) x L_a	10	70 - 260	25	4,9	70 - 260

Determination of maximum thickness of insulation material:

For surface assembly: $h_d = L_a - t_{tol} - h_{ef}$

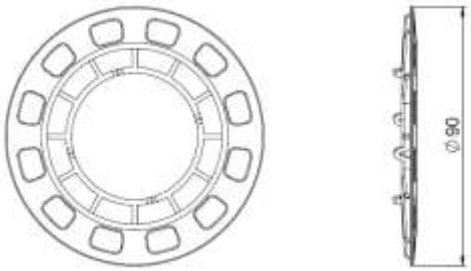
For countersunk assembly: $h_d = L_a - t_{tol} - h_{ef} + 20$ mm

Table A2: Materials

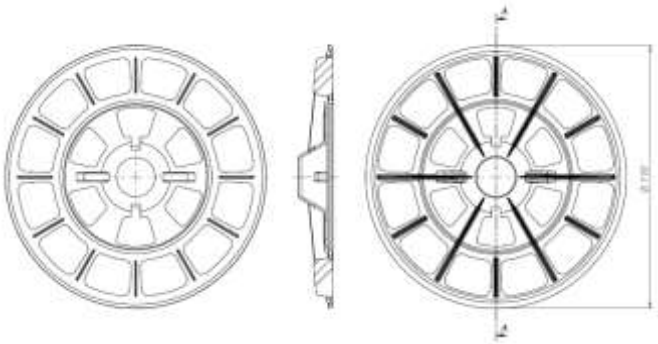
Designation	Material
Anchor sleeve	Virgin plastic: polypropylene, of different colours [1)]
Expansion pin made of steel	Carbon steel ($f_{y,k}$ = 180 MPa, $f_{u,k}$ = 300 MPa) galvanised ≥ 5 µm according to EN ISO 4042 (KOELNER KI-10M)
Expansion pin made of plastic	Virgin plastic: glass fibre reinforced polypropylene PPHGF30 nature (KOELNER KI-10)
[1)] nature, blue, brown, red, white, black, green, yellow, grey	

R-KWL-90:

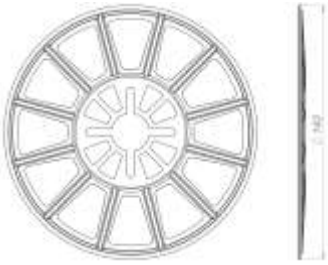
KWL-090PP:



KWL-110PP:



R-KWL-140:

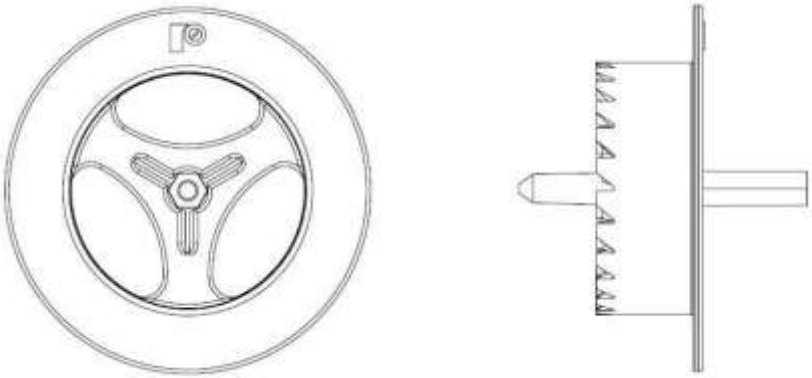


KOELNER KI-10 and KOELNER KI-10M	**Annex A5** of European Technical Assessment ETA-07/0291
Product description Additional plates R-KWL-90, KWL-090PP, KWL-110PP and R-KWL-140	

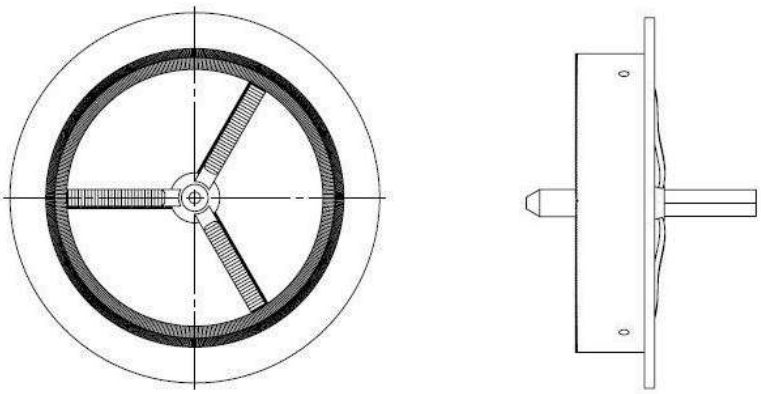
Table A3: Additional plates R-KWL-90, KWL-090PP, KWL-110PP and R-KWL-140

Plate type	Outer diameter [mm]	Material
R-KWL-90	90	Glass fibre reinforced polyamide PA6 GF30, nature or polypropylene, nature
KWL-090PP	90	
KWL-110PP	110	
R-KWL-140	140	

Cutter K-KFS for countersunk assembly:



Cutter R-KFS for countersunk assembly:



KOELNER KI-10 and KOELNER KI-10M	**Annex A7** of European Technical Assessment ETA-07/0291
Product description Cutters K-KFS and R-KFS for countersunk assembly	

Specification of intended use

Anchorages 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 (base material group A), according to Annex C1.
- Solid masonry (base material group B), according to Annex C1.
- Hollow or perforated masonry (base material group C), according to Annex C1.
- Lightweight aggregate concrete (base material group D), according to Annex C1.
- Autoclaved aerated concrete (base material group E), according to Annex C1.
- For other base materials of the base material groups 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 γ_M = 2,0 and γ_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 (ETICS), according to EAD 330196-01-0604.

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.

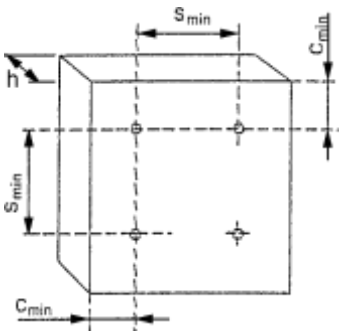
KOELNER KI-10 and KOELNER KI-10M	**Annex B1** of European Technical Assessment ETA-07/0291
Intended use Specifications	

Table B1: Installation characteristics

Anchor type		**KI-10 and KI-10M**		
Base material group		A, B, C	D	E
Nominal diameter of drill bit	d_o [mm]	10		
Cutting diameter of drill bit	d_{cut} [mm]	≤ 10,45		
Depth of drill hole	h_1 [mm]	≥ 35	≥ 50	≥ 70
Effective anchorage depth	$h_{ef} = h_{nom}$ [mm]	≥ 25	≥ 40	≥ 60

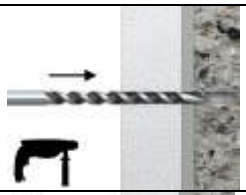
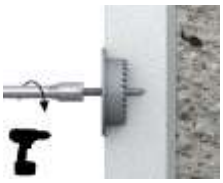
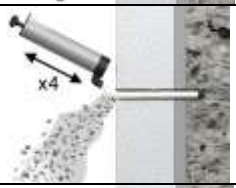
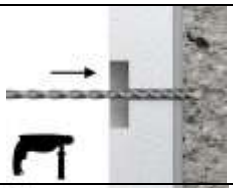
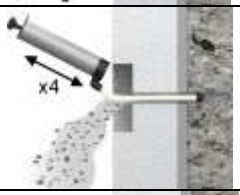
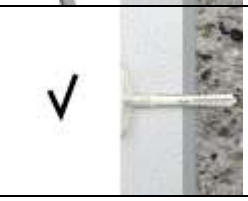
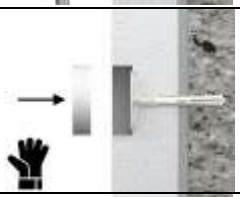
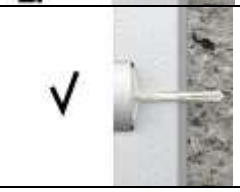
Table B2: Minimum thickness of base material, spacing and edge distance

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



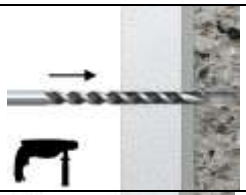
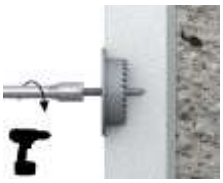
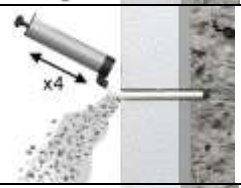
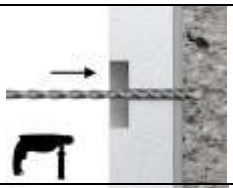
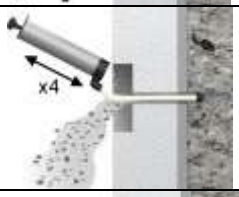
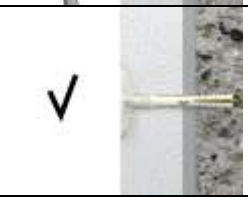
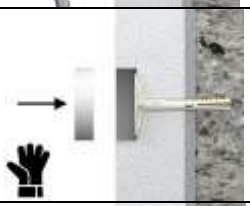
KOELNER KI-10 and KOELNER KI-10M	**Annex B2** of European Technical Assessment ETA-07/0291
Intended use Installation characteristics, minimum thickness of base material, edge distance and spacing	

Installation instruction – KOELNER KI-10:

Surface assembly:		**Countersunk assembly:**	
	Drill hole perpendicular to substrate surface using method acc. to Annex C1.		Drill a recess in the insulation material with a cutter.
	Clean the drill hole.		Drill hole perpendicular to substrate surface using method acc. to Annex C1.
	Set-in sleeve manually.		Clean the drill hole.
	Set expansion element with hammer.		Set-in sleeve manually.
	Correctly installed anchor.		Set expansion element with hammer.
			Put the blanking plate in place.
			Correctly installed anchor.

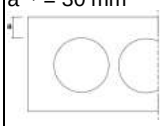
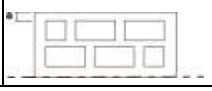
KOELNER KI-10 and KOELNER KI-10M	**Annex B3** of European Technical Assessment ETA-07/0291
Intended use Installation instruction of KOELNER KI-10 anchor	

Installation instruction – KOELNER KI-10M:

Surface assembly:		**Countersunk assembly:**	
	Drill hole perpendicular to substrate surface using method acc. to Annex C1.		Drill a recess in the insulation material with a cutter.
	Clean the drill hole.		Drill hole perpendicular to substrate surface using method acc. to Annex C1.
	Set-in sleeve manually.		Clean the drill hole.
	Set expansion element with hammer.		Set-in sleeve manually.
	Correctly installed anchor.		Set expansion element with hammer.
			Put the blanking plate in place.
			Correctly installed anchor.

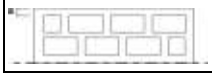
KOELNER KI-10 and KOELNER KI-10M	**Annex B4** of European Technical Assessment ETA-07/0291
Intended use Installation instruction of KOELNER KI-10M anchor	

Table C1-1: Characteristic resistance under tension loads N_{Rk} in concrete and in masonry for single anchor

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]		Drill method
					KI-10	KI-10M	
A	Concrete C12/15			EN 206-1	0,5	0,5	hammer
	Concrete C16/20 ÷ C50/60			EN 206-1	0,5	0,5	
B	Clay brick 	≥ 1,70	≥ 30,0	EN 771-1	0,5	0,4	
	Calcium silicate brick (e.g. Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106) 	≥ 2,00	≥ 20,0	EN 771-2	0,6	0,6	hammer
C	Calcium silicate hollow block (e.g. Kalksandstein KS L-R(P) 8 DF Lochstein according to DIN 106)  a [1)] = 30 mm 	≥ 1,60	≥ 12,0	EN 771-2	0,6	0,5	rotary
	Perforated ceramic brick (e.g. Hlz B – 1.0 1NF 12-1 according to DIN 105)  a [1)] = 13 mm 	≥ 0,95	≥ 12,0	EN 771-1	0,4	0,4	rotary

[1)] Minimum values “a”. For elements with lower value of “a” the load tests on the construction are required

Table C1-2: Characteristic resistance under tension loads N_{Rk} in concrete and in masonry for single anchor

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]		Drill method
					KI-10	KI-10M	
C	Perforated ceramic brick (e.g. 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	rotary
	Verticaly perforated porosited block (e.g. Porotherm 25 P+W)  a [1] = 10 mm 	≥ 0,80	≥ 15,0	EN 771-1	0,4	0,3	rotary
	Verticaly perforated ceramic block (e.g. MEGA-MAX 250)  a [1] = 12 mm 	≥ 0,80	≥ 15,0	EN 771-1	0,3	0,3	rotary

[1] Minimum values “a”. For elements with lower value of “a” the load tests on the construction are required

Table C1-3: Characteristic resistance under tension loads N_{Rk} in concrete and in masonry for single anchor

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]		Drill method
					KI-10	KI-10M	
C	Lightweight concrete hollow block (e.g. Hbl according to DIN 18151) a [1] = 30 [mm] 	≥ 0,80	≥ 2,0	EN 771-3	0,4	0,4	rotary
	Lightweight concrete hollow block Tekno Amerblok a [1] = 30 [mm] 	≥ 1,56	≥ 12,5	EN 771-3	0,4	0,3	rotary
D	Lightweight concrete block	≥ 1,56	≥ 20,0	EN 771-3	0,5	0,6	hammer
E	Autoclaved aerated concrete block	≥ 0,35	≥ 2,0	EN 771-4	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

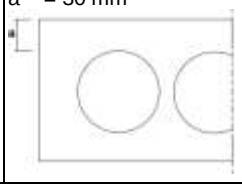
Table C2.1: Point thermal transmittance according to EOTA Technical Report TR 025

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

Table C2.2: 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	60	2,1	0,5
KI-10M	60	2,6	0,4

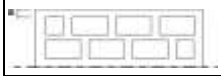
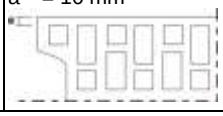
Table C3.1: Displacements

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]		$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]	
				KI-10	KI-10M	KI-10	KI-10M
A	Concrete C20/25	–	_	0,18	0,17	0,78	0,53
	Concrete C50/60	–	_	0,17	0,18	0,60	0,63
B	Clay brick 	≥ 1,70	≥ 30,0	0,17	0,13	0,93	0,76
B	Calcium silicate brick (e.g. Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106) 	≥ 2,00	≥ 20,0	0,20	0,20	0,86	0,75
C	Calcium silicate hollow block (e.g. Kalksandstein KS L-R(P) 8 DF Lochstein according to DIN 106)  a [1)] = 30 mm 	≥ 1,60	≥ 12,0	0,20	0,17	0,73	0,57

[1)] Minimum values “a”. For elements with lower value of “a” the load tests on the construction are required

KOELNER KI-10 and KOELNER KI-10M	**Annex C3** of European Technical Assessment ETA-07/0291
Performances Displacements	

Table C3.2: Displacements

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]		$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]	
				KI-10	KI-10M	KI-10	KI-10M
C	Perforated ceramic brick (e.g. Hlz B – 1,0 1NF 12-1 according to DIN 105)  a [1)] = 13 mm 	≥ 0,95	≥ 12,0	0,15	0,13	0,84	0,52
	Perforated ceramic brick (e.g. Hlz B – 1,0 3NF 12-1 according to DIN 105)  a [1)] =13 mm 	≥ 0,95	≥ 12,0	0,15	0,15	0,59	0,64
	Verticaly perforated porosited block (e.g. Porotherm 25 P+W)  a [1)] = 10 mm 	≥ 0,80	≥ 15,0	0,15	0,10	0,56	0,49

[1)] Minimum values “a”. For elements with lower value of “a” the load tests on the construction are required

Table C3.3: Displacements

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]		$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]	
				KI-10	KI-10M	KI-10	KI-10M
C	Verticaly perforated ceramic block (e.g. MEGA-MAX 250)  a [1] = 12 mm 	≥ 0,80	≥ 15,0	0,10	0,12	0,61	0,74
	Lightweight concrete hollow block (e.g. Hbl according to DIN 18151) a [1] = 30 [mm] 	≥ 0,80	≥ 2,0	0,13	0,13	0,53	0,57
	Lightweight concrete hollow block Tekno Amerblok a [1] = 30 [mm] 	≥ 1,56	≥ 12,5	0,15	0,12	0,61	0,18
D	Lightweight concrete block	≥ 1,56	≥ 20,0	0,17	0,20	0,99	0,61
E	Autoclaved aerated concrete block	≥ 0,35	≥ 2,0	0,03	0,03	0,50	0,40

[1] Minimum values “a”. For elements with lower value of “a” the load tests on the construction are required