Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-08/0191 of 10 December 2013

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	KEW Frame plug RD 10 and RDD 10
Product family to which the construction product belongs	Plastic anchor for multiple use in concrete and masonry for non-structural applications
Manufacturer	Kunststofferzeugnisse GmbH Wilthen Dresdener Straße 19 02681 Wilthen DEUTSCHLAND
Manufacturing plant	Kunststofferzeugnisse GmbH Wilthen Dresdener Straße 19 02681 Wilthen DEUTSCHLAND
This European Technical Assessment contains	18 pages including 14 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 multiple use in concrete and masonry for non-structural applications", ETAG 020, Edition March 2012, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific part

1 Technical description of the product

The KEW Frame plug RD 10 and RDD 10 are plastic anchors 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 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

The performances given in Section 3 are only valid if the anchors are 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)

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

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Not applicable

3.4 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annex C 1 and C 2
Characteristic resistance for bending moments	See Annex C 1
Displacements under shear and tension loads	See Annex C 3
Edge distances and spacings	See Annex B 5 and B 6

3.5 Protection against noise (BWR 5)

Not applicable

3.6 Energy economy and heat retention (BWR 6)

Not applicable

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 27 June 1997 (97/463/EC) (Official Journal of the European Communities L 198 of 25.07.1997, p. 31–32) the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use(s)	Level or class	System
Plastic anchors 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 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 10 December 2013 by Deutsches Institut für Bautechnik

Gerhard Breitschaft
President

Beglaubigt:
E. Aksünger

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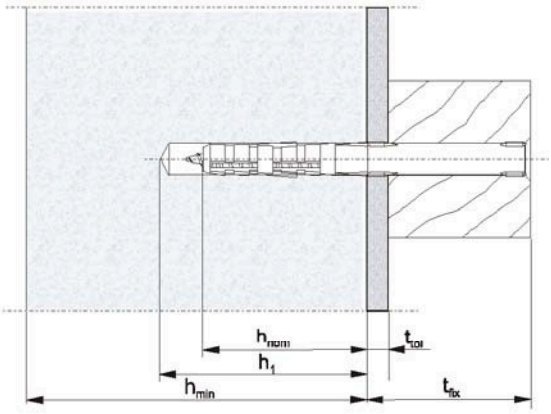
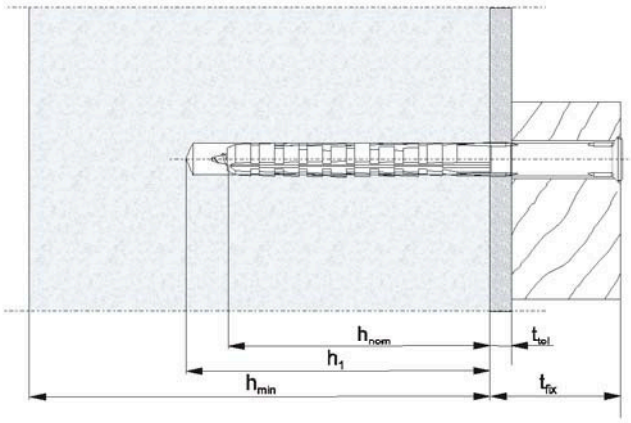
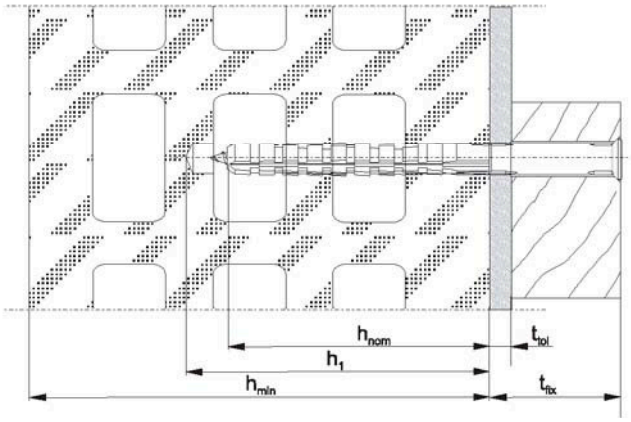
KEW – RD 10



KEW – RDD 10





Legend

h_{nom} = overall plastic anchor embedment depth in the base material

h_1 = depth of drill hole to deepest point

h_{min} = thickness of member (wall)

t_{fix} = thickness of fixture

t_{tol} = thickness of layer or non-load bearing coating

KEW Frame plug RD and RDD 10	Annex A 1
Product description Intended use	

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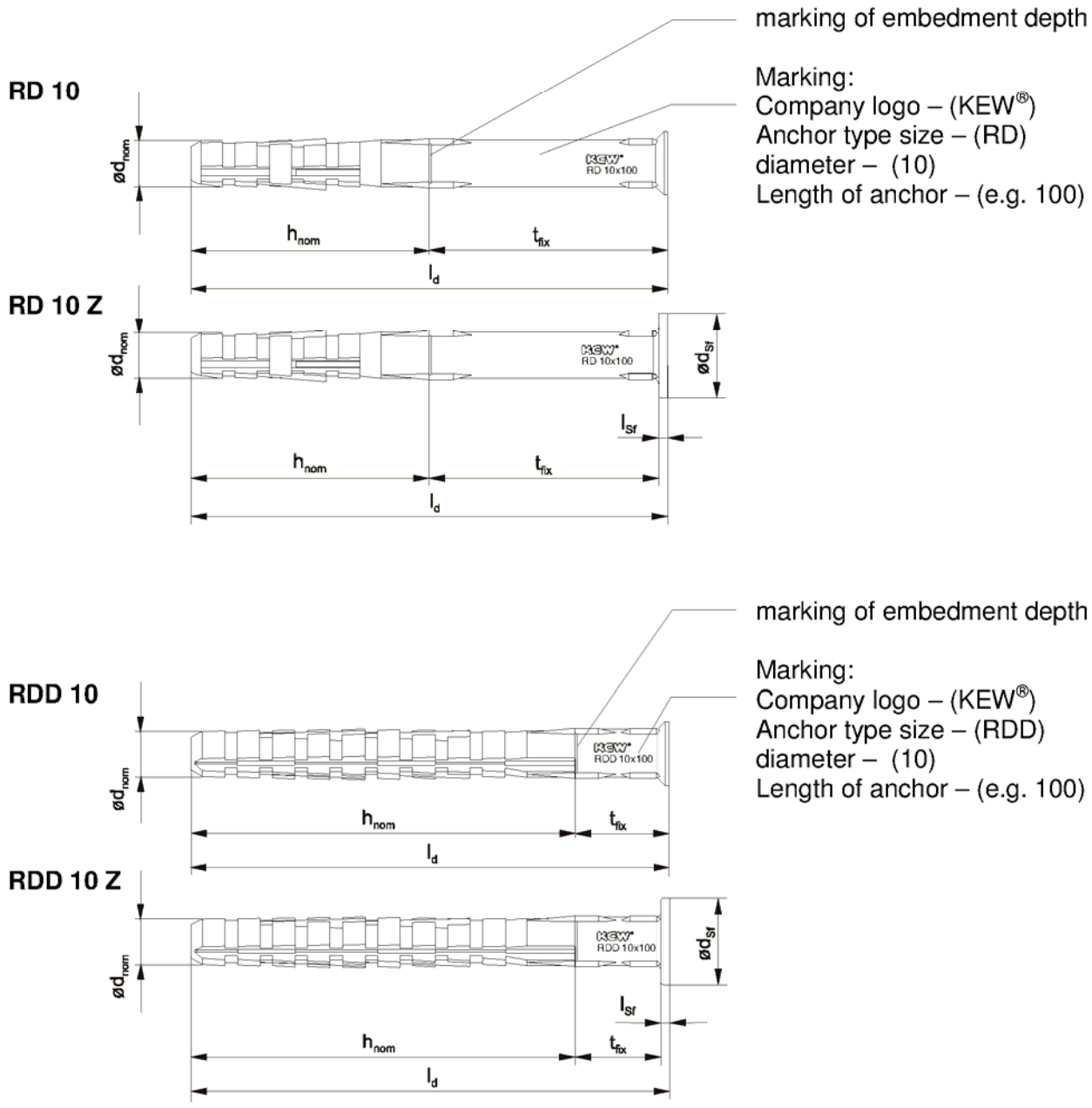
Anchor sleeve



KEW Frame plug RD and RDD 10	Annex A 2
Product description Anchor type - dimensions	

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Special screw

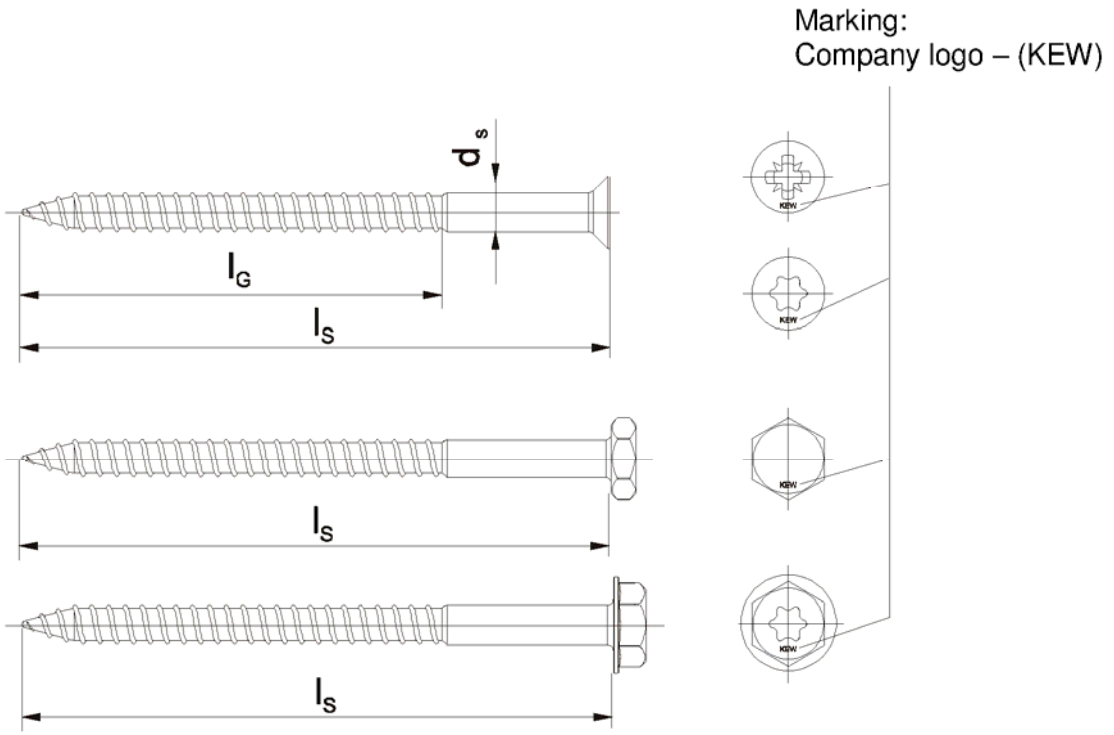

Table A1: Dimensions [mm]

Anchor type	Anchor sleeve						Special screw		
	h_{nom} [mm]	Ø d_{nom} [mm]	t_{fix} [mm]	l_d [mm]	l_{Sf} [mm]	Ø d_{Sf} [mm]	Ø d_s [mm]	l_G [mm]	l_s [3] [mm]
RD 10	**50**	**10**	**≥8[1]/10**	**80 - 300**	**1,8**	**18**	**7**	**70**	**≥85**
RD 10[2]	**50**	**10**	**≥8[1]/10**	**60**	**1,8**	**18**	**7**	**60**	**65**
RDD 10	**80**	**10**	**≥8[1]/10**	**90 - 300**	**1,8**	**18**	**7**	**70**	**≥95**

[1] For RD 10 Z and RDD 10 Z

[2] For RD 10x60 and RD 10x60 Z

[3] To insure that the screw penetrates the anchor sleeve, l_s must be $l_d + l_{Sf}$ [4] + 5 mm

[4] Only valid for flat collar version

KEW Frame plug RD and RDD 10	Annex A 3
Product description Special screw - dimensions	

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Table A2: Materials

Member	Material
Anchor sleeve	Polyamid, PA6, colour papyrus white
Special screw	Steel, galvanized A2L or A2K according to EN ISO 4042:2001-01 $f_{yk} \geq 480$ N/mm²; $f_{uk} \geq 600$ N/mm²
	Stainless steel; mat.No. 1.4401 – 1.4571 according to EN ISO 3506-01:2010-04 $f_{yk} \geq 450$ N/mm²; $f_{uk} \geq 700$ N/mm²

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads
- Multiple use for 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.
- Solid brick masonry (use category b), according to Annex C 2.
  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 C 2.
- 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 site tests according to ETAG 020, Annex B Edition March 2012.

Temperature range:

Table B1:

Temperature range:	Max long term temperautre °C	Max short term temperautre °C
Temperature range "a" -40°C to +40°C	**+24**	**+40**
Temperature range "b" -40°C to +80°C	**+50**	**+80**

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Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- 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 given in Annex C 1 and C 2 for use categories a, b and c, other drilling methods may be determined by job-site tests according to ETAG 020, Annex C Edition March 2012
- 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 ≥ 0°C
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks

KEW Frame plug RD and RDD 10	Annex B 2
Intended Use Bedingungen	

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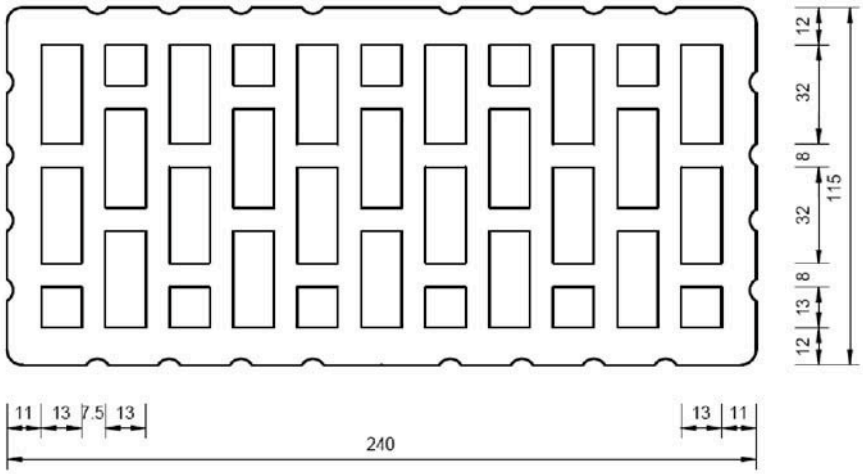
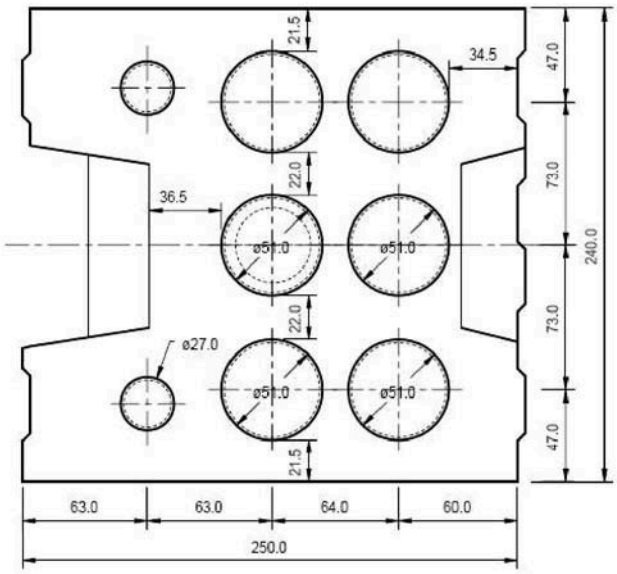
Table B2: Geometry and dimensions of the hollow or perforated masonry

Base material	drawing
Hollow clay brick HLz 12-1,0-2DF Acc. to EN 771-1:2011	**Figure 1** 
Hollow sand-lime brick KS L 12-1,4-8DF Acc. to EN 771-2:2011	**Figure 2** 

KEW Frame plug RD and RDD 10

Intended Use
Stone geometry (use category "c")

Annex B 3

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Tabelle B3: Installation parameters

Anchor type			RD 10	RDD 10
Drill hole diameter	$d_0 =$	[mm]	10	10
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	10,45	10,45
Depth of drill hole to deepest point[1)]	$h_1 \geq$	[mm]	60	90
Overall plastic anchor embedment depth in the base material [1)]	$h_{nom} \geq$	[mm]	50	80 [2)]
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	10,5	10,5

[1)] See Annex 1

[2)] For hollow and perforated masonry the influence of $h_{nom} \geq 80$ mm has to be detected by job site tests according ETAG 020, Annex B Edition March 2012.

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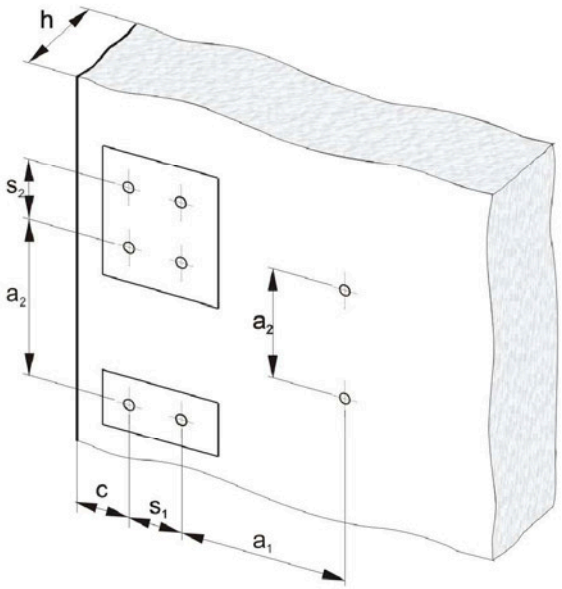
Table B4: Minimum thickness of member, edge distance and spacing in concrete (use category "a")

			≥ C 20/25		C 12/15	
			RD 10	RDD 10	RD 10	RDD 10
Minimum thickness	h_{min} =	[mm]	100	110	100	110
Characterisistic edge distances	$c_{cr,N}$ =	[mm]	50	70	70	100
Minimum edge distances	c_{min} =	[mm]	50	50	70	70
Minimum spacing distances	s_{min} =	[mm]	50	75	70	105
spacing between outer anchors of adjoining groups or between single anchors	a ≥	[mm]	65	85	95	120

Scheme of distance and spacing in concrete (use category "a")



KEW Frame plug RD and RDD 10	Annex B 5
Intended Use Minimum thickness of Member Minimum spacing and edge distances in concrete use category "a"	

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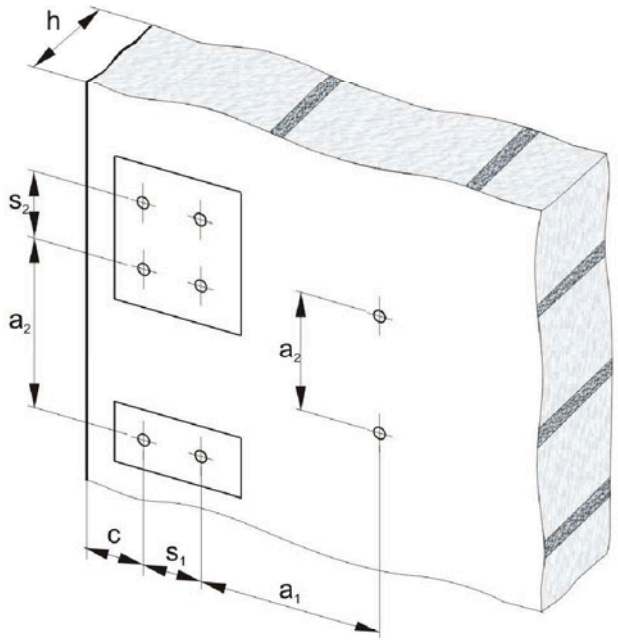
Table B5: Minimum distances and dimensions in masonry (use category "b" and "c")

				RD 10 / RDD 10
Minimum thickness of member	h_{min}		[mm]	**115**
Single Anchor				
Minimum spacing	a	≥	[mm]	**250**
Minimum edge distance	c_{min}	=	[mm]	**100**
Anchor Group				
Spacing perpendicular to free edge	s_1	≥	[mm]	**100**
Spacing parallel to free edge	s_2	≥	[mm]	**100**
Minimum edge distance	c_{min}	=	[mm]	**100**

Scheme of distance and spacing in masonry (use category "b" and "c")



KEW Frame plug RD and RDD 10

Annex B 6

Intended Use
Minimum thickness of member
Minimum spacing and edge distances in masonry use category "b" and "c"

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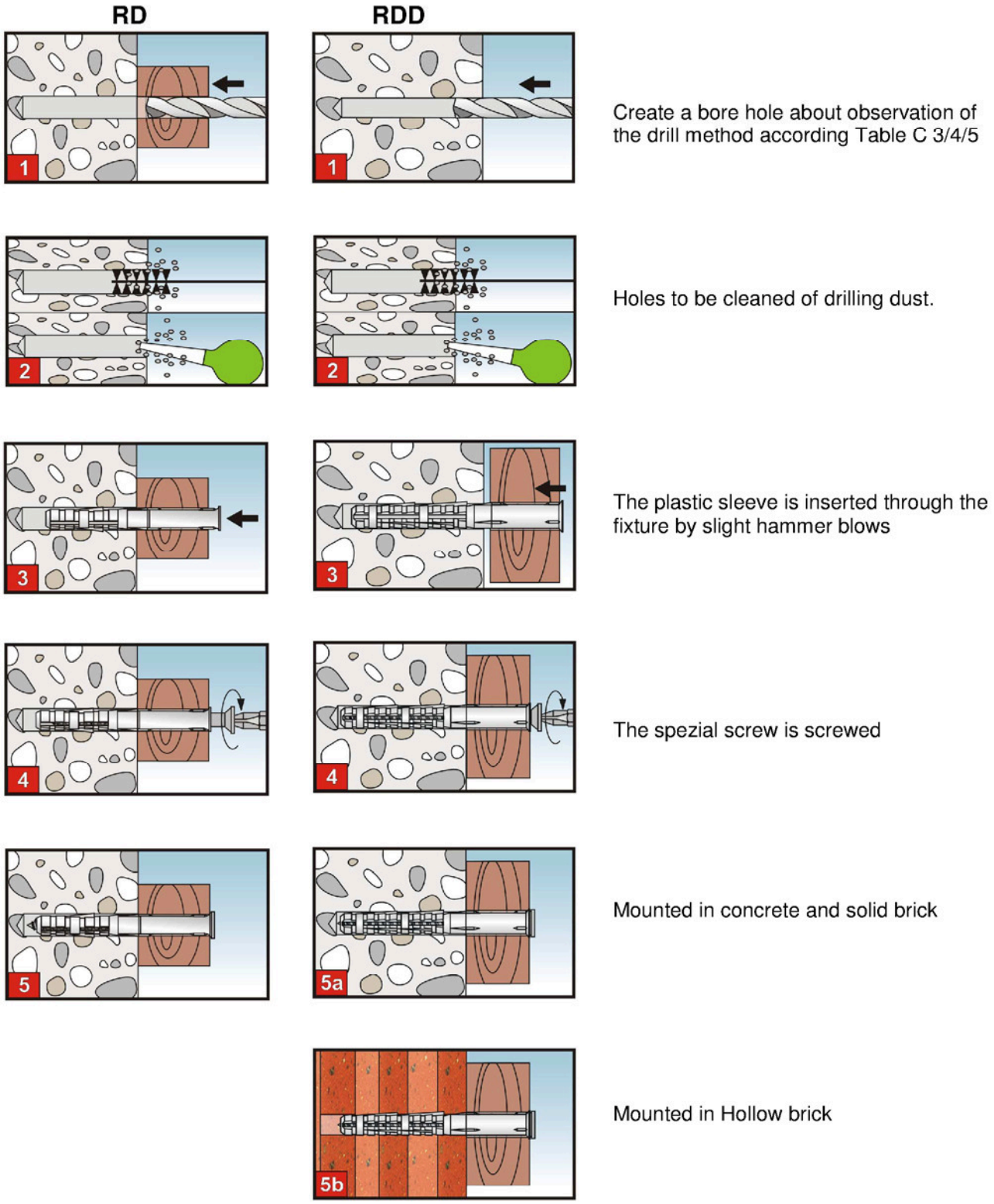
Installation instructions



Create a bore hole about observation of the drill method according Table C 3/4/5

Holes to be cleaned of drilling dust.

The plastic sleeve is inserted through the fixture by slight hammer blows

The spezial screw is screwed

Mounted in concrete and solid brick

Mounted in Hollow brick

KEW Frame plug RD and RDD 10	Annex B 7
Intended Use Installation instructions	

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Table C1: Characteristic bending resistance of the screw

			galvanised steel	stainless steel
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	**11,8**	**13,7**

Table C2: Characteristic resistance of the screw

Failure of expansion element (special screw)			galvanised steel	stainless steel
Characteristic tension resistance	$N_{Rk,s}$	[kN]	**14,3**	**16,6**
Characteristic shear resistance	$V_{Rk,s}$	[kN]	**7,1**	**8,3**

Table C3: Characteristic resistance for use in concrete for single anchor and anchor group

Pull-out failure (plastic sleeve)			**Drill method**	**24 °C / 40 °C**		**50 °C / 80 °C**	
				RD 10	**RDD10**	**RD 10**	**RDD10**
Concrete ≥ C16/20							
Characteristic resistance	$N_{Rk,p}$	[kN]	Hammer drilling	**3,0**	**5,0**	**2,0**	**4,0**
Concrete C12/15							
Characteristic resistance	$N_{Rk,p}$	[kN]	Hammer drilling	**2,0**	**3,5**	**1,2**	**3,0**

KEW Frame plug RD and RDD 10

Performances
Characteristic resistance and characteristic bending resistance of the screw
Characteristic resistance in concrete

Annex C 1

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Table C4: Characteristic resistance F_{Rk} in [kN] in solid masonry (use category "b") for single anchor and anchor group

Base material	Min. DF or min. size (L x W x H) [mm]	Bulk density class [kg/dm³]	Minimum compressive strength f_b [N/mm²]	Drill method	Characteristic resistance F_{RK} [kN]			
					24 °C / 40 °C		50 °C / 80 °C	
					RD	RDD	RD	RDD
Clay brick Mz 20-1,8-NF acc. to EN 771-1:2011	NF (240x116x71)	≥ 1,8	20	Hammer drilling	2,5	4,0 5,0[1)]	2,0	4,0 5,0[1)]
			10		1,5	3,0 3,5[1)]	1,5	3,0 3,5[1)]
Solid sand-lime brick KS 12-1,0-2DF Acc. to EN 771-2:2011	NF (240x115x70)	≥ 1,8	20	Hammer drilling	3,0	4,0 5,0[1)]	2,0	4,0 4,0[1)]
			10		2,0	3,0 3,5[1)]	1,5	3,0

4) Only for edge distance c ≥150mm; intermediate values by linear interpolation.

Tabelle C5: Characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c") for single anchor and anchor group

Base material	Min. DF or min. size (L x W x H) [mm]	Bulk density class [kg/dm³]	Minimum compressive strength f_b [N/mm²]	Drill method	Geometry		charakt. resistance F_{RK} [kN]	
					Annex	Figure	24°C / 40°C	50°C / 80°C
							RDD	RDD
Clay brick Mz 20-1,8-NF acc. to EN 771-1:2011	2DF (240x115x115)	≥ 1,0	12	Rotary drilling	B 3	1	1,2	0,9
Solid sand-lime brick KS 12-1,0-2DF Acc. to EN 771-2:2011	8DF (250x240x237)	≥ 1,4	12	Rotary drilling	B 3	2	2,0	1,5

KEW Frame plug RD and RDD 10

Performances
Characteristic resistance in concrete and in solid masonry
Characteristic resistance in hollow or perforated masonry

Annex C 2

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Table C6: Displacements under tension und shear loading in concrete and masonry for single anchor and anchor group

	Tension load			Shear load		
	F [1] [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [1] [kN]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
RD 10	**1,2**	**0,01**	**0,11**	**2,83**	**2,2**	**3,3**
RD 10	**2,0**	**0,02**	**0,21**	**2,83**	**3,0**	**4,5**

[1] Intermediate values by linear interpolation

KEW Frame plug RD and RDD 10

Performances
Displacements in concrete and masonry

Annex C 3