Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-08/0188 of 19 October 2017

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	KTS Facade Anchor KT 10 and KT 14
Product family to which the construction product belongs	Plastic anchor for multiple use in concrete and masonry for non-structural applications
Manufacturer	KtS Kunststofftechnik GmbH Osterkamp 18 59368 Werne DEUTSCHLAND
Manufacturing plant	KtS Kunststofftechnik GmbH Osterkamp 18 59368 Werne DEUTSCHLAND
This European Technical Assessment contains	17 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	ETAG 020, March 2012, used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

The KTS Facade Anchor in the range of KT 10 and KT 14 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel or stainless steel.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled hole.

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)

The essential characteristics regarding mechanical resistance and stability are included under the Basic Works Requirement Safety in use.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A 1
Resistance to fire	See Annex C 1

3.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annexes C 1 - C 4
Characteristic resistance for bending moments	See Annex C 1
Displacements under shear and tension loads	See Annex C 3 – C 4
Anchor distances and dimensions of members	See Annex B 2 - B 4

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

In accordance with guideline for European technical approval ETAG 020, March 2012 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: 97/463/EC.

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 at Deutsches Institut für Bautechnik.

Issued in Berlin on 19 October 2017 by Deutsches Institut für Bautechnik

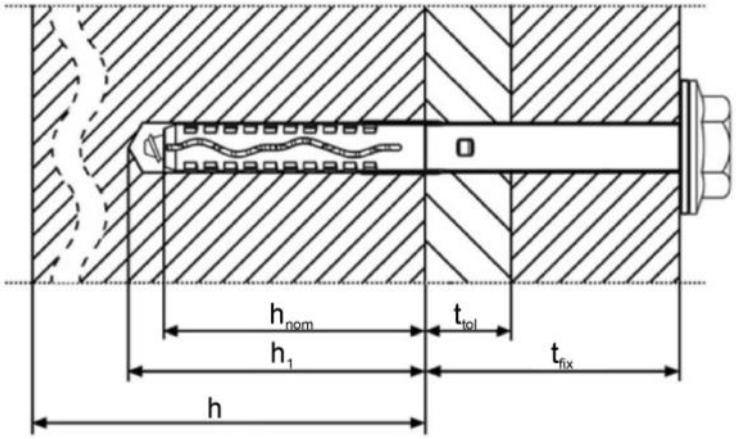
BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Aksünger

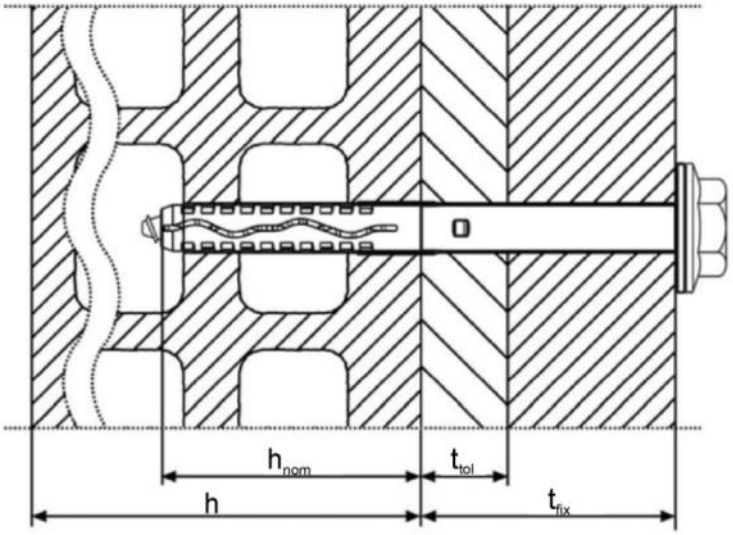
Deutsches Institut für Bautechnik

KTS Façade Anchor KT 10 and KT 14

Fixing in concrete and solid masonry



Fixing in hollow or perforated masonry



Legend

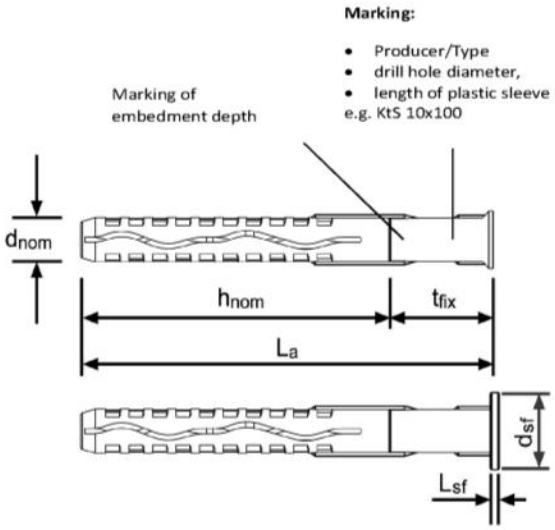
h_{nom} = overall plastic anchor embedment depth in the base material
h_1 = depth of drilled hole to deepest point
h = thickness of member (wall)
t_{fix} = thickness of fixture
t_{tol} = thickness of layer or non-load bearing coating

KTS Façade Anchor KT 10 and KT 14	Annex A 1
Product description Installed condition	

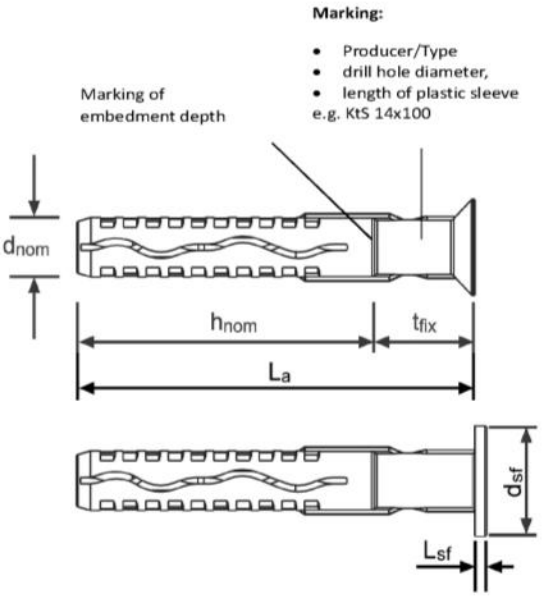
Deutsches Institut für Bautechnik

Anchor types / specific screw

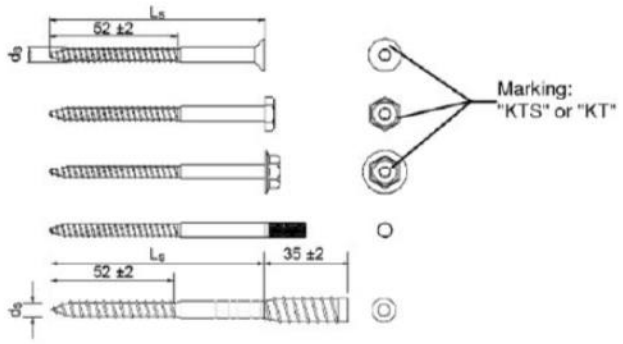
Anchor sleeve KT 10



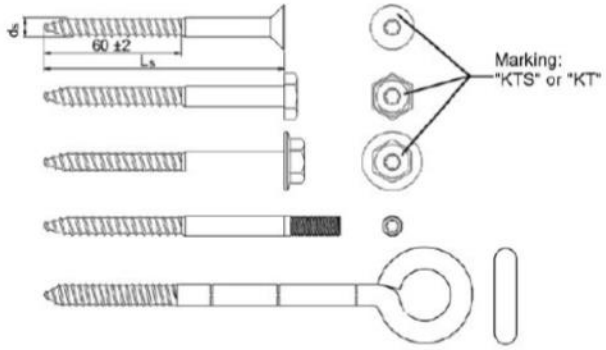
Anchor sleeve KT 14



Special screw KT 10



Special screw KT 14



KTS Façade Anchor KT 10 und KT 14	
Product description Anchor types / specific screw marking	Annex A 2

Deutsches Institut für Bautechnik DIBt

Table A1: Dimensions [mm]

Type	Anchor sleeve								Special screw [1]			
	d_{nom} [mm]	h_{nom} [mm]	$t_{fix,\,min}$ [mm]	$t_{fix,\,max}$ [mm]	$L_{a,\,min}$ [mm]	$L_{a,\,max}$ [mm]	L_{Sf} [2] [mm]	d_{Sf} [mm]	d_s [mm]	d_k [3] [mm]	$L_{s,\,min}$ [mm]	$L_{s,\,max}$ [mm]
KT 10	10	70	10	230	80	300	2	18	7	5,8	90	310
KT 14	14	70	10	290	80	360	3	26	10	8,4	90	370

1) To insure that the screw penetrates the anchor sleeve L_s must be $L_a + L_{sf} + 8$.
2) Only valid for flat collar version
3) core diameter of the thread

Table A2: Materials

Name	Material
Anchor sleeve	Polyamide PA6, colour: red, grey
Special screw	Carbon steel, strength class 6.8, electrogalvanic coating Zn ≥ 5µm according EN ISO 4042:1999
	Stainless steel according EN 10088-3:2014, material 1.4401, 1.4404 or 1.4571

KTS Façade Anchor KT 10 und KT 14

Product description
Dimension and materials

Annex A 3

Deutsches Institut für Bautechnik DIBt

Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads
- Multiple fixing of non-structural applications

Base materials:
- Reinforced or unreinforced normal weight concrete with strength classes ≥ C12/15 (use category a), according to EN 206-1:2000, Annex C1
- Solid brick masonry (use category b), according to Annex C2
  Note: The characteristic resistance is also valid for larger brick sizes and larger compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annex C2
- Autoclaved aerated concrete (use category d), according to Annex C4
- Mortar strength class of the masonry ≥ M2,5 at minimum according to EN 998-2:2010.
- For other base materials of the use categories a, b, c and d the characteristic resistance of the anchor may be determined by job size tests according to ETAG 020, Annex B Edition March 2012.

Temperature Range:

· Temperature range a):	-40°C to +40°C	(max. long term temperature +24°C and max. short term temperature +40°C)
· Temperature range b):	-40°C bis +80°C	(max. long term temperature +50°C and max. short term temperature +80°C)

Use conditions (Environmental conditions):
- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- The specific screw made of galvanized steel may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).
- Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:
- The anchorages are designed in accordance with the ETAG 020, Annex C Edition March 2012 under the responsibility of an engineer experienced in anchorages and masonry work.
- 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.
- Fasteners are only to be used for multiple use for non-structural application, according to ETAG 020 Edition March 2012.

Installation:
- Hole drilling by the drill modes according to Annex C1, C2, C4
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Installation temperature from ≥ -20°C
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks

KTS Façade Anchor KT 10 and KT 14	
Intended use Specifications	Annex B 1

Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Anchor type		KT 10	KT 14
Drill hole diameter	d_0 = [mm]	10	14
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	10,45	14,45
Depth of drilled hole to deepest point [1]	$h_1 \geq$ [mm]	85	85
Overall plastic anchor embedment depth in the base material [1), 2)]	$h_{nom} \geq$ [mm]	70	70
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	10,5	14,5

1) See Annex A1
2) For hollow and perforated masonry the influence of h_{nom} > 70 mm has to be detected by job site tests according ETAG 020 Annex B

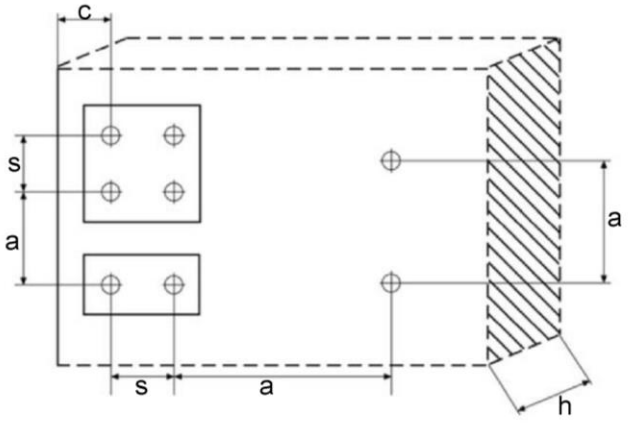
Table B2: Minimum thickness of member, edge distance and spacing in concrete

KT 10: Fixing points with a spacing a ≤ $s_{cr,N}$ are considered as a group with a max. characteristic resistance $N_{Rk,p}$ acc. to Table C3. For a > $s_{cr,N}$ the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table C3.

KT 14: Fixing points with a spacing a ≤ $s_{cr,N}$ are considered as a group with a max. characteristic resistance $N_{Rk,p}$ acc. to Table C3. For a > $s_{cr,N}$ the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table C3.

Type		Minimum thickness of member h_{min} [mm]	Characteristic edge distance $c_{cr,N}$ [mm]	Minimum edge distances c_{min} [mm]	Minimum spacing s_{min} [mm]	Characteristic spacing $s_{cr,N}$ [mm]
KT 10	Concrete C12/15	100	100	85	70	85
	Concrete ≥ C16/20		70	60	50	85
KT 14	Concrete C12/15	100	140	120	105	115
	Concrete ≥ C16/20		100	85	75	115

Scheme of distance and spacing in concrete



KTS Façade Anchor KT 10 and KT 14

Intended use
Installation parameters, edge distance and spacings for use in concrete

Annex B 2

Deutsches Institut für Bautechnik DIBt

Table B3: Minimum distance and dimensions in solid masonry

		KT 10		KT 14	
Minimum thickness of member	h_{min} [mm]	115	240 [2)]	115	240 [1)]
Single anchor					
Minimum spacing	a_{min} [mm]	max (250 mm / $s_{1,min}$ / $s_{2,min}$)			
Minimum edge distance	c_{min} [mm]	100	120 [2)]	100	200 [1)]
Anchor Group					
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	200	85 [2)]	200	
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	400	85 [2)]	400	
Minimum edge distance	c_{min} [mm]	100	120 [2)]	100	

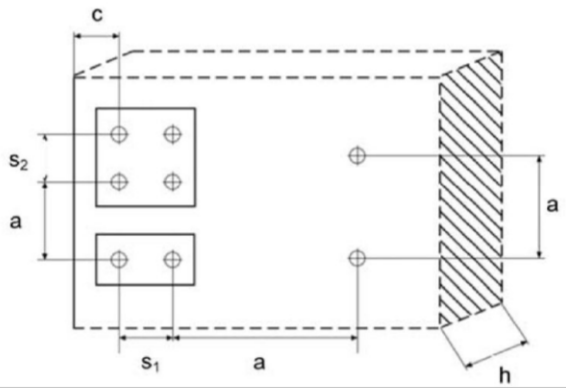
1) Only for KS-NF and member thickness h ≥ 240 mm [see Table C4, with footnote 5]
2) Only for Mz-NF and KS-NF [see Table C4, with footnote 6]

Table B4: Minimum distance and dimensions in hollow or perforated masonry (only for KT 10)

		KT 10 in HLz-2DF [1)]	KT 10 in KSL-8DF [1)]
Minimum thickness of member	h_{min} [mm]	115	115
Single anchor			
Minimum spacing	a_{min} [mm]	max (250 mm / $s_{1,min}$ / $s_{2,min}$)	
Minimum edge distance	c_{min} [mm]	100	60
Anchor Group			
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	100	100
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	100	100
Minimum edge distance	c_{min} [mm]	100	60

1) Information for base material, see Table C4

Scheme of distance and spacing in solid masonry



KTS Façade Anchor KT 10 and KT 14

Intended use
Edge distance and spacings for use in masonry and hollow or perforated masonry

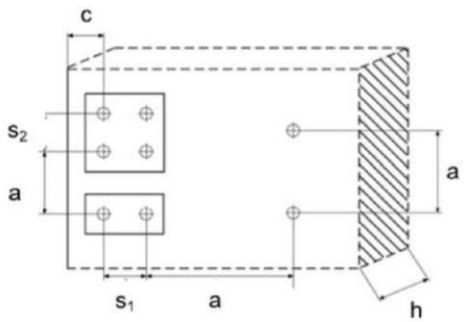
Annex B 3

Deutsches Institut für Bautechnik DIBt

Table B5: Minimum distances and dimensions in autoclaved aerated concrete

		KT 10
Minimum thickness of member	h_{min} [mm]	200
Single anchor		
Minimum allowable spacing	a_{min} [mm]	max (250 mm / $s_{1,min}$ / $s_{2,min}$)
Minimum allowable edge distance	c_{min} [mm]	100
Anchor Group		
Minimum allowable spacing **perpendicular** to free edge	$s_{1,min}$ [mm]	200
Minimum allowable spacing **parallel** to free edge	$s_{2,min}$ [mm]	400
Minimum allowable edge distance	c_{min} [mm]	100

Scheme of distance and spacing in autoclaved aerated concrete



KTS Façade Anchor KT 10 and KT 14

Intended use
Edge distance and spacings for use in autoclaved aerated concrete

Annex B 4

Deutsches Institut für Bautechnik DIBt

Figure 1: Geometry of stone: Hollow clay brick HLz EN 771-1:2011

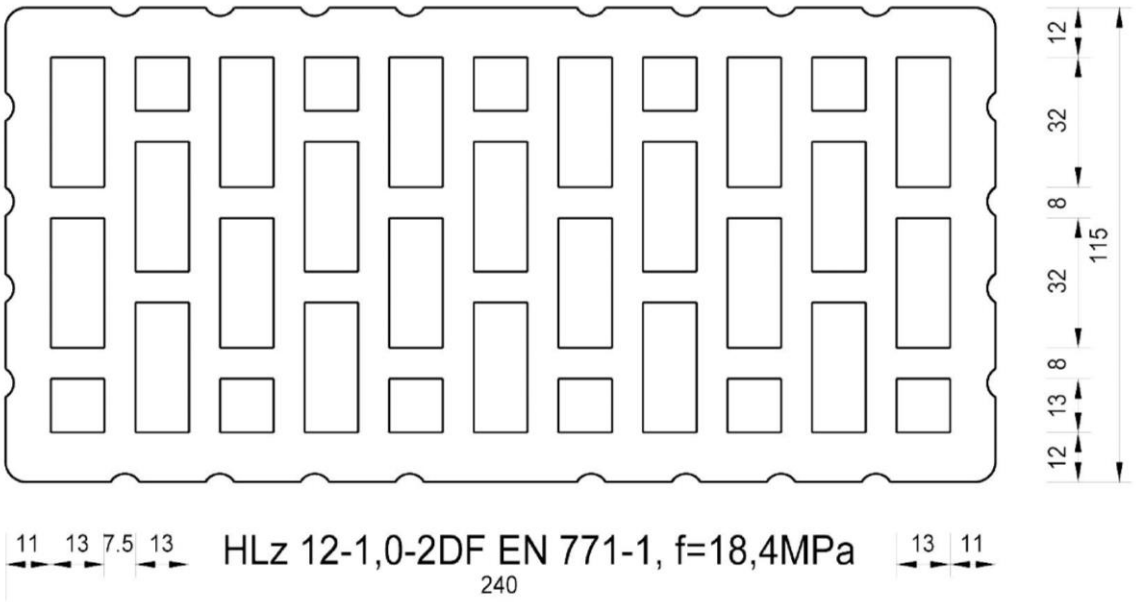
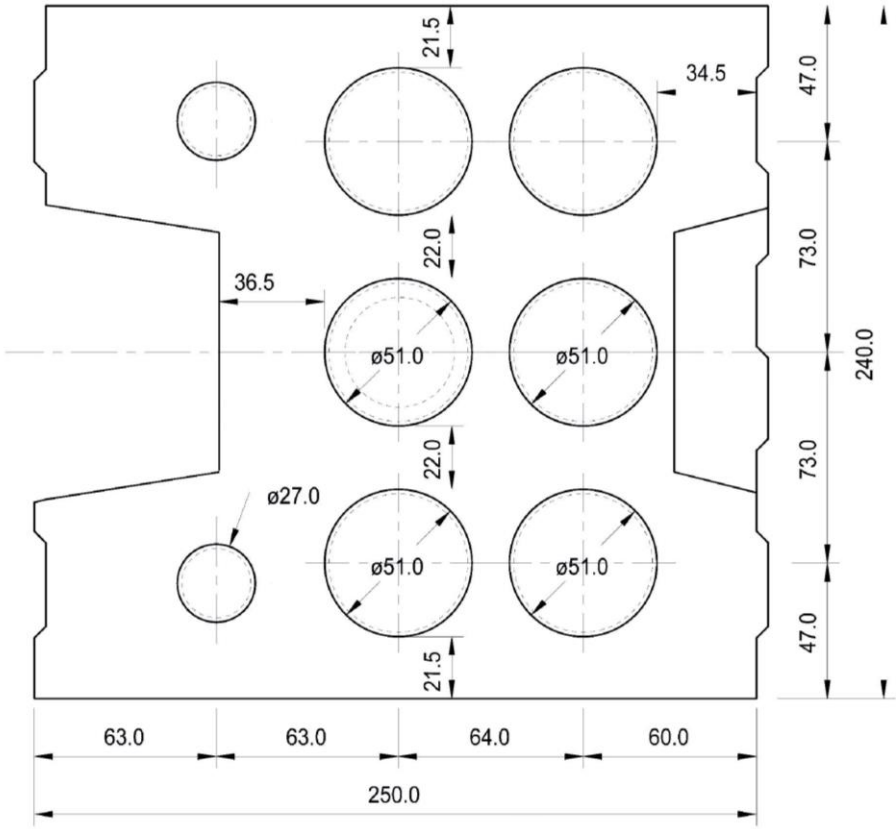


Figure 2: Geometry of stone: Hollow sand-lime brick KSL EN 771-2:2011

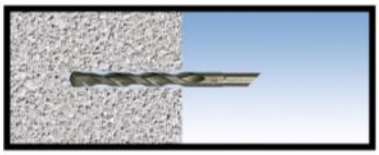


KTS Façade Anchor KT 10 and KT 14	
Intended use Geometry of stones	Annex B 5

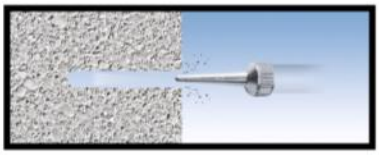
Deutsches Institut für Bautechnik

DIBt

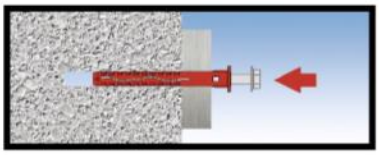
Installation instructions



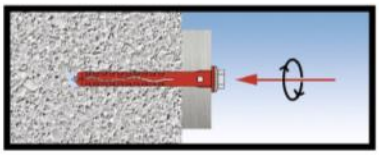
1. Drill a hole



2. Blow out drill-hole and clean it



3. Put the plug into the drill-hole



4. Screw in tight the anchor plate

KTS Façade Anchor KT 10 and KT 14

Intended use
Installation instructions

Annex B 6

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic resistance of the screw

Failure of expansion element (special screw)			KT 10		KT 14	
			gvz	stainless steel	gvz	stainless steel
Characteristic tension resistance	$N_{Rk,s}$	[kN]	15,0	13,5	30,2	27,1
Partial safety factor	γ_{Ms} [1)]		1,5	1,6	1,5	1,6
Characteristic shear resistance	$V_{Rk,s}$	[kN]	7,5	6,8	15,1	13,6
Partial safety factor	γ_{Ms} [1)]		1,25	1,33	1,25	1,33
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	12,8	11,5	36,2	32,6
Partial safety factor	γ_{Ms} [1)]		1,25	1,33	1,25	1,33

Table C2: Values under fire exposure in concrete C20/25 to C50/60 in any load direction, no permanent centric tension load and without lever arm, fastening of facade systems

Anchor type	Fire resistance class	F [1)]
KT 10	R 90	0,8 kN

1) $F = F_{Rk} / (\gamma_M \cdot \gamma_F)$

Table C3: Characterstic resistance by pull-out failure for use in concrete (drill procedure: hammer drilling)

Pull-out failure (plastic sleeve)			KT 10		KT 14	
			ϑ = 24/40 °C	ϑ = 50/80 °C	ϑ = 24/40 °C	ϑ = 50/80 °C
· Concrete ≥ C16/20 according EN206-1:2000						
Characteristic resistance	$N_{Rk,p}$	[kN]	5,0	3,5	7,5	5,0
Partial safety factor	γ_{Mc} [1)]		1,8			
· Concrete C12/15 according EN206-1:2000						
Charcterstic resistance	$N_{Rk,p}$	[kN]	3,5	2,5	5,0	3,5
Partial safety factor	γ_{Mc} [1)]		1,8			

1) In absence of other national regulations

KTS Façade Anchor KT 10 and KT 14	
Performances Characteristic resistance of the screw, Characteristic bending resistance, Characteristic resistance for use in concrete	Annex C 1

Deutsches Institut für Bautechnik DIBt

Table C4: Characteristic resistance F_{RK} in [kN] in solid and hollow or perforated masonry (use category „b“ and „c“)

Use category	Base material	Type Min. DF or min. Size (L x W x H) Figure [mm]	Bulk density class ρ [kg/dm³]	Min. compressive strength f_b [N/mm²]	Drill-method	Thickness of wall h [mm]	Comment	Charcteristic resistance F_{RK} [kN] KT 10 24/40 °C	KT 10 50/80 °C	KT 14 24/40 °C	KT 14 50/80 °C
b	Clay brick Mz EN 771-1:2011	NF (240x115x71)	1,8	20	H [1]	115	Vertical perforation up to 15%	4,0 6,0 [4]	3,5	4,5 7,5 [5]	4,5 5,0 [5]
				10				3,0 4,5 [4]	2,5	3,0 5,0 [5]	3,0 3,5 [5]
				20		240		6,0 [6]	3,5 [6]		
				10				5,0 [6]	2,5 [6]		
	Solid sand lime brick Ks EN 771-2:2011	NF (240x115x71)	1,8	20	H [1]	115	Vertical perforation up to 15%	1,5	1,5	1,5	1,5
				10				1,2	1,2	1,2	1,2
				20		240		6,0 [6]	4,0 [6]	9,0 [5]	6,0 [5]
				10				5,0 [6]	3,0 [6]	6,0 [5]	4,0 [5]
	Solid sand-lime brick Ks EN 771-2:2011	2DF (240x115x112)	2,0	20	H [1]	115	Vertical perforation up to 15%	4,0 6,0 [4]	4,0	4,5 9,0 [5]	4,5 9,0 [5]
				10				3,0 4,5 [4]	3,0	3,0 6,0 [5]	3,0 6,0 [5]
c	Hollow clay brick HLz EN 771-1:2011	2DF (240x115x115) see Annex B5, Figure 1	1,0	12	R [2]	115	Vertical perforation more than 15% and less than 50%, outer web thickness ≥ 12 mm	1,5	0,75		
	Hollow sand-lime brick KSL EN 771-2:2011	8DF (250x240x237) see Annex B5, Figure 2	1,4	12	R [2]	115 [7]	Vertical perforation more than 15% and less than 50%, outer web thickness ≥ 21,5 mm	1,2	0,6		
Partial safety factor [3]						γ_{Mm}		2,5			

1) Hammer drilling
2) Rotary drilling
3) In absence of other national regulations
4) Only valid for an edge distance c ≥ 150 mm
5) Only valid for an edge distance c ≥ 200 mm
6) Only valid for an edge distance c ≥ 120 mm
7) Cut brick for reveal

KTS Façade Anchor KT 10 and KT 14

Performances
Characteristic resistance for use in solid and hollow or perforated masonry

Annex C 2

Table C5: Displacements under tension and shear loading in concrete

Type	Tension load			Shear load		
	F [1] [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [1] [kN]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
KT 10	1,98	0,2	0,4	2,98	1,0	1,5
KT 14	2,98	0,4	0,6	6,11	3,0	4,5

1) Intermediate values by linear interpolation

Table C6: Displacements under tension and shear loading in solid and hollow or perforated masonry

Type	Base material [1]	F	Displacements [mm]			
			Tension load		Shear load	
		[kN]	δ_{NO}	$\delta_{N\infty}$	δ_{VO}	$\delta_{V\infty}$
KT 10	Clay brick Mz EN 771-1:2011	1,71	0,2	0,4	1,4	2,1
	Solid sand-lime brick KS-NF EN 771-2:2011	0,43	0,2	0,4	0,4	0,5
	Solid sand-lime brick KS-2DF EN 771-2:2011	1,71	0,2	0,4	1,4	2,1
	Hollow clay brick HLz EN 771-1:2011	0,43	0,1	0,2	0,9	1,3
	Hollow sand-lime brick KSL EN 771-2:2011	0,34	0,2	0,4	0,7	1,0
KT 14	Clay brick Mz EN 771-1:2011	2,14	0,2	0,4	1,8	2,7
	Solid sand-lime brick KS-NF EN 771-2:2011	0,43	0,1	0,2	0,4	0,5
	Solid sand-lime brick KS-2DF EN 771-2:2011	2,57	0,1	0,2	2,1	3,2
	Solid sand-lime brick KS EN 771-2:2011 (240 x 240 x 71)	2,57	1,1	2,2	2,1	3,2

1) Information for base material masonry: see Annex C2, Table C4

Deutsches Institut für Bautechnik DIBt

Table C7: Characteristic resistance F_{RK} in [kN] in autoclaved aerated concrete (use category „d“)

Type	Base material	Bulk density ρ [kg/m³]	Minimum compressive strength f_b [N/mm²]	Brill method	Characteristic resistance F_{RK} [kN] 24/40 °C	Characteristic resistance F_{RK} [kN] 50/80 °C
KT 10	uncracked autoclaved aerated concrete (autoclaved aerated concrete blocks) EN771-4:2011	≥ 350	1,8	R [2)]	0,9	0,75
		≥ 650	5,4	R [2)]	2,5	2,5
	Partial safety factor [1)]	$\gamma_{M,AAC}$			2,0	

1) In absence of other national regulations
2) Rotary drilling

Table C8: Displacements under tension and shear loading autoclaved aerated concrete

Type	Base material	Tension load F [1)] [kN]	Tension load δ_{NO} [mm]	Tension load $\delta_{N\infty}$ [mm]	Shear load F [1)] [kN]	Shear load δ_{VO} [mm]	Shear load $\delta_{V\infty}$ [mm]
KT 10	$f_b \geq 1{,}8\ ^N/_{mm^2}$	0,3	0,2	0,4	0,3	0,6	1,0
	$f_b \geq 5{,}4\ ^N/_{mm^2}$	0,9	0,2	0,4	0,9	1,8	2,7

1) Intermediate values by linear interpolation