Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA

www.eota.eu

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

European Technical Assessment ETA-07/0121 of 20 December 2022

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	fischer frame fixing SXR/ SXRL
Product family to which the construction product belongs	Plastic anchor for redundant non-structural systems in concrete and masonry
Manufacturer	fischerwerke GmbH & Co. KG Klaus-Fischer-Straße 1 72178 Waldachtal DEUTSCHLAND
Manufacturing plant	fischerwerke
This European Technical Assessment contains	59 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330284-00-0604, edition 12/2020
This version replaces	ETA-07/0121 issued on 13 December 2018

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

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

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No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

Specific part

1 Technical description of the product

The fischer frame fixing in the range SXR 8, SXRL 8, SXR 10, SXRL 10 and SXRL 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 organic layer 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 16 – C 45
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 and B 6
Displacements under short-term and long-term loading	See Annex C 2
Durability	See Annex B 1 and B 2

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.

The following standards and documents are referred to in this European Technical Assessment:

- EOTA European Assessment Document EAD 330284-00-0604, edition December 2020: Plastic anchors for redundant non-structural systems in concrete and masonry
- EOTA Technical Report TR 051, Edition April 2018: Recommendations for job site tests of plastic anchors and screws
- EOTA Technical Report TR 064, Edition May 2018: Design of plastic anchors in conrete and masonry
- EN 206:2013+A1:2016: Concrete – Specification, performance, production and conformity
- EN 771-1:2011+A1:2015: Specification for masonry units – Part 1: Clay masonry units
- EN 771-2:2011+A1:2015: Specification for masonry units – Part 2: Calcium silicate
- EN 771-3:2011+A1:2015: Specification for masonry units – Part 3: Aggregate concrete masonry units (dense and lightweight aggregates)
- EN 771-4:2011+A1:2015: Specification for masonry units – Part 4: autoclaved aerated concrete masonry units
- EN 998-2:2010: Specification for mortar for masonry - Part 2: Masonry mortar
- EN 1993-1-4:2006 + A1:2015: Eurocode 3: Design of steel structures – Part 1-4: General rules - Supplementary rules for stainless steels
- EN 12602:2016: Prefabricated reinforced components of autoclaved aerated concrete
- EN ISO 4042:2018: Fasteners – Electroplated coating systems

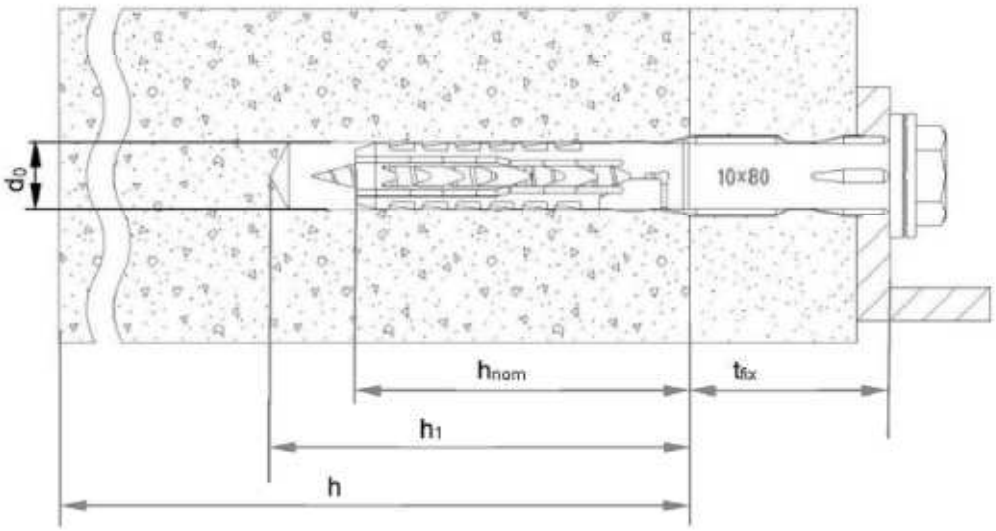
Issued in Berlin on 20 December 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

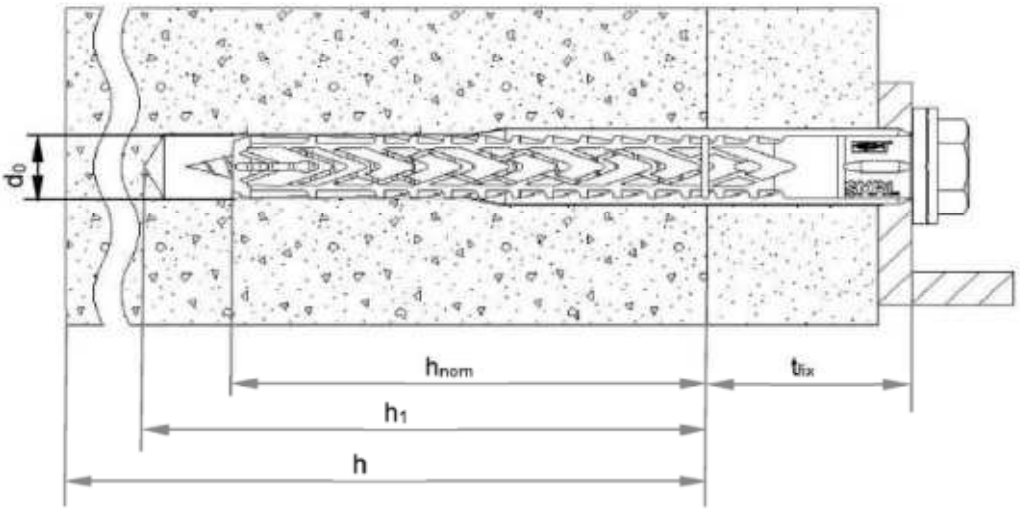
beglaubigt:
Kerstin Ziegler

Deutsches Institut für Bautechnik DIBt

SXR



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



Legend

h_{nom} = Overall plastic anchorage embedment depth in the base material

h = Depth of drill hole to deepest point

d_0 = Nominal drill hole diameter

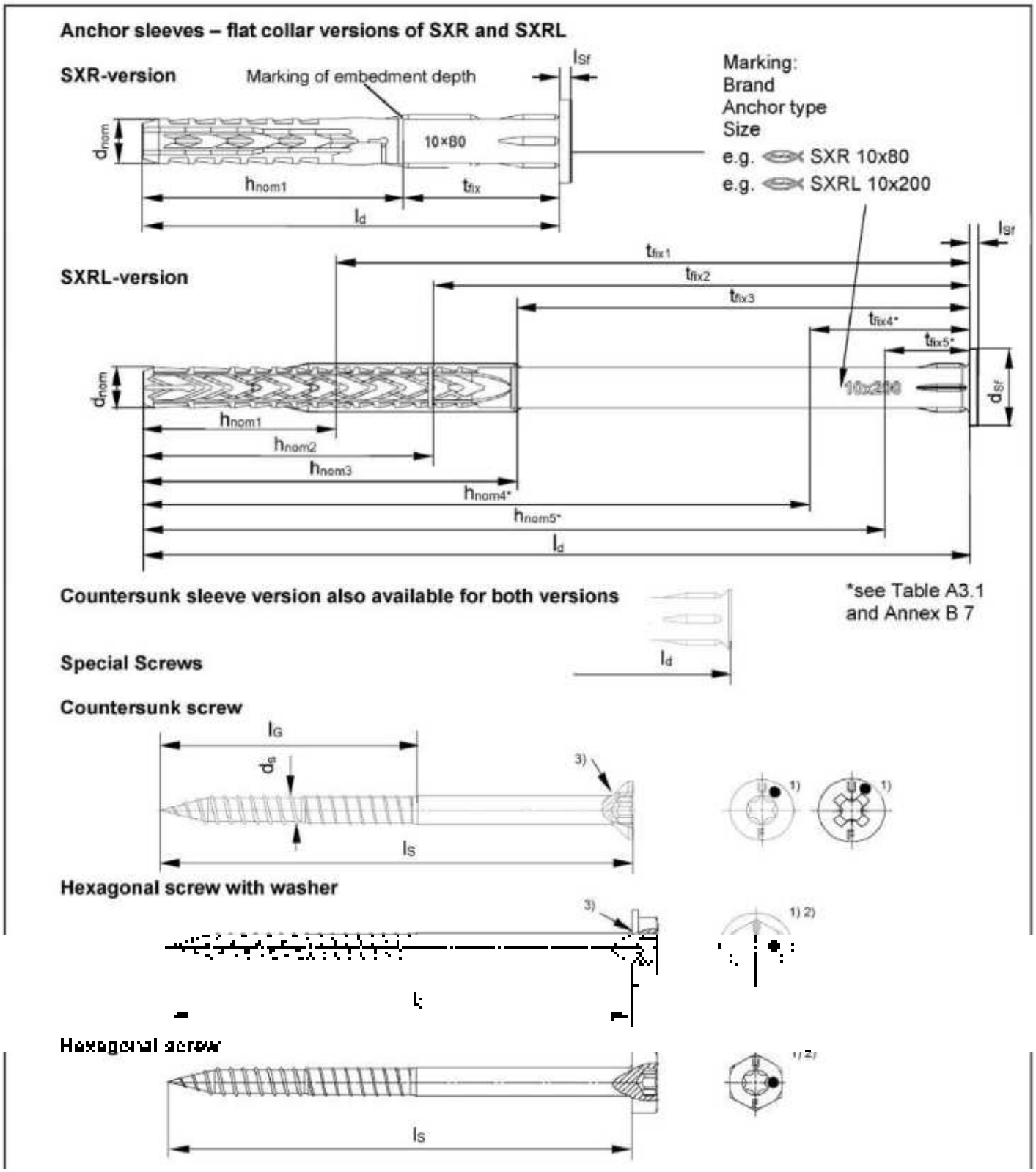
h = Thickness of member (base material)

t_{fix} = Thickness of fixture and / or non-load bearing layer

Fig. not to scale

fischer frame fixing SXR / SXRL	Annex A 1
Product description Details and legend	

Deutsches Institut für Bautechnik DIBt



Figures not to scale

fischer frame fixing SXR / SXRL	Annex A 2
Product description And intended use specification	

Table A3.1: Dimensions

Anchor type	Anchor sleeve											Special screw		
	h_{nom1} [mm]	h_{nom2} [mm]	h_{nom3} [mm]	h_{nom4} [mm]	h_{nom5} [mm]	d_{nom} [mm]	t_{fix} [mm]	min. l_d [mm]	max. l_d [mm]	l_{sf} [1)] [mm]	d_{sf} [1)] [mm]	d_s [mm]	l_G [mm]	l_s [mm]
SXR 8	50	-	-	-	-	8	≥ 1	51	360	1,8	15,0	6	≥ 59	$l_d + l_{sf}$ [1)] $+ d_s$
SXRL 8	50	70	90	-	-	8	≥ 1	51	360	1,8	15,0	6	≥ 59	$l_d + l_{sf}$ [1)] $+ d_s$
SXR 10	50	-	-	-	-	10	≥ 1	51	360	2,2	18,5	7	≥ 57	$l_d + l_{sf}$ [1)] $+ d_s$
SXRL 10	50[2)]	70	90[3)4)]	150[4)]	180[4)]	10	≥ 1	51	360	2,2	18,5	7	≥ 57	$l_d + l_{sf}$ [1)] $+ d_s$
SXRL 14	-	70	90	-	-	14	≥ 1	71	600	3,1	24,0	10	≥ 63	$l_d + l_{sf}$ [1)] $+ d_s$

1) Only valid for flat collar version.
2) Marking optional.
3) [illegible]
4) [illegible]

Table A3.2: Materials

Name	Material
Anchor sleeve	- Polyamide, PA6, colour grey
Special screw	- Galvanised steel gvz with Zn5/Ag or Zn5/An in accordance with EN ISO 4042 or Galvanised steel gvz with Zn5/Ag or Zn5/An in accordance with EN ISO 4042 with corrosion protection organic layer (ZnSn/Ag/IT or ZnSn/An/IT, recoated with three layers total layer thickness > 6 µm) or Stainless steel "A2" of corrosion resistance class CRC II in accordance with EN 1993-1-4 or - Stainless steel "A4" or "R" of corrosion resistance class CRC III in accordance with EN 1993-1-4

fischer frame fixing SXR / SXRL	Annex A 3
Product description Dimensions and materials	

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads
- Redundant non-structural applications

Base materials:

- Reinforced or unreinforced concrete without fibres strength classes ≥ C12/15 (base material group 1), as per EN 206, see Annex C 1 and C 2.
- Thin walled concrete components (e.g. weather shells) strength classes ≥ C 20/25 (base material group 1), as per EN 206, thickness ≥ 10 mm, see Annex C 1 and C 2.
- Pre-stressed or unreinforced normal weight concrete strength classes ≥ C20/25 (base material group 1), as per EN 206, see Annex C 1 and C 2.
- Solid brick masonry (base material group 1): as per EN 771-1, EN 771-2 or EN 771-3, see Annex C 3 – C 4, C 7 – C 26.
  Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry units; all characteristic resistance values of solid brick masonry are valid for installation in the mortar joint or in the brick of the units.
- Hollow or perforated brick masonry (base material group 2): as per EN 771-1, EN 771-2 or EN 771-3, see Annex C 5 – C 6, C 26 – C 43, installation in brick or stone
  see Annex C 5, C 43, installation in mortar joint
- Reinforced or unreinforced aerated concrete (base material group 3): as per EN 12602 and normal reinforced or unreinforced aerated concrete (base material group 1): as per EN 771-4, see Annex C 15, C 44 and C 45
- Mortar strength class of the masonry ≥ M2,5 in accordance with EN 998-2
- For other comparable base materials of the base material group 1 or 2, or in case of the characteristic resistance of the anchor may be determined by job site tests in accordance with TR 051

Temperature Range:

SXR 8 and 10 and SXRL 8

- a: -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)

SXR 12 and 14

- c: -20 °C to 50 °C (max. short term temperature + 50 °C and max. long term temperature + 30 °C)
- d: -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 special screw made of galvanised steel or galvanised steel with an additional organic cover may also be used in areas exposed 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 of corrosion resistance class CRC III.
  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 to be designed in accordance with TR 064 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.

Installation:

- Hole drilling by the drilling method in accordance with Annex C 1 for base material group "a" and Annex C 2 – C 5 for base material group "b", "c" and "d".
- 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 SXR 8/10, SXRL 8 and SXRL 14: -5 °C to +40 °C
  SXRL 10: -20 °C to +40 °C
- Exposure to UV due to solar radiation of the not protected anchor by rendering ≤ 6 weeks.
- No ingress of water in the borehole at temperatures < 0 °C.

Table B3.1: Installation parameters

Anchor type				SXR 8	SXRL 8	SXR 10	SXRL 10	SXRL 14
Drill hole diameter	d_0	=	[mm]	8	8	10	10	14
Cutting diameter of drill bit	d_{cut}	≤	[mm]	8,45	8,45	10,45	10,45	14,45
Overall plastic anchor embedment depth in the base material [illegible]	h_{nom}	≥	[mm]	50	50	50	50	
	h_{nom}	≥	[mm]	-	70	-	70	70
	h_{nom} [illegible]	≥	[mm]	-	90	-	90	90
	h_{nom}	≥	[mm]	-	-	-	150	-
	h_{nom} [illegible]	≥	[mm]	-	-	-	180	-
Depth of drill hole to deepest point	h_1	≥	[mm]	60	50	50	60	-
	h_1	≥	[mm]		90		80	85
	h_1 [illegible]	≥	[mm]	-	100	-	100	105
	h_1 [illegible]	≥	[mm]				60	
	h_1 [illegible]	≥	[mm]		-		160	
Diameter of clearance hole in the fixture	d_f	≤	[mm]	8,50	8,50	10,50/12,50 [illegible]	10,50/12,50 [illegible]	15,40

1) See Annex A [illegible]
2) [illegible]
3) [illegible] (see Annex C [illegible] and C [illegible]).
4) Only valid for base material perforated clay brick S8 (see Annex C 32 and C 43).
5) 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	SXR 10 / SXRL 10			
Base material group "a"	l_d [mm]		h_{nom} ≥ 50 mm	
	SXR	SXRL	$t_{fix, min}$	$t_{fix, max}$
	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

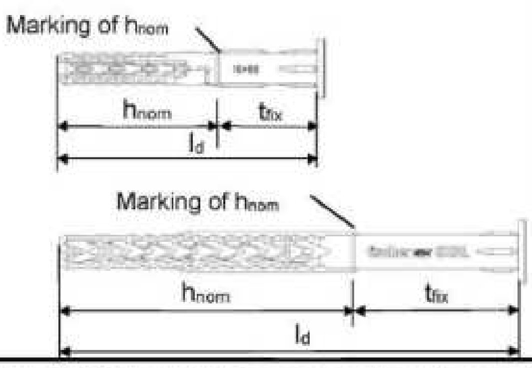
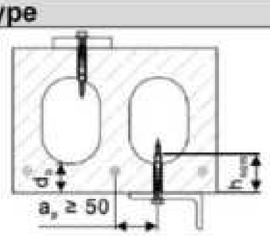


Table B3.3: Installation parameters for use in pre-stressed hollow concrete core slabs

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



fischer frame fixing SXR / SXRL

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

Annex B 3

Deutsches Institut für Bautechnik DIBt

Table B4.1: Minimum thickness of member, edge distances and spacing in concrete – base material group "a"

Anchor type	Embedment depth h_{nom} [mm]	Concrete strength class	Minimum thickness of member h_{min} [mm]	Characteristic edge distance c_{cr} [mm]	Characteristic spacing s_{cr} [mm]	Minimum edge distances and spacing[1] c_{min}, s_{min} [mm]
		C12/15		70	70	s_{min} = 70 for c ≥ 70 c_{min} = 70 for s > 70
SXR 8	≥ 50	≥ C16/20	100	55	55	s = 55 for c ≥ 55 c_{min} = 55 for s < 55
		C12/15		85	90	s = 85 for c ≥ 85 c_{min} = 90 for s ≥ 90
	≥ 50	≥ C16/20	110	55	75	s = 55 for c ≥ 55 c_{min} = 55 for s < 55
SXRL 8		C12/15		85	105	s = 85 for c ≥ 85 c_{min} = 90 for s ≥ 90
	≥ 70	≥ C16/20	100	55	90	s = 55 for c ≥ 55 c_{min} = 55 for s < 55
		C12/15		140	100	s = 70 for c ≥ 140 c_{min} = 90 for s ≥ 100
SXR 10	≥ 50	≥ C16/20	100[4]	105	90	s = 55 for c ≥ 105 c_{min} = 55 for s < 70
		C12/15		140	130	s = 70 for c ≥ 140 c_{min} = 110 for s ≥ 130
	≥ 50	≥ C16/20	110	105	130	s = 55 for c ≥ 105 c_{min} = 55 for s < 135
SXRL 10		C12/15	110[4]	140	130	s = 70 for c ≥ 140 c_{min} = 110 for s ≥ 130
	≥ 70[3]	≥ C16/20		105	135	s = 55 for c ≥ 105 c_{min} = 55 for s < 135
		C12/15		140	135	s = 85 for c ≥ 140 c_{min} = 90 for s ≥ 135
SXRL 14	≥ 70[3]	≥ C16/20	110	100	170	s = 100 for c ≥ 100 c_{min} = 80 for s < 170

[1] Intermediate values by linear interpolation

[2] Values valid for non-reinforced concrete.
Please note: Values for non-reinforced concrete are h_{min} = 110 mm, c_{min} = 100 mm, s_{min} = 80 mm for concrete ≥ C16/20 and c_{min} = 140 mm, 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 ≥ C16/20 and c_{min} = 140 mm, s_{min} = 110 mm for concrete C12/15.

[4] Also valid for thin concrete slabs and prestressed hollow concrete core slabs see Table B3.3 h ≥ 40 mm, h_{nom} = 50 mm to 59 mm.

Fixing points with a spacing a ≤ s_{cr} are considered as a group with a maximum characteristic resistance $N_{Rk,p}$ according to Table C1.2. For a spacing a > s_{cr} the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ according to Table C1.2.

Scheme of edge distance and spacing
base material group a

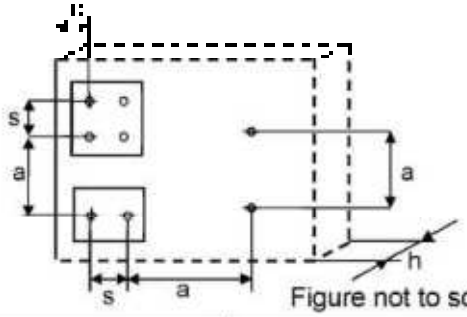


Figure not to scale

fischer frame fixing SXR / SXRL

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

Annex B 4

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

Anchor type			SXR 8	SXRL 8	SXR 10	SXRL 10	SXRL 14
Minimum thickness of member[1]	h_{min}	[mm]	100	115	100	110	115
Distance between anchor groups and / or single anchors	a_{min}	[mm]	250	250	250	250	250
Single anchor							
Minimum edge distance[2]	c_{min}	[mm]	100	100	100	100	100
Anchor group							
Minimum spacing perpendicular to free edge[2]	$s_{1,min}$	[mm]	100[3]	100[3]	100[3]	100[3]	100[3]
Minimum spacing parallel to free edge[2]	$s_{2,min}$	[mm]	100[3]	100[3]	100[3]	100[3]	100[3]
Minimum edge distance[2]	c_{min}	[mm]	100	100	100	100	100

[1] [illegible]
[2] [illegible]
[3] [illegible]

Scheme of edge distances and spacing in solid and hollow or perforated brick masonry base material group "b" and "c" and unreinforced autoclaved aerated concrete base material group "d"

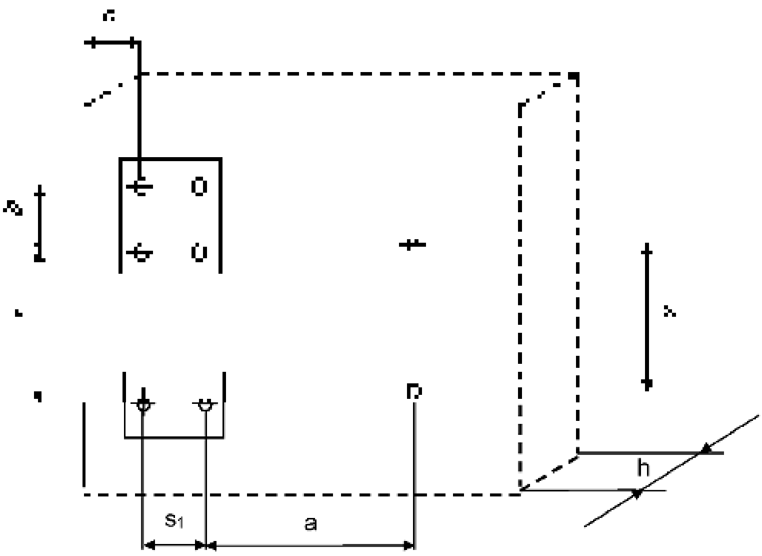


Figure not to scale

fischer frame fixing SXR / SXRL	Annex B 5
Intended use Minimum thickness of member, edge distances and spacing for use in solid and hollow or perforated masonry	

Table B6.1: Minimum thickness of member, edge distances and spacing in unreinforced autoclaved aerated concrete - base material group "d"

Anchor type			SXRL 8		SXR 10	SXRL 10	SXRL 14		
Compressive strength	f_{ck}	[N/mm²]	≥ 2 to < 6	≥ 6	≥ 2	≥ 2	≥ 2 to < 4	≥ 4	
Nominal embedment depth	h_{nom} ≥	[mm]	70 and 90		90	70 90	70	90	70 90
Minimum thickness of member	h_{min}	[mm]	175		300	100 120	175		300
Minimum distance between anchor groups and / or single anchors	a_{min}	[mm]	250		400	250	250		
Single anchor									
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[2)]	80	80	100
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	80	110	400	100 / 120[2)]	80 100	80	125
Minimum edge distance	c_{min}	[mm]	80	110	200	120	120	120	120

1) See Table B6.3
2) Only valid for autoclaved aerated concrete ≥ 500 kg/m³

Table B6.2: Minimum thickness of member, edge distances and spacing in reinforced autoclaved aerated concrete - base material group "d"

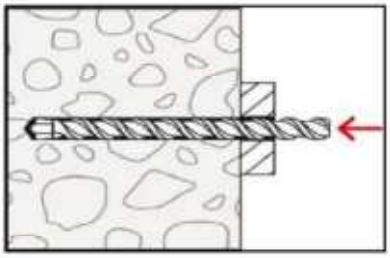
Anchor type [size x h_{nom}]			SXRL 10 x 70		SXRL 10 x 90	
Compressive strength[1)]	f_{ck}	[N/mm²]	≥ 2	≥ 6	≥ 2	≥ 6
Minimum spacing between anchor groups and / or single anchors	a_{min}	[mm]	250	250	250	250
Single anchor						
Minimum thickness of member	h_{min}	[mm]	100	240	120	240
Minimum edge distance	$c_{1,min}$	[mm]	120	120	120	120
Minimum edge distance perpendicular to $c_{1,min}$	$c_{2,min}$	[mm]	180	180	180	180
Anchor group						
Minimum thickness of member	h_{min}	[mm]	175	240	175	240
Minimum edge distance	$c_{1,min}$	[mm]	100	120	100	120
Minimum edge distance perpendicular to $c_{1,min}$	$c_{2,min}$	[mm]	150	180	150	180
Minimum spacing perpendicular to free edge	$s_{1,min}$	[mm]	100	120	100	120
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	100	120	100	120

1) See Table B6.3

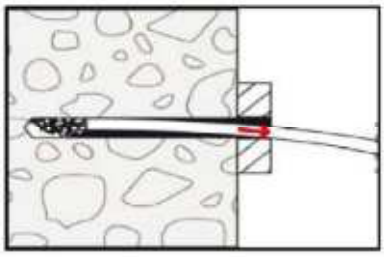
Scheme of edge distances and spacing see Annex B 5

fischer frame fixing SXR / SXRL	Annex B 6
Intended use Minimum thickness of member, edge distance and spacing for use in unreinforced and reinforced autoclaved aerated concrete	

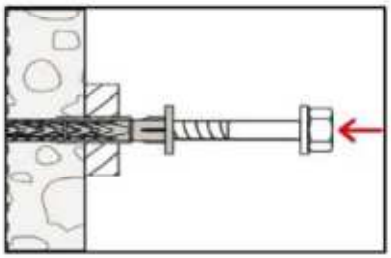
Installation instructions



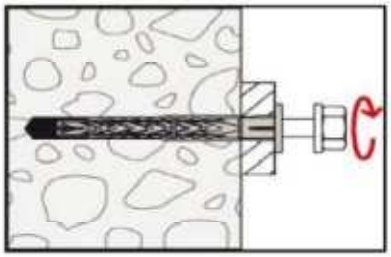
1. Drill the bore hole according to Table B3.1 using the drilling method described in the corresponding Annex C.



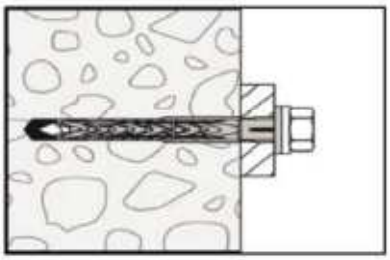
2. Base material group „a", „b", „d": Remove dust from borehole.



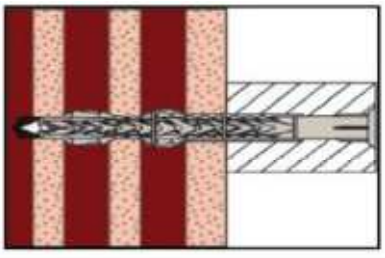
3. Insert anchor (screw and sleeve) by using a hammer until the collar of the plastic sleeve is flush with the surface of the fixture. In case of using brick S8 (see Table A3.1 footnote 4), additional embedment depths h_{nom} 150mm or h_{nom} 180 mm may be taken by measuring the anchorage depth and the fixture height. The corresponding length of anchor should be taken.



4. The screw is screwed-in until the head of the screw touches the sleeve. The anchor is correctly mounted, when the head of the screw fits tight on the surface and cannot be screwed-in any further.



5. Correctly installed anchor in concrete.



6. Correctly installed anchor in hollow or perforated masonry.

fischer frame fixing SXR / SXRL

Intended use
Installation instructions

Annex B 7

Deutsches Institut für Bautechnik DIBt

Table C1.1: Characteristic resistance of the screw

Failure of expansion element (special screw)		SXR 8 / SXRL 8		SXR 10 / SXRL 10		SXRL 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 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 factor	γ_{Ms} [1] [-]	1,25	1,29	1,29	1,29	1,25	1,29
Characteristic bending resistance of the screw							
Overall plastic anchor embedment depth in the base material [mm]						h_{nom2} 70 / h_{nom3} 90	h_{nom2} 70 / h_{nom3} 90
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	12,4	12,0	20,6 23,6[2]	20,6	48,7 / 62,5	47,0 / 60,5
Partial 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 SXRL 10: "High load" screw version on request only for countersunk screws – head marking is ●●

Table C1.2: Characteristic resistance due to pullout-failure for use in concrete - base material group "a"[1]

Pull-out failure (plastic sleeve)			SXR 8	SXRL 8		SXR 10	SXRL 10		SXRL 14
Embedment depth h_{nom} [mm]		≥	50	50	70	50	50	70	70
Concrete ≥ C12/15									
Characteristic tension resistance 30/50 °C	$N_{Rk,p}$ [kN]		3,0	4,0	5,0	5,0	5,5	8,0	8,5
Characteristic tension resistance 50/80 °C	$N_{Rk,p}$ [kN]		2,6 3,0[3]	4,0	5,0	4,6	5,0	6,6	8,0
Concrete ≥ 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]	[5]	[5]	3,6	2,6 3,0[3]	[4]	[5]
Characteristic tension resistance 50/80 °C	$N_{Rk,p}$ [kN]	$h \geq 40$ mm	[4]	[5]	[5]	3,0	2,6 3,0[3]	[4]	[5]
Concrete ≥ C16/65 in pre-stressed concrete core slabs									
Characteristic resistance 50/80 °C	$N_{Rk,p}$ [kN]	$d_b \geq 30$ mm	[4]	[5]	[5]	[4]	3,6 4,0[4]	[4]	[5]
		$d_b \geq 40$ mm	5)	5)	5)	5)	5,5 6,0[4]	5)	5)
Partial factor	γ_{Mc} [2] [-]		1,8						

[1] Drilling method: Hammer drilling.
[2] In absence of other national regulations.
[3] Only valid for concrete class ≤ C50/60
[4] Only valid for concrete class ≤ C50/60 °C
[5] No performance assessed

fischer frame fixing SXR / SXRL	Annex C 1
Performances Characteristic values and reduced characteristic values of bending resistance of the screw Characteristic values and reduced characteristic values	

Table C2.1: Displacements[1] 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]
SXR 8	50	1,2	0,65	1,30	1,02	1,53
SXRL 8	50	1,6	0,56	1,12	2,00	3,00
	70	2,0	0,64	1,28	2,30	3,45
SXR 10	50	2,0	1,29	2,58	1,15[3]/3,05[4]	1,74[3]/4,58[4]
SXRL 10	50	2,2	0,58	1,16	1,96	2,94
	70	3,2	1,74	3,48	1,69[3]/3,13[4]	2,54[3]/4,69[4]
	90	3,2	1,74	3,48	1,69[3]/3,13[4]	2,54[3]/4,69[4]
SXRL 14	70	3,4	0,39	0,63	2,79	4,19
	90	3,4	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 ≤ 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: Displacements[1] under tension and shear loading in autoclaved aerated concrete

Displacements under					Tension load[2]		Shear load[2]	
Anchor type	Base material type	f_{ck} / $f_{cm,dec}$ [N/mm²]	h_{nom} [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
SXRL 8	unreinforced autoclaved aerated concrete	≥ 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
SXR 10		≥ 2	50	0,32	0,03	0,06	0,21	0,31
SXRL 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
SXRL 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
SXRL 10	reinforced autoclaved aerated concrete	≥ 2	70/90	0,18	0,14/0,33	0,28/0,66	0,36	0,54
		≥ 6	70/90	1,07/1,25	0,49/0,73	0,98/1,46	2,14/2,50	3,21/3,75

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, shear load without lever arm) fastening of façade systems

Anchor type	Fire resistance class	$F_{Rk,fi,90}$	$\gamma_{M,fi}$[1]
SXR 10 / SXRL 10 / SXRL 14	R 90	0,8 kN	1,0

1) In absence of other national regulations.

If one-side fire load, see table B4.1 for edge distance.
In case of fire attack from more than one side the minimum edge distance should be ≥ 300 mm or 2 h_{ef}, the bigger value is decisive.

fischer frame fixing SXR / SXRL	Annex C 2
Performances Displacements under tension and shear loading in concrete, masonry and autoclaved aerated concrete (AAC); fire resistance in concrete	

Table C1.1: Summary of concrete – base material group "a" and solid bricks – base material group "b"[1]

Base material	Format	Dimensions (L x W x H) [mm]	Mean compressive strength as per EN 771 [N/mm²]	Bulk density ρ [kg/dm³]	See Annex
Concrete ≥ C12/15 as per EN 206					C [illegible]
Weather resistant shells of external wall panels ≥ C[illegible] as per EN 206					C [illegible]
Prestressed concrete core slabs ≥ C45/55 as per EN [illegible]					C [illegible]
Clay brick Mz as per EN 771-1, e.g. Schlagmann, DE	2 DF	240 x 115 x 113	≥ 10	≥ 1,5	C 1[illegible]
Clay brick Mz, as per EN 771-1, e.g. Wienerberger, UK	[illegible]	240 x 115 x 52	≥ 10	≥ 1,8	C [illegible]7
Clay brick Mz as per EN 771-1, e.g. Schlagmann, DE e.g. [illegible], DE	NF	240 x 115 x 71	≥ 10	≥ 1,8	C [illegible]8
Clay brick Mz, as per EN 771-1, e.g. Schlagmann, DE	2 DF	240 x 115 x 113	≥ 10	≥ 2,4	C 1[illegible]
Calcium silicate solid brick KS as per EN 771-2, e.g. KS Wemding, DE	NF	240 x 115 x 71	≥ 10	≥ 1,8	C 19 C 20
Calcium silicate solid brick KS as per EN 771-2, e.g. [illegible], DE	2 DF	240 x 115 x 113	≥ 10	≥ 2,0	C 20
Calcium silicate solid brick KS as per EN 771-2, e.g. KS Wemding, DE	12 DF	498 x 175 x 240	≥ 10	≥ 1,8	C 21
Calcium silicate solid brick KS as per EN 771-2, e.g. KS Wemding, DE	8 DF	498 x 115 x 240	≥ 10	≥ 2,0	C 22
Calcium silicate solid brick KS XL-PE, as per EN 771-2, e.g. KS Wemding, DE	XL-PE	998 x 100 x 498	≥ 10	≥ 2,0	C 22

1) Vertical perforation ≤ 15% cross section reduced by perforation vertically to the bearing area

fischer frame fixing SXR / SXRL

Performances
Summary of base materials concrete and solid bricks

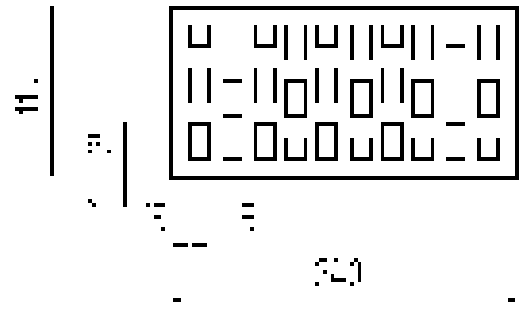
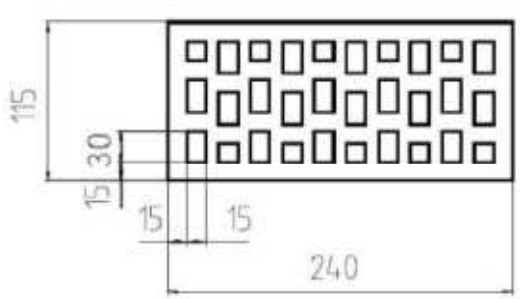
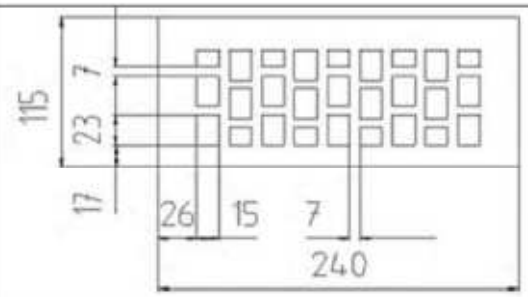
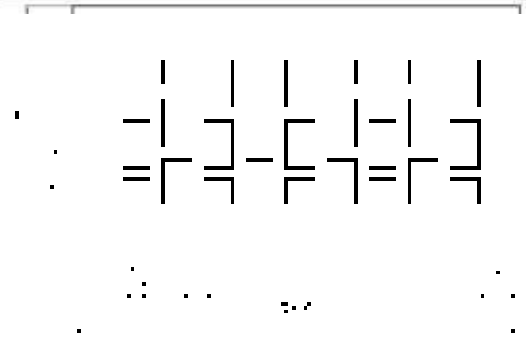
Annex C [illegible]

Table C4.1: Summary of solid bricks – base material group "b"[1]

Base material	Format	Dimensions (L x W x H) [mm]	Mean compressive strength as per EN 771 [N/mm²]	Bulk density ρ [kg/dm³]	See Annex
Lightweight solid brick Vbl as per EN 771-3, e.g. KLB, DE	2 DF	240 x 115 x 113	≥ 2.5	≥ 1.2	C 23
Lightweight solid brick Vbl as per EN 771-3, e.g. KLB, DE	[illegible]	190 x [illegible] x 240	≥ 2.5	≥ 1.0	C 23 C 24
Lightweight solid brick Vbl as per EN 771-3, e.g. KLB, DE	[illegible]	[illegible] x 240 x 240	≥ 2.5	≥ 1.4	C 24
Lightweight solid brick Vbl as per EN 771-3, e.g. [illegible], DE	16 DF	500 x 240 x 248	≥ 1.3	≥ 0.6	C 23
Lightweight solid brick concrete Vbl, as per EN 771-3, e.g. Tarmac, UK		440 x 100 x 215	≥ 2.5	≥ 1.4	C 2[illegible]
Solid brick normal concrete Vbn, as per EN 771-3, e.g. [illegible], DE	-	[illegible]	≥ 5	≥ 1.[illegible]	[illegible]
Lightweight solid brick Vbn, as per EN 771-3, e.g. Tarmac, UK	-	440 x 100 x 215	≥ 7.5	≥ 1.6	C 26

1) [illegible]

Table C 5.1: Summary of hollow or perforated bricks – base material group 1 [1]

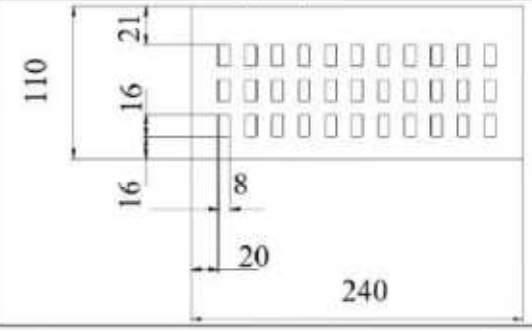
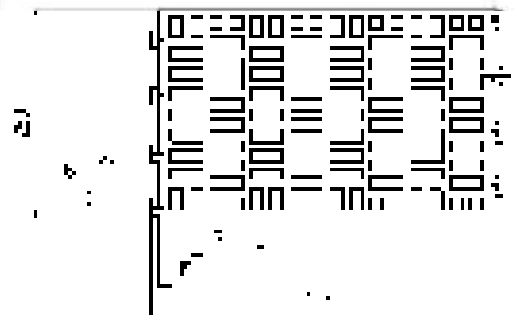
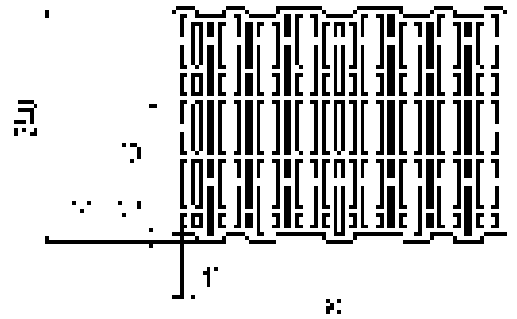
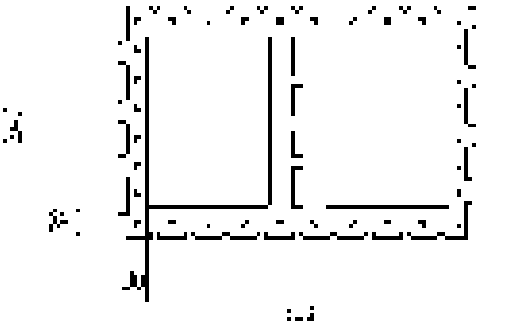
Base material	Format Dimensions (l x w x h) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz [2] as per EN 771-1 *e.g. Wienerberger, DE*	2 DF 240 x 115 x 113		≥ 10 / ≥ 1,0	C 27
Perforated clay brick **HLz** as per EN 771-1, *e.g. Wienerberger, DE*	2 DF 240 x 115 x 113		≥ 10 / ≥ 1,0	C 27
Perforated clay brick **VHLz** as per EN 771-1, *e.g. Wienerberger, DE*	NF 240 x 115 x 71		≥ 20 / ≥ 1,6	C 28
Perforated clay brick VHLz as per EN 771-1, *e.g. Wienerberger, DE*	2 DF 240 x 115 x 113		≥ 20 / ≥ 1,6	C 28

[1] Vertical perforation ≤ 15 % and ≤ 50 % [illegible]

Figures not to scale

fischer frame fixing SXR / SXRI	Annex C 5
Performances Summary of base materials hollow or perforated bricks	

Table C6.1: Summary of hollow or perforated bricks – brick material group 1 [21]

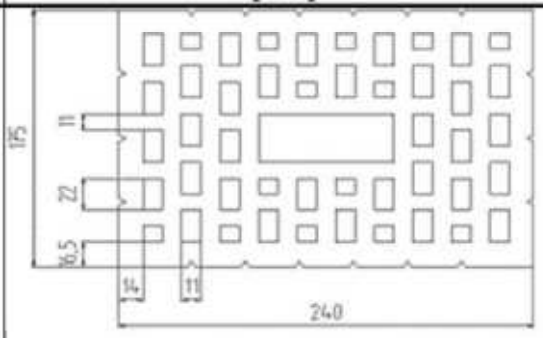
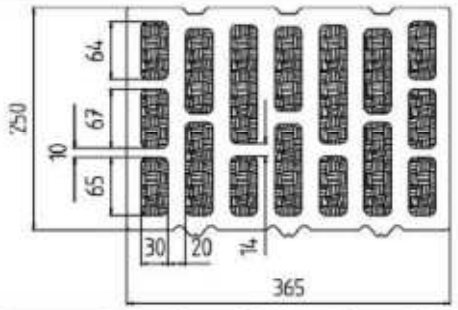
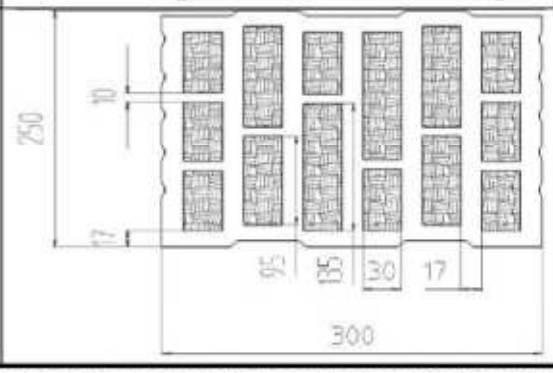
Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz as per EN 771-1, *e.g. Wienerberger, BS, DE*	DF 240 x 110 x 52		≥ 10 / ≥ 1,5	C 29
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton T14 DF*	6 DF 440 x 300 x 240		≥ 5 / ≥ 0,9	C 29
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton T14 DF*	10 DF 275 x 300 x 248		≥ 5 / ≥ 0,9	C 29
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton T14 DF*	12 DF 365 x 247 x 248		≥ 5 / ≥ 0,9	C 29

1) Vertical perforation > 15 % and ≤ 50 % gross cross-section; cross-section perforation vertically and horizontally

Figures not to scale

fischer frame fixing SXR / SXRI	Annex C 6
Performances Summary of base materials hollow or perforated bricks	

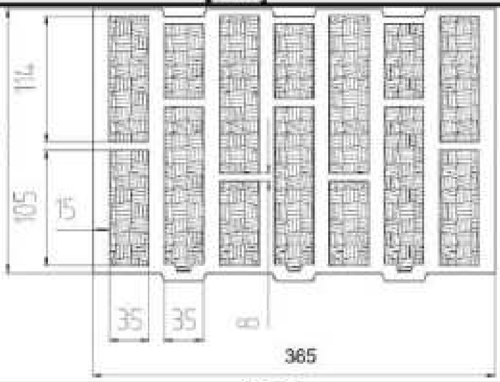
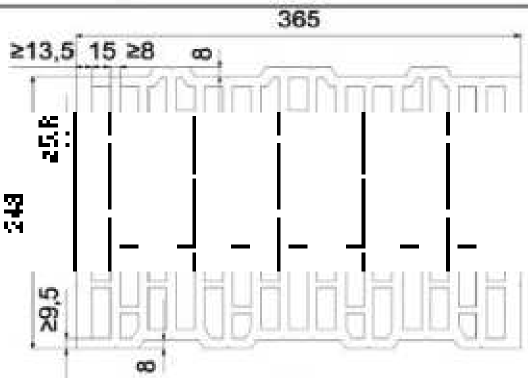
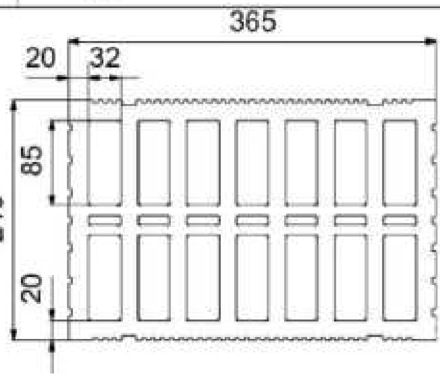
Table C7.1: Summary of hollow or perforated bricks – base material group 1 [1)]

Base material	Format/ Dimensions (l x w x h) [mm]	Brick drawing [mm]	Mean compressive strength acc. per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann, DE*	3 DF 240 x 175 x 113		≥ 7,5 / ≥ 1,0	C 30
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton S11, DE*	12 DF 250 x 365 x 240		≥ 5 / ≥ 0,8	C 31
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton S10, DE*	10 DF 250 x 300 x 240		≥ 5 / ≥ 0,7	C 31

1) Vertically perforation > 15 % and ≤ 50 %, cross section reduced by perforation vertically to the resting area.

Figures not to scale

Table C8.1: Summary of hollow or perforated bricks – base material group "c"1)

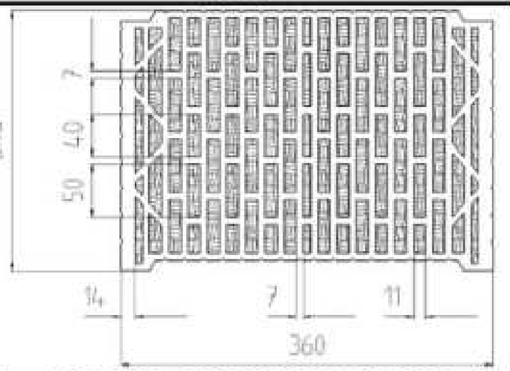
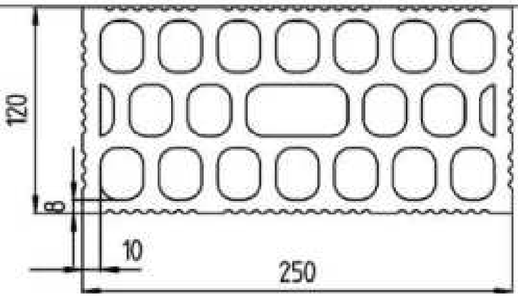
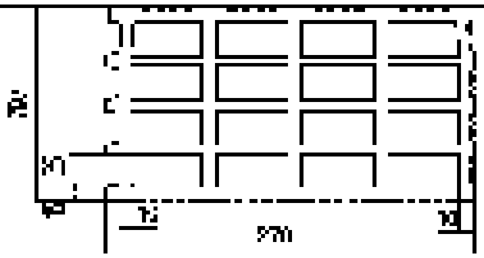
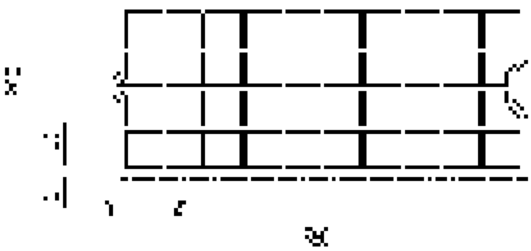
Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann Poroton T8, DE*	12 DF 248 x 365 x 249		≥ 2,5 / ≥ 0,6	C 31
Perforated clay brick HLz as per EN 771-1 e.g. Schlagmann..., DE	248 x 365 x 249		≥ 7,5 / ≥ 0,75	C 32 C 43 (header side)
Perforated clay brick HLz as per EN 771-1, *e.g. Schlagmann S8 Halbziegel LZ, DE*	248/123 x 365 x 249		≥ 5 / ≥ 0,75	C 32 C 43 (header side)

1) Vertically perforated with > 15 % and < 50 % cross section reduced by perforation vertically to the resting area.

Figures not to scale

fischer frame fixing SXR / SXRL	Annex C 8
Performances Summary of base materials hollow or perforated bricks	

Table C9.1: Summary of hollow or perforated bricks – base material group "c"1)

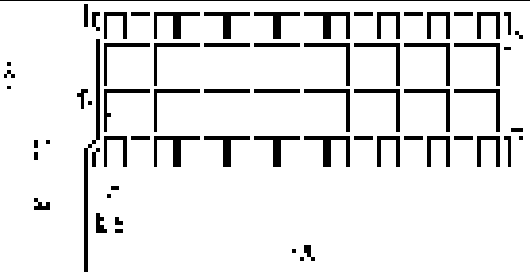
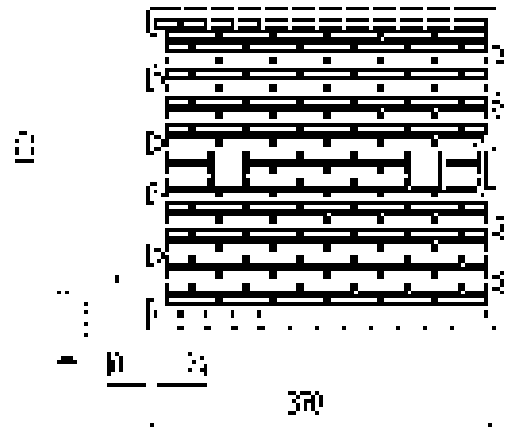
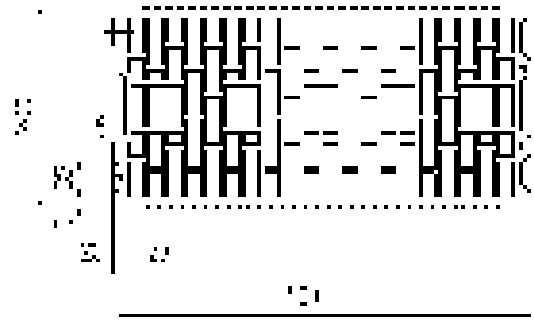
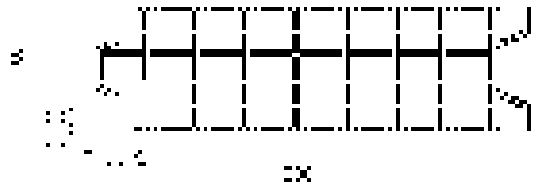
Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz as per EN 771-1, *e.g. Hörl & Hartmann Coriso WS 09, DE*	10 DF 245 x 365 x 249		≥ 2,5 / ≥ 0,8	C 33
Perforated clay brick HLz as per EN 771-1, *e.g. Doppio Uni IT Wienerberger, IT*	250 x 120 x 190		≥ 7,5 / ≥ 0,9	C 33
Perforated clay brick HLz as per EN 771-1, *e.g. Imerys Gelimatic, FR*	500 x 200 x 2[illegible]0		≥ 5 / ≥ 0,6	C 34
Perforated clay brick HLz as per EN 771-1, *e.g. Imerys Optibric FR*	5[illegible]0 x 200 x 275		≥ 5 / ≥ 0,6	C 34

1) [illegible]

Figures not to scale

fischer frame fixing SXR / SXRL	Annex C 9
Performances Summary of base materials hollow or perforated bricks	

Table C10.1: Summary of hollow or perforated bricks – brick material group 1 [1]

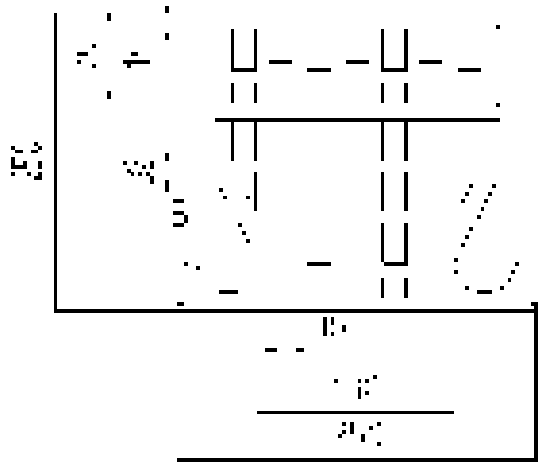
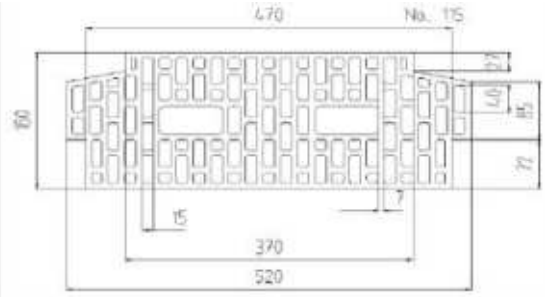
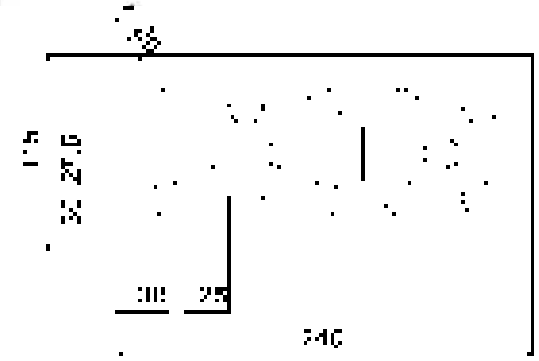
Basic material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771-1 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay brick HLz as per EN 771-1, e.g. Bisotherm 8 DF, FR	370 x 200 x 249		≥ 8,0 / ≥ 0,6	C 34
Perforated clay brick HLz as per EN 771-1, e.g. Wienerberger Porotherm 30 R, FR	370 x 440 x 249		≥ 7,3 / ≥ 0,7	C 35
Perforated clay brick HLz as per EN 771-1, e.g. Wienerberger Porotherm 30 DF 620, FR	300 x 200 x 275		≥ 8,7 / ≥ 0,7	C 33
Perforated clay brick HLz as per EN 771-1, e.g. Tonwerk Calenberg, FR	300 x 200 x 220		≥ 8,7 / ≥ 0,7	C 36

[1] Vertically perforated or with horizontal and vertically perforated cavities

Figures not to scale

fischer frame fixing SXR / SXRI	Annex C 10
Performances Summary of basic materials hollow or perforated bricks	

Table C11.1: Summary of hollow or perforated bricks – base material group 1 [1]

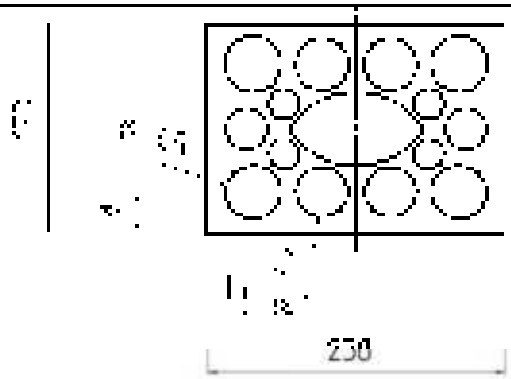
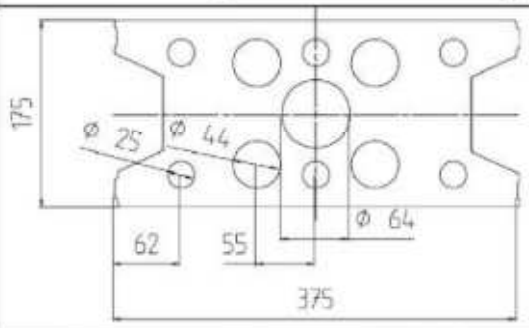
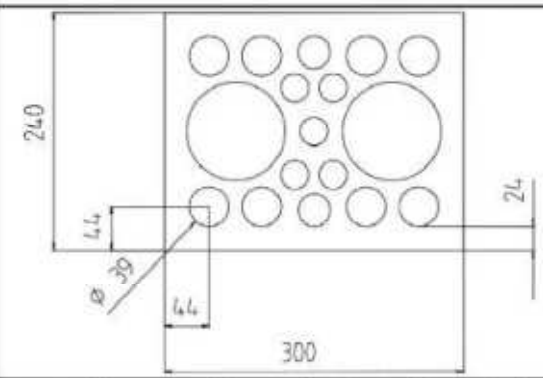
Base material	Format/ Dimensions (l x w x h) [mm]	Brick drawing [mm]	Mean compressive strength acc. per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Perforated clay ceiling brick as per EN 15037-3, *e.g. Hörl & Hartmann ceiling brick, DE*	250 x 250 x 190		≥ 2,5 / ≥ 0,7	C 35
Perforated clay ceiling brick as per EN 15037-3, *e.g. Hörl & Hartmann block for beam-and-block ceilings, DE*	520 x 180 x 250		≥ 2,5 / ≥ 0,7	C 36
Hollow calcium silicate brick KSV as per EN 771-2, *e.g. KS Quadro, DE*	240 x 115 x 113		≥ 12 / ≥ 1,4	C 37

[1] Vertical perforation > 15 % and ≤ 50 % (see declaration of performance of bricks and blocks)

Figures not to scale

fischer frame fixing SXR / SXRI	Annex C 11
Performances Summary of base material hollow or perforated bricks	

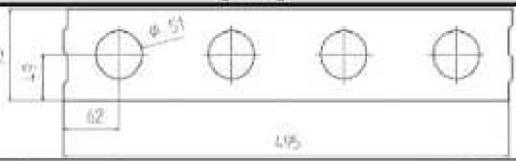
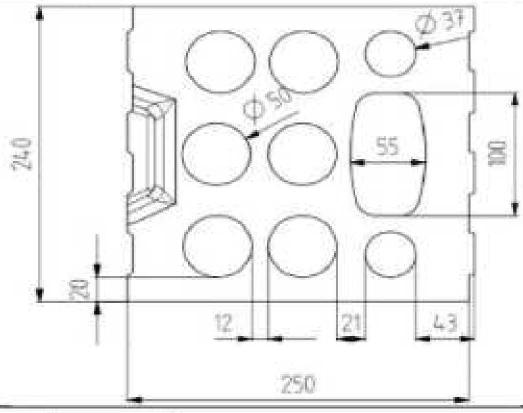
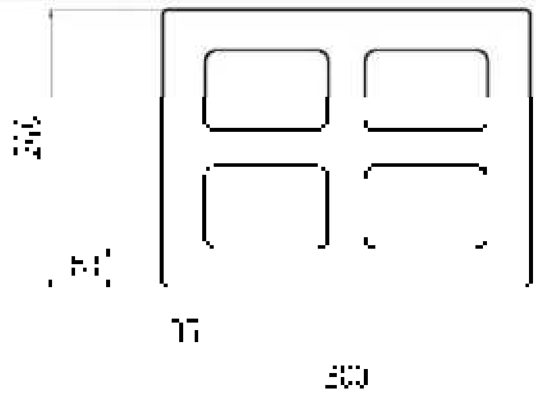
Table C 12.1: Summary of hollow or perforated bricks – base material group 1c[1]

Base material	Format/ Dimensions (l x w x h) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Hollow calcium silicate brick KSL as per EN 771-2, e.g. KS Wemding, DE	2 DF 240 x 175 x 113		≥ 7,5 / ≥ 1,4	C 37
Hollow calcium silicate brick KSL as per EN 771-2, *e.g. KS Wemding, DE*	9 DF 375 x 175 x 248		≥ 10 / ≥ 1,6	C 38
Hollow calcium silicate brick KSL as per EN 771-2, *e.g. KS Wemding, DE*	5 DF 300 x 240 x 113		≥ 7,5 / ≥ 1,4	C 38

[1] Vertically perforation > 15 % and ≤ 50 %, cross section reduced by perforation vertically to the resting area.

Figures not to scale

Table C13.1: Summary of hollow or perforated bricks – base material group "c"[1]

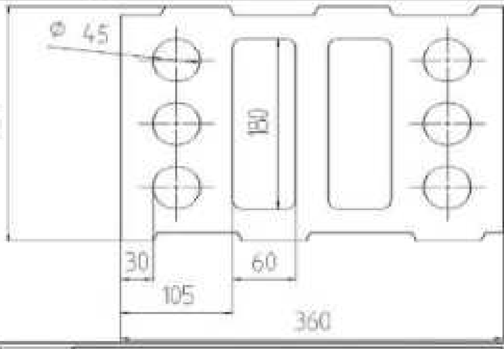
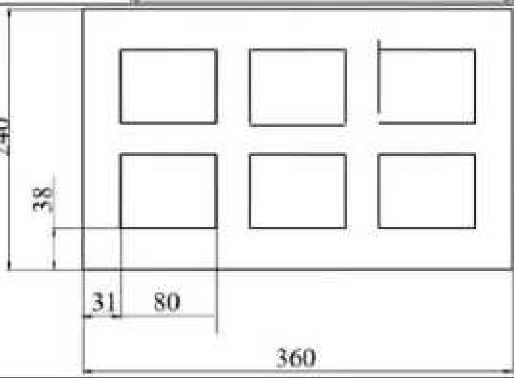
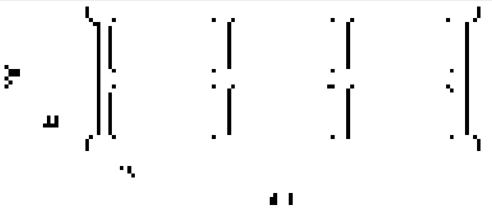
Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Hollow calcium silicate brick KSL as per EN 771-2, *e.g. KS Wemding, P10, DE*	495 x 98 x 245		≥ 2,5 / ≥1,2	C 39
Hollow calcium silicate brick KSL as per EN 771-2, *e.g. KS Wemding, DE*	9 DF 250 x 240 x 240		≥ 7,5 / ≥ 1,4	C 39
Hollow brick light-weight concrete Hbl as per EN 771-3, e.g. [illegible]	300 x 240 x 240		≥ 2,5 / ≥ 1,4	C 39
Hollow brick light-weight concrete Hbl as per EN 771-3, e.g. [illegible]	440 x 2[illegible]0 x 210		≥ 2,0 / ≥ 1,2	C 40

1) Vertically perforated with [illegible] % and ≤ 50 % cross section reduced by perforation vertically to the resting area.

Figures not to scale

fischer frame fixing SXR / SXRL	Annex C 13
Performances Summary of base materials hollow or perforated bricks	

Table C14.1: Summary of hollow or perforated bricks – base material group "c"[1)]

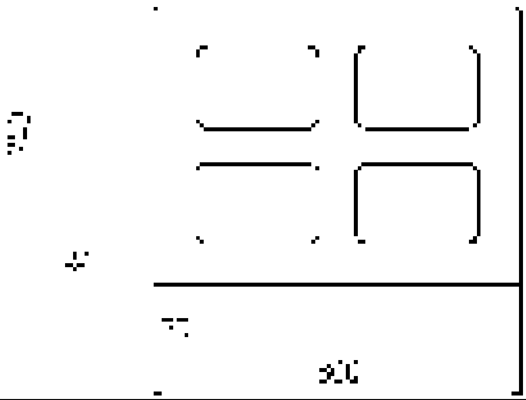
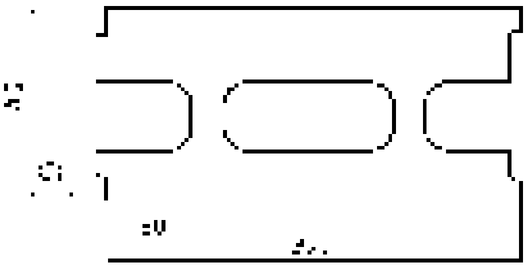
Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Hollow brick light-weight concrete Hbl as per EN 771-3, *e.g. Knobel, DE*	500 x 240 x 240		≥ 2,5 / ≥ 0,9	C 40
Hollow brick light-weight concrete Hbl as per EN 771-3, *e.g. KLB, DE*	360 x 250 x 250		≥ 2,5 / ≥ 0,9	C 41
Hollow brick light-weight concrete Hbl as per EN 771-3, *e.g. KLB, DE*	360 x 240 x 240		≥ 2,5 / ≥ 1,0	C 41
Hollow brick light-weight concrete Hbl as per EN 771-3, *e.g. Sepa Parpaing, FR*	500 x 200 x 200		≥ 2,5 / ≥ 0,9	C 41

1) Vertically perforated ≥ 15 % and ≤ 50 % cross section reduced by perforation vertically to the resting area

Figures not to scale

fischer frame fixing SXR / SXRL	Annex C 14
Performances Summary of base materials hollow or perforated bricks	

Table C15.1: Summary of hollow or perforated bricks – base material group "c"[1)]

Base material	Format/ Dimensions (L x W x H) [mm]	Brick drawing [mm]	Mean compressive strength as per EN 771 [N/mm²] / bulk density ρ [kg/dm³]	See Annex
Hollow brick normal concrete Hbn as per EN 771-[illegible] e.g. [illegible]	[illegible] x 240 x 240		[illegible]	[illegible]
Heat insulation brick WDB e.g. [illegible]	[illegible] x 240 x 240		≥ 2,5 / ≥ 0,7	[illegible]

1) [illegible]

Table C15.2: Summary of autoclaved aerated concrete – base material group "d"

Base material	Format [mm]	Dimensions (L x W x H) [mm]	Mean compressive strength as per EN 771 [N/mm²]	Bulk density ρ [kg/dm³]	See Annex
Unreinforced autoclaved aerated concrete, as per EN 771-4					[illegible]
Reinforced autoclaved aerated concrete, AAC as per EN 12602					[illegible]

Figures not to scale

fischer frame fixing SXR / SXRL	Annex C 15
Performances Summary of base materials hollow or perforated bricks and autoclaved aerated concrete	

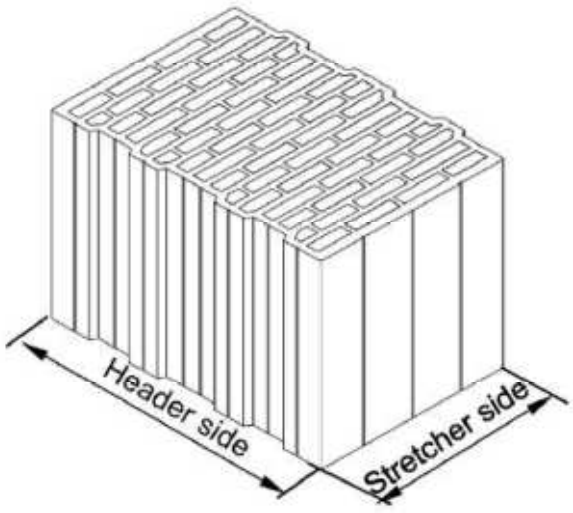
Deutsches Institut für Bautechnik DIBt

Footnotes for Annex C 17 – C 43

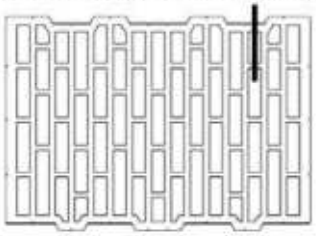
[1] In accordance with national regulations
[2] Only valid for temperature range 24/40 °C.
[3] Only valid for edge distance c ≥ 150 mm; intermediate values by linear interpolation
[4] Only valid for edge distance c ≥ 200 mm; intermediate values by linear interpolation.
[5] Only valid for edge distance c ≥ 150 mm for temperature range 50/80 °C; intermediate values by linear interpolation.
[6] Only valid for edge distance c ≥ 200 mm for temperature range 50/80 °C; intermediate values by linear interpolation.
[7] Only valid for spacings s ≥ 150 mm
[8] Only valid for spacings s ≥ 200 mm for temperature range 50/80 °C
[9] The characteristic resistance [illegible] can be taken from the lower characteristic strength of the masonry unit
[10] The characteristic resistance [illegible] is only valid for shear loads without lever arm, for single anchors with s ≥ 350 mm in the header side.
[11] Only valid for [illegible] ≥ 240 mm
[12] The compressive strength of the single brick must not be less than 60% of the mean compressive strength.
[13] The lowest load of two consecutive embedment depths may be used for the intermediate embedment depths
[14] If the compressive strength of the used masonry according to EN 771-1, EN 771-2 or EN 771-3 in the construction site is lower than the mean compressive strength given in the tables according to Annex C 17 – C 43, F_{Rk} shall be calculated as follows:

$$F_{Rk,existing} = F_{Rk,Table} \cdot \frac{\text{Mean compressive strength (determined value)}}{\text{Mean compressive strength (in Table C 17)}}$$

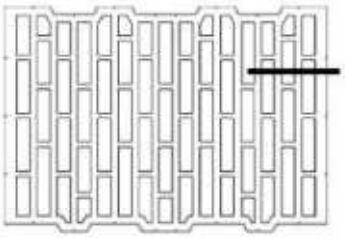
Detailed design of header side and stretcher side



Possible position of the anchor in the header side of brick e.g. S9 (see Annex C 8, C 43)



Possible Position of the anchor in the stretcher side of brick e.g. S9 (see Annex C 8, C 32)



fischer frame fixing SXR / SXRL

Annex C 16

Performances
-bricks
Detailed design of header and stretcher side fixing, possible positions of anchor in the brick

Table C17.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Clay brick Mz; ρ ≥ 1,8 as per EN 771-1 *e.g. Schlagmann, DE* **3 DF** (240x175x113) Hammer drilling	10/8	**0,90** **1,20**[2]	10)	10)	10)	**0,90** **1,50**[4]	10)	10)	10)	10)
	12,5/10	**1,20** **1,50**[2]	10)	10)	10)	**1,20** **1,50**[4] **2,00**[6]	10)	10)	10)	10)
	15/12	**1,50** **2,00**[2]	10)	10)	10)	**1,50** **2,00**[4] **2,50**[6]	10)	10)	10)	10)
	20/16	**2,00** **2,50**[2]	10)	10)	10)	**2,00** **2,50**[4] **3,00**[6]	10)	10)	10)	10)
	24,7	**2,50** **3,00**[2]	10)	10)	10)	**2,50** **3,50**[4] **4,00**[6]	10)	10)	10)	10)
Clay brick Mz; ρ ≥ 1,8 as per EN 771-1 *e.g.Wienerberger, DK* **DF** (240x115x52) Hammer drilling	10/8	**0,90**[7]	**0,90** **1,20**[4]	**0,90** **1,20**[2]	9)	10)	**1,50**[7]	10)	10)	10)
	12,5/10	**0,90**[7] **1,20**[8]	**1,20** **1,50**[3]	**1,20** **1,50**[2]	9)	**1,20**[7]	**2,00**[7]	**2,00**[7]	10)	10)
	15/12	**1,20**[7] **1,50**[8]	**1,20** **1,50**[2] **2,00**[4]	**1,50** **2,00**[2]	9)	**1,20**[7] **1,50**[8]	**2,50**[7]	**2,00**[7] **2,50**[8]	10)	10)
	20/16	**1,50**[7] **2,00**[9]	**1,50** **2,00**[2] **2,50**[4]	**2,00** **2,50**[2]	9)	**1,50**[7] **2,00**[8]	**3,50**[7]	**3,00**[7]	10)	10)
	25/20	**2,00**[7] **2,50**[8]	**2,00** **2,50**[2] **3,00**[4] **3,50**[6]	**2,50** **3,50**[2]	9)	**2,00**[7] **2,50**[8]	**4,00**[7] **4,50**[5][7]	**4,00**[7]	10)	10)
	26,7	**2,00**[7] **2,50**[8]	**2,50** **3,00**[4] **3,50**[6]	**3,00** **3,50**[2]	9)	**2,00**[7] **2,50**[8]	**4,00**[7] **4,50**[3][7] **5,00**[5][7]	**4,00**[7]	10)	10)
	35/28	**3,00**[7]	11)	11)	11)	**3,00**[7] **3,50**[8]	11)	**5,50**[7]	10)	10)
	45/36	**3,00**[7]	11)	11)	11)	**4,00**[7] **4,50**[8]	11)	**6,50**[7] **7,00**[8]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Deutsches Institut für Bautechnik DIBt

Table C18.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Clay brick Mz; ρ ≥ 1,8 as per EN 771-1 *e.g. Schlagmann, DE e.g. Ebersdobler, DE* **NF** (240x115x71) Hammer drilling	10/8	0,75[7] 0,90[8]	0,90	1,20 1,50[2]	9)	10)	1,20[7] 1,50[8]	3,00 3,50[4][7]	1,50 2,00[6]	9)
	12,5/10	0,90[7] 1,20[8]	1,20	1,50 2,00[2]	9)	0,90[7] 1,20[3][7]	1,50[7] 2,00[8]	3,50 4,00[7] 4,50[4][7]	2,00 2,50[6]	9)
	15/12	1,20[7] 1,50[8]	1,50	2,00 2,50[2]	9)	1,20[7] 1,50[8]	2,00[7]	4,00 4,50[2] 5,50[4][7]	2,50 3,00[6]	9)
	18,5/-	1,20[7] 1,50[8]	1,50	2,00 2,50[2]	9)	1,20[7] 1,50[8]	2,00[7]	5,00 5,50[2] 6,00[7] 6,50[4][7] 7,00[6][8]	2,50 3,00[6]	9)
	20/16	1,50[7] 2,00[8]	2,00	2,50 3,50[2]	9)	1,50[7] 2,00[8]	2,50[7] 3,00[8]	11)	3,00 3,50[2]	9)
	25/20	2,00[7] 2,50[9]	2,50	3,00 4,00[2]	9)	2,00[7] 2,50[8]	3,50[7]	11)	4,00 4,50[2]	9)
	35/28	2,50[7] 3,00[8]	3,00 3,50[2]	4,50 5,00[2]	9)	3,00[7] 3,50[8]	4,50[7] 5,00[8]	11)	5,50 6,00[2] 6,50[6]	9)
	35,4	3,00[7]	3,00 3,50[2]	4,50 5,00[2]	9)	3,00[7] 3,50[8]	4,50[7] 5,00[8]	11)	5,50 6,00[2] 6,50[6]	9)
	38,4	11)	3,50 4,00[2]	5,00	9)	3,50[7] 4,00[8]	5,00[7]	11)	6,00 7,00[5]	9)
	45/36	11)	11)	11)	11)	4,00[7] 4,50[8]	11)	11)	11)	11)
	60/48	11)	11)	11)	11)	5,00[7]	11)	11)	11)	11)
		11)	11)	11)	11)	5,00[7]	11)	11)	11)	11)
Partial factor	γ_{Mm}[1] [-]	2,5								

Footnotes see Annex C 16.

fischer frame fixing SXR / SXRL

Performances
Characteristic resistance for use in solid masonry

Annex C 18

Table C19.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Clay brick Mz; ρ ≥ 2,2 as per EN 771-1 *e.g. Schlagmann, DE* **2 DF** (240x115x113) Hammer drilling	10/8	10)	10)	10)	10)	**1,20**[7]	10)	10)	10)	10)
	12,5/10	10)	10)	10)	10)	**1,50**[7]	10)	10)	10)	10)
	15/12	10)	10)	10)	10)	**1,50**[7] **2,00**[8]	10)	10)	10)	10)
	20/16	10)	10)	10)	10)	**2,00**[7] **2,50**[8]	10)	10)	10)	10)
	25/20	10)	10)	10)	10)	**3,00**[7]	10)	10)	10)	10)
	26,4	10)	10)	10)	10)	**3,00**[7] **3,50**[8]	10)	10)	10)	10)
Calcium silicate solid brick KS; ρ ≥ 1,8 as per EN 771-2 *e.g. KS Wemding, DE* **NF** (240x115x71) Hammer drilling	10/8	**1,20**	**0,50** **0,75**[7] **0,90**[8]	**0,50** **0,60**[7] **0,90**[8]	9)	**0,90**[7] **2,00**[4][7]	10)	**1,50** **2,00**[4]	**1,20** **1,50**[7]	9)
	12,5/10	**1,20** **1,50**[2]	**0,60** **0,90**[7] **1,20**[8]	**0,60** **0,75**[7] **0,90**[8]	9)	**1,20**[7] **2,00**[4][7] **2,50**[6][8]	10)	**2,00** **2,50**[4]	**1,50** **2,00**[7]	9)
	15/12	**1,50** **2,00**[2]	**0,75** **1,20**[7]	**0,75** **0,90**[7] **1,20**[8]	9)	**1,50**[7] **2,50**[4][7] **3,00**[6][8]	10)	**2,50** **3,00**[4]	**2,00** **2,50**[8]	9)
	20/16	**2,00** **2,50**[2]	**0,90** **1,50**[7]	**0,90** **1,20**[7] **1,50**[8]	9)	**2,00**[7] **3,50**[4][7] **4,00**[6][8]	10)	**3,50** **4,00**[4] **4,50**[6]	**2,50** **3,00**[7] **3,50**[8]	9)
	25/20	**2,50** **3,00**[2]	**1,20** **2,00**[7]	**1,20** **1,50**[7] **2,00**[8]	9)	**2,50**[7] **4,50**[4][7] **5,00**[6][8]	10)	**4,00** **5,00**[4] **5,50**[6]	**3,00** **3,50**[7] **4,50**[8]	9)
	27,0	**2,50** **3,00**[2]	**1,20** **2,00**[7]	**1,20** **1,50**[7] **2,00**[8]	9)	**3,00**[7] **5,00**[4][7]	10)	**4,00** **5,00**[4] **5,50**[6]	**3,00** **3,50**[7] **4,50**[8]	9)
	35/28	**3,00**	**2,00** **2,50**[7] **3,00**[8]	**2,00** **3,00**[8]	9)	11)	10)	**5,50** **6,00**[3] **6,50**[4] **7,50**[6]	**4,50** **5,50**[7] **6,00**[8]	9)
	37,4/-	**3,00**	**2,00** **3,00**[7]	**2,00** **2,50**[7] **3,00**[8]	9)	11)	10)	**5,50** **6,00**[3] **6,50**[4] **8,00**[6]	**5,00** **5,50**[7] **6,00**[8] **6,50**[5][8]	9)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Table continued on page 16

Table C20.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Calcium silicate solid brick KS; ρ ≥ 2,0 as per EN 771-2 *e.g. KS Wemding, DE* **NF** (240x115x71) Hammer drilling	10/8	**1,20** **1,50**[2]	10)	10)	10)	**0,90**	**1,20**[7]	9)	10)	10)
	12,5/10	**1,20** **1,50**[2]	10)	10)	10)	**1,20**	**1,50**[7]	9)	10)	10)
	15/12	**1,50** **2,00**[2]	10)	10)	10)	**1,20** **1,50**[2]	**1,50**[7] **2,00**[8]	9)	10)	10)
	20/16	**2,00** **2,50**[2]	10)	10)	10)	**1,50** **2,00**[2]	**2,00**[7] **2,50**[8]	9)	10)	10)
	25/20	**2,50** **3,00**[2]	10)	10)	10)	**2,00** **2,50**[2]	**3,00**[7]	9)	10)	10)
	35/28	**3,00**	10)	10)	10)	**3,00** **3,50**[2]	**4,00**[7] **4,50**[8]	9)	10)	10)
	37,2/-	**3,00**	10)	10)	10)	**3,00** **3,50**[2]	**4,00**[7] **4,50**[8]	9)	10)	10)
	45/36	11)	10)	10)	10)	**4,00** **4,50**[2]	11)	11)	10)	10)
	54,6/-	11)	10)	10)	10)	**5,00**	11)	11)	10)	10)
Calcium silicate solid brick KS; ρ ≥ 2,0 as per EN 771-2 *e.g. Bayer Esslingen, Hermann Peter, DE* **2 DF** (240x115x113) Hammer drilling	10/8	10)	10)	10)	10)	10)	**2,00** **2,50**[2]	9)	10)	10)
	12,5/10	10)	10)	10)	10)	10)	**2,50** **3,00**[2]	9)	10)	10)
	15/12	10)	10)	10)	10)	10)	**3,00**	9)	10)	10)
	20/16	10)	10)	10)	10)	10)	**3,50**	9)	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C21.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Calcium silicate solid brick KS; ρ ≥ 1,8 as per EN 771-2 *e.g. KS Wemding, DE* **12 DF** (495x175x240) Hammer drilling	10/8	10)	10)	10)	10)	10)	10)	**4,00**[7]	**3,50**[7] **5,00**[3][7] **5,50**[5][8]	9)
	12,5/10	10)	10)	10)	10)	10)	10)	**5,00**[7]	**4,00**[7] **6,00**[3][7] **6,50**[5][8] **7,00**[6][8]	9)
	15/12	10)	10)	10)	10)	10)	10)	**6,00**[7]	**4,50**[7] **7,00**[3][7] **7,50**[4][7] **8,50**[6][8]	9)
	20/16	10)	10)	10)	10)	10)	10)	**6,50**[7] **8,50**[8]	**5,00**[7] **8,50**[3][7] **10,00**[4][7]	9)
	23,5/-	10)	10)	10)	10)	10)	10)	**6,50**[7] **8,50**[8]	**5,50**[7] **9,00**[3][7] **10,00**[4][7]	9)
Calcium silicate solid brick KS; ρ ≥ 2,0 as per EN 771-2 *e.g. KS Wemding, DE* **12 DF** (495x175x240) Hammer drilling	10/8	**1,50**	10)	10)	10)	**2,00**	10)	10)	10)	10)
	12,5/10	**1,50** **2,00**[2]	10)	10)	10)	**2,50** **3,00**[2]	10)	10)	10)	10)
	15/12	**2,00** **2,50**[2]	10)	10)	10)	**3,00** **3,50**[2]	10)	10)	10)	10)
	20/16	**3,00**	10)	10)	10)	**4,00** **4,50**[2]	10)	10)	10)	10)
	25/20	**3,00**	10)	10)	10)	**5,00**	10)	10)	10)	10)
	33,9/-	**3,00**	10)	10)	10)	**5,00**	10)	10)	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C22.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Calcium silicate solid brick KS; ρ ≥ 2,0 as per EN 771-2 *e.g. KS Wemding, DE* **8 DF** (495x115x240) Hammer drilling	10/8	10)	**2,00**[7]	**2,50**[7] **3,50**[5][8]	9)	10)	**2,50**[7] **3,00**[6][8]	9)	10)	10)
	12,5/10	10)	**2,50**[7]	**3,00**[7] **3,50**[3][7] **4,50**[5][8]	9)	10)	**3,00**[7] **3,50**[4][7] **4,00**[6][8]	9)	10)	10)
	15/12	10)	**3,00**[7] **3,50**[5][8]	**3,00**[7] **3,50**[3][7] **5,00**[5][8]	9)	10)	**3,00**[7] **4,00**[4][7] **4,50**[6][8]	9)	10)	10)
	20/16	10)	**3,50**[7] **4,00**[3][7]	**4,00**[7] **5,00**[3][7]	9)	10)	**3,50**[7] **5,50**[4][7]	9)	10)	10)
	22,2/-	10)	**3,50**[7] **4,00**[3][7]	**4,00**[7] **5,00**[3][7]	9)	10)	**4,00**[7] **5,50**[4][7]	9)	10)	10)
Calcium silicate solid brick KS XL-PE; ρ ≥ 2,0 as per EN 771-2 *e.g. KS Wemding, DE* (998x150x498) Hammer drilling	10/8	10)	10)	10)	10)	10)	**2,50**	9)	10)	10)
	12,5/10	10)	10)	10)	10)	10)	**3,00**	9)	10)	10)
	15/12	10)	10)	10)	10)	10)	**3,50**	9)	10)	10)
	20/16	10)	10)	10)	10)	10)	**4,50**	9)	10)	10)
	25/20	10)	10)	10)	10)	10)	**5,50 6,00**[12]	9)	10)	10)
	31,3/-	10)	10)	10)	10)	10)	**5,50 7,50**[12]	9)	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C23.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Lightweight solid brick Vbl; ρ ≥ 1,2 as per EN 771-3 *e.g. KLB, DE* **2 DF** (240x115x113) Hammer drilling	2,5/2	**0,50**[7]	**0,60**	**0,90**[3] **1,20**[5]	[9]	**0,75**[7] **0,90**[8]	**0,50** **0,60**[2]	[9]	**1,20** **1,50**[2]	[9]
	2,7/-	**0,75**[7] **0,90**[8]	**0,60**	**1,20**[3] **1,50**[5]	[9]	[10]	**0,60**	[9]	**2,00** **2,50**[3]	[9]
Lightweight solid brick Vbl; ρ ≥ 1,4 as per EN 771-3 *e.g. KLB, DE* **2 DF** (240x115x113) Hammer drilling	2,5/2	[10]	[10]	[10]	[10]	[10]	[10]	**1,50** **2,50**[12]	[10]	[10]
	5/4	[10]	[10]	[10]	[10]	[10]	[10]	**3,50** **5,00**[12]	[10]	[10]
Lightweight solid brick Vbl; ρ ≥ 1,0 as per EN 771-3 *e.g. KLB, DE* **8 DF** (490x115x240) Hammer drilling	2,5/2	**1,20**	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]
	3,1	**1,50**	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]
Lightweight solid brick Vbl; ρ ≥ 1,2 as per EN 771-3 *e.g. KLB, DE* **8 DF** (490x115x240) Hammer drilling	2,5/2	[10]	[10]	[10]	[10]	**1,20**	[10]	[10]	[10]	[10]
Lightweight solid brick Vbl; ρ ≥ 1,6 as per EN 771-3 *e.g. KLB, DE* **8 DF** (490x115x240) Hammer drilling	2,5/2	[10]	[10]	[10]	[10]	**0,90**[7] **1,20**[8]	[10]	[10]	[10]	[10]
	5/4	[10]	[10]	[10]	[10]	**2,00**[7] **2,00**[8] **2,50**[5][8]	[10]	[10]	[10]	[10]
	7,5/6	[10]	[10]	[10]	[10]	**2,50**[7] **3,00**[3][7] **3,50**[5][8]	[10]	[10]	[10]	[10]
	9,0/-	[10]	[10]	[10]	[10]	**2,50**[7] **3,50**[3][7] **4,00**[5][8]	[10]	[10]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C24.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Lightweight solid brick Vbl; ρ ≥ 1,8 as per EN 771-3 *e.g. KLB, DE* **8 DF** (490x240x115) Hammer drilling	5/4	1,50[7] 2,00[5][8]	10)	10)	10)	10)	10)	2,00[7]	10)	10)
	7,5/6	2,00[7] 2,50[3][7]	10)	10)	10)	10)	10)	2,50[7] 3,00[5][8]	10)	10)
	10/8	2,50[7] 3,00[3][7]	10)	10)	10)	10)	10)	3,00[7] 3,50[3][7]	10)	10)
	12,5/10	2,50[7]	10)	10)	10)	10)	10)	3,00[7] 4,50[3][7]	10)	10)
	13,42/-	3,00[7]	10)	10)	10)	10)	10)	3,50[7] 5,00[3][7]	10)	10)
Lightweight solid brick Vbl; ρ ≥ 1,4 as per EN 771-3 *e.g. KLB, DE* **8 DF** (245x240x240) Hammer drilling	5/4	0,50[7] 0,60[8]	10)	10)	10)	2,00[7]	10)	10)	10)	10)
	7,5/6	0,75[7] 0,90[8]	10)	10)	10)	2,50[7]	10)	10)	10)	10)
	8,65/-	0,90[7]	10)	10)	10)	2,50[7]	10)	10)	10)	10)
Lightweight solid brick Vbl; ρ ≥ 1,6 as per EN 771-3 *e.g. KLB, DE* **8 DF** (245x240x240) Hammer drilling	2,5/2	10)	0,60[7] 0,75[8]	0,90[7] 1,20[8]	9)	1,20[7] 1,50[5][8]	0,90[7] 1,20[6][8]	2,00[7]	1,50[7] 2,00[3][7]	9)
	5/4	10)	1,20[7] 1,50[8]	2,00[7] 2,50[5][8]	9)	2,00[7] 2,50[3][7] 3,00[5][8]	2,00[7]	3,50[7] 4,00[8] 4,50[12]	2,50[7] 3,50[3][7] 4,50[5][8]	9)
	7,5/6	10)	2,00[7]	2,50[7] 3,00[3][7] 4,00[5][8]	9)	2,50[7] 4,00[3][7] 4,50[5][8]	2,50[7] 3,00[4][5][7] 3,50[6][8]	5,50[7] 6,00[8] 6,50[12]	3,00[7] 5,50[3][7] 6,50[6][8]	9)
	10/8	10)	2,50[7]	3,00[7] 4,00[3][7] 5,00[5][8]	9)	2,50[7] 4,00[3][7] 4,50[5][8]	3,00[7] 3,50[3][7] 4,00[4][5][7] 4,50[6][8]	7,50[7] 8,00[8] 9,00[12]	3,50[7] 6,50[3][7] 7,50[4][7] 8,50[6][8]	9)
	11/-	10)	2,50[7] 3,00[8]	3,00[7] 4,50[3][7] 5,00[5][8]	9)	11)	3,00[7] 4,00[3][7] 4,50[4][5][7] 5,00[6][8]	6,50[7] 8,50[8] 10,00[12]	4,00[7] 7,00[3][7] 8,00[4][7] 9,50[6][8]	9)
Partial factor	γ_{Mm}[1] [-]	2,5								

Footnotes see Annex C 16.

Table C25.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Lightweight solid brick Vbl; ρ ≥ 0,8 as per EN 771-3, *e.g. Liapor Super-K, DE* **16 DF** (500x240x248) Hammer drilling	1,8/2	10)	10)	10)	10)	10)	10)	**0,40**[7]	10)	10)
	2,2/-	10)	10)	10)	10)	10)	10)	**0,50**[7]	10)	10)
Lightweight solid brick Vbl; ρ ≥ 1,4 as per EN 771-3, *e.g. Tarmac, UK* (440x100x215) Hammer drilling	2,5/2	10)	10)	10)	10)	**0,90**[7]	10)	**1,20**[7]	10)	10)
	5/4	10)	10)	10)	10)	**1,50**[7]	10)	**2,00**[7] **2,50**[4)7]	10)	10)
	7,3/-	10)	10)	10)	10)	**2,00**[7] **2,50**[3)7] **3,00**[5)8]	10)	**2,00**[7] **3,50**[4)7] **4,00**[6)8]	10)	10)
Solid brick normal concrete Vbn; ρ ≥ 1,8 as per EN 771-3 *e.g. Adolf Blatt, DE* (240x245x240) Hammer drilling	5/4	**1,50**[7]	10)	10)	10)	**1,50**[7] **2,00**[8]	10)	10)	10)	10)
	7,5/6	**2,00**[7] **2,50**[8]	10)	10)	10)	**2,50**[7] **3,00**[5)8]	10)	10)	10)	10)
	10/8	**3,00**[7]	10)	10)	10)	**3,00**[7] **3,50**[3)7] **4,00**[5)8]	10)	10)	10)	10)
	12,5/10	**3,00**[7]	10)	10)	10)	**3,50**[7] **4,00**[3)7] **5,00**[5)8]	10)	10)	10)	10)
	15/12	**3,00**[7]	10)	10)	10)	**3,50**[7] **5,00**[3)7] **5,00**[5)8]	10)	10)	10)	10)
	17,0/-	**3,00**[7]	10)	10)	10)	**4,00**[7] **5,00**[3)7] **5,00**[5)8]	10)	10)	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

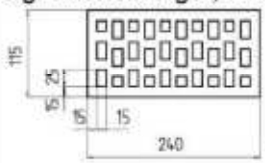
Deutsches Institut für Bautechnik DIBt

Table C26.1: Characteristic resistance F_{Rk}[16] in [kN] for use in solid masonry - base material group "b"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 50	≥ 70	≥ 70	≥ 90
Solid brick normal concrete Vbn; ρ ≥ 1,8 as per EN 771-3 *e.g. Tarmac, UK* (440x100x215) Hammer drilling	7,5/6	10)	10)	10)	10)	**1,50**[7] **2,00**[8]	10)	**2,50**[7] **4,50**[12]	10)	10)
	10/8	10)	10)	10)	10)	**2,00**[7] **2,50**[8]	10)	**3,50**[7] **6,00**[12]	10)	10)
	12,5/10	10)	10)	10)	10)	**2,50**[7] **3,00**[5][8]	10)	**4,00**[7] **4,50**[8] **7,50**[12]	10)	10)
	15/12	10)	10)	10)	10)	**3,00**[7] **3,50**[5][8]	10)	**5,00**[7] **9,00**[12]	10)	10)
	18,0/-	10)	10)	10)	10)	**3,50**[7] **4,00**[3][7] **4,50**[5][8]	10)	**6,00**[7] **6,50**[8] **11,00**[12]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C26.2: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 1,2 Form B, as per EN 771-1 *e.g. Wienerberger, DE*  **2 DF** (240x115x113) Rotary drilling	10/8	**0,40**[7] **0,50**[8]	10)	10)	10)	**0,90**[7]	10)	**0,90**[7]	10)	10)
	12,5/10	**0,60**[7]	10)	10)	10)	**1,20**[7]	10)	**1,20**[7]	10)	10)
	15/12	**0,60**[7] **0,75**[8]	10)	10)	10)	**1,50**[7]	10)	**1,50**[7]	10)	10)
	20/16	**0,90**[7]	10)	10)	10)	**2,00**[7]	10)	**2,00**[7]	10)	10)
	25/20	**1,20**[7]	10)	10)	10)	**2,50**[7]	10)	**2,50**[7]	10)	10)
	26,7/-	**1,20**[7] **1,50**[8]	10)	10)	10)	**2,50**[7]	10)	**2,50**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

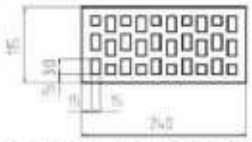
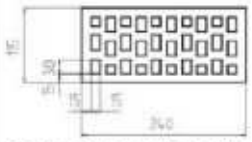
Footnotes see Annex C 16.

fischer frame fixing SXR / SXRL

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

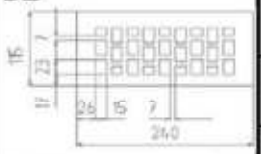
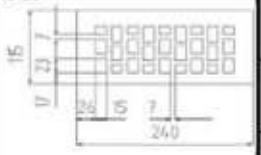
Annex C 26

Table C27.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8[15]			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 1,0 as per EN 771-1 *e.g. Wienerberger, DE*  **2 DF** (240x115x113) Rotary drilling	10/8	**0,40**[7]	[10]	[10]	[10]	**0,60**[7] **0,75**[8]	[10]	**0,60**	[10]	[10]
	12,5/10	**0,50**[7]	[10]	[10]	[10]	**0,75**[7] **0,90**[8]	[10]	**0,75**	[10]	[10]
	15/12	**0,60**[7]	[10]	[10]	[10]	**0,90**[7]	[10]	**0,90**	[10]	[10]
	15,6/-	**0,60**[7]	[10]	[10]	[10]	**0,90**[7] **1,20**[8]	[10]	**1,20**	[10]	[10]
Perforated clay brick HLz; ρ ≥ 1,2 as per EN 771-1 *e.g. Wienerberger, DE*  **2 DF** (240x115x113) Rotary drilling	10/8	[10]	**0,40**[7]	**0,40**[7] **0,50**[8]	**0,40** **0,60**[2]	[10]	[10]	**0,60**[7]	[10]	[10]
	12,5/10	[10]	**0,50**[7]	**0,50**[7] **0,60**[8]	**0,60** **0,75**[2]	[10]	[10]	**0,75**[7]	[10]	[10]
	15/12	[10]	**0,60**[7]	**0,60**[7] **0,75**[8]	**0,60** **0,90**[2]	[10]	[10]	**0,90**[7]	[10]	[10]
	20/16	[10]	**0,75**[7] **0,90**[8]	**0,75**[7] **0,90**[8]	**0,90** **1,20**[2]	[10]	[10]	**1,20**[7]	[10]	[10]
	25/20	[10]	**0,90**[7] **1,20**[8]	**0,90**[7] **1,20**[8]	**1,20** **1,50**[2]	[10]	[10]	**1,50**[7]	[10]	[10]
	35/28	[10]	**1,20**[7] **1,50**[8]	**1,20**[7] **1,75**[8]	**1,50** **2,00**[2]	[10]	[10]	**2,00**[7] **2,50**[8]	[10]	[10]
	35,9	[10]	**1,20**[7] **1,50**[8]	**1,50**[7] **2,00**[8]	**1,50** **2,00**[2]	[10]	[10]	**2,50**[7]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

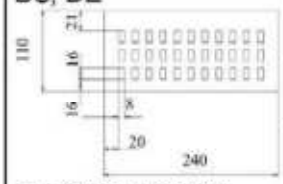
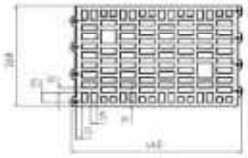
Footer table 1 of 15.

Table C28.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14[15]	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick VHLz; ρ ≥ 1,6 as per EN 771-1, *e.g. Wienerberger, DE*  **NF** (240x115x71) Rotary drilling	20/16	10)	10)	10)	10)	10)	10)	10)	**1,50 2,00**[2]	**1,50 2,00**[2]
	25/20	10)	10)	10)	10)	10)	10)	10)	**2,00 2,50**[2]	**2,00 2,50**[2]
	35/28	10)	10)	10)	10)	10)	10)	10)	**3,00 3,50**[2]	**2,50 3,00**[2]
	45/36	10)	10)	10)	10)	10)	10)	10)	**4,00 4,50**[2]	**3,50 4,00**[2]
	60/48	10)	10)	10)	10)	10)	10)	10)	**5,00 6,00**[2]	**4,50 5,50**[2]
	70,1/-	10)	10)	10)	10)	10)	10)	10)	**6,00 7,00**[2]	**5,50 6,50**[2]
Perforated clay brick VHLz; ρ ≥ 1,6 as per EN 771-1, *e.g. Wienerberger, DE*  **2 DF** (240x115x113) Rotary drilling	12,5/10	10)	**0,50**[7] **0,60**[8]	**0,50**[7] **0,60**[8]	**0,30**[7] **0,40**[8]	**0,90**[7]	10)	**1,20**[7]	10)	10)
	15/12	10)	**0,60**[7] **0,75**[8]	**0,60**[7] **0,75**[8]	**0,40**[7] **0,50**[8]	**0,90**[7] **1,20**[8]	10)	**1,20**[7] **1,50**[8]	10)	10)
	20/16	10)	**0,75**[7] **0,90**[8]	**0,75**[7] **1,20**[8]	**0,50**[7] **0,60**[8]	**1,50**[7]	10)	**1,50**[7] **2,00**[8]	10)	10)
	25/20	10)	**0,90**[7] **1,20**[8]	**0,90**[7] **1,20**[8]	**0,60**[7] **0,90**[8]	**1,50**[7] **2,00**[8]	10)	**2,00**[7] **2,50**[8]	10)	10)
	35/28	10)	**1,50**[7]	**1,50**[7] **2,00**[8]	**0,90**[7] **1,20**[8]	**2,50**[7]	10)	**3,00**[7]	10)	10)
	45/36	10)	**2,00**[7]	**2,00**[7]	**1,20**[7] **1,50**[8]	**2,50**[7]	10)	**4,00**[7]	10)	10)
	60/48	10)	**2,50**[7]	**2,50**[7]	**1,50**[7] **2,00**[8]	**2,50**[7]	10)	**5,50**[7]	10)	10)
	60,7/-	10)	**2,50**[7]	**2,50**[7]	**1,50**[7] **2,00**[8]	**2,50**[7]	10)	**5,50**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16

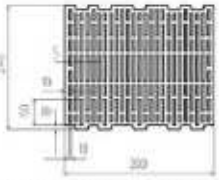
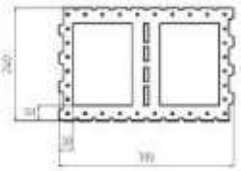
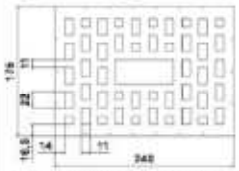
Table C29.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 1,5 as per EN 771 -1 *e.g. Wienerberger, BS, DE*  **DF** (240x110x52) Hammer drilling	10/8	**0,60**[7]	[10]	[10]	[10]	**0,50**[7] **0,60**[8]	[10]	[10]	[10]	[10]
	12,5/10	**0,75**[7]	[10]	[10]	[10]	**0,60**[7] **0,75**[8]	[10]	[10]	[10]	[10]
	15/12	**0,75**[7] **0,90**[8]	[10]	[10]	[10]	**0,75**[7] **0,90**[8]	[10]	[10]	[10]	[10]
	20/16	**1,20**[7]	[10]	[10]	[10]	**0,90**[7] **1,20**[8]	[10]	[10]	[10]	[10]
	25/20	**1,50**[7]	[10]	[10]	[10]	**1,20**[7] **1,50**[8]	[10]	[10]	[10]	[10]
	35/28	**2,00**[7]	[10]	[10]	[10]	**1,50**[7] **2,00**[8]	[10]	[10]	[10]	[10]
	45/36	**2,50**[7]	[10]	[10]	[10]	**2,00**[7] **2,50**[8]	[10]	[10]	[10]	[10]
	48,1/-	**2,50**[7]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]	[10]	[10]
Perforated clay brick HLz; ρ ≥ 0,9 as per EN 771-1 *e.g. Schlagmann, DE*  **10 DF** (440x260x240) Rotary drilling	5/4	**0,40 0,50**[2]	[10]	[10]	[10]	**0,60**	[10]	[10]	[10]	[10]
	7,5/6	**0,60 0,75**[2]	[10]	[10]	[10]	**0,90**	[10]	[10]	[10]	[10]
	10/8	**0,90**	[10]	[10]	[10]	**1,20**	[10]	[10]	[10]	[10]
	10,9/-	**0,90 1,20**[2]	[10]	[10]	[10]	**1,20 1,50**[2]	[10]	[10]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Deutsches Institut für Bautechnik DIBt

Table C30.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14[15]	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1 *e.g. Schlagmann Poroton T14, DE*  **10 DF** (240x300x240) Rotary drilling	5/4	10)	10)	10)	10)	**0,30**	10)	**0,50**[7]	10)	10)
	6,4/-	10)	10)	10)	10)	**0,30** **0,40**[2]	10)	**0,50**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	**0,30** **0,40**[2]	10)	**0,75**[7]	10)	10)
	7,7/-	10)	10)	10)	10)	**0,30** **0,40**[2]	10)	**0,75**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1 *e.g. Schlagmann Planfüllziegel, DE*  **12 DF** (380x240x240) Rotary drilling	2,5/2	**0,40** **0,50**[2]	10)	10)	10)	**0,60**	10)	10)	10)	10)
	5/4	**0,75** **0,90**[2]	10)	10)	10)	**1,20**	10)	10)	10)	10)
	7,5/6	**1,20** **1,50**[2]	10)	10)	10)	**2,00**	10)	10)	10)	10)
	8,0/-	**1,20** **1,50**[2]	10)	10)	10)	**2,00**	10)	10)	10)	10)
Perforated clay brick HLz; ρ ≥ 1,0 as per EN 771-1 *e.g. Schlagmann, DE*  **3 DF** (240x175x113) Rotary drilling	7,5/6	10)	10)	10)	10)	10)	10)	10)	**1,50**[7]	**2,00**[7]
	10/8	10)	10)	10)	10)	10)	10)	10)	**2,00**[7]	**2,50**[7]
	12,5/10	10)	10)	10)	10)	10)	10)	10)	**2,50**[7]	**2,50**[7]
	15/12	10)	10)	10)	10)	10)	10)	10)	**2,50**[7]	**2,50**[7]
	15,8/-	10)	10)	10)	10)	10)	10)	10)	**2,50**[7]	**2,50**[7]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

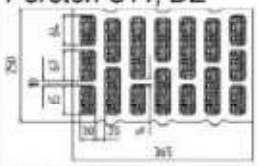
fischer frame fixing SXR / SXRL

Performances

Characteristic resistance for use in hollow or perforated masonry

Annex C 30

Table C31.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,8 as per EN 771-1 *e.g. Schlagmann Poroton S11, DE*  **12 DF** (250x365x240) Rotary drilling	5/4	10)	10)	10)	10)	10)	10)	**1,20**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	10)	10)	**1,50**[7]	10)	10)
	8,6/-	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1 *e.g. Schlagmann Poroton S10, DE*  **10 DF** (250x300x240) Rotary drilling	5/4	10)	10)	10)	10)	10)	10)	**1,20**[7] **1,50**[8]	10)	10)
	7,5/6	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
	7,7/-	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,6 as per EN 771-1 *e.g. Schlagmann Poroton T8, DE*  **12 DF** (248x365x240) Rotary drilling	2,5/2	10)	10)	10)	10)	10)	10)	**0,75**[7]	10)	10)
	5/4	10)	10)	10)	10)	10)	10)	**1,50**[7]	10)	10)
	5,8/-	10)	10)	10)	10)	10)	10)	**1,50**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

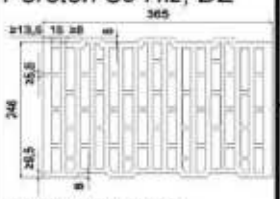
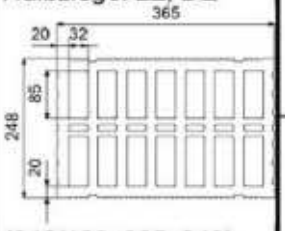
fischer frame fixing SXR / SXRL

Performances
Characteristic resistance for use in hollow or perforated masonry

Annex C 31

Deutsches Institut für Bautechnik DIBt

Table C32.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	**70**	**90**	70	90
Perforated clay brick HLz; ρ ≥ 0,75 as per EN 771-1 *e.g. Schlagmann Poroton S9 Hlz, DE*  (248x365x249) Rotary drilling	7,5/6	10)	10)	10)	10)	10)	**0,75 1,20[7]**	**0,90 1,20[3)7) 1,50[3)8)]**	10)	10)
	10/8	10)	10)	10)	10)	10)	**0,90 1,50[7]**	**1,50 2,00[3)7)]**	10)	10)
	12,5/10	10)	10)	10)	10)	10)	**1,20 2,00[7]**	**1,50 2,00[3)7) 2,50[3)8)]**	10)	10)
	15/12	10)	10)	10)	10)	10)	**1,50 2,50[7]**	**2,00 2,50[3)] 3,00[3)8)]**	10)	10)
	16/-	10)	10)	10)	10)	10)	**1,50 2,50[7]**	**2,00 2,50[7)] 3,00[3)7)]**	10)	10)
Perforated clay brick HLz; ρ ≥ 0,75 as per EN 771-1 *e.g. Schlagmann S8 Halbziegel LZ, DE*  (248/123x365x249) Rotary drilling	5/4	10)	10)	10)	10)	10)	**0,30**	**0,60**	10)	10)
	7,5/6	10)	10)	10)	10)	10)	**0,40**	**0,90**	10)	10)
	10/8	10)	10)	10)	10)	10)	**0,50**	**1,20**	10)	10)
	10,2/-	10)	10)	10)	10)	10)	**0,50**	**1,20**	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

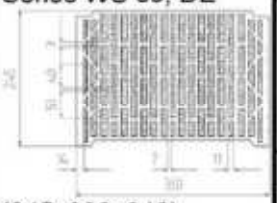
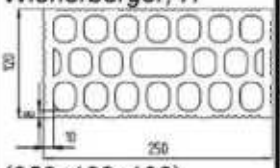
fischer frame fixing SXR / SXRL

Performances

Characteristic resistance for use in hollow or perforated brick masonry

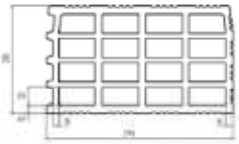
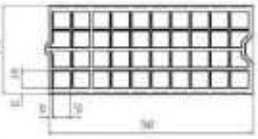
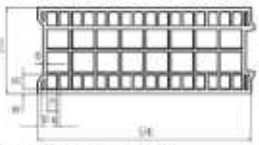
Annex C 32

Table C33.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8[15]			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,8 as per EN 771-1. *e.g. Hörl & Hartmann Coriso WS 09, DE*  (245x360x240) Rotary drilling	2,5/2	10)	10)	10)	10)	10)	**0,50**[7] **0,60**[4)7]	**0,50**[7]	10)	10)
	5/4	10)	10)	10)	10)	10)	**0,90**[7] **1,20**[4)7]	**0,90**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	10)	**1,50**[7] **2,00**[6)7]	**1,50**[7]	10)	10)
	7,7/-	10)	10)	10)	10)	10)	**1,50**[7] **2,00**[4)7]	**1,50**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,9 as per EN 771-1 *e.g. Doppio Uni IT Wienerberger, IT*  (250x120x190) Rotary drilling	7,5/6	10)	**0,50**[7] **0,60**[8]	**0,40**[7] **0,60**[8]	**0,60**[7] **0,75**[8]	10)	10)	10)	10)	10)
	10/8	10)	**0,60**[7] **0,75**[8]	**0,60**[7] **0,75**[8]	**0,75**[7] **0,90**[8]	10)	10)	10)	10)	10)
	12,5/10	10)	**0,75**[7] **0,90**[8]	**0,75**[7] **0,90**[8]	**0,90**[7] **1,20**[8]	10)	10)	10)	10)	10)
	15/12	10)	**0,90**[7] **1,20**[8]	**0,90**[7] **1,20**[8]	**1,20**[7] **1,50**[8]	10)	10)	10)	10)	10)
	18,7/-	10)	**1,20**[7] **1,50**[8]	**1,20**[7] **1,50**[8]	**1,50**[7] **2,00**[8]	10)	10)	10)	10)	10)
Partial factor	γ_{Mm}[1] [-]	2,5								

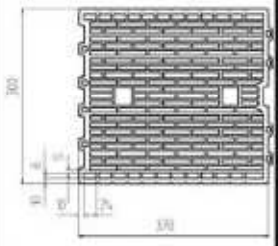
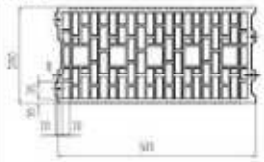
Footnotes see Annex C 16.

Table C34.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,6 as per EN 771-1, *e.g. Imerys Gelimatic, FR*  (500x200x270) Rotary drilling	5/4	10)	10)	10)	10)	**0,50**[7]	10)	**1,20**[7]	10)	10)
	6,5/-	10)	10)	10)	10)	**0,60**[7] **0,75**[8]	10)	**1,50**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,6 as per EN 771-1, *e.g. Imerys Optibric, FR*  (560x200x275) Rotary drilling	5/5	10)	10)	10)	10)	**0,50**[7] **0,60**[8]	10)	**0,75**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	**0,75**[7] **0,90**[8]	10)	**1,20**[7]	10)	10)
	10/8	10)	10)	10)	10)	**0,90**[7] **1,20**[8]	10)	**1,50**[7]	10)	10)
	10,5/-	10)	10)	10)	10)	**1,20**[7]	10)	**1,50**[7]	10)	10)
Perforated clay brick HLz; ρ ≥ 0,6 as per EN 771-1, *e.g. Bouyer Leroux BGV, FR*  (570x200x315) Rotary drilling	5/4	10)	10)	10)	10)	**0,60**[7] **0,75**[8]	10)	**0,75**[7]	10)	10)
	7,4/-	10)	10)	10)	10)	**0,90**[7] **1,20**[8]	10)	**1,20**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

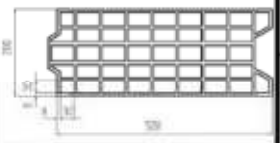
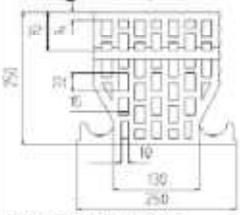
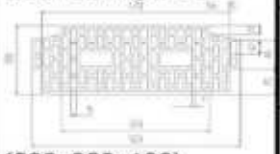
Table C35.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1, *e.g. Wienerberger Porotherm 30 R, FR*  (370x300x250) Rotary drilling	7,5/6	10)	10)	10)	10)	**0,40**[7]	10)	10)	10)	10)
	10/8	10)	10)	10)	10)	**0,50**[7] **0,60**[8]	10)	10)	10)	10)
	10,7/-	10)	10)	10)	10)	**0,50**[7] **0,60**[8]	10)	10)	10)	10)
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1 *e.g. Wienerberger Porotherm GF R20, FR*  (500x200x275) Rotary drilling	5/4	10)	10)	10)	10)	10)	10)	**0,40**[7] **0,50**[8]	10)	10)
	7,5/6	10)	10)	10)	10)	**0,40** **0,50**[2]	10)	**0,60**[7] **0,75**[8]	10)	10)
	10/8	10)	10)	10)	10)	**0,60**	10)	**0,90**[8]	10)	10)
	11,8/-	10)	10)	10)	10)	**0,60** **0,75**[2]	10)	**0,90**[7] **1,20**[8]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16

Deutsches Institut für Bautechnik DIBt

Table C36.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Perforated clay brick HLz; ρ ≥ 0,7 as per EN 771-1, *e.g. Terreal Calibric, FR*  (500x200x220) Rotary drilling	5/4	10)	10)	10)	10)	**0,30** **0,40**[2]	10)	**0,60**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	**0,50** **0,60**[2]	10)	**0,90**[7]	10)	10)
	9,4/-	10)	10)	10)	10)	**0,60** **0,75**[2]	10)	**0,90**[7] **1,20**[8]	10)	10)
Perforated clay ceiling brick; ρ ≥ 0,7 as per EN 15037-3 *e.g. Hörl & Hartmann ceiling block, DE*  (250x250x190) Rotary drilling	5/4	10)	10)	10)	10)	10)	10)	**0,90**[7]	10)	10)
	7,5/6	10)	10)	10)	10)	10)	10)	**1,50**[7]	10)	10)
	10/8	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
	12,1/-	10)	10)	10)	10)	10)	10)	**2,50**[7]	10)	10)
Perforated clay ceiling brick; ρ ≥ 0,7 as per EN 15037 *e.g. Hörl & Hartmann block for beam-and-block ceilings, DE*  (520x250x180) Rotary drilling	2,5/2	10)	10)	10)	10)	10)	10)	**0,50**[7]	10)	10)
	5/4	10)	10)	10)	10)	10)	10)	**0,90**[7] **1,20**[8]	10)	10)
	7,5/6	10)	10)	10)	10)	10)	10)	**1,50**[7]	10)	10)
	8,9/-	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

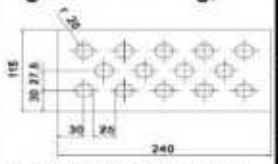
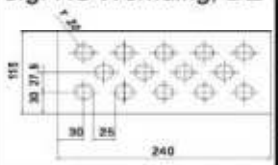
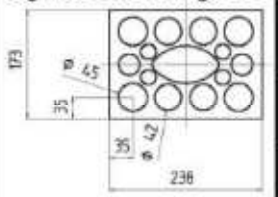
fischer frame fixing SXR / SXRL

Performances

Characteristic resistance for use in hollow or perforated brick masonry

Annex C 36

Table C37.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8[15]			SXR 10	SXRL 10		SXRL 14[15]	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow calcium silicate brick KSL; ρ ≥ 1,4 as per EN 771-2 *e.g. KS Wemding, DE*  **2 DF** (240x115x113) Hammer drilling	7,5/6	**0,75**[7] **0,90**[8]	10)	10)	10)	**0,90**[7]	10)	**1,50**[7]	**1,20**	**2,50**
	10/8	**0,90**[7] **1,20**[8]	10)	10)	10)	**1,20**[7] **1,50**[8]	10)	**2,00**[7]	**1,50**	**2,50**
	12,5/10	**1,20**[7] **1,50**[8]	10)	10)	10)	**1,50**[7]	10)	**2,50**[7]	**2,00**	**2,50**
	15/12	**1,50**[7] **2,00**[8]	10)	10)	10)	**2,00**[7]	10)	**2,50**[7]	**2,00** **2,50**[2]	**2,50**
	17,6/-	**2,00**[7]	10)	10)	10)	**2,00**[7] **2,50**[8]	10)	**2,50**[7]	**2,50**	**2,50**
Hollow calcium silicate brick KSL; ρ ≥ 1,6 as per EN 771-2 *e.g. KS Wemding, DE*  **2 DF** (240x115x113) Hammer drilling	10/8	10)	**0,60** **0,75**[2]	**0,90** **1,20**[2]	**0,75**[7] **0,90**[8]	10)	10)	10)	10)	10)
	12,5/10	10)	**0,75** **0,90**[2]	**1,20** **1,50**[2]	**0,90**[7] **1,20**[8]	10)	10)	10)	10)	10)
	15/12	10)	**0,90**	**1,50** **2,00**[2]	**1,20**[7] **1,50**[8]	10)	10)	10)	10)	10)
	20/16	10)	**1,20** **1,50**[2]	**2,00** **2,50**[2]	**1,50**[7] **2,00**[8]	10)	10)	10)	10)	10)
	25/20	10)	**1,50**	**2,50**	**2,00**[7] **2,50**[8]	10)	10)	10)	10)	10)
	32,5/-	10)	**2,00**	**2,50**	**2,50**[7]	10)	10)	10)	10)	10)
Hollow calcium silicate brick KSL; ρ ≥ 1,4 as per EN 771-2 *e.g. KS Wemding, DE*  **3 DF** (240x175x113) Hammer drilling	7,5/6	10)	10)	10)	10)	**0,60**[7] **0,75**[8]	10)	**0,60**	10)	10)
	10/8	**0,50**[7]	10)	10)	10)	**0,90**[7]	10)	**0,75**	10)	10)
	12,5/10	**0,60**[7]	10)	10)	10)	**1,20**[7]	10)	**0,90**	10)	10)
	15/12	**0,75**[7]	10)	10)	10)	**1,20**[7] **1,50**[8]	10)	**1,20**	10)	10)
	20/16	**0,90**[7] **1,20**[8]	10)	10)	10)	**1,50**[7] **2,00**[8]	10)	**1,50**	10)	10)
	25/20	**1,20**[7]	10)	10)	10)	10)	10)	**2,00**	10)	10)
	27,7/-	**1,20**[7] **1,50**[8]	10)	10)	10)	10)	10)	**2,00**	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

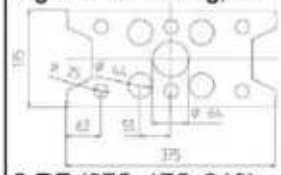
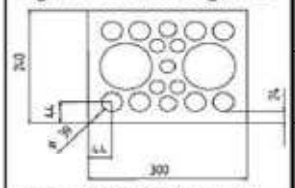
fischer frame fixing SXR / SXRL

Performances

Characteristic resistance for use in hollow or perforated brick masonry

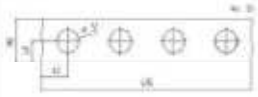
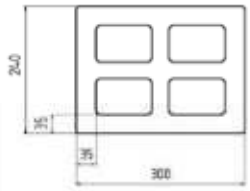
Annex C 37

Table C38.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8[15]			SXR 10	SXRL 10		SXRL 14[15]	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow calcium silicate brick KSL; ρ ≥ 1,4 as per EN 771-2 *e.g. KS Wemding, DE*  **9 DF** (375x175x248) Hammer drilling	10/8	[10]	**0,30**[7]	**0,60**[7] **0,75**[8]	**0,30**[7] **0,40**[8]	[10]	[10]	**1,50**[7]	**1,50**[7] **2,00**[8]	**0,75**[7] **0,90**[8]
	12,5/10	[10]	**0,30**[7] **0,40**[8]	**0,75**[7] **0,90**[8]	**0,40**[7] **0,60**[8]	[10]	[10]	**1,50**[7] **2,0**[8]]	**2,00**[7]	**0,90**[7] **1,20**[8]
	15/12	[10]	**0,40**[7]	**0,90**[7] **1,20**[8]	**0,50**[7] **0,60**[8]	[10]	[10]	**2,00**[7]	**2,50**[7]	**1,20**[7] **1,50**[8]
	20/16	[10]	**0,50**[7] **0,60**[8]	**1,20**[7] **1,50**[8]	**0,75**[7] **0,90**[8]	[10]	[10]	**3,00**[7]	**3,00**[7] **3,50**[8]	**1,50**[7] **2,00**[8]
	25/20	[10]	**0,60**[7] **0,75**[8]	**1,50**[7] **2,00**[8]	**0,90**[7] **1,20**[8]	[10]	[10]	**3,50**[7]	**4,00**[7] **4,50**[8]	**2,00**[7] **2,50**[8]
	28,5/-	[10]	**0,60**[7] **0,75**[8]	**1,50**[7] **2,00**[8]	**0,90**[7] **1,20**[8]	[10]	[10]	**4,00**[7]	**4,50**[7] **5,00**[8]	**2,00**[7] **2,50**[8]
Hollow calcium silicate brick KSL; ρ ≥ 1,4 as per EN 771-2 *e.g. KS Wemding, DE*  **5 DF** (300x240x113) Hammer drilling	7,5/6	**0,40**[7] **0,50**[8]	[10]	[10]	[10]	**1,20**[7]	[10]	[10]	[10]	[10]
	10/8	**0,50**[7] **0,60**[8]	[10]	[10]	[10]	**1,50**[7]	[10]	[10]	[10]	[10]
	12,5/10	**0,60**[7] **0,75**[8]	[10]	[10]	[10]	**2,00**[7]	[10]	[10]	[10]	[10]
	15/12	**0,75**[7] **0,90**[8]	[10]	[10]	[10]	**2,00**[7] **2,50**[8]	[10]	[10]	[10]	[10]
	20/16	**0,90**[7] **1,20**[8]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]	[10]	[10]
	25/20	**1,20**[7] **1,50**[8]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]	[10]	[10]
	35/28	**2,00**[7]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]	[10]	[10]
	36,4/-	**2,00**[7]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Table C39.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow calcium silicate brick KSL; ρ ≥ 1,2 as per EN 771-2 *e.g. KS Wemding, P10, DE*  (495x98x245) Hammer drilling	2,5/2	**0,30 0,40**[2]	[10]	[10]	[10]	**0,60 0,75**[2]	[10]	[10]	[10]	[10]
	5/4	**0,60 0,75**[2]	[10]	[10]	[10]	**1,20 1,50**[2]	[10]	[10]	[10]	[10]
	7,5/6	**0,90 1,20**[2]	[10]	[10]	[10]	**2,00 2,50**[2]	[10]	[10]	[10]	[10]
	9,4/-	**1,20 1,50**[2]	[10]	[10]	[10]	**2,00 2,50**[2]	[10]	[10]	[10]	[10]
Hollow calcium silicate brick KSL; ρ ≥ 1,4 as per EN 771-2 *e.g. KS Wemding, DE*  **9 DF** (250x240x240) Hammer drilling	7,5/6	[10]	[10]	[10]	[10]	[10]	[10]	**0,90**[7] **1,20**[8]	[10]	[10]
	10/8	[10]	[10]	[10]	[10]	[10]	[10]	**1,50**[7]	[10]	[10]
	12,5/10	[10]	[10]	[10]	[10]	[10]	[10]	**1,50**[7] **2,00**[8]	[10]	[10]
	15/12	[10]	[10]	[10]	[10]	[10]	[10]	**2,00**[7]	[10]	[10]
	16,5/-	[10]	[10]	[10]	[10]	[10]	[10]	**2,50**[7]	[10]	[10]
Hollow brick light-weight concrete Hbl; ρ ≥ 1,4 as per EN 771-3, *e.g. KLB, DE*  (300x240x240) Hammer drilling	2,5/2	[10]	[10]	[10]	[10]	**1,50**[7] **2,00**[8]	[10]	[10]	[10]	[10]
	2,6/-	[10]	[10]	[10]	[10]	**2,00**[7]	[10]	[10]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

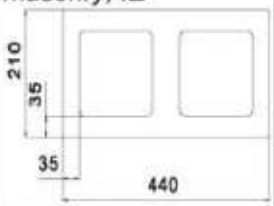
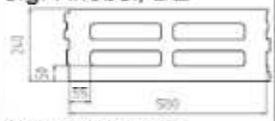
fischer frame fixing SXR / SXRL

Performances
Characteristic resistance for use in hollow or perforated brick masonry

Annex C 39

Deutsches Institut für Bautechnik DIBt

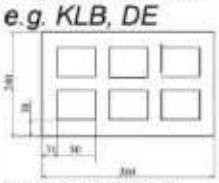
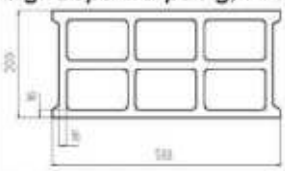
Table C40.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8[15]			SXR 10	SXRL 10		SXRL 14[15]	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow brick light-weight concrete Hbl; ρ ≥ 1,2 as per EN 771-3, *e.g. Roadstone masonry, IE*  (440x210x215) Hammer drilling	2,5/2	**0,75**[7] **0,90**[8]	**0,40**[7] **0,50**[8]	**0,40**[7] **0,50**[8]	[10]	**0,90**[7] **1,20**[8]	[10]	**0,60**[7]	**0,90**[7]	[10]
	5/4	**1,50**[7] **2,00**[8]	**0,90**[7]	**0,75**[7] **0,90**[8]	**0,30**[8]	**2,00**[7]	[10]	**1,20**[7]	**2,00**[7]	[10]
	7,5/6	**2,50**[7]	**1,20**[7] **1,50**[8]	**1,20**[7] **1,50**[8]	**0,30**[7] **0,40**[8]	**2,50**[7]	[10]	**2,00**[7]	**2,50**[7]	[10]
	10/8	**2,50**[7]	**1,50**[7] **2,00**[8]	**1,50**[7] **2,00**[8]	**0,40**[7] **0,50**[8]	**2,50**[7]	[10]	**2,50**[7]	**3,50**[7]	[10]
	11,3/-	**2,50**[7]	**2,00**[7]	**2,00**[7] **2,50**[8]	**0,40**[7] **0,60**[8]	**2,50**[7]	[10]	**2,50**[7]	**4,00**[7]	[10]
Hollow brick light-weight concrete Hbl; ρ ≥ 0,8 as per EN 771-3, *e.g. Knobel, DE*  (500x240x240) Rotary drilling	2,5/2	[10]	**1,20**[7]	**1,20**[7] **1,50**[8]	**1,20**[7]	[10]	**1,20**[7] **1,50**[8]	**1,50**[7] **2,00**[4][8]	**2,00**[7]	**1,50**[7]
	4,0/-	[10]	**1,50**[7] **2,00**[8]	**2,00**[7] **2,50**[8]	**1,50**[7] **2,00**[8]	[10]	**2,00**[7] **2,50**[8]	**2,50**[7] **3,00**[4][8] **3,50**[6][8]	**2,50**[7]	**2,50**[7]
Hollow brick light-weight concrete Hbl; ρ ≥ 0,9 as per EN 771-3, *e.g. Knobel, DE*  (500x240x240) Rotary drilling	2,5/2	[10]	**0,60**[7]	**0,90**[7] **1,50**[8]	**0,60**[7] **0,75**[8]	[10]	**0,90**[7]	[10]	[10]	[10]
	5/4	[10]	**1,20**[7]	**2,00**[7] **2,50**[8]	**1,20**[7] **1,50**[8]	[10]	**2,00**[7]	[10]	[10]	[10]
	6,2/-	[10]	**1,50**[7]	**2,50**[7]	**1,50**[7] **2,00**[8]	[10]	**2,50**[7]	[10]	[10]	[10]
Partial factor	γ_{Mm}[1] [-]	**2,5**								

Footnotes see Annex C 16.

Deutsches Institut für Bautechnik DIBt

Table C41.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow brick light-weight concrete Hbl; ρ ≥ 0,9 as per EN 771-3, *e.g. KLB, DE*  (360x250x250) Hammer drilling	2,5/2	10)	10)	10)	10)	10)	10)	**1,20**[7]	10)	10)
	3,9/-	10)	10)	10)	10)	10)	10)	**2,00**[7]	10)	10)
Hollow brick light-weight concrete Hbl; ρ ≥ 1,0 as per EN 771-3, *e.g. KLB, DE*  (360x240x240) Hammer drilling	2,5/2	**0,50**[7] **0,60**[8]	10)	10)	10)	10)	10)	10)	10)	10)
	5/4	**1,20**[7]	10)	10)	10)	10)	10)	10)	10)	10)
	6,3/-	**1,20**[7] **1,50**[8]	10)	10)	10)	10)	10)	10)	10)	10)
Hollow brick light-weight concrete Hbl; ρ ≥ 0,9 as per EN 771-3, *e.g. Sepa Parpaing, FR*  (500x200x200) Rotary drilling	2,5/2	10)	10)	10)	10)	**0,30 0,60**[7]	10)	10)	10)	10)
	5/4	**0,30**	10)	10)	10)	**0,60 1,20**[7]	10)	**0,30**[7] **0,40**[8]	10)	10)
	5,9/-	**0,30 0,40**[2]	10)	10)	10)	**0,75 1,20**[7] **1,50**[8]	10)	**0,40**[7] **0,50**[8]	10)	10)
	7,5/6	**0,30 0,40**[2]	10)	10)	10)	**0,75 1,20**[7] **1,50**[8]	10)	**0,50**[7] **0,60**[8]	10)	10)
	8,4/-	**0,30 0,40**[2]	10)	10)	10)	**0,75 1,20**[7] **1,50**[8]	10)	**0,60**[7]	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

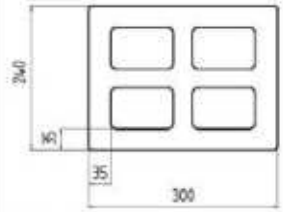
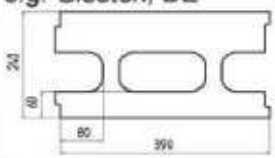
Footnotes see Annex C 16.

fischer frame fixing SXR / SXRL

Performances
Characteristic resistance for use in hollow or perforated masonry

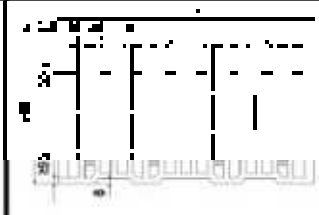
Annex C 41

Table C42.1: Characteristic resistance F_{Rk}[16] in [kN] for use in hollow or perforated brick masonry – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10		SXRL 14	
		h_{nom} [mm]								
		50	50	70	90	50	50	70	70	90
Hollow brick normal concrete Hbn; ρ ≥ 1,6 as per EN 771-3, *e.g. Adolf Blatt, DE*  (300x240x240) Hammer drilling	2,5/2	10)	10)	10)	10)	**1,50**[7]	10)	**0,75**[7] **1,50**[4][7]	10)	10)
	5/4	10)	10)	10)	10)	**2,50**[7]	10)	**1,50**[7] **2,50**[4][7]	10)	10)
	7,3/-	10)	10)	10)	10)	**2,50**[7]	10)	**2,00**[7] **2,50**[4][7]	10)	10)
Heat insulation brick WDB; ρ ≥ 0,7 *e.g. Gisoton, DE*  (390x240x240) Hammer drilling	2,5/2	10)	10)	10)	10)	**1,50**[7]	10)	10)	10)	10)
	3,7/-	10)	10)	10)	10)	**2,00**[7] **2,50**[8]	10)	10)	10)	10)
Partial factor	γ_{Mm}[1] [-]	**2,5**								

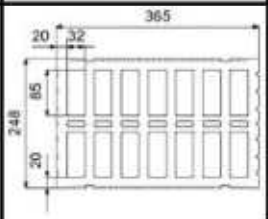
Footnotes see Annex C 16.

Table C43.1: Characteristic resistance F_{Rk}[16] in [kN] in perforated bricks for use in the header side – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Brick drawing [mm]	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	**SXRL 10** Characteristic resistance F_{Rk} [kN] Temperature range 30/50°C and 50/80°C h_{nom} [mm]	
			70	90
Perforated clay brick HLz; ρ ≥ 0,75 as per EN 771-1 e.g. Schlagmann Porotherm 8 DF (248x365x249) Rotary drilling		7,5/6	0,75	0,75
		10/8	0,90	0,90
		12,5/10	1,20	1,20
		15/12	1,50	1,50
		16/-	1,50	1,50
Partial factor		γ_{Mm}[1] [-]	2,5	
Minimum edge distance		c_{min} = [mm]	70	
Minimum spacing perpendicular to free edge		$s_{1,min}$ = [mm]	150	
Minimum spacing parallel to free edge		$s_{2,min}$ = [mm]	250	

Footnotes see Annex C 16.

Table C43.2: Characteristic resistance F_{Rk}[16] in [kN] in perforated bricks for use in the header side – base material group "c"

Base material; bulk density [kg/dm³] [*Supplier Title, country*] Geometry, DF or nominal Size (L x W x H) [mm] and drilling method	Brick drawing [mm]	Mean compressive strength as per EN 771 / Minimum compressive strength single brick[14] [N/mm²]	**SXRL 10** Characteristic resistance F_{Rk} [kN] Temperature range 30/50°C and 50/80°C h_{nom} [mm]			
			70	90	150[13]	180[13]
Perforated clay brick HLz; ρ ≥ 0,75 as per EN 771-1 *e.g. Schlagmann S8 Halbziegel LZ, DE* (248/123 x 365 x 249) Rotary drilling		5/4	**0,50**[12]	**0,30 0,60**[12]	**0,90**	**0,30 0,60**[12]
		7,5/6	**0,30 0,75**[12]	**0,40 0,90**[12]	**1,20**	**0,50 0,90**[12]
		10/8	**0,40 1,20**[12]	**0,50 1,20**[12]	**1,50**	**0,60 1,20**[12]
		10,2/-	**0,40 1,20**[12]	**0,60 1,20**[12]	**1,50**	**0,60 1,20**[12]
Partial factor		γ_{Mm}[1] [-]	2,5			
Minimum edge distance		c_{min} = [mm]	75			
Minimum spacing perpendicular to free edge		$s_{1,min}$ = [mm]	150			
Minimum spacing parallel to free edge		$s_{2,min}$ = [mm]	250			

Footnotes see Annex C 16

Table C44.1: Characteristic resistance F_{Rk} in [kN] for use in unreinforced autoclaved aerated concrete – base material group "d"

Base material Size (L x W x H) [mm] and drilling method	Mean compressive strength as per EN 771-4 $f_{cm,decl}$ [N/mm²]	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C								
		SXR 8	SXRL 8			SXR 10	SXRL 10[3)]		SXRL 14	
		h_{nom} [mm]								
		≥ 50	≥ 50	≥ 70	≥ 90	≥ 50	≥ 70	≥ 90	≥ 70	≥ 90
Autoclaved aerated concrete as per EN 771-4 e.g. (500x120x300) e.g. (500x250x300) Hammer drilling	≥ 2,0	8)	8)	**0,40**	**0,60**	**0,40**[3)] **0,50**[2)3)]	**0,50**	**0,60**[7)] **0,90**[4)5)]	**0,90**	**1,20**
	≥ 2,5	8)	8)	8)	8)	8)	**0,75**	**0,90**[7)] **1,20**[4)5)]	8)	8)
	≥ 3,0	8)	8)	**0,60** **0,90**[6)]	**0,90** **1,20**[6)]	**0,40**[3)] **0,50**[2)3)]	**0,90** **1,20**[4)]	**1,20**[7)] **1,50**[4)5)]	**1,50**	**2,00**
	≥ 3,5	8)	8)	8)	8)	8)	**1,20** **1,50**[4)]	**1,50**[7)] **2,00**[4)5)]	8)	8)
	≥ 4,0	8)	8)	**0,90** **1,50**[6)]	**1,20** **1,50**[6)]	**0,75** **0,90**[2)]	**1,50** **2,00**[4)]	**1,50**[7)] **2,00**[4)]	**2,50**	**3,00**
	≥ 4,5	8)	8)	8)	8)	8)	**1,50** **2,00**[4)]	**2,00**[7)] **2,50**[4)7)]	8)	8)
	≥ 5,0	8)	8)	8)	8)	8)	**2,00** **2,50**[4)]	**2,00**[7)] **3,00**[4)]	8)	8)
	≥ 6,0	8)	8)	**1,50** **3,00**[6)]	**2,00** **3,00**[6)]	**0,75** **0,90**[6)]	**2,50** **3,00**[4)]	**3,00**[7)] **3,50**[4)7)]	**4,00**	**5,00**
Partial factor	γ_{MAAC}[1)] [-]	**2,0**								

1) [illegible]
2) [illegible]
3) [illegible]
4) [illegible]
5) Only valid for … edge distance [illegible]
6) Only valid for edge distance [illegible]
7) Only valid for spacing [illegible]
8) [illegible]

Table C45.1: Characteristic resistance F_{Rk} in [kN] for use in reinforced autoclaved aerated concrete for SXRL 10 – base material group "d"

Base material and drilling method	Compressive strength f_{ck} [N/mm²] (compressive strength class) as per EN 12602	Characteristic resistance F_{Rk} [kN] Temperature range 30/50 °C and 50/80 °C			
		$h_{nom} \geq 70$ mm		$h_{nom} \geq 90$ mm	
		Member thickness h_{min} [mm]			
		175	240	175	240
Reinforced autoclaved aerated concrete, AAC as per EN 12602 – cam-set drilling	≥ 2,0 (AAC 2)	0,50	[2]	0,50	[2]
	≥ 2,5 (AAC 2,5)	0,75	[2]	0,90	[2]
	≥ 3,0 (AAC 3)	1,20	[2]	1,20	[2]
	≥ 3,5 (AAC 3,5)	1,50	[2]	1,50	[2]
	≥ 4,0 (AAC 4)	[3]	1,50	[3]	2,00
	≥ 4,5 (AAC 4,5)	[3]	2,00	[3]	2,50
	≥ 5,0 (AAC 5)	[3]	2,00	[3]	2,50
	≥ 6,0 (AAC 6)	[3]	3,00	[3]	3,50
Partial factor	γ_{MAAC} [1] [-]	2,0			

1) In absence of other national regulations.
2) The characteristic resistance F_{Rk} at h_{min} 175 mm is also valid for bigger member thickness.
3) No performance assessed.