

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-10/0475
of 21 March 2022

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

Berner frame fixing BXRfix / BXRLfix

Plastic anchor for redundant non-structural systems in
concrete and masonry

Berner Trading Holding GmbH
Bernerstraße 6
74653 Künzelsau
DEUTSCHLAND

Berner Herstellwerk 6

40 pages including 3 annexes which form an integral part
of this assessment

EAD 330284-00-0604, edition 12/2020

ETA-10/0475 issued on 6 May 2015

European Technical Assessment

ETA-10/0475

English translation prepared by DIBt

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Specific part

1 Technical description of the product

The Berner frame fixing in the range BXRfix 8, BXRLfix 8, BXRfix 10, BXRLfix 10 and BXRLfix 14 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel, of galvanised steel with an additional Duplex-coating or of 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 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 2

3.2 Mechanical resistance and stability (BWR 4)

Essential characteristic	Performance
Resistance to steel failure under tension loading	See Annex C 1
Resistance to steel failure under shear loading	See Annex C 1
Resistance to pull-out or concrete failure under tension loading (base material group a)	See Annex C 1
Resistance in any load direction without lever arm (base material group b, c, d)	See Annexes C 3 – C 20
Edge distance and spacing (base material group a)	See Annex B 4
Edge distance and spacing (base material group b, c, d)	See Annex B 5
Displacements under short-term and long-term loading	See Annex C 2
Durability	See Annex B 1

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

In accordance with European Assessment Document EAD 330284-00-0604 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 EAD

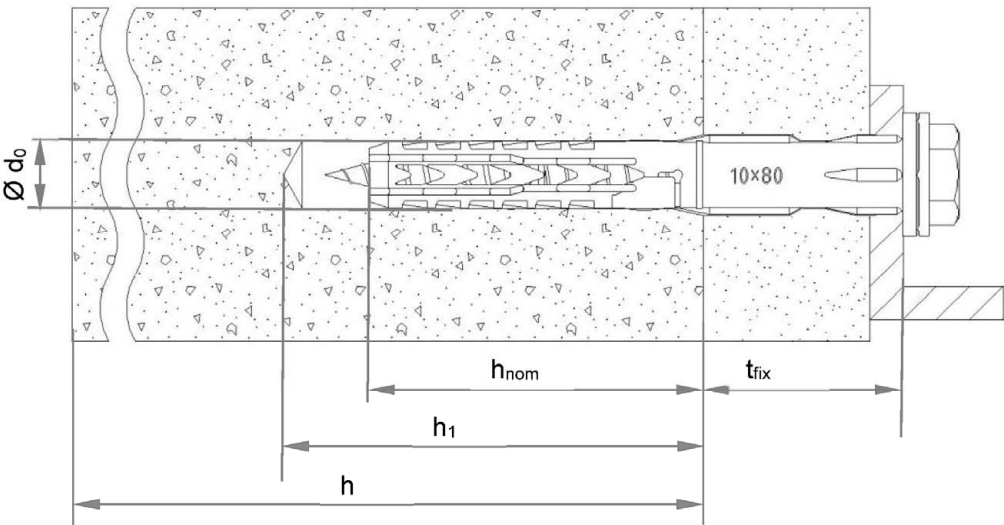
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 21 March 2022 by Deutsches Institut für Bautechnik

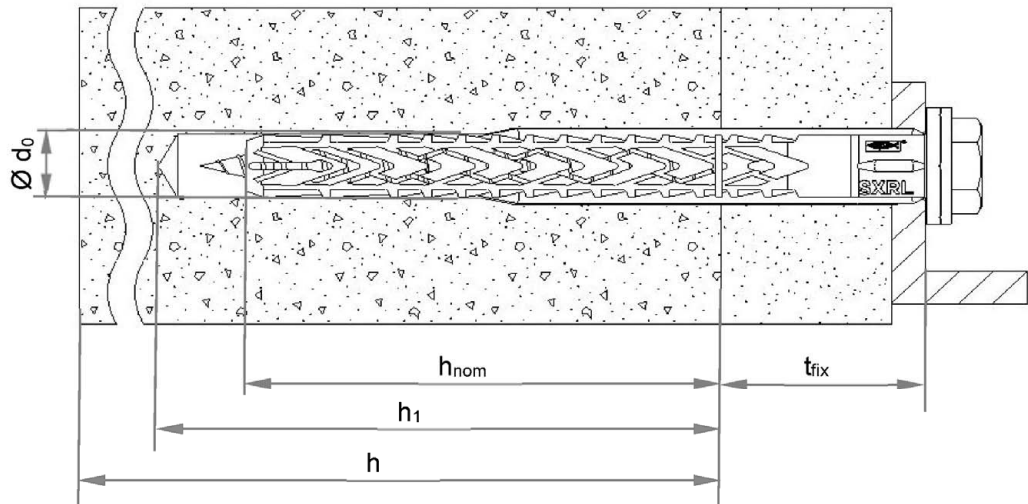
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

BXRfix



BXRLfix (e.g. with h_{nom2})



Legend

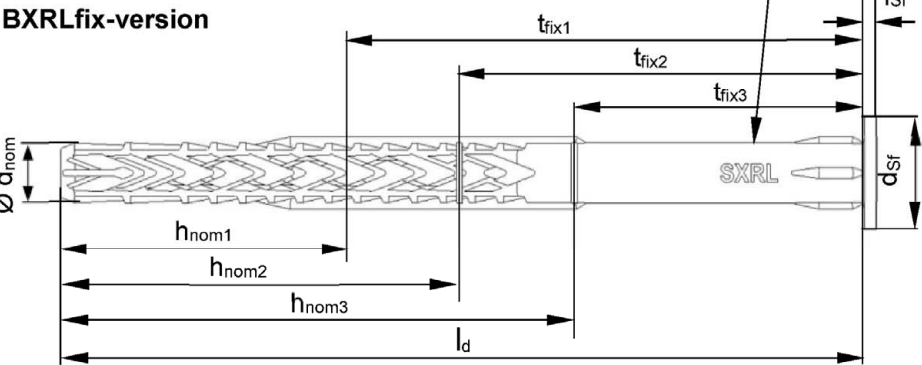
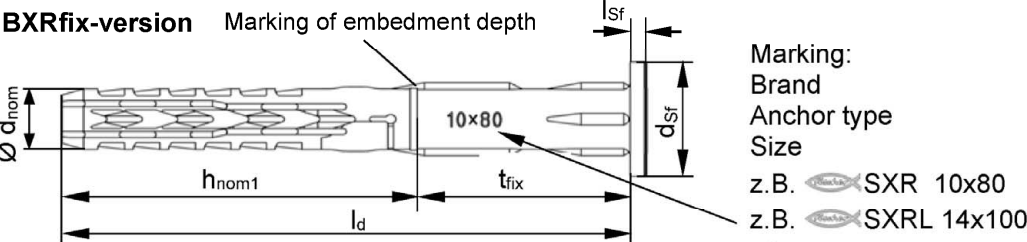
- d_0 = Nominal drill hole diameter
- h_{nom} = Overall plastic anchor embedment depth in the base material
- h_1 = Depth of drill hole to deepest point
- h = Thickness of member (wall)
- t_{fix} = Thickness of fixture and / or non-load bearing layer

Berner frame fixing BXRfix / BXRLfix

Product description
Installed anchor

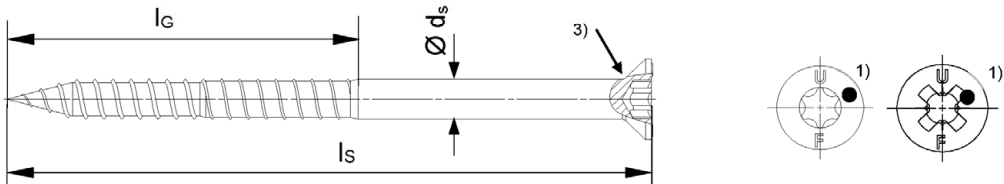
Annex A 1

Anchor sleeves – flat collar versions of BXRfix and BXRLfix

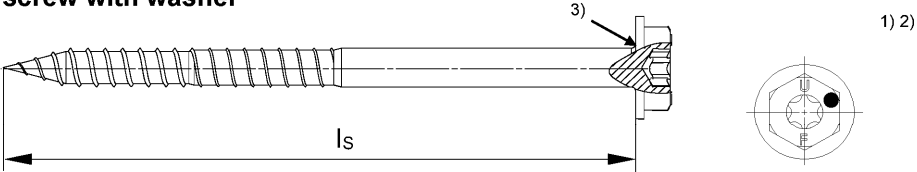


Countersunk sleeve version also available for both versions

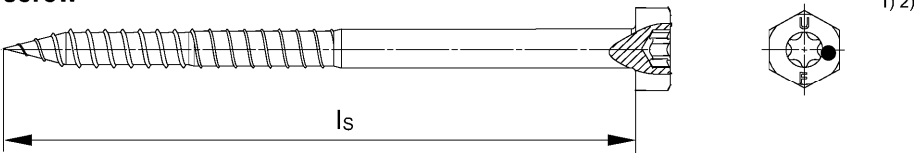
Countersunk screws



Hexagonal screw with washer



Hexagonal screw



- 1) Additional marking for the special screw, stainless steel version: e.g. "A4" or "R" or "A2".
- 2) Internal driving feature for Torx bit is optional for hexagonal head.
- 3) Optional additional version with underhead ribs.

Berner frame fixing BXRfix / BXRLfix

Product description
Anchor types / special screws

Annex A 2

Table A3.1: Dimensions

Anchor type	Anchor sleeve									Special screw		
	h_{nom1} [mm]	h_{nom2} [mm]	h_{nom3} [mm]	$\varnothing d_{nom}$ [mm]	t_{fix} [mm]	min. l_d [mm]	max. l_d [mm]	$l_{sf}^{1)}$ [mm]	$\varnothing d_{sf}^{1)}$ [mm]	$\varnothing d_s$ [mm]	l_G [mm]	l_s [mm]
BXRfix 8	50	-	-	8	≥ 1	51	360	1,8	> 15,0	6,0	≥ 55	$\geq l_d + 6$
BXRLfix 8	50	70	90	8	≥ 1	51	360	1,8	> 15,0	6,0	≥ 55	$\geq l_d + 6$
BXRfix 10	50	-	-	10	≥ 1	51	360	2,2	> 18,5	7,0	≥ 57	$\geq l_d + 7$
BXRLfix 10	50 ²⁾	70	90	10	≥ 1	51	360	2,2	> 18,5	7,0	≥ 57	$\geq l_d + 7$
BXRLfix 14	-	70	90	14	≥ 1	71	600	3,1	> 24,0	9,6	≥ 63	$\geq l_d + 10$

1) Only valid for flat collar version.

2) Marking optional.

Table A3.2: Material

Name	Material
Anchor sleeve	- Polyamide, PA6, colour grey
Special screw	- Steel gvz mit Zn5/Ag or Zn5/An in accordance with EN ISO 4042:2018
	<u>or</u>
	- Steel gvz mit Zn5/Ag or Zn5/An in accordance with EN ISO 4042:2018 with additional organic layer (Zn5/Ag/T7 or Zn5/An/T7, resp.) in three layers (total layer thickness $\geq 6 \mu m$)
	<u>or</u>
Special screw	- Stainless steel „A2“ of corrosion resistance class CRC II in accordance with EN 1993-1-4:2006 + A1:2015
	<u>or</u>
	- Stainless steel „A4“ or „R“ of corrosion resistance class CRC III in accordance with EN 1993-1-4:2006 + A1:2015

Berner frame fixing BXRfix / BXRLfix

Product description
Dimensions and materials

Annex A 3

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads.
- Redundant non-structural systems.

Base materials:

- Reinforced or unreinforced compacted normal weight concrete without fibres, strength classes $\geq$ C12/15 (base material group "a"), in accordance with EN 206:2013+A1:2016, see Annex C 1 and C 2.
- Thin-walled concrete components (e.g. weather shells) in accordance with EN 206:2013+A1:2016 $\geq$ 40 mm thickness.
- Solid brick masonry (base material group "b") as per EN 771-1:2011+A1:2015, EN 771-2:2011+A1:2015 or EN 771-3:2011+A1:2015, see Annex C 3 – C 7.
Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (base material group "c"), as per EN 771-1:2011+A1:2015, EN 771-2:2011+A1:2015 or EN 771-3:2011+A1:2015, see Annex B 7 – B 13 and C 7 – C 19.
- Reinforced autoclaved aerated concrete (base material group "d"), as per EN 12602:2016, and unreinforced autoclaved aerated concrete (base material group "d") as per EN 771-4:2011+A1:2015, see Annex C 20.
- Mortar strength class of the masonry $\geq$ M2,5 in accordance with EN 998-2:2010.
- For other comparable base materials of the base material group "a", "b", "c" and "d" the characteristic resistance of the anchor may be determined by job site tests in accordance with TR 051:2018-04.

Temperature Range:

BXRfix 8 and 10 and BXRLfix 8

- c: - 40 °C to 50 °C (max. short term temperature + 50 °C and max long term temperature + 30 °C)
- b: - 40 °C to 80 °C (max. short term temperature + 80 °C and max long term temperature + 50 °C)

BXRLfix 10 and 14

- c: - 20 °C to 50 °C (max. short term temperature + 50 °C and max long term temperature + 30 °C)
- b: - 20 °C to 80 °C (max. short term temperature + 80 °C and max long term temperature + 50 °C)

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: Special screw made of zinc coated steel or stainless steel.
- The specific screw made of galvanised steel or galvanised steel with an additional organic layer 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: Special screw made of stainless steel "A4" or "R".
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).

Berner frame fixing BXRfix / BXRLfix

Intended use
Specifications

Annex B 1

Table B3.1: Installation parameters

Anchor type		BXRfix 8	BXRLfix 8	BXRfix 10	BXRLfix 10	BXRLfix 14
Nominal drill hole diameter	$d_0 =$ [mm]	8	8	10	10	14
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8,45	8,45	10,45	10,45	14,45
Overall plastic anchor embedment depth in the base material ¹⁾²⁾	$h_{nom1} \geq$ [mm]	50	50	50	50	-
	$h_{nom2} \geq$ [mm]	-	70	-	70	70
	$h_{nom3} \geq$ [mm]	-	90	-	90	90
Depth of drill hole to deepest point ¹⁾	$h_{1,1} \geq$ [mm]	60	60	60	60	-
	$h_{1,2} \geq$ [mm]	-	80	-	80	85
	$h_{1,3} \geq$ [mm]	-	100	-	100	105
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	8,5	9,5	10,5/12,5 ³⁾	10,5/12,5 ³⁾	15,4

¹⁾ See Annex A 1.

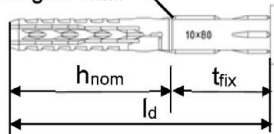
²⁾ For base material group "c": If the embedment depth is higher than h_{nom} given in the Table B3.1, job site tests have to be carried out in accordance with TR 051:2018-04.

³⁾ See Table C2.1.

Table B3.2: Assignment of h_{nom} , l_d and t_{fix} for use in thin concrete slabs (e.g. weather resistant shells of external wall panels) and pre-stressed concrete core slabs

Anchor type	BXRfix 10 / BXRLfix 10			
	l_d		$h_{nom} \geq 50$ mm	
	BXRfix	BXRLfix	$t_{fix, min}$	$t_{fix, max}$
For use in base material group „a“	52	-	1	2
	60	60	1	10
	80	80	21	30
	100	100	41	50
	120	120	61	70
	140	140	81	90
	160	160	101	110
	180	180	121	130
	200	200	141	150
	230	230	171	180
	260	260	201	210
	-	290	231	240
	[mm]			

Marking of h_{nom}



Marking of h_{nom}

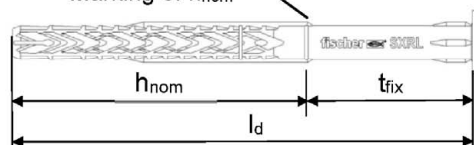
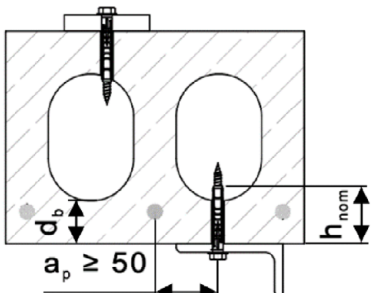


Table B3.3: Installation parameters for use in pre-stressed hollow concrete core slabs

Anchor type		BXRLfix 10			
	Flange thickness	d_b	≥	[mm]	30
	Overall plastic anchor embedment depth in the base material	h_{nom}		[mm]	50 bis 59

Berner frame fixing BXRfix / BXRLfix

Intended use

Installation parameters, parameters for use in thin skins (weather resistant concrete skins of external wall panels) and pre-stressed hollow concrete core slabs

Annex B 3

Table B4.1: Min. thickness of member, edge distance and spacing in concrete – base material group “a”⁽¹⁾

Anchor Type	Embedment depth h_{nom} [mm]	Strength class	Minimum thickness of member h_{min} [mm]	Characteristic edge distance $c_{cr, N}$ [mm]	Characteristic spacing $s_{cr, N}$ [mm]	Minimum spacing and edge distances ¹⁾ s_{min}, c_{min} [mm]
BXRfix 8	≥ 50	$\geq C16/20$	100	50	65	$s_{min} = 50$ for $c \geq 50$ $c_{min} = 50$ for $s \geq 50$
		C12/15		70	70	$s_{min} = 70$ for $c \geq 70$ $c_{min} = 70$ for $s \geq 70$
BXRLfix 8	≥ 50	$\geq C16/20$	80	60	75	$s_{min} = 60$ for $c \geq 60$ $c_{min} = 60$ for $s \geq 60$
		C12/15		85	90	$s_{min} = 85$ for $c \geq 85$ $c_{min} = 85$ for $s \geq 85$
	≥ 70	$\geq C16/20$	100	60	90	$s_{min} = 60$ for $c \geq 60$ $c_{min} = 60$ for $s \geq 60$
		C12/15		85	105	$s_{min} = 85$ for $c \geq 85$ $c_{min} = 85$ for $s \geq 85$
BXRfix 10	≥ 50	$\geq C16/20$	100 ⁽⁴⁾	100	90	$s_{min} = 50$ for $c \geq 150$ $c_{min} = 60$ for $s \geq 70$
		C12/15		140	100	$s_{min} = 70$ for $c \geq 210$ $c_{min} = 85$ for $s \geq 100$
BXRLfix 10	≥ 50	$\geq C16/20$	100 ⁽⁴⁾	100	105	$s_{min} = 50$ for $c \geq 100$ $c_{min} = 50$ for $s \geq 125$
		C12/15		140	120	$s_{min} = 70$ for $c \geq 140$ $c_{min} = 70$ for $s \geq 175$
	$\geq 70^{(2)}$	$\geq C16/20$		100	105	$s_{min} = 50$ for $c \geq 100$ $c_{min} = 50$ for $s \geq 125$
		C12/15		140	120	$s_{min} = 70$ for $c \geq 140$ $c_{min} = 70$ for $s \geq 175$
BXRLfix 14	$\geq 70^{(3)}$	$\geq C16/20$	110	100	120	$s_{min} = 60$ for $c \geq 100$ $c_{min} = 60$ for $s \geq 125$
		C12/15		140	135	$s_{min} = 85$ for $c \geq 140$ $c_{min} = 85$ for $s \geq 175$

1) Intermediate values by linear interpolation.

2) Values valid for reinforced concrete.

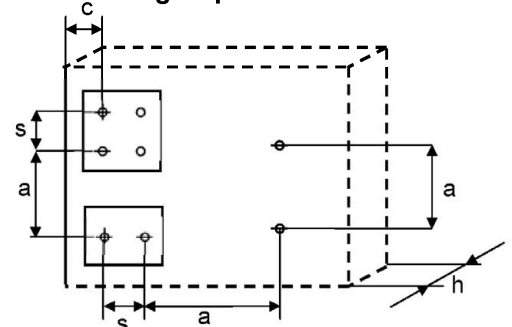
Please note: Values for non-reinforced concrete are $h_{min} = 110$ mm and $c_{min} = s_{min} = 80$ mm for concrete $\geq C16/20$ and $c_{min} = s_{min} = 110$ mm for concrete C12/15.

3) Please note: Values for non-reinforced concrete are $h_{min} = 110$ mm, $c_{min} = 100$ mm, $s_{min} = 80$ mm for concrete $\geq C16/20$ and $c_{min} = 140$ mm, $s_{min} = 110$ mm for concrete C12/15.

4) Also valid for thin concrete slabs $h \geq 40$ mm, $h_{nom} = 50$ mm to 59 mm.

Fixing points with a spacing $a \leq s_{cr}$ are considered as a group with a maximum characteristic resistance $N_{Rk,p}$ acc. to Table C1.3. For a spacing $a > s_{cr}$ the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table C1.3.

Scheme of distance and spacing in concrete base material group “a”



Berner frame fixing BXRfix / BXRLfix

Intended use

Minimum thickness of member, edge distances and spacings for use in concrete

Annex B 4

Table B5.1: Minimum thickness of member, edge distance and spacing in solid and hollow or perforated masonry – base material group “b” and “c”

Anchor type		BXRfix 8	BXRLfix 8	BXRfix 10	BXRLfix 10	BXRLfix 14
Minimum thickness of member	h_{min} [mm]	100	115	100	110	115
Single anchor						
Minimum spacing	a_{min} [mm]	250	250	250	250	250
Minimum edge distance	c_{min} [mm]	100	100	100	100	100
Anchor group						
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	100	100	100	100	100
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	100	100	100	100	100
Minimum edge distance	c_{min} [mm]	100	100	100	100	100
Distance between anchor groups and / or single anchors	a_{min} [mm]	250				

Scheme of distance and spacing in solid and hollow or perforated masonry, base material group “b” and “c” and in autoclaved aerated concrete base material group “d”

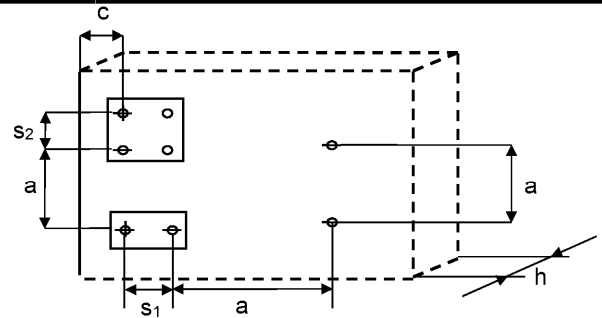


Table B5.2: Minimum thickness of member, edge distance and spacing in autoclaved aerated concrete – base material group “d”

Anchor type			BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14			
Compressive strength ¹⁾	f _{ck}	[N/mm ²]	≥ 2 bis < 6 ≥ 6		≥ 2	≥ 2		≥ 2 bis < 4		≥ 4	
Nominal embedment depth	h _{nom}	≥ [mm]	70 and 90		50	70	90	70	90	70	90
Minimum thickness of member	h _{min}	[mm]	175		100	100	120	175		300	
Single anchor											
Minimum spacing	a _{min}	[mm]	250	250	250	250		250			
Minimum edge distance	c _{min}	[mm]	60	80	100	120		80		100	120
Anchor group											
Minimum spacing perpendicular to free edge	s _{1,min}	[mm]	80	110	200	100 / 120 ¹⁾		80		80	100
Minimum spacing parallel to free edge	s _{2,min}	[mm]	80	110	400	100 / 120 ¹⁾		80	100	80	125
Minimum edge distance	c _{min}	[mm]	90	110	100	120		120		120	150
Distance between anchor groups and / or single anchors			a _{min}	[mm]	250 ²⁾						

¹⁾ Valid for bulk density $\rho \geq 600$ kg/m³.

²⁾ For BXRfix 10 $a_{min} \geq 400$ mm valid.

Berner frame fixing BXRfix / BXRLfix

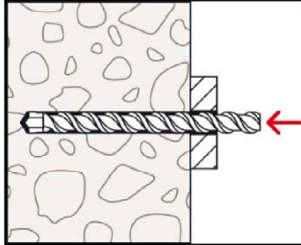
Intended use

Minimum thickness of member, edge distances and spacings for use in solid, hollow or perforated masonry and in autoclaved aerated concrete

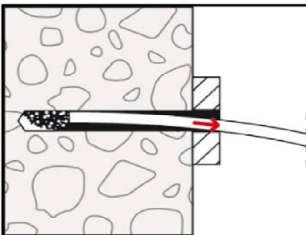
Annex B 5

Installation instructions

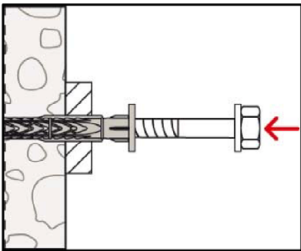
The following pictures show fixing through timber in concrete and hollow brick.
Summary of all kind of masonry brick see Annex C.



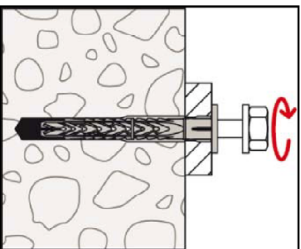
1. Drill the bore hole acc. to Table B3.1 using the drill method described in the corresponding Annex C.



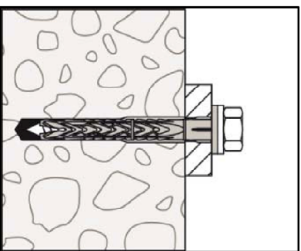
2. For use in base material group "a" (concrete), "b" (solid brick), "d" (autoclaved aerated concrete): Remove dust from borehole.



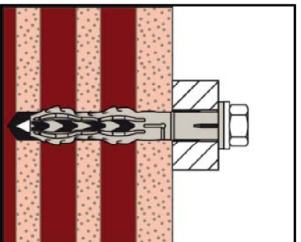
3. Insert anchor (screw and sleeve) by using a hammer until the collar of the plastic sleeve is flush with the surface of the fixture.



4. The screw is screwed-in until the head of the screw touches the sleeve. The anchor is correctly installed, if the head of the screw fits tight on the surface and nor the anchor sleeve neither the screw cannot be turned-in any further.



5. Correctly installed anchor in base material group „a“ concrete „b“ solid brick and „d“ autoclaved aerated concrete.



6. Correctly installed anchor in base material group „c“ hollow and perforated brick.

Berner frame fixing BXRfix / BXRLfix

Intended use
Installation instructions

Annex B 6

Table B7.1: Summary of hollow or perforated brick – see Annex C 7 – C 9

Brick No./ Country	Dimensions	Brick drawing	See Annex
S1/DE	2 DF 240 x 115 x 113 mm		C 7
S2/DE	2 DF 240 x 115 x 113 mm		C 8
S3/DE	NF 240 x 115 x 71 mm		C 8
S4/DE	2 DF 240 x 115 x 113 mm		C 8
S5/DE	DF 240 x 110 x 52 mm		C 9
Berner frame fixing BXRfix / BXRLfix Intended use Summary of hollow or perforated brick			Annex B 7

Table B8.1: Summary of hollow or perforated brick – see Annex C 9 – C 10

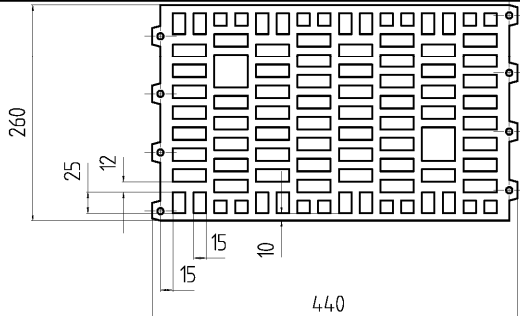
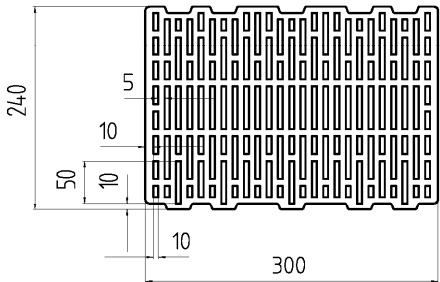
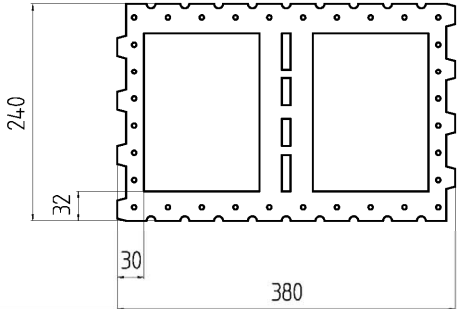
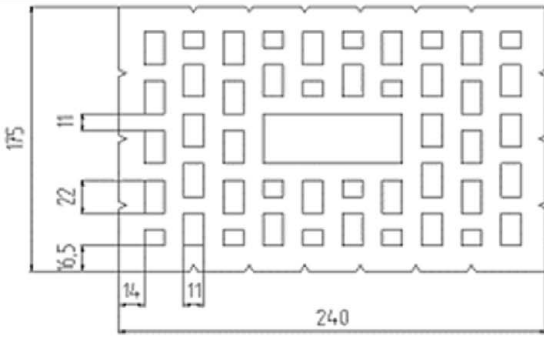
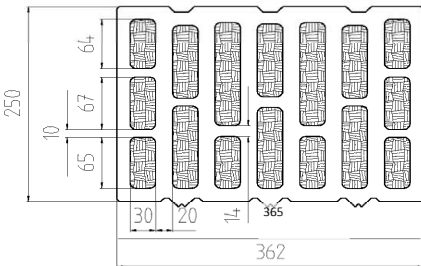
Brick No./ Country	Dimensions	Brick drawing	See Annex
S6/DE	10 DF 440 x 240 x 260 mm		C 9
S7/DE	10 DF 300 x 240 x 240 mm		C 9
S8/DE	12 DF 380 x 240 x 240 mm		C 10
S9/DE	3 DF 240 x 175 x 113 mm		C 10
S10/DE	12 DF 365 x 250 x 240 mm		C 10
Berner frame fixing BXRfix / BXRLfix Intended use Summary of hollow or perforated brick			Annex B 8

Table B9.1: Summary of hollow or perforated brick – see Annex C 11 – C 12

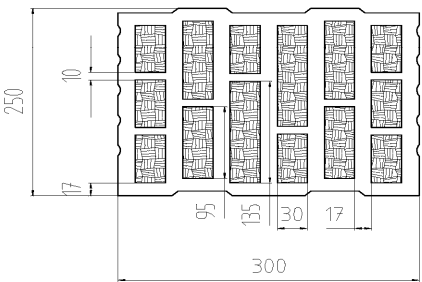
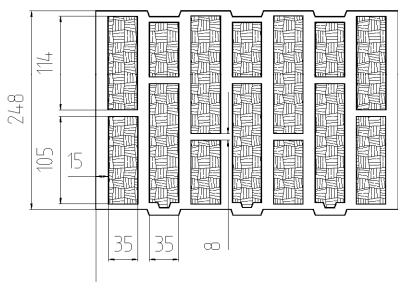
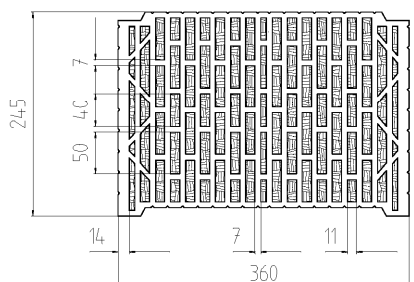
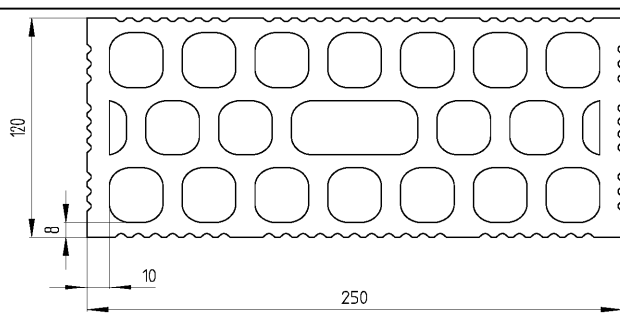
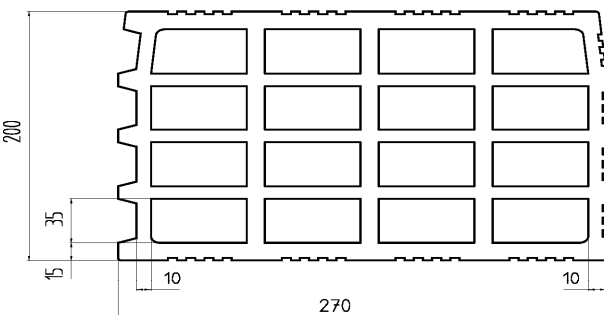
Brick No./ Country	Dimensions	Brick drawing	See Annex
S11/DE	10 DF 300 x 250 x 240 mm		C 11
S12/DE	10 DF 365 x 248 x 240 mm		C 11
S13/DE	10 DF 360 x 245 x 240 mm		C 11
S14/IT	250 x 120 x 190 mm		C 12
S15/FR	500 x 200 x 270 mm		C 12
Berner frame fixing BXRfix / BXRLfix Intended use Summary of hollow or perforated brick			Annex B 9

Table B10.1: Summary of hollow or perforated brick – see Annex C 12 – C 14

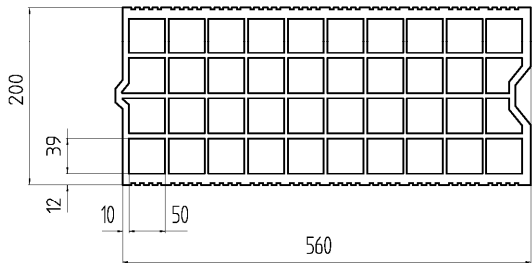
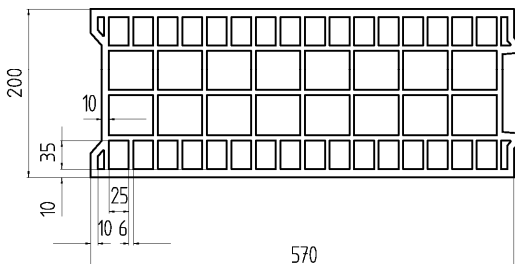
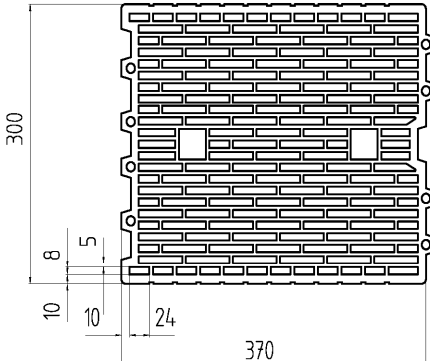
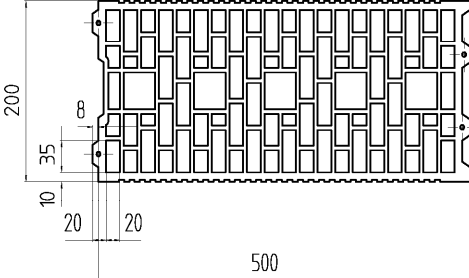
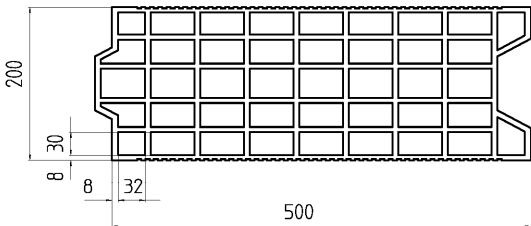
Brick No./ Country	Dimensions	Brick drawing	See Annex
S16/FR	560 x 200 x 275 mm		C 12
S17/FR	570 x 200 x 315 mm		C 13
S18/FR	370 x 300 x 250 mm		C 13
S19/FR	500 x 200 x 275 mm		C 13
S20/FR	500 x 200 x 220 mm		C 14
Berner frame fixing BXRfix / BXRLfix			Annex B 10
Intended use Summary of hollow or perforated brick			

Table B11.1: Summary of hollow or perforated – see Annex C 14 – C 15

Brick No./ Country	Dimensions	Brick drawing	See Annex
S21/DE	250 x 250 x 190 mm		C 14
S22/DE	520 x 180 x 250 mm		C 14
S23/DE	2 DF 240 x 115 x 113 mm		C 15
S24/DE	3 DF 240 x 175 x 113 mm		C 15
S25/DE	9 DF 380 x 175 x 240 mm		C 15
Berner frame fixing BXRfix / BXRLfix			Annex B 11
Intended use Summary of hollow or perforated brick			

Table B12.1: Summary of hollow or perforated – see Annex C 16 – C 17

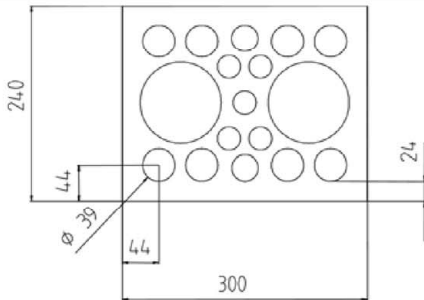
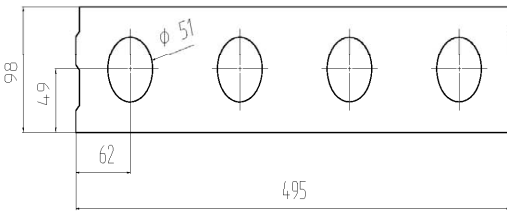
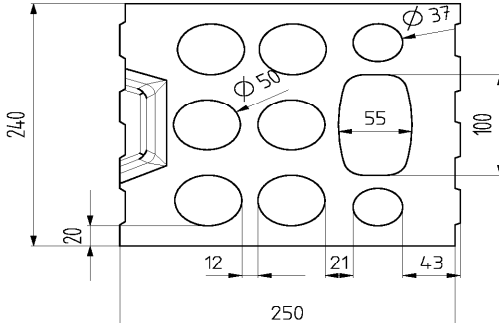
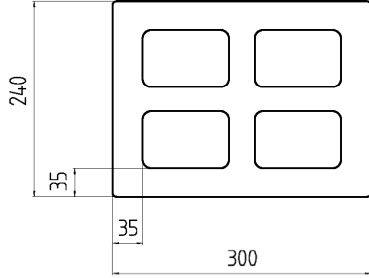
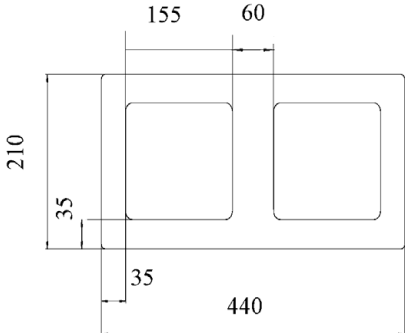
Brick No./ Country	Dimensions	Brick drawing	See Annex
S26/DE	5 DF 300 x 240 x 113 mm		C 16
S27/DE	2 DF 495 x 98 x 245 mm		C 16
S28/DE	9 DF 250 x 240 x 240 mm		C 16
S29/DE	300 x 240 x 240 mm		C 17
S30/IE	440 x 210 x 215 mm		C 17
Berner frame fixing BXRfix / BXRLfix			Annex B 12
Intended use Summary of hollow or perforated brick			

Table B13.1: Summary of hollow or perforated brick – see Annex C 17 – C 19

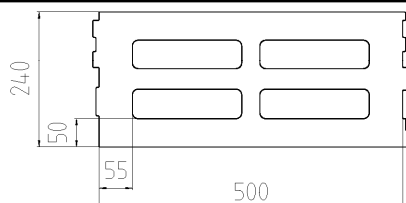
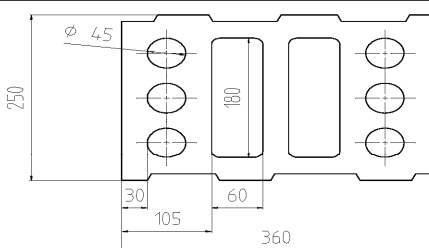
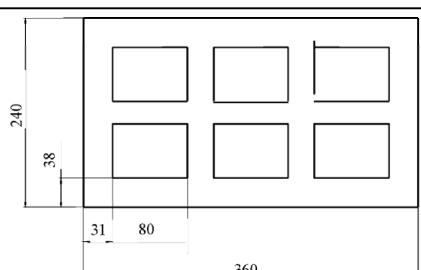
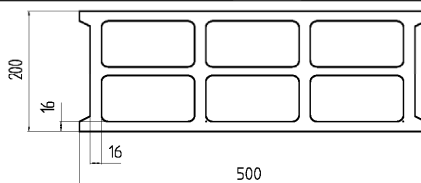
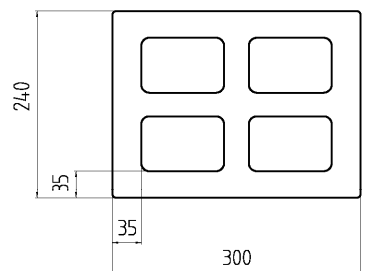
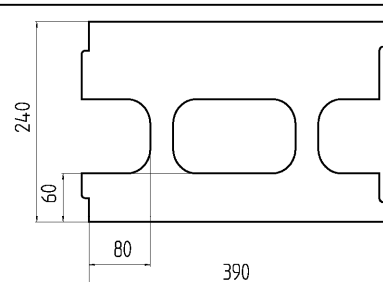
Brick No./ Country	Dimensions	Brick drawing	See Annex
S31/DE	500 x 240 x 240 mm		C 17
S32/DE	360 x 250 x 250 mm		C 18
S33/DE	360 x 240 x 240 mm		C 18
S34/FR	500 x 200 x 200 mm		C 18
S35/DE	300 x 240 x 240 mm		C 19
S36/DE	390 x 240 x 240		C 19
Berner frame fixing BXRfix / BXRLfix			Annex B 13
Intended use Summary of hollow or perforated brick			

Table C1.1: Characteristic resistance of the screw

Failure of expansion element (special screw)		BXRfix 8 / BXRLfix 8		BXRfix 10 / BXRLfix 10		BXRLfix 14	
		galvanised steel	stainless steel	galvanised steel	stainless steel	galvanised steel	stainless steel
Characteristic tension resistance	$N_{Rk,s}$ [kN]	14,8	14,3	21,7 24,9 ²⁾	21,7	43,4	42,0
Partial safety factor	γ_{Ms} ¹⁾ [-]	1,50	1,55	1,55	1,55	1,50	1,55
Characteristic shear resistance	$V_{Rk,s}$ [kN]	7,4	7,1	10,8 12,4 ²⁾	10,8	21,7	21,0
Partial safety factor	γ_{Ms} ¹⁾ [-]	1,25	1,29	1,29	1,29	1,25	1,29

¹⁾ In absence of other national regulations.

²⁾ Only for BXRLfix 10: "High load" screw version on request only for countersunk screws – head marking is ●●.

Table C1.2: Characteristic bending resistance of the screw

Anchor type		BXRfix 8 / BXRLfix 8		BXRfix 10 / BXRLfix 10		BXRLfix 14	
Material		galvanised steel	stainless steel	galvanised steel	stainless steel	galvanised steel	stainless steel
Overall plastic anchor embedment depth in the base material						h_{nom2} 70mm	h_{nom3} 90mm
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	12,4	12,0	20,6 23,6 ²⁾	20,6	48,7	62,5
Partial safety factor	γ_{Ms} ¹⁾ [-]	1,25	1,29	1,29	1,29	1,25	1,29

¹⁾ In absence of other national regulations.

²⁾ Only for BXRLfix 10: "High load" screw version on request only for countersunk screws – head marking is ●●.

Table C1.3: Characteristic resistance for use in concrete – base material group "a", hammer drilling

Pull-out failure (plastic sleeve)			BXRfix 8		BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14	
Embedment depth h_{nom} [mm]			50		50	70	50		50	70	70	
Concrete $\geq$ C12/15												
Characteristic tension resistance 30/50 °C	$N_{Rk,p}$ [kN]		3,0	4,0	5,0	5,0		5,5	6,5	8,5		
Characteristic tension resistance 50/80 °C	$N_{Rk,p}$ [kN]		2,5 3,0 ²⁾	4,0	5,0	4,5		5,0	6,5	8,5		
Concrete $\geq$ C12/15 (e.g. weather resistant shells of external wall panels)												
Characteristic tension resistance 30/50 °C	$N_{Rk,p}$ [kN]	$h \geq 40$ mm	4)	4)	4)	3,5		2,5 / 3,0 ²⁾	4)	4)		
Characteristic tension resistance 50/80 °C	$N_{Rk,p}$ [kN]	$h \geq 40$ mm	4)	4)	4)	3,0		2,5 / 3,0 ²⁾	4)	4)		
Concrete $\geq$ C45/55 in pre-stressed concrete core slabs												
Characteristic tension resistance 50/80 °C	$N_{Rk,p}$ [kN]	$d_b \geq 30$ mm	4)	4)	4)	4)		3,5 / 4,0 ³⁾	4)	4)		
		$d_b \geq 40$ mm	4)	4)	4)	4)		5,5 / 6,0 ³⁾	4)	4)		
Partial safety factor γ_{Mc} ¹⁾ [-]		1,8										

¹⁾ In absence of other national regulations.

²⁾ Value corresponds to concrete class $\geq$ C16/20.

³⁾ Only valid for temperature range 30/50 °C.

⁴⁾ No performance assessed.

Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance and characteristic bending resistance of the screw
Characteristic resistance for use in concrete

Annex C 1

Table C2.1: Displacements¹⁾ under tension and shear loading in concrete and masonry

Displacements under			Tension load ²⁾		Shear load ²⁾	
Anchor type	h_{nom} [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{vo} [mm]	$\delta_{v\infty}$ [mm]
BXRfix 8	50	1,2	0,65	1,30	1,02	1,53
BXRLfix 8	50	1,6	0,56	1,12	2,00	3,00
	70	2,0	0,64	1,28	2,30	3,45
BXRfix 10	50	2,0	1,29	2,58	1,15 ^{3)/3,05⁴⁾}	1,74 ^{3)/4,58⁴⁾}
BXRLfix 10	50	2,2	0,58	1,16	1,96	2,94
	70	2,6	1,67	3,34	1,15 ^{3)/3,05⁴⁾}	1,74 ^{3)/4,58⁴⁾}
BXRLfix 14	70	3,40	0,39	0,63	2,79	4,19

¹⁾ Valid for all ranges of temperatures.

²⁾ Intermediate values by linear interpolation.

³⁾ Valid for diameter in the clearance hole $\leq 10,5$ mm (see Table B3.1).

⁴⁾ Valid for diameter in the clearance hole = 12,5 mm (see Table B3.1).

Table C2.2: Displacements¹⁾ under tension and shear loading in autoclaved aerated concrete

Displacements under				Tension load ²⁾		Shear load ²⁾	
Anchor type	f_{ck} [N/mm ²]	h_{nom} [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{vo} [mm]	$\delta_{v\infty}$ [mm]
BXRLfix 8	≥ 2	70/90	0,14/0,21	0,45/0,55	0,90/1,10	0,28/0,42	0,42/0,63
	≥ 6	70/90	1,07	0,73/0,80	1,46/1,60	2,14	3,21
BXRfix 10	≥ 2	50	0,32	0,03	0,06	0,21	0,31
BXRLfix 10	≥ 2	70/90	0,32	0,23	0,46	0,64	0,96
	≥ 6	70/90	1,43	0,65	1,30	2,86	4,29
BXRLfix 14	≥ 2	70/90	0,32/0,43	0,19/0,25	0,38/0,50	0,64/0,86	0,96/1,29
	≥ 3	70/90	0,60/0,77	0,23/0,31	0,45/0,63	1,19/1,54	1,79/2,31
	≥ 4	70/90	0,88/1,11	0,26/0,38	0,53/0,76	1,75/2,22	2,62/3,33
	≥ 6	70/90	1,43/1,79	0,34/0,51	0,68/1,02	2,86/3,58	4,29/5,37

¹⁾ Valid for all ranges of temperatures.

²⁾ Intermediate values by linear interpolation.

Table C2.3: 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 façade systems

Anchor type	Fire resistance class	$F_{Rk,fi,90}$	$\gamma_{M,fi}$ ¹⁾
BXRfix 10 / BXRLfix 10 / BXRLfix 14	R 90	$\leq 0,8$ kN	1,0

¹⁾ In absence of other national regulations.

In case of fire attack from one side see Table B4.1 for edge distance. In case of fire attack from more than one side the minimum edge distance shall be $c \geq 300$ mm, $c \geq 2 \cdot h_{ef}$; the bigger value is decisive.

Berner frame fixing BXRfix / BXRLfix	Annex C 2
Performances Displacements under tension and shear loading in concrete, masonry and autoclaved aerated concrete	

Table C3.1: Characteristic resistance F_{Rk} in [kN] in solid masonry - base material group "b"

Base material [Supplier Title, country] Geometry, DF or nom. Size (L x W x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90	
Clay brick Mz, as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann DE</i> 3 DF (240x175x113) hammer drilling	20/1,8	3,0	9)	9)	9)	2,0 4,0 ⁴⁾ 4,5 ⁶⁾	9)	9)	9)	9)	
	10/1,8	2,0	9)	9)	9)	3,0 ⁴⁾	9)	9)	9)	9)	
Clay brick Mz, as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann DE</i> <i>e.g. Ebersdobler DE</i> NF (240x115x71) hammer drilling	36/1,8	2,5	3,0	4,0 4,5 ³⁾	8)	5,0	3,5	4,0 5,5 ³⁾	4,0 6,0 ⁴⁾ 7,0 ⁶⁾	8)	
	20/1,8	2,5	3,0	4,0 4,5 ³⁾	8)	3,0 3,5 ²⁾	3,5	4,0 5,5 ³⁾	4,0 6,0 ⁴⁾ 7,0 ⁶⁾	8)	
	12/1,8	2,0	2,0	2,5	8)	2,0	2,0	4,0 5,5 ³⁾	3,0 4,5 ⁴⁾ 5,0 ⁶⁾	8)	
	10/1,8	2,0	2,0	2,5	8)	2,0	9)	3,5 4,5 ³⁾	3,0 4,5 ⁴⁾ 5,0 ⁶⁾	8)	
Clay brick Mz, as per EN 771-1:2011+A1:2015 <i>e.g. Wienerberger, DK</i> DF (240x115x52) hammer drilling	28/1,8	3,0	2,5	3,0 3,5 ²⁾	8)	3,0	3,0 4,5 ³⁾ 5,0 ⁵⁾	5,5 6,5 ³⁾	9)	9)	
	20/1,8	2,0	2,5	3,0 3,5 ²⁾	8)	2,0	3,0 4,5 ³⁾ 5,0 ⁵⁾	4,0 4,5 ³⁾	9)	9)	
	16/1,8	1,5	2,5	3,0 3,5 ²⁾	8)	1,5	3,0 4,5 ³⁾ 5,0 ⁵⁾	3,0 3,5 ³⁾	9)	9)	
	12/1,8	1,5	1,5 2,0 ²⁾	2,0 2,5 ²⁾	8)	1,2	2,5 3,5 ³⁾	2,5 3,0 ³⁾	9)	9)	
	10/1,8	1,5	1,2 1,5 ²⁾	8)	8)	1,2	9)	2,5 3,0 ³⁾	9)	9)	
Partial safety factor γ_{Mm} ¹⁾ [-]		2,5									
1) In absence of other national regulations. 2) Only valid for temperature range 30/50° C. 3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation. 4) Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation. 5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 6) Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 8) Values of lower h_{nom} can also be taken for next higher h_{nom}. 9) No performance assessed.											
Berner frame fixing BXRfix / BXRLfix									Annex C 3		
Performances Characteristic resistance for use in solid masonry											

Table C4.1: Characteristic resistance F_{Rk} in [kN] in solid masonry - base material group "b"

Base material [Supplier Title, country, Land] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14			
		h_{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90	
Calcium silicate solid brick KS , as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding DE</i> NF (240x115x71) hammer drilling	36/2,0	9)	9)	9)	9)	5,0	3,5 4,0³⁾	8)	9)	9)	
	20/2,0	9)	9)	9)	9)	3,0 3,5²⁾	3,5 4,0³⁾	8)	9)	9)	
	20/1,8	2,5	2,5	3,0	8)	2,5 4,0⁴⁾	9)	3,5	4,5 5,0⁴⁾ 6,0⁶⁾	8)	
	10/2,0	9)	9)	9)	9)	2,0	2,0 2,5³⁾	8)	9)	9)	
	10/1,8	2,0	2,0	2,0	8)	1,5	9)	2,5	3,0 3,5⁴⁾ 4,0⁶⁾	8)	
Calcium silicate solid brick KS , as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding DE</i> 12 DF (495x175x240) hammer drilling	28/2,0	3,0	9)	9)	9)	5,0	9)	9)	9)	9)	
	20/2,0	3,0	9)	9)	9)	4,5	9)	9)	9)	9)	
	20/1,8	9)	9)	9)	9)	9)	9)	6,5 8,5⁴⁾	4,0 11,0⁴⁾ 11,5⁶⁾	8)	
	16/1,8	9)	9)	9)	9)	9)	9)	6,5 8,5⁴⁾	4,0 11,0⁴⁾ 11,5⁶⁾	8)	
	12/1,8	9)	9)	9)	9)	9)	9)	6,5 8,5⁴⁾	4,0 11,0⁴⁾ 11,5⁶⁾	8)	
	10/2,0	2,5	9)	9)	9)	3,0	9)	9)	9)	9)	
	10/1,8	9)	9)	9)	9)	9)	9)	5,5 7,0⁴⁾	3,5 9,0⁴⁾ 9,5⁶⁾	8)	
	8/1,8	9)	9)	9)	9)	9)	9)	4,0 5,5⁴⁾	2,5 7,5⁴⁾	8)	
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5									
1) In absence of other national regulations. 2) Only valid for temperature range 30/50° C. 3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation. 4) Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation. 5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 6) Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 8) Values of lower h_{nom} can also be taken for next higher h_{nom}. 9) No performance assessed.											
Berner frame fixing BXRfix / BXRLfix Performances								Annex C 4			
Characteristic resistance for use in solid masonry											

Table C5.1: Characteristic resistance F_{Rk} in [kN] in solid masonry - base material group "b"

Base material [Supplier Title, country, Land] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14			
		h_{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90	
Calcium silicate solid brick KS , as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding DE</i> 8 DF (495x115x240) hammer drilling	16/2,0	9)	3,0 4,5 ³⁾ 5,0 ⁶⁾	3,5 5,0 ³⁾ 6,0 ⁴⁾ 6,5 ⁶⁾	8)	9)	3,5 5,0 ³⁾ 6,0 ⁴⁾ 6,5 ⁶⁾	8)	9)	9)	
	12/2,0	9)	2,5 3,0 ³⁾ 3,5 ⁵⁾	2,5 4,0 ³⁾ 4,5 ⁴⁾ 5,0 ⁶⁾	8)	9)	2,5 4,0 ³⁾ 4,5 ⁴⁾ 5,0 ⁶⁾	8)	9)	9)	
Lightweight solid brick Vbl , as per EN 771-3:2011+A1:2015 <i>e.g. KLB DE</i> 2 DF (240x115x113) hammer drilling	4/1,4	9)	9)	9)	9)	0,75	9)	2,5	9)	9)	
	2/1,4	9)	9)	9)	9)	0,4	9)	1,2	9)	9)	
	2/1,2	0,9	0,4 0,5 ²⁾	0,9 1,2 ²⁾	8)	0,75 0,9 ³⁾	0,4	8)	0,9 1,2 ²⁾	8)	
Lightweight solid brick Vbl , as per EN 771-3:2011+A1:2015 <i>e.g. KLB DE</i> 8 DF (490x240x115) hammer drilling	12/1,8	2,5	9)	9)	9)	9)	9)	3,0 4,5 ³⁾	9)	9)	
	10/1,8	2,5	9)	9)	9)	9)	9)	2,5 3,5 ³⁾	9)	9)	
	8/1,8	2,5	9)	9)	9)	9)	9)	2,0 3,0 ³⁾	9)	9)	
	8/1,6	9)	9)	9)	9)	3,0	9)	9)	9)	9)	
	6/1,8	2,0	9)	9)	9)	9)	9)	1,5 2,0 ³⁾	9)	9)	
	6/1,6	9)	9)	9)	9)	2,0	9)	9)	9)	9)	
	4/1,8	1,2	9)	9)	9)	9)	9)	0,9 1,5 ³⁾	9)	9)	
	2/1,2	9)	9)	9)	9)	1,2	9)	9)	9)	9)	
	2/1,0	1,2	9)	9)	9)	9)	9)	9)	9)	9)	
Partial safety factor	$\gamma_{Mm}^{1)}$ [-]	2,5									

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation.

4) Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation.

5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

6) Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

8) Values of lower h_{nom} can also be taken for next higher h_{nom} .

9) No performance assessed.

Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in solid masonry

Annex C 5

Table C6.1: Characteristic resistance F_{Rk} in [kN] in solid masonry - base material group "b"

Base material [Supplier Title, country, Land] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8			BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90	
Lightweight solid brick Vbl , as per EN 771-3:2011+A1:2015 <i>e.g. KLB DE</i> 8 DF (245x240x240) hammer drilling	10/1,6	9)	2,0 2,5 ²⁾	3,0 4,0 ⁵⁾	8)	2,5	3,0 3,5 ⁵⁾	7,5	3,5 6,0 ⁴⁾ 7,0 ⁶⁾	8)	
	8/1,6	9)	1,5 2,0 ²⁾	2,5 3,5 ⁵⁾	8)	2,5	2,5 3,0 ⁵⁾	6,0	3,0 5,0 ⁴⁾ 6,0 ⁶⁾	8)	
	6/1,6	9)	1,2 1,5 ²⁾	2,0 2,5 ⁵⁾	8)	2,5	2,0	4,5	2,0 3,5 ⁴⁾ 4,5 ⁶⁾	8)	
	6/1,4	0,9	9)	9)	9)	9)	9)	9)	9)	9)	
	4/1,6	9)	0,75 0,9 ²⁾	1,2 1,5 ⁵⁾	8)	0,9	1,2 1,5 ⁵⁾	3,0	1,5 2,5 ⁴⁾ 3,0 ⁶⁾	8)	
	4/1,4	0,6 0,75 ²⁾	9)	9)	9)	9)	9)	9)	9)	9)	
	2/1,6	9)	0,4 0,5 ²⁾	0,6 0,9 ⁵⁾	8)	0,5	0,6	1,5	9)	9)	
Lightweight solid brick Vbl , as per EN 771-3:2011+A1:2015, <i>e.g. Liapor Super-K DE</i> 16 DF (500x240x248) hammer drilling	2/0,8	9)	9)	9)	9)	9)	9)	0,5	9)	9)	
Lightweight solid brick Vbl , as per EN 771-3:2011+A1:2015, <i>e.g. Tarmac UK</i> (440x100x215) hammer drilling	6/1,4	9)	9)	9)	9)	2,0 2,5 ⁴⁾	9)	2,0 3,0 ³⁾	9)	9)	
	4/1,4	9)	9)	9)	9)	1,2 1,5 ⁴⁾	9)	1,5 2,0 ³⁾	9)	9)	

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation.

4) Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation.

5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

6) Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

8) Values of lower h_{nom} can also be taken for next higher h_{nom} .

9) No performance assessed.

Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in solid masonry

Annex C 6

Table C7.1: Characteristic resistance F_{Rk} in [kN] in solid masonry - base material group "b"

Base material [Supplier Title, country, Land] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8		BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14	
		h_{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90	
Solid brick normal concrete Vbn, as per EN 771-3:2011+A1:2015 <i>e.g. Adolf Blatt DE</i> (240x245x240) hammer drilling	20/1,8	2,5	9)	9)	9)	4,5	9)	9)	9)	9)	
	16/1,8	2,5	9)	9)	9)	3,5	9)	9)	9)	9)	
	12/1,8	2,5	9)	9)	9)	3,0	9)	9)	9)	9)	
	10/1,8	1,5	9)	9)	9)	3,0	9)	9)	9)	9)	
	8/1,8	1,5	9)	9)	9)	9)	9)	9)	9)	9)	
	4/1,8	0,75	9)	9)	9)	9)	9)	9)	9)	9)	
Solid brick normal concrete Vbn, as per EN 771-3:2011+A1:2015 <i>e.g. Tarmac UK</i> (440x100x215) hammer drilling	16/1,8	9)	9)	9)	9)	4,0 4,5 ²⁾	9)	5,5	9)	9)	
	10/1,8	9)	9)	9)	9)	2,5 3,0 ²⁾	9)	3,5	9)	9)	
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5									

Footprints see Table C7.2

Table C7.2: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group "c"

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. Druckfestig- keit f_b [N/mm²] / Rohdichte ρ [kg/dm³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]									
		50	50	70	90	50	50	70	70	90	
S1 Perforated clay brick HLz Form B, as per EN 771-1:2011+A1:2015 e.g. <i>Wienerberger</i>	20/1,2	1,2	9)	9)	9)	2,5 3,0 ⁵⁾	9)	2,0	9)	9)	
	20/1,0	9)	9)	9)	9)	2,0	9)	9)	9)	9)	
	12/1,2	9)	9)	9)	9)	9)	9)	1,2	9)	9)	
	10/1,2	9)	9)	9)	9)	1,5 2,0 ²⁾	9)	9)	9)	9)	
	10/1,0	9)	9)	9)	9)	1,2	9)	9)	9)	9)	
	8/1,2	0,5	9)	9)	9)	9)	9)	9)	9)	9)	
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5									

¹⁾ In absence of other national regulations.

²⁾ Only valid for temperature range 30/50° C.

⁵⁾ Only valid for edge distance $c \geq 150$ mm at temperature range 30/50° C; intermediate values by linear interpolation.

⁹⁾ No performance assessed.

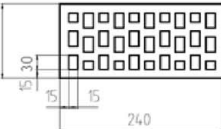
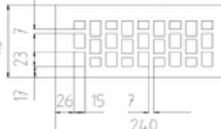
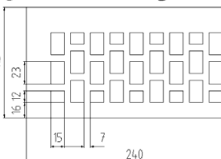
Berner frame fixing BXRfix / BXRLfix

Performances

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

Annex C 7

Table C8.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8 ⁷⁾			BXRfix 10	BXRLfix 10		BXRLfix 14 ⁷⁾	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S2 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 e.g. <i>Wienerberger</i> 	28/1,2	9)	1,2 1,5 ²⁾	1,5 2,0 ²⁾	1,5 2,0 ²⁾	9)	9)	2,0	9)	9)
	20/1,2	9)	0,9 1,2 ²⁾	0,9 1,2 ²⁾	1,2 1,5 ²⁾	9)	9)	1,2	9)	9)
	12/1,0	0,6	9)	9)	9)	0,9	9)	0,75	9)	9)
	10/1,2	9)	0,6	0,6 0,75 ²⁾	0,6 0,9 ²⁾	9)	9)	9)	9)	9)
	10/1,0	9)	9)	9)	9)	0,75	9)	0,6	9)	9)
	8/1,0	0,4	9)	9)	9)	0,6	9)	9)	9)	9)
S3 Perforated clay brick VHLz as per EN 771-1:2011+A1:2015, e.g. <i>Wienerberger</i> 	48/1,6	9)	9)	9)	9)	9)	9)	9)	4,5 5,0 ²⁾	4,5 5,0 ²⁾
	28/1,6	9)	9)	9)	9)	9)	9)	9)	2,5 3,0 ²⁾	2,5 3,0 ²⁾
	20/1,6	9)	9)	9)	9)	9)	9)	9)	1,5 2,0 ²⁾	1,5 2,0 ²⁾
S4 Perforated clay brick VHLz as per EN 771-1:2011+A1:2015, e.g. <i>Wienerberger</i> 	48/1,6	9)	2,5	2,5	1,5 2,0 ²⁾	2,5	9)	4,5	9)	9)
	36/1,6	9)	2,0	2,0	1,2 1,5 ²⁾	2,0	9)	3,0	9)	9)
	28/1,6	9)	1,5	1,5	0,9 1,2 ²⁾	1,5	9)	2,5	9)	9)
	20/1,6	9)	0,9	0,9	0,6 0,9 ²⁾	0,9	9)	1,5	9)	9)
	12/1,6	9)	0,6	0,6	0,4 0,5 ²⁾	0,6	9)	0,9	9)	9)
	10/1,6	9)	9)	9)	9)	-	9)	0,9	9)	9)
Partial safety factor γ_{Mm} ¹⁾ [-]		2,5								

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation.

4) Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation.

5) Only valid for edge distance $c \geq 150$ mm at temperature range 30/50° C; intermediate values by linear interpolation.

6) Only valid for edge distance $c \geq 200$ mm at temperature range 30/50° C; intermediate values by linear interpolation.

7) The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths.

9) No performance assessed.

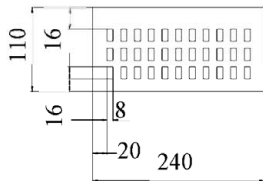
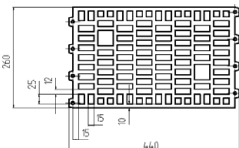
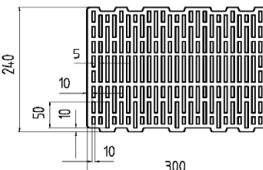
Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in hollow or perforated masonry

Annex C 8

Table C9.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S5 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 <i>e.g. Wienerberger, BS</i> 	28/1,5	2,5	9)	9)	9)	2,5	9)	9)	9)	9)
	20/1,5	1,2 1,5 ²⁾	9)	9)	9)	2,0	9)	9)	9)	9)
	10/1,5	0,6 0,9 ²⁾	9)	9)	9)	1,2	9)	9)	9)	9)
DF(240x110x52) hammer drilling										
S6 Perforated clay brick HLz Form B, as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann</i> 	8/0,9	0,9	9)	9)	9)	9)	9)	9)	9)	9)
	6/0,9	0,6	9)	9)	9)	9)	9)	9)	9)	9)
	4/0,9	0,4	9)	9)	9)	9)	9)	9)	9)	9)
10 DF (440x240x260) rotary drilling										
S7 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann Poroton T14</i> 	6/0,7	9)	9)	9)	9)	0,3 0,4 ²⁾	9)	0,5	9)	9)
	10 DF (300x240x240) rotary drilling									
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

9) No performance assessed

Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in hollow or perforated masonry

Annex C 9

Table C10.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

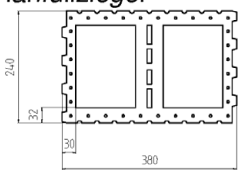
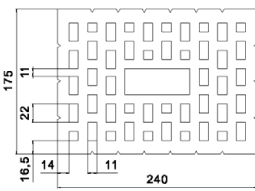
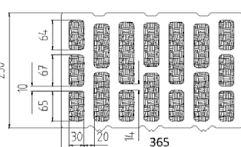
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8				BXRfix 10	BXRLfix 10		BXRLfix 14	
		h_{nom} [mm]									
		50	50	70	90	50	50	70	70	90	
S8 Perforated clay brick HLz geometry B, as per EN 771-1:2011+A1:2015, e.g. <i>Schlagmann</i> <i>Planfüllziegel</i> 	6/0,7	1,2	9)	9)	9)	2,0	9)	9)	9)	9)	
	4/0,7	0,75	9)	9)	9)	9)	9)	9)	9)	9)	
	2/0,7	0,4	9)	9)	9)	9)	9)	9)	9)	9)	
12 DF (380x240x240) rotary drilling											
S9 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 e.g. <i>Schlagmann</i> 	12/1,0	9)	9)	9)	9)	9)	9)	9)	2,0	2,5	
	10/1,0	9)	9)	9)	9)	9)	9)	9)	2,0	2,0	
	8/1,0	9)	9)	9)	9)	9)	9)	9)	1,5	1,5	
	6/1,0	9)	9)	9)	9)	9)	9)	9)	1,2	1,2	
3 DF (240x175x113) rotary drilling											
S10 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, e.g. <i>Schlagmann</i> <i>Poroton S11</i> 	8/0,8	9)	9)	9)	9)	9)	9)	1,5	9)	9)	
	6/0,8	9)	9)	9)	9)	9)	9)	1,2	9)	9)	
	4/0,8	9)	9)	9)	9)	9)	9)	0,75	9)	9)	
12 DF (365x250x240) rotary drilling											
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5									
1) In absence of other national regulations. 9) No performance assessed.											
Berner frame fixing BXRfix / BXRLfix								Annex C 10			
Performances Characteristic resistance for use in hollow or perforated masonry											

Table C11.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

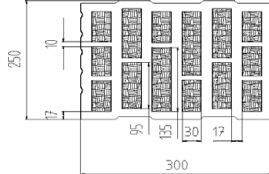
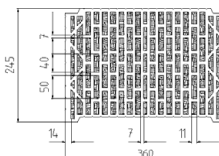
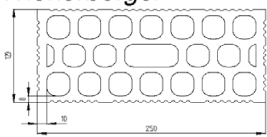
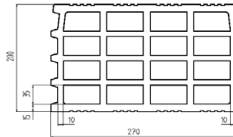
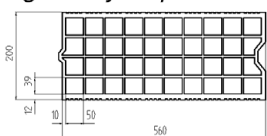
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S11 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann Poroton S10</i> 	6/0,7	9)	9)	9)	9)	9)	9)	1,5	9)	9)
	4/0,7	9)	9)	9)	9)	9)	9)	0,9	9)	9)
10 DF (300x250x240) rotary drilling										
S12 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 <i>e.g. Schlagmann Poroton T8</i> 	4/0,6	9)	9)	9)	9)	9)	9)	1,2	9)	9)
	2/0,6	9)	9)	9)	9)	9)	9)	0,6	9)	9)
12 DF (365x248x240) rotary drilling										
S13 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Hörl & Hartmann Coriso WS 09</i> 	6/0,8	9)	9)	9)	9)	9)	9)	0,9	9)	9)
	4/0,8	9)	9)	9)	9)	9)	9)	0,6	9)	9)
	2/0,8	9)	9)	9)	9)	9)	9)	0,3	9)	9)
(360x245x240) rotary drilling										
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								
1) In absence of other national regulations. 9) No performance assessed.										
Berner frame fixing BXRfix / BXRLfix								Annex C 11		
Performances Characteristic resistance for use in hollow or perforated masonry										

Table C12.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8 ⁷⁾		BXRfix 10	BXRLfix 10		BXRLfix 14 ⁷⁾		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S14 Perforated clay brick HLz as per EN 771-1:2011+A1:2015 <i>e.g. Doppio Uni IT Wienerberger</i>  (250x120x190) rotary drilling	20/0,9	9)	1,2	0,9 1,5 ²⁾	1,5 2,0 ²⁾	9)	9)	9)	9)	9)
	16/0,9	9)	0,9	0,9 1,2 ²⁾	1,2 1,5 ²⁾	9)	9)	9)	9)	9)
	12/0,9	9)	0,75	0,6 0,75 ²⁾	0,9 1,2 ²⁾	9)	9)	9)	9)	9)
S15 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Imerys Gelimatic</i>  (500x200x270) rotary drilling	6/0,6	9)	9)	9)	9)	0,6 0,75 ⁶⁾	9)	1,5	9)	9)
	4/0,6	9)	9)	9)	9)	9)	9)	0,9	9)	9)
	2/0,6	9)	9)	9)	9)	9)	9)	0,5	9)	9)
S16 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Imerys Optibric</i>  (560x200x275) rotary drilling	10/0,6	9)	9)	9)	9)	1,2	9)	1,5	9)	9)
	8/0,6	9)	9)	9)	9)	9)	9)	1,2	9)	9)
	6/0,6	9)	9)	9)	9)	9)	9)	0,9	9)	9)
	4/0,6	9)	9)	9)	9)	9)	9)	0,6	9)	9)
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

6) Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

7) The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths.

9) No performance assessed.

Berner frame fixing BXRfix / BXRLfix

Annex C 12

Performances

Characteristic resistance for use in hollow or perforated masonry

Table C13.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group „c“

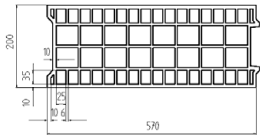
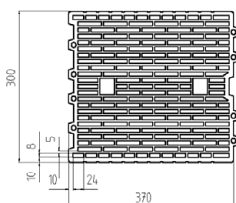
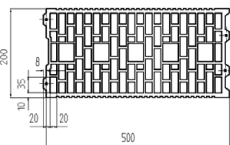
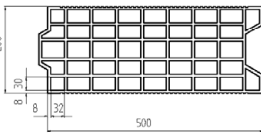
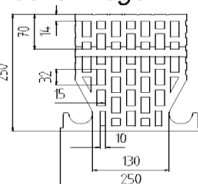
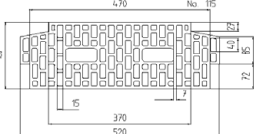
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S17 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Bouyer Leroux BGV</i>  (570x200x315) rotary drilling	6/0,6	9)	9)	9)	9)	0,75 0,9 ³⁾ 1,2 ⁵⁾	9)	0,9	9)	9)
S18 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Wienerberger Porotherm 30 R</i>  (370x300x250) rotary drilling	10/0,7	9)	9)	9)	9)	0,5 0,6 ³⁾	9)	9)	9)	9)
S19 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Wienerberger Porotherm GF R20</i>  (500x200x275) rotary drilling	10/0,7	9)	9)	9)	9)	0,6 0,75 ³⁾	9)	0,9	9)	9)
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								
1) In absence of other national regulations. 3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation. 5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 7) The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths. 9) No performance assessed.										
Berner frame fixing BXRfix / BXRLfix							Annex C 13			
Performances Characteristic resistance for use in hollow or perforated masonry										

Table C14.1: Characteristic resistance F_{Rk} in [kN] in Hohl- oder Lochsteinen – base material group „c“

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S20 Perforated clay brick HLz as per EN 771-1:2011+A1:2015, <i>e.g. Terreal Calibric</i> 	8/0,7	9)	9)	9)	9)	0,6 0,75 ⁶⁾	9)	0,9	9)	9)
	6/0,7	9)	9)	9)	9)	9)	9)	0,75	9)	9)
	4/0,7	9)	9)	9)	9)	9)	9)	0,4	9)	9)
S21 Deckenziegel DIN 4159:2014-05, <i>e.g. Hörl & Hartmann Deckenziegel</i> 	10/0,7	9)	9)	9)	9)	9)	9)	2,0	9)	9)
	8/0,7	9)	9)	9)	9)	9)	9)	1,5	9)	9)
	6/0,7	9)	9)	9)	9)	9)	9)	1,2	9)	9)
S22 Deckenziegel as per EN 15037-3:2011, <i>e.g. Hörl & Hartmann Decken-Einhängeziegel</i> 	8/0,7	9)	9)	9)	9)	9)	9)	1,5	9)	9)
	6/0,7	9)	9)	9)	9)	9)	9)	1,2	9)	9)
	4/0,7	9)	9)	9)	9)	9)	9)	0,9	9)	9)
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								

¹⁾ In absence of other national regulations.

⁶⁾ Only valid for edge distance $c \geq 200$ mm for temperature range 30/50° C; intermediate values by linear interpolation.

⁹⁾ No performance assessed.

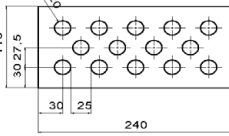
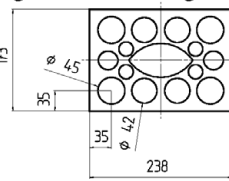
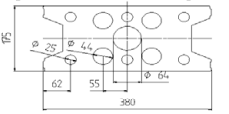
Berner frame fixing BXRfix / BXRLfix

Annex C 14

Performances

Characteristic resistance for use in hollow or perforated masonry

Table C15.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8 ⁷⁾		BXRfix 10	BXRLfix 10		BXRLfix 14 ⁷⁾		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S23 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding</i> 	20/1,4	9)	2,0	2,5	2,5	9)	9)	9)	9)	9)
	12/1,4	2,0	1,2	1,5	1,5	2,0 2,5 ²⁾	9)	2,5	1,5 2,0 ²⁾	2,5
	10/1,4	1,5	9)	9)	9)	2,0	9)	2,0	1,5	2,0
	8/1,4	1,2	9)	9)	9)	1,5	9)	1,5	1,2	1,5
	6/1,4	0,9	9)	9)	9)	9)	9)	9)	0,9	1,2
S24 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding</i> 	20/1,4	1,2 1,5 ²⁾	9)	9)	9)	9)	9)	9)	9)	9)
	16/1,4	0,9 1,2 ²⁾	9)	9)	9)	9)	9)	2,0	9)	9)
	12/1,4	0,75 0,9 ²⁾	9)	9)	9)	9)	9)	1,5	9)	9)
	10/1,4	0,6 0,75 ²⁾	9)	9)	9)	9)	9)	1,2	9)	9)
	8/1,4	0,5 0,6 ²⁾	9)	9)	9)	9)	9)	1,0	9)	9)
	6/1,4	9)	9)	9)	9)	9)	9)	0,75	9)	9)
S25 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding</i> 	20/1,4	9)	0,6 0,75 ²⁾	1,5 2,0 ²⁾	0,9 1,2 ²⁾	9)	9)	3,5	3,5 4,0 ²⁾	1,5 2,0 ²⁾
	12/1,4	9)	0,4 0,5 ²⁾	0,9 1,2 ²⁾	0,5 0,75 ²⁾	9)	9)	2,0	2,0 2,5 ²⁾	0,9 1,2 ²⁾
	10/1,4	9)	9)	9)	9)	9)	9)	2,0	1,5 2,0 ²⁾	0,75 0,9 ²⁾
Partial safety factor γ_{Mm} ¹⁾ [-]		2,5								

1) In absence of other national regulations.

2) Only valid for temperature range 30/50° C.

7) The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths.

9) No performance assessed.

Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in hollow or perforated masonry

Annex C 15

Table C16.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

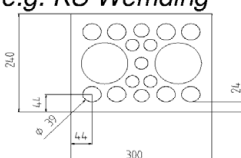
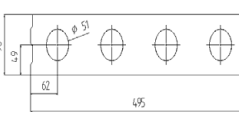
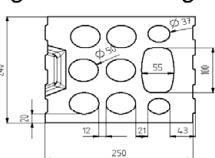
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S26 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding</i>  5 DF (300x240x113) hammer drilling	16/1,4	2,0	9)	9)	9)	3,0 3,5⁵⁾	9)	9)	9)	9)
	12/1,4	1,5	9)	9)	9)	9)	9)	9)	9)	9)
	10/1,4	1,2	9)	9)	9)	1,5	9)	9)	9)	9)
	8/1,4	0,9	9)	9)	9)	9)	9)	9)	9)	9)
	6/1,4	0,75 0,9²⁾	9)	9)	9)	9)	9)	9)	9)	9)
S27 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding, P10</i>  (495x98x245) hammer drilling	6/1,2	1,2 1,5²⁾	9)	9)	9)	1,5 2,0³⁾ 2,5⁵⁾	9)	9)	9)	9)
	4/1,2	0,75 0,9²⁾	9)	9)	9)	9)	9)	9)	9)	9)
	2/1,2	0,4 0,5²⁾	9)	9)	9)	9)	9)	9)	9)	9)
S28 Hollow calcium silicate brick KSL as per EN 771-2:2011+A1:2015 <i>e.g. KS Wemding</i>  9 DF (250x240x240) hammer drilling	12/1,4	9)	9)	9)	9)	9)	9)	2,0	9)	9)
	10/1,4	9)	9)	9)	9)	9)	9)	1,5	9)	9)
	8/1,4	9)	9)	9)	9)	9)	9)	1,2	9)	9)
	6/1,4	9)	9)	9)	9)	9)	9)	0,9	9)	9)
Partial safety factor γ_{Mm} ¹⁾ [-]		2,5								
1) In absence of other national regulations. 2) Only valid for temperature range 30/50° C. 3) Only valid for edge distance $c \geq 150$ mm; intermediate values by linear interpolation. 5) Only valid for edge distance $c \geq 150$ mm for temperature range 30/50° C; intermediate values by linear interpolation. 9) No performance assessed.										
Berner frame fixing BXRfix / BXRLfix							Annex C 16			
Performances Characteristic resistance for use in hollow or perforated masonry										

Table C17.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

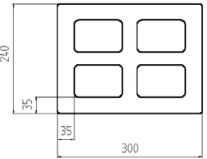
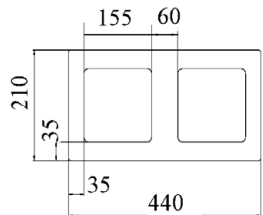
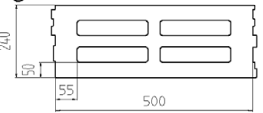
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C									
		BXRfix 8	BXRLfix 8 ⁷⁾		BXRfix 10		BXRLfix 10		BXRLfix 14 ⁷⁾		
h_{nom} [mm]											
50	50	70	90	50	50	70	70	90			
S29 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>KLB</i>  (300x240x240) hammer drilling	2/1,2	9)	9)	9)	9)	1,5	9)	9)	9)	9)	
S30 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>Roadstone masonry</i>  (440x210x215) hammer drilling	10/1,2	2,5	2,0	2,0 2,5 ²⁾	0,4 0,6 ²⁾	9)	9)	2,5	3,0	9)	
	8/1,2	2,0	1,5	1,5 2,0 ²⁾	0,3 0,5 ²⁾	2,5	9)	2,0	2,5	9)	
	6/1,2	1,5	1,2	1,2 1,5 ²⁾	0,3	2,0	9)	1,5	2,0	9)	
	4/1,2	9)	9)	9)	9)	9)	9)	0,9	1,2	9)	
	2/1,2	9)	9)	9)	9)	9)	9)	0,5	0,6	9)	
S31 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>Knobel</i>  (500x240x240) rotary drilling	6/0,8	9)	1,5	2,5	1,5 2,0 ²⁾	9)	2,5	9)	9)	9)	
	4/0,8	9)	0,9	1,5	0,9 1,2 ²⁾	9)	1,5	9)	9)	9)	
	2/0,8	9)	0,5	0,75	0,5 0,6 ²⁾	9)	0,75	9)	9)	9)	
	2/0,7	9)	1,5 2,0 ²⁾	2,0 2,5 ²⁾	1,5 2,0 ²⁾	9)	2,0 2,5 ²⁾	2,5	1,2 1,5 ²⁾	0,75	
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5									
1) In absence of other national regulations. 2) Only valid for temperature range 30/50° C. 7) The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths. 9) No performance assessed.											
Berner frame fixing BXRfix / BXRLfix								Annex C 17			
Performances Characteristic resistance for use in hollow or perforated masonry											

Table C18.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

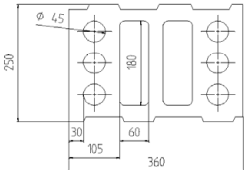
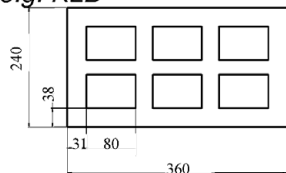
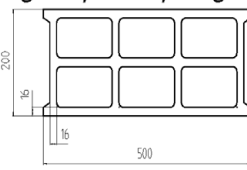
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S32 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>KLB</i>  (360x250x250) hammer drilling	2/0,9	9)	9)	9)	9)	9)	9)	0,75	9)	9)
S33 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>KLB</i>  (360x240x240) hammer drilling	6/1,0	1,5	9)	9)	9)	9)	9)	9)	9)	9)
S34 Hollow brick lightweight concrete Hbl as per EN 771-3:2011+A1:2015, e.g. <i>Sepa Parpaing</i>  (500x200x200) rotary drilling	6/0,9	9)	9)	9)	9)	9)	9)	0,5	9)	9)
	4/0,9	0,3 0,4²⁾	9)	9)	9)	0,9 1,2⁴⁾ 1,5⁶⁾	9)	0,3	9)	9)
Partial safety factor γ_{Mm} ¹⁾ [-]		2,5								
¹⁾ In absence of other national regulations. ²⁾ Only valid for temperature range 30/50° C. ⁴⁾ Only valid for edge distance $c \geq 200$ mm; intermediate values by linear interpolation. ⁶⁾ Only valid for edge distance $c \geq 200$ mm at temperature range 30/50° C; intermediate values by linear interpolation. ⁹⁾ No performance assessed.										
Berner frame fixing BXRfix / BXRLfix								Annex C 18		
Performances Characteristic resistance for use in hollow or perforated masonry										

Table C19.1: Characteristic resistance F_{Rk} in [kN] in hollow or perforated brick – base material group “c”

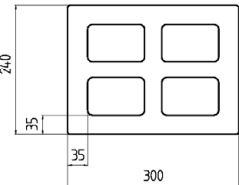
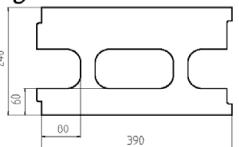
Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f_b [N/mm ²] / bulk density ρ [kg/dm ³]	Characteristic resistance F_{Rk} [kN] 50/80°C								
		BXRfix 8	BXRLfix 8		BXRfix 10	BXRLfix 10		BXRLfix 14		
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
S35 Hollow brick normal concrete Hbn , as per EN 771-3:2011+A1:2015, <i>e.g. Adolf Blatt</i>  (300x240x240) hammer drilling	6/1,6	9)	9)	9)	9)	2,5	9)	2,0	9)	9)
	4/1,6	9)	9)	9)	9)	1,5	9)	1,2	9)	9)
	2/1,6	9)	9)	9)	9)	0,75	9)	0,6	9)	9)
S36 Heat insulation brick WDB <i>e.g. Gisoton</i>  (390x240x240) hammer drilling	2/0,7	9)	9)	9)	9)	1,5	9)	9)	9)	9)
Partial safety factor $\gamma_{Mm}^{1)}$ [-]		2,5								
1) In absence of other national regulations. 9) No performance assessed.										
Berner frame fixing BXRfix / BXRLfix							Annex C 19			
Performances Characteristic resistance for use in hollow or perforated masonry										

Table C20.1: Characteristic resistance F_{Rk} in [kN] in autoclaved aerated concrete – base material group “d”

Base material [Supplier Title, country] Geometry, DF or nom. size (L x B x H) [mm] and drilling method	Min. com- pressive strength f _{ck} [N/mm²]	Characteristic resistance F _{Rk} [kN] 50/80°C									
		BXRfix 8		BXRLfix 8		BXRfix 10		BXRLfix 10		BXRLfix 14	
		h _{nom} [mm]									
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 70	≥ 90	≥ 70	≥ 90	
Autoclaved aerated concrete AAC, as per EN 771-4:2011+A1:2015 e.g. (500x120x300) e.g. (500x250x300) hammer drilling	≥ 6	9)	9)	1,5 3,0 ⁵⁾	2,0 3,0 ⁵⁾	0,75 0,9 ⁵⁾	2,0 2,5 ⁶⁾ 3,0 ⁴⁾	2,5 3,0 ⁶⁾ 4,0 ⁴⁾	4,0	5,0	
	≥ 4	9)	9)	0,9 1,5 ⁵⁾	1,2 1,5 ⁵⁾	0,75 0,9 ²⁾	1,2 1,5 ⁶⁾ 2,0 ⁴⁾	1,5 2,5 ⁴⁾	2,5	3,0	
	≥ 3	9)	9)	0,6 0,9 ⁵⁾	0,9 1,2 ⁵⁾	0,4 ³⁾ 0,5 ²⁾³⁾	0,9 1,2 ⁴⁾	0,9 1,2 ⁶⁾ 1,5 ⁴⁾	1,5	2,0	
	≥ 2	9)	9)	0,4	0,6	0,4 ³⁾ 0,5 ²⁾³⁾	0,5 0,75 ⁴⁾	0,6 0,9 ⁴⁾	0,9	1,2	
Partial safety factor γ _{MAAC} ¹⁾ [-]		2,0									

1) In absence of other national regulations.

2) Only valid for temperature range 30/50 °C.

3) For the fixing in autoclaved aerated concrete with a nominal compressive strength $f_{ck} < 4$ N/mm² the hole is made by using the accompanying AAC hole punch in accordance with Table C20.2.

4) Values valid for member thickness $h_{min} \geq 175$ mm.

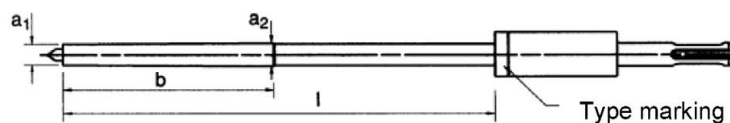
5) Only valid for edge distance $c \geq 120$ mm.

6) Only valid for edge distance $c \geq 180$ mm.

9) No performance assessed.

**Table C20.2: Assignment AAC hole punch type – anchor type (length) only for autoclaved aerated concrete
 $f_{ck} < 4$ N/mm² BXRfix 10**

Hole punch only for BXRfix 10 $h_{nom} = 50$ mm, $f_{ck} < 4$ N/mm ²					Anchor type (length)
Type	a_1	a_2	b	l	
GBS 10 x 80	9	10	80	85	BXRfix 10 x 52 BXRfix 10 x 60 BXRfix 10 x 80
GBS 10 x 100			90	105	BXRfix 10 x 100
GBS 10 x 135				140	BXRfix 10 x 120
GBS 10 x 160				165	BXRfix 10 x 140 BXRfix 10 x 160
GBS 10 x 185				190	BXRfix 10 x 180
GBS 10 x 230				235	BXRfix 10 x 200 BXRfix 10 x 230



Berner frame fixing BXRfix / BXRLfix

Performances

Characteristic resistance for use in autoclaved aerated concrete

Annex C 20