Deutsches Institut für Bautechnik

DIBt

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-14/0336 of 31 October 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Hollow block frame plug HBR 10
Product family to which the construction product belongs	Plastic anchor d=10mm for multiple use in masonry for non-structural applications
Manufacturer	Apolo MEA Befestigungssysteme GmbH Industriestraße 6 86551 Aichach DEUTSCHLAND
Manufacturing plant	Werk I
This European Technical Assessment contains	15 pages including 11 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.

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This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to Article 25 Paragraph 3 of Regulation (EU) No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

Specific Part

Technical description of the product

1 The hollow block frame plug HBR 10 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 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 tension and shear loads	See Annex C 3
Anchor distances and dimensions of members	See Annex B 2 and B 3

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)

The sustainable use of natural resources was not investigated.

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 97/463/EC of the Commission of 27 June 1997 (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 (AVCP) (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	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.

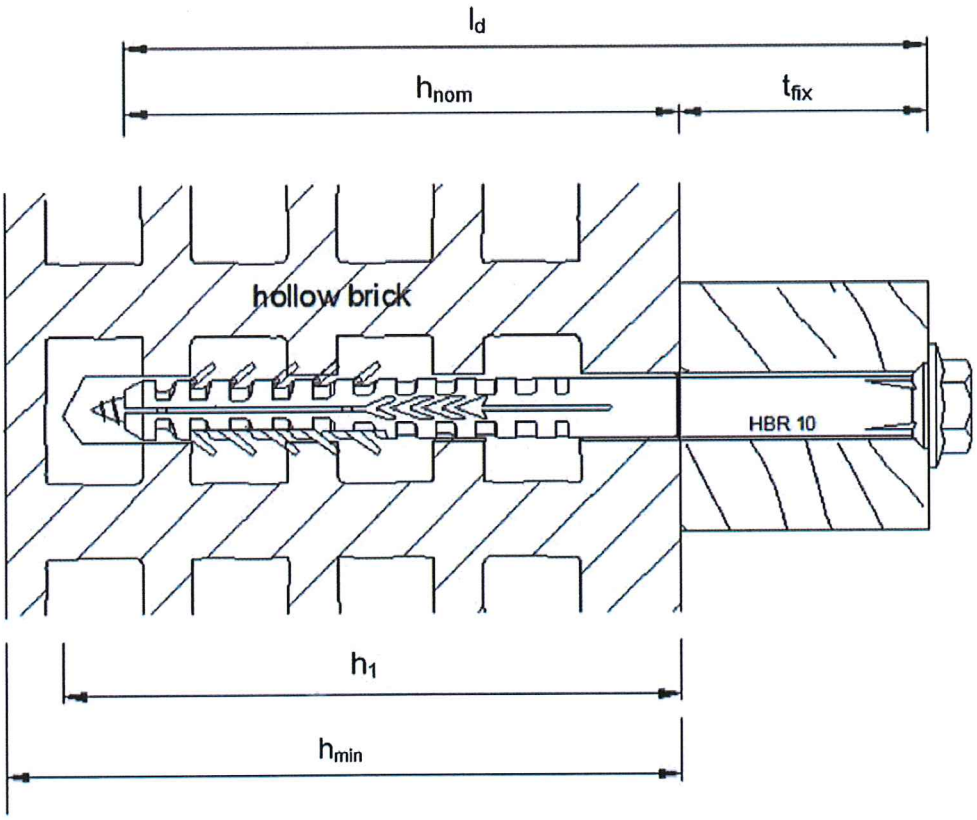
Issued in Berlin on 12 November 2014 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
Aksünger

Deutsches Institut für Bautechnik DIBt

Installed condition



h_{nom} = overall plastic anchor embedment depth in the base material
h_1 = depth of drilled hole to deepest point
h_{min} = minimum thickness of member
t_{fix} = thickness of fixture
l_d = length of plug

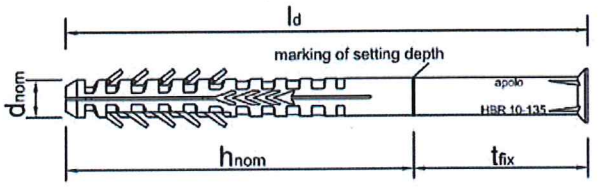
Hollow block frame plug HBR 10	Annex A 1
Product description Installed condition	

Deutsches Institut für Bautechnik DIBt

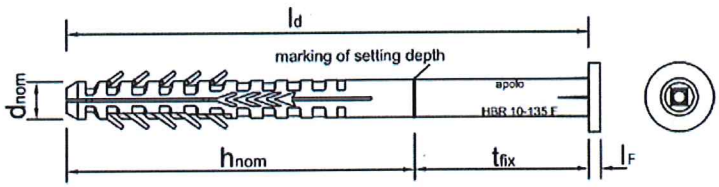
Product description

Anchor sleeve HBR 10

Sleeve with countersunk head (S) or with flathead (F)



HBR 10 Type S

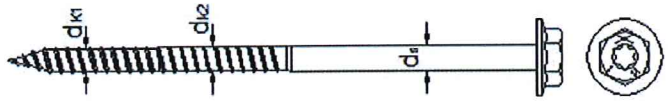


HBR 10 Type F

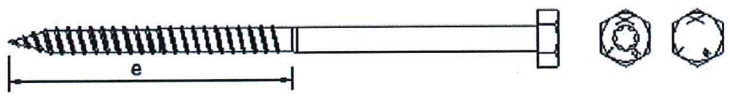
Marking:	Brand	Type	diameter (d_{nom}) - length (l_d)
Example:	apolo (or logo)	HBR	10 - 135

Special screw

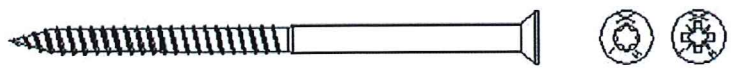
Screw head with different tool fittings



Type SSKS



Type SSK



Type TX or PZ

Marking:	Brand	steel grade	Code No screw length	manufacturer code
Example:	X	6.8	14	1

Hollow block frame plug HBR 10

Product description
Anchor types, specification screws

Annex A 2

Deutsches Institut für Bautechnik DIBt

Table A1: Dimensions [mm]

Anchor sleeve					
	l_d	Ø d_{nom}	t_{fix} min	t_{fix} max	h_{nom}
HBR 10	≥90	10	≥ 1	1000	90

Special screw					
	l_s 1)	Ø d_s	Ø d_{k1} 2)	Ø d_{k2} 2)	e
HBR 10	≥95	7	5,8	6,3	75

1) To ensure, that the screw penetrates the anchor sleeve, l_s must be min. $l_d + l_F + 5$ mm

2) Ø d_{k1} and Ø d_{k2} are core diameters of the thread

Table A2: Materials

Designation	Material
anchor sleeve	Polyamid PA 6
special screw (steel, zinc plated)	Steel, galvanised ≥ 5 µm acc. EN ISO 4042:2011-01 f_{uk} ≥ 600 N/mm², f_{yk} ≥ 480 N/mm² (≥ 6.8 screw)
special screw (stainless steel)	Stainless steel A4, material 1.4401 or 1.4571 f_{uk} ≥ 700 N/mm², f_{yk} ≥ 350 N/mm²

Hollow block frame plug HBR 10	**Annex A 3**
Product description Dimensions and materials	

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:
- Solid brick masonry (use category b), according to Annex C1.
  Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annex C2.
- Mortar strength class of the masonry ≥ M2,5 according to EN 998-2:2010.
- For other base materials of the use categories b and c the characteristic resistance of the anchor may be determined by job site tests according to ETAG 020, Annex B Edition March 2012.

Temperature Range:
- a) -40 °C to +40 °C (max. long term temperature +24 °C, max. short term temperature +40 °C).
- b) -40 °C to +80 °C (max. long term temperature +50 °C, 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 galvanised steel 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 and C2.
- 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 -10 °C to +40 °C.
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks.

Hollow block frame plug HBR 10	Annex B 1
Intended Use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Anchor type			HBR 10
Drill hole diameter	d_0 =	[mm]	10
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	10,45
Depth of drill hole to the deepest point [1)]	$h_1 \geq$	[mm]	100
Overall plastic anchor embedment depth in the base material [1), 2)]	$h_{nom} \geq$	[mm]	90
Diameter of clearence hole in the fixture	$d_f \leq$	[mm]	10,5

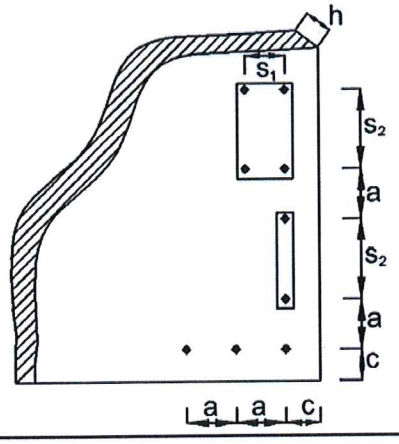
1) see Annex A1

2) For hollow and perforated masonry the influence of h_{nom} > 90 mm has to be detected by job site tests

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

Base material	Minimum thickness of member	Minimum edge distance	Minimum spacing		
				Anchor Group	
				perpendicular to free edge	parallel to free edge
	h_{min} [mm]	c_{min} [mm]	a_{min} [mm]	$s_{1,min}$ [mm]	$s_{2,min}$ [mm]
Sand-lime solid brick **KS 12-1,8 3DF**	175	100	250	200	400

Scheme of distances and spacing in solid masonry



Hollow block frame plug HBR 10	Annex B 2
Intended Use Installation parameters, edge distances and spacing's for use in solid masonry	

Deutsches Institut für Bautechnik DIBt

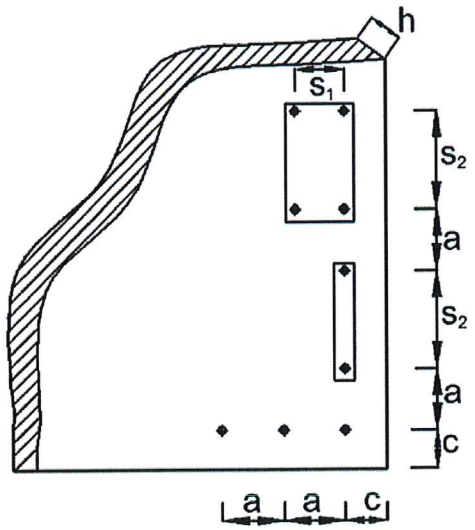
Table B3: Minimum distances and dimensions in hollow masonry

Base material	Minimum thickness of member	Minimum edge distance	Minimum spacing		
				Anchor Group [1]	
				perpendicular to free edge	parallel to free edge
	h_{min}	c_{min}	a_{min}	$s_{1,min}$	$s_{2,min}$
	[mm]	[mm]	[mm]	[mm]	[mm]
Hollow clay brick **HLz 12-1,0**	175	80	250	160	320
Hollow sand-lime brick **KSL 12-1,4 3DF**	175	80	250	180	360
Hollow concrete block **HBL 2-0,8 16DF**	240[2)]	50[2)]	250[2)]	100[2)]	200[2)]

[1)] The design method is valid for single anchors and anchor groups with two or four anchors.

[2)] Only for installation in long side of masonry (see annex C 4 figure 3)

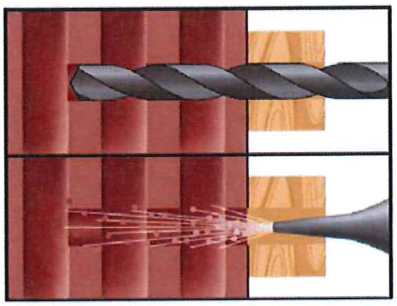
Scheme of distances and spacing in hollow masonry



Hollow block frame plug HBR 10	Annex B 3
Intended Use Edge distances and spacing's for use in hollow masonry	

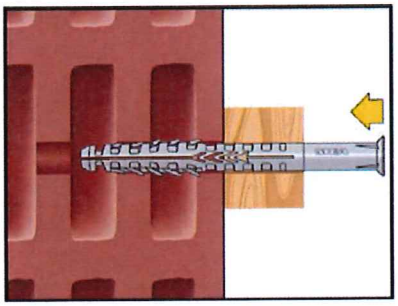
Deutsches Institut für Bautechnik DIBt

Installation instructions

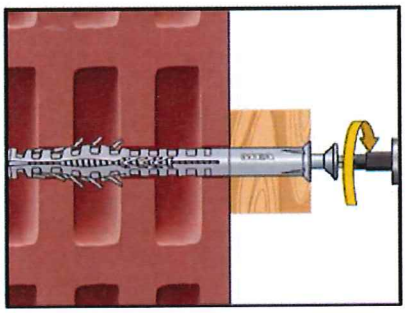


Make the drill hole (can be drilled also through the fixing part).

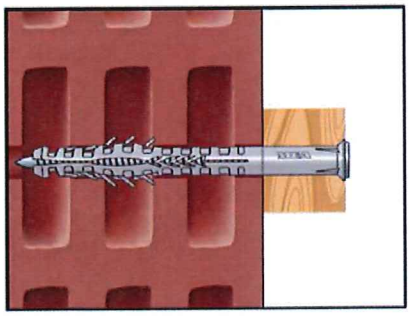
Clean the hole.



Put the plug completely into the hole. The plug must be long enough that the setting depth is ensured.



Turn in the special screw with a screwdriver to fix the fixing part.



The plug is mounted correctly when the screw is completely in the plug.

Hollow block frame plug HBR 10	**Annex B 4**
Intended Use Installation instructions	

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic bending resistance of the screw

Expansion element = special screw Ø 7 mm			material	
			galvanised steel	stainless steel
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	22,7	26,4
Partial safety factor	γ_{Ms} [1)]		1,25	2,0

1) In absence of other national regulations

Table C2: Characteristic resistance of the screw

Failure of expansion element			material	
			galvanised steel	stainless steel
Character. tension resistance	$N_{Rk,s}$	[kN]	22,1	25,8
Partial safety factor for $N_{Rk,s}$	γ_{Ms} [1]		1,5	2,4
Characteristic shear resistance	$V_{Rk,s}$	[kN]	11,0	12,9
Partial safety factor for $V_{Rk,s}$	γ_{Ms} [1)]		1,25	2,0

1) In absence of other national regulations

Table C3: Characteristic resistance F_{Rk} in [kN] in solid masonry (use category "b")

Base material	Bulk density class ρ [kg/dm³]	Minimum compressive strength f_b [N/mm²]	Min. DF or min. size (L x W x H) [mm]	drill method	Characteristic resistance F_{Rk} [kN]	
					ϑ = 24/40 °C	ϑ = 50/80 °C
Sand-lime solid brick **KS 12-1,8 3DF** DIN V 106:2005-10/ EN 771-2:2011	≥ 1,8	12	3 DF (240*175*113)	Hammer drilling	**3,0**	**3,0**
Partial safety factor			γ_{Mm} [1)]		**2,5**	

1) In absence of other national regulations

Hollow block frame plug HBR 10	**Annex C 1**
Performances Characteristic resistance of the screw, Characteristic resistance for use in solid masonry	

Deutsches Institut für Bautechnik DIBt

Table C4: Characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

Base material	Bulk density class ρ [kg/dm³]	Minimum compressive strength f_b [N/mm²]	Min. DF or min. size (L x W x H) [mm]	figure/ geometry	drill method	Characteristic resistance F_{Rk} [kN] ϑ = 24/40 °C	Characteristic resistance F_{Rk} [kN] ϑ = 50/80 °C
Hollow clay brick **HLz 12-1,0** DIN V 105-100:2012-01/ EN 771-1:2011	≥ 1,0	12	230*170*113	Annex C4, figure 1	Rotary drilling only	**1,20**	**0,90**
Hollow Sand-lime brick **KSL 12-1,4 3DF** DIN V 106:2005-10/ EN 771-2:2011	≥ 1,4	12	3 DF (240*175*113)	Annex C4, figure 2	Rotary drilling only	**0,75**	**0,75**
Hollow concrete block **HBL 2-0,8 16DF** DIN V 18151-100:2005-100	≥ 0,8	2	16 DF (496*240*238)	Annex C4, figure 3	Rotary drilling only	**0,40**[2)]	**0,40**[2)]
Partial safety factor				γ_{Mm}[1)]		**2,5**	

1) In absence of other national regulations
2) Only for installation in long side of masonry (see annex C 4 figure 3)

Hollow block frame plug HBR 10	**Annex C 2**
Performances Characteristic resistance for use in hollow masonry	

Deutsches Institut für Bautechnik DIBt

Table C5a: Displacement under tension and shear load in masonry for temperature ϑ = 24/40°C

Base material	F	Displacements			
		Tension load		Shear load	
		δ_{NO}	$\delta_{N\infty}$	δ_{VO}	$\delta_{V\infty}$
	[kN]	[mm]	[mm]	[mm]	[mm]
Sand-lime solid brick **KS 12-1,8 3DF** DIN V 106:2005-10/ EN 771-2:2011	0,86	0,1	0,1		
Hollow clay brick **HLz 12-1,0** DIN 105-100:2012-01 / EN 771-1:2011	0,34	0,1	0,1	1,9	2,8
Hollow Sand-lime brick **KSL 12-1,4 3DF** DIN V 106:2005-10 / EN 771-2:2011	0,21	0,1	0,1	2,0	3,0
Hollow concrete block **HBL 2-0,8 16DF** DIN V 18151-100:2005-100	0,11[1)]	0,1[1)]	0,1[1)]	4,8[1)]	7,1[1)]

[1)] Only for installation in longside of masonry (see annex C 4 figure 3)

Table C5b: Displacement under tension and shear load in masonry for temperature ϑ = 50/80°C

Base material	F	Displacements			
		Tension load		Shear load	
		δ_{NO}	$\delta_{N\infty}$	δ_{VO}	$\delta_{V\infty}$
	[kN]	[mm]	[mm]	[mm]	[mm]
Sand-lime solid brick **KS 12-1,8 3DF** DIN V 106:2005-10/ EN 771-2:2011	0,86	0,1	0,1		
Hollow clay brick **HLz 12-1,0** DIN 105-100:2012-01 / EN 771-1:2011	0,26	0,2	0,3	2,1	3,2
Hollow Sand-lime brick **KSL 12-1,4 3DF** DIN V 106:2005-10 / EN 771-2:2011	0,21	0,2	0,4	1,5	2,3
Hollow concrete block **HBL 2-0,8 16DF** DIN V 18151-100:2005-100	0,11[1)]	0,1[1)]	0,1[1)]	4,5[1)]	6,7[1)]

[1)] Only for installation in long side of masonry (see annex C 4 figure 3)

Hollow block frame plug HBR 10	**Annex C 3**
Performances Displacement for use in masonry	

Deutsches Institut für Bautechnik DIBt

Table C6: Geometry and dimensions of hollow or perforated brick

Figure 1

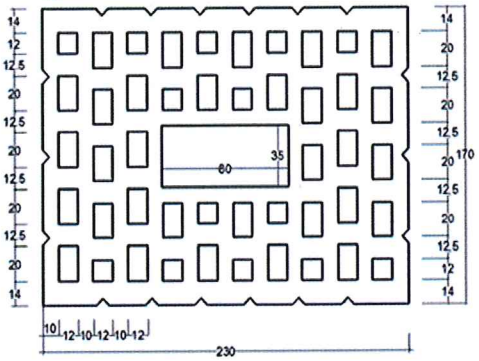


Figure 2

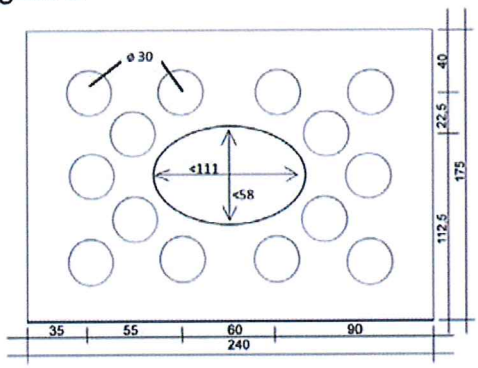


Figure 3

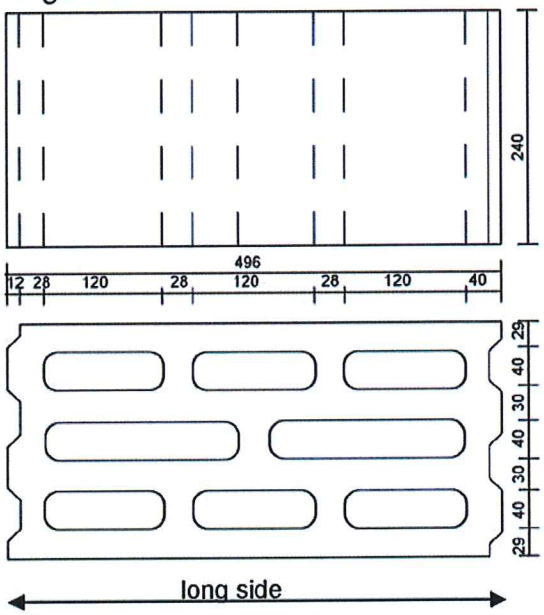


Figure	Base material	Bulk density class ρ [kg/dm³]	Minimum compressive strength f_b [N/mm²]	Min. DF or min. size (L x W x H) [mm]
1	Hollow clay brick **HLZ 12-1,0** DIN 105-100:2012-01 / EN 771-1:2011	≥ 1,0	12	230*170*113
2	Hollow sand-lime brick **KSL 12-1,4 3DF** DIN V 106:2005-10 / EN 771-2:2011	≥ 1,4	12	3 DF (240*175*113)
3	Hollow concrete block **HBL 2-0,8 16DF** DIN V 18151-100:2005-100	≥ 0,8	2	16 DF (496*240*238)

Hollow block frame plug HBR 10

Performances
Geometry and dimensions of hollow or perforated brick

Annex C 4