Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

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European Technical Assessment ETA-07/0121 of 10 April 2015

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 multiple use in concrete and masonry for non-structural applications
Manufacturer	fischerwerke GmbH & Co. KG Klaus-Fischer-Straße 1 72178 Waldachtal DEUTSCHLAND
Manufacturing plant	fischerwerke
This European Technical Assessment contains	27 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	Guideline for European technical approval of "Plastic anchors for multiple use in concrete and masonry for non-structural applications", ETAG 020, Edition March 2012, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The fischer frame fixing in the range SXR 8, SXR 10 and SXRL 10 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel, of galvanised steel with an additional Duplex-coating or of stainless steel.

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

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

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

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A 1
Resistance to fire	See Annex C 2

3.3 Hygiene, health and the environment (BWR 3)

Not applicable

3.4 Safety and accessibility (BWR 4)

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

3.5 Protection against noise (BWR 5)

Not applicable

3.6 Energy economy and heat retention (BWR 6)

Not applicable

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

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

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

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

Product	Intended use	Level or class	System
Plastic anchors for use in concrete and masonry	For use in systems, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems	—	2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

Issued in Berlin on 10 April 2015 by Deutsches Institut für Bautechnik

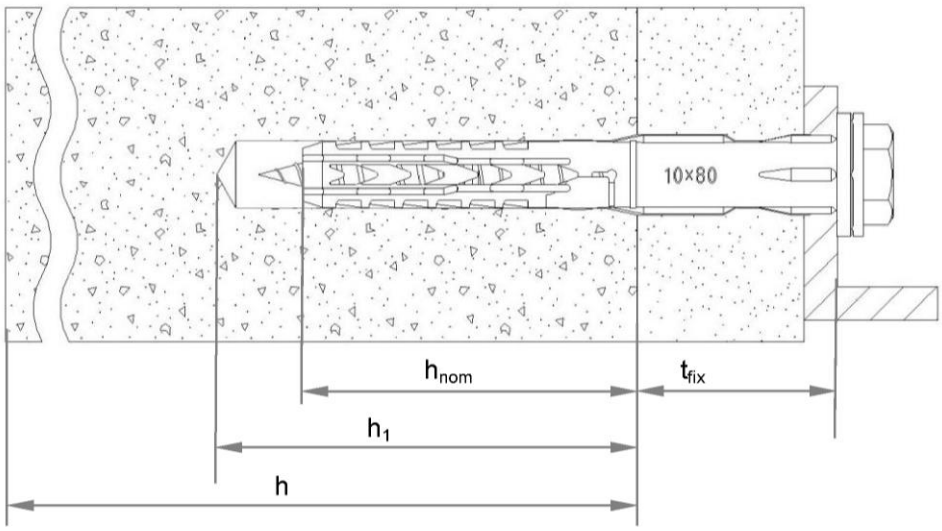
Uwe Bender
Abteilungsleiter

beglaubigt:
Aksünger

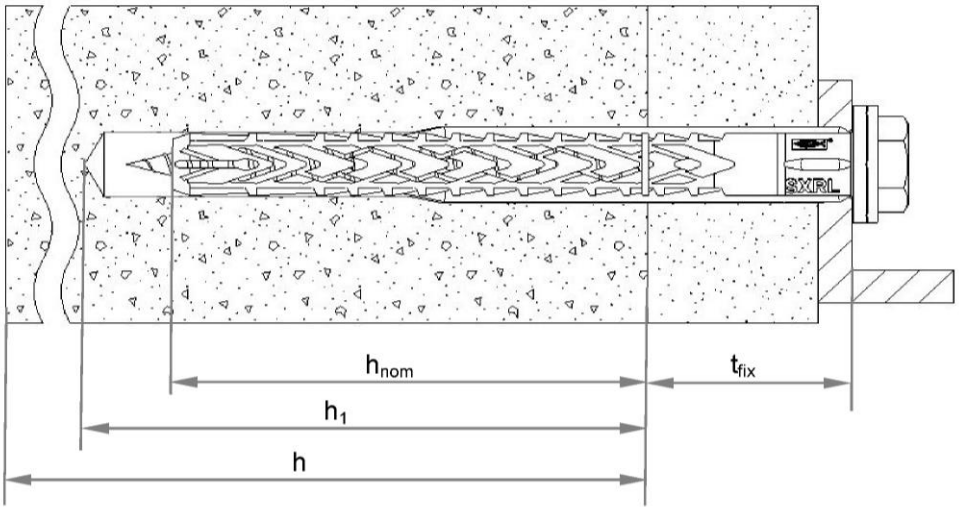
Deutsches Institut für Bautechnik

DIBt

SXR



SXRL



Legend

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

h_1 = depth of drill hole to deepest point

h = thickness of member (wall)

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

fischer frame fixing SXR / SXRL	**Annex A 1**
Product description Installed anchor	

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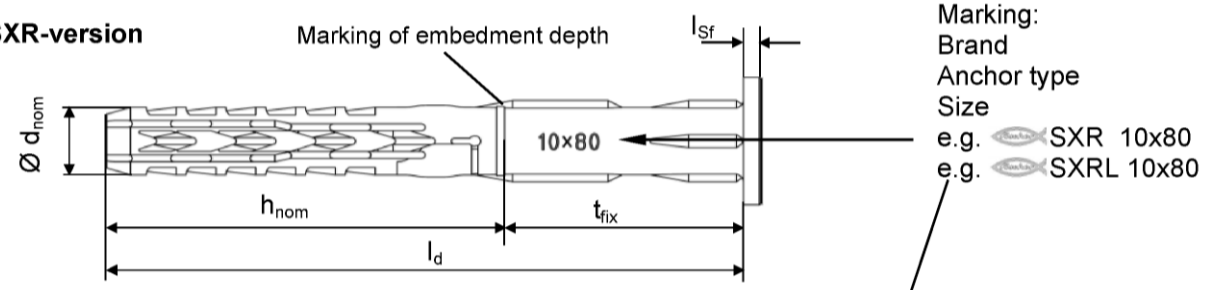
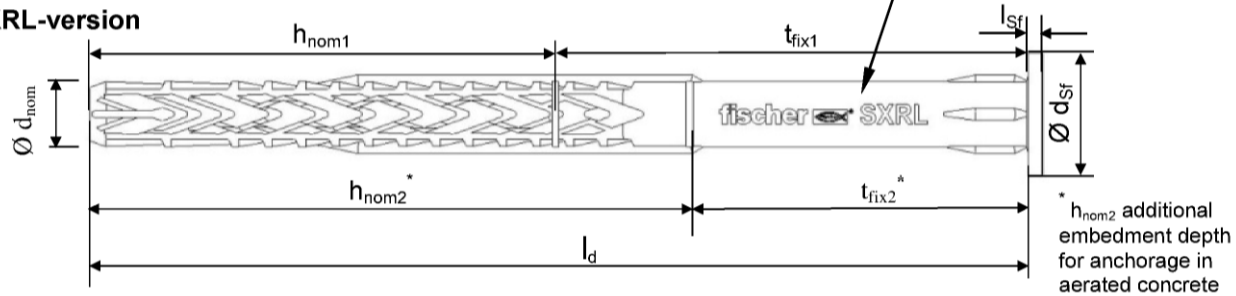
Anchor sleeves – flat collar versions of SXR and SXRL

SXR-version

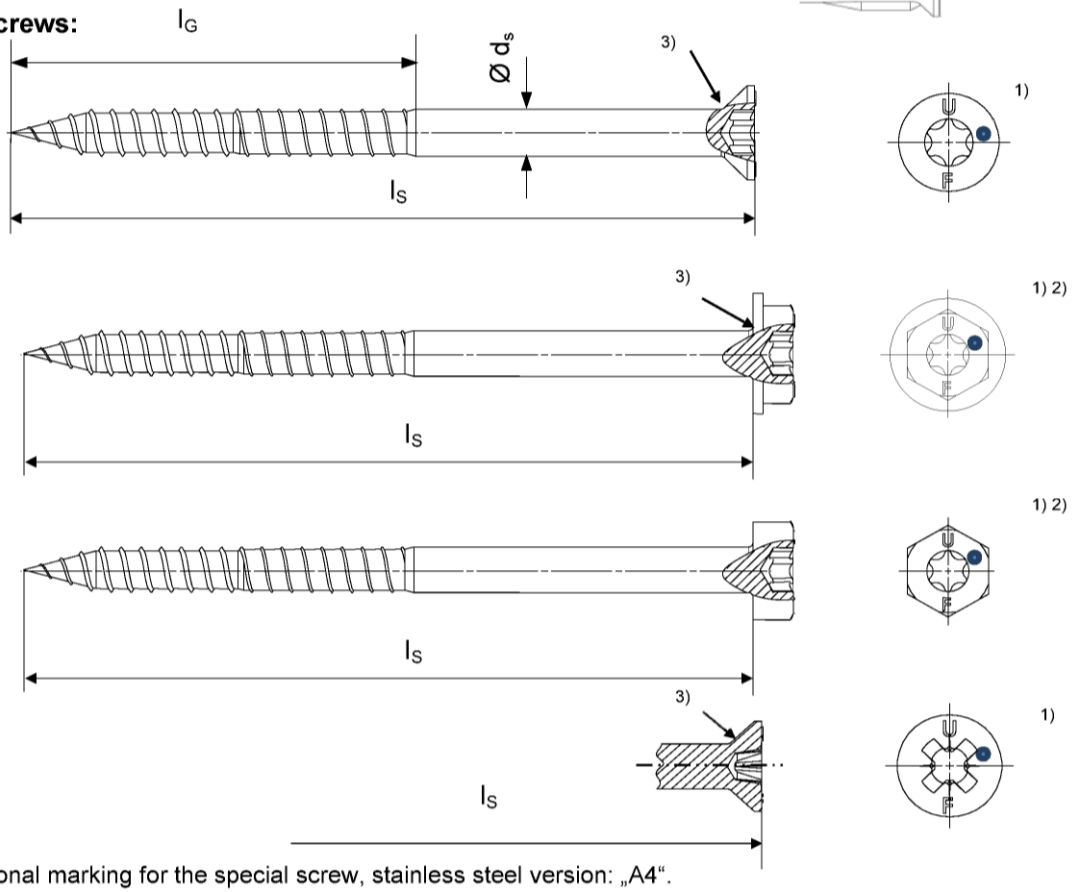


SXRL-version



Countersunk version also available for both versions

Special screws:



1) Additional marking for the special screw, stainless steel version: „A4“.
2) Internal driving feature for Torx bit is optional for hexagonal head
3) Optional additional version with underhead ribs

fischer frame fixing SXR / SXRL	**Annex A 2**
Product description Anchor types / specific screws	

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Table A3.1: Dimensions [mm]

Anchor type	Anchor sleeve						Special screw		
	h_{nom} [mm]	Ø d_{nom} [mm]	t_{fix} [mm]	l_d [mm]	l_{Sf} [3] [mm]	Ø d_{Sf} [mm]	Ø d_s [mm]	l_G [mm]	l_s [mm]
SXR 8	**50**	**8**	**≥ 1**	**51-360**	**1,8**	**15,0**	**6,0**	**≥ 55**	**≥ 57** [2]
SXR 10	**50**	**10**	**≥ 1**	**51-360**	**2,2**	**18,5**	**7,0**	**≥ 57**	**≥ 58** [1]
SXRL 10	**70/90** [4]	**10**	**≥ 1**	**71/91** [4] **-360**	**2,2**	**18,5**	**7,0**	**≥ 77**	**≥ 78/98** [1]

1) To ensure that the screw penetrates the anchor sleeve, l_s must be $l_d + l_{Sf}$ [3] + 7 mm
2) To ensure that the screw penetrates the anchor sleeve, l_s must be $l_d + l_{Sf}$ [3] + 6 mm
3) Only valid for flat collar version
4) Additional for use in aerated concrete

Table A3.2: Materials

Name	Material
Anchor sleeve	Polyamide, PA6, colour grey
Special screw	- Steel gvz A2G or A2F acc. to EN ISO 4042:2001-01 **or** - Steel gvz A2G or A2F acc. to EN ISO 4042:2001-01 + Duplex-coating type Delta-Seal in three layers (total layer thickness ≥ 6 µm) **or** - Stainless steel acc. to EN 10 088-3:2014, e.g. 1.4401, 1.4571, 1.4578, 1.4362

fischer frame fixing SXR / SXRL

Annex A 3

Product description
Dimensions and materials

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Specifications of intended use

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

Base materials:
- Reinforced or unreinforced normal weight concrete with strength classes ≥ C12/15 (use category "a"), according to EN 206-1:2000.
- Solid brick masonry (use category "b"), according to Annex C3, C7, C8 and C14.
  Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (use category "c"), according to Annex C4 – C6, C9 - C15.
- Autoclaved aerated concrete (use category "d"), according to Annex C16.
- Mortar strength class of the masonry ≥ M2,5 according to EN 998-2:2010.
- For other base materials of the use categories "a", "b", "c" and "d" the characteristic resistance of the anchor may be determined by job site tests according to ETAG 020, Annex B, Edition March 2012.

Temperature Range:
SXR 8 and 10
- c: - 40 °C to 50 °C (max. short term temperature + 50 °C and max long term temperature + 30 °C)
- b: - 40 °C to 80 °C (max. short term temperature + 80 °C and max long term temperature + 50 °C)

SXRL 10
- c: - 20 °C to 50 °C (max. short term temperature + 50 °C and max long term temperature + 30 °C)
- b: - 20 °C to 80 °C (max. short term temperature + 80 °C and max long term temperature + 50 °C)

Use conditions (Environmental conditions):
- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- The specific screw made of galvanised steel or galvanised steel with an additional Duplex-coating may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e.g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).

  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:
- The anchorages are to be designed in accordance with the ETAG 020, Annex C under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple use for non-structural application, according to ETAG 020, Edition March 2012.

Installation:
- Hole drilling by the drilling method according to Annex C3 – C16 for use categories "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: -5°C to + 40°C
  SXRL 10: -20°C to + 40°C
- Exposure to UV due to solar radiation of the not protected anchor ≤ 6 weeks.

fischer frame fixing SXR / SXRL	**Annex B 1**
Intended use Specifications	

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Table B2.1: Installation parameters

Anchor type			SXR 8	SXR 10	SXRL 10
Drill hole diameter	d_0 =	[mm]	8	10	10
Cutting diameter of drill bit	d_{cut} ≤	[mm]	8,45	10,45	10,45
Depth of drill hole to deepest point [1]	h_1 ≥	[mm]	60	60	80/100[3]
Overall plastic anchor embedment depth in the base material [1) 2)]	h_{nom} ≥	[mm]	50	50	70/90[3]
Diameter of clearance hole in the fixture	d_f ≤	[mm]	8,5	10,5/12,5[4]	10,5/12,5[4]

1) See Annex A1.
2) If the embedment depth is higher than h_{nom} given in Table B2.1 (only for hollow and perforated masonry), job site tests have to be carried out according to ETAG 020, Annex C.
3) Only for use in aerated concrete.
4) See Table Table C2.1.

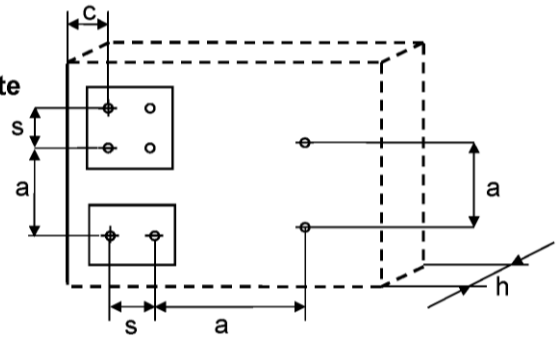
Table B2.2: Minimum thickness of member, edge distance and spacing in concrete

Anchor type		Min. thickness of member h_{min} [mm]	Characteristic edge distance $c_{cr,N}$ [mm]	Characteristic spacing $s_{cr,N}$ [mm]	Min. spacing and edge distances [1] [mm]
SXR 8	≥ C16/20	100	50	65	s_{min} = 50 for c ≥ 50 c_{min} = 50 for s ≥ 50
	C12/15		70	70	s_{min} = 70 for c ≥ 70 c_{min} = 70 for s ≥ 70
SXR 10	≥ C16/20		100	90	s_{min} = 50 for c ≥ 150 c_{min} = 60 for s ≥ 70
	C12/15		140	100	s_{min} = 70 for c ≥ 210 c_{min} = 85 for s ≥ 100
SXRL 10[2)]	≥ C16/20	100	100	105	s_{min} = 50 for c ≥ 100 c_{min} = 50 for s ≥ 125
	C12/15		140	120	s_{min} = 70 for c ≥ 140 c_{min} = 70 for s ≥ 175

1) Intermediate values by linear interpolation.
2) Values valid for reinforced concrete.
Please note: Values for non-reinforced-concrete are h_{min} = 110 mm and $c_{min} = s_{min}$ = 80 mm for concrete ≥ C16/20 and $c_{min} = s_{min}$ = 110 mm for C12/15.

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

Scheme of distance and spacing in concrete



fischer frame fixing SXR / SXRL

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

Annex B 2

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Table B3.1: Minimum distances and dimensions in masonry

Anchor type			SXR 8	SXR 10	SXRL 10
Minimum thickness of member	h_{min}	[mm]	100	100	110
Minimum spacing perpendicular to free edge	$s_{1,min}$	[mm]	100	100	100
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	100	100	100
Minimum edge distance	c_{min}	[mm]	100	100	100

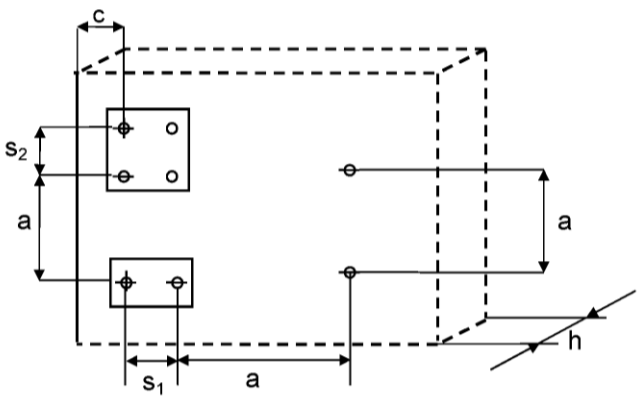
Table B3.2: Minimum distances and dimensions in AAC

Anchor type			SXR 10	SXRL 10
Minimum thickness of member	h_{min}	[mm]	100	175
Minimum spacing perpendicular to free edge	$s_{1,min}$	[mm]	200	100/120[1)]
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	400	100/120[1)]
Minimum edge distance	c_{min}	[mm]	100	100/120[1)]

[1)] Valid for AAC ≥ 600 kg/m³

Scheme of distance and spacing in masonry and AAC

a ≥ max (250 mm; $s_{1,min}$; $s_{2,min}$)



fischer frame fixing SXR / SXRL	**Annex B 3**
Intended use Installation parameters, edge distances and spacing's for use in masonry and AAC	

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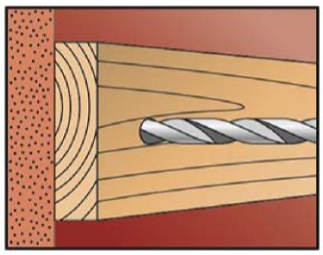
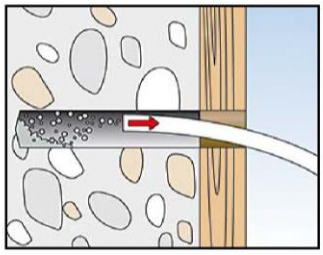
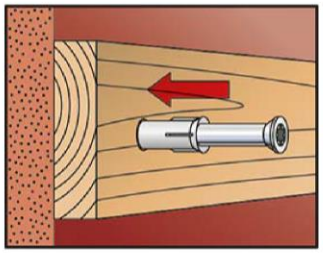
Installation instructions (the following pictures show fixing through timber)



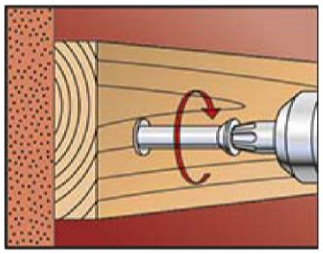
1. Drill the bore hole Ø 8 mm (SXR 8) and Ø 10 mm (SXR 10 / SXRL 10) using the drill method described in the corresponding annex.



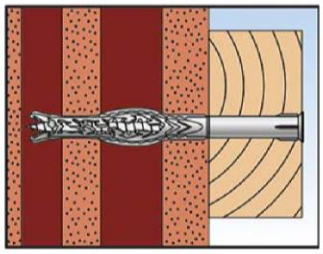
2. Remove dust from borehole.



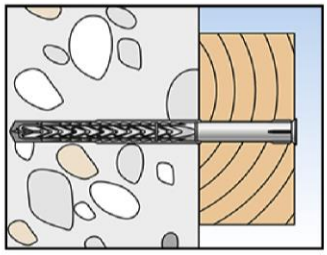
3. Insert anchor (screw and plug) by using a hammer until the collar of the plastic sleeve is flush with the surface of the fixture.



4. The screw is screwed-in until the head of the screw touches the sleeve.



5. Correctly installed anchor in hollow masonry.



6. Correctly installed anchor in concrete.

fischer frame fixing SXR / SXRL

Intended use
Installation instructions

Annex B 4

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Table C1.1: Characteristic bending resistance of the screw

Anchor type		SXR 8		SXR 10		SXRL 10	
Material		galvanised steel	stainless steel	galvanised steel	stainless steel	galvanised steel	stainless steel
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	**12,4**	**10,4**	**20,6**	**20,6**	**20,6/ 23,6**[2)]	**20,6**
Partial safety factor	γ_{Ms} [1)]	**1,25**	**1,29**	**1,25**	**1,25**	**1,25**	**1,25**

1) In absence of other national regulations.
2) "High load" screw version on request only for countersunk screws – head marking is ●●

Table C1.2: Characteristic resistance of the screw

Failure of expansion element (special screw)		SXR 8		SXR 10		SXRL 10	
		galvanised steel	stainless steel	galvanised steel	stainless steel	galvanised steel	stainless steel
Characteristic tension resistance	$N_{Rk,s}$ [kN]	**14,8**	**12,3**	**21,7**	**21,7**	**21,7 /24,9**[2)]	**21,7**
Partial safety factor	γ_{Ms} [1)]	**1,50**	**1,55**	**1,55**	**1,55**	**1,55**	**1,55**
Characteristic shear resistance	$V_{Rk,s}$ [kN]	**7,4**	**6,2**	**10,8**	**10,8**	**10,8/ 12,4**[2)]	**10,8**
Partial safety factor	γ_{Ms} [1)]	**1,25**	**1,29**	**1,29**	**1,29**	**1,29**	**1,29**

1) In absence of other national regulations.
2) "High load" screw version on request only for countersunk screws – head marking is ●●

Table C1.3: Characteristic resistance for use in concrete

Pull-out failure (plastic sleeve)		SXR 8		SXR 10		SXRL 10	
Temperature range		30/50 °C	50/80 °C	30/50 °C	50/80 °C	30/50 °C	50/80 °C
Concrete ≥ C12/15							
Characteristic resistance	$N_{Rk,p}$ [kN]	**3,0**	**2,5 / 3,0**[2)]	**5,0**	**4,5**	**6,5**	**6,5**
Partial safety factor	γ_{Mc} [1)]	**1,8**					

1) In absence of other national regulations.
2) Value corresponds to concrete class ≥ C16/20.

fischer frame fixing SXR / SXRL	**Annex C 1**
Performances Characteristic resistance and characteristic bending resistance of the screw Characteristic resistance for use in concrete	

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Table C2.1: Displacements[1] under tension and shear loading in concrete and masonry

Anchor type		Tension load [2]		Shear load [2]	
	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
SXR 8	1,2	0,65	1,30	1,02	1,53
SXR 10	2,0	1,29	2,58	1,15/3,05[3]	1,74/4,58[3]
SXRL 10	2,6	1,67	3,34	1,15/3,05[3]	1,74/4,58[3]

1) Valid for all ranges of temperatures.
2) Intermediate values by linear interpolation.
3) Valid for diameter in the clearance hole ≤ 12,5 mm (see Table B2.1).

Table C2.2: Displacements[1] under tension und shear loading in autoclaved aerated concrete AAC

Anchor type		Tension load [2]		Shear load [2]	
	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
SXR 10	0,32	0,03	0,06	0,21	0,31
SXRL 10 AAC2	0,32	0,23	0,46	0,64	0,96
SXRL 10 AAC6	1,43	0,65	1,3	2,86	4,29

1) Valid for all ranges of temperatures.
2) Intermediate values by linear interpolation.

Table C2.3: Characteristic values under fire exposure in concrete C20/25 to C50/60 in any load direction, no permanent centric tension load and without lever arm

Anchor type	Fire resistance class	F_{Rk}
SXR 10	R 90	0,8 kN
SXRL 10		

fischer frame fixing SXR / SXRL	Annex C 2
Performances Displacements under tension and shear loading in concrete and masonry and AAC, Characteristic resistance under fire exposure	

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Table C3.1: SXR 8 characteristic resistance F_{Rk} in [kN] in solid masonry (use category "b")

Base material [**Supplier** *Title*]	Min. DF or min. size (L x W x H) [mm]	Bulk density class ρ [kg/dm³]	Min. Compressive strength f_b [N/mm²]	Drill method [1]	Characteristic resistance F_{RK} **SXR 8** [kN] 50/80 °C
Clay brick Mz, e.g. Mz acc. to DIN 105-100, EN 771-1:2011 e.g. **Schlagmann,** *Mz*	3 DF (240x175x113)	≥ 1,8	20	H	**3,0**
			10		**2,0**
Clay brick Mz, e.g. Mz acc. to DIN 105-100:2012-01, EN 771-1:2011. e.g. **Schlagmann,** Mz	NF (240x115x71)	≥ 1,8	20	H	**2,5**
			10		**2,0**
Clay brick Mz, e.g. Mz acc. to DIN EN 771-1:2011+ A1:2014, e.g. **Wienerberger DK,** *MS*	DF (240x115x52)	≥ 1,8	28	H	**3,0**
			20		**2,0**
			10		**1,5**
Calcium silicate solid brick e.g. KS acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding,** *KS*	NF (240x115x71)	≥ 1,8	20	H	**2,5**
			10		**2,0**
	(175x500x235)	≥ 2,0	20		**3,0**
			10		**2,5**
Lightweight solid brick, e.g. acc. to DIN V 18152-100:2005, EN 771-3:2011 e.g. **KLB,** *V*	(240x115x113)	≥ 1,2	2	H	**0,9**
	(240x490x115)	≥ 1,0	2		**1,2**
	(240x490x115)	≥ 1,8	8		**2,5**
			4		**1,2**
	(240x240x245)	≥ 1,4	6		**0,9**
			4		**0,6 /0,75** [2]
Solid block normal concrete VBN acc. to DIN 18153-100:2005, EN 771-3:2011 e.g. **Adolf Blatt**, *Vbn*	(246x240x245)	≥ 1,8	12	H	**2,5**
			8		**1,5**
			4		**0,75**
Partial safety factor				γ_{Mm} [3]	**2,5**

[1] H = Hammer drilling, R = Rotary drilling.
[2] The value F_{Rk} is valid for temperature range 30/50 °C only.
[3] In absence of other national regulations.

fischer frame fixing SXR / SXRL	**Annex C 3**
Performances Characteristic resistance SXR 8 for use in solid masonry	

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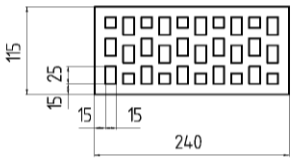
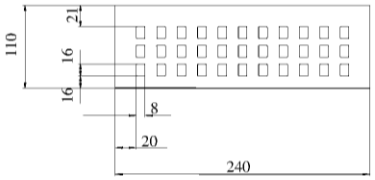
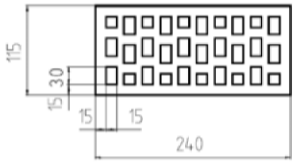
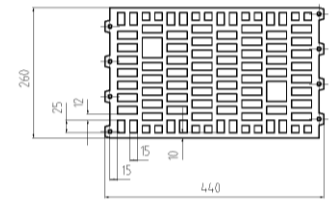
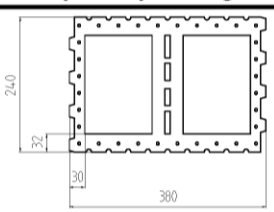
Table C4.1: SXR 8 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry ("c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	min. compressive strength f_b [N/mm²] bulk density ≥ ρ [kg/dm³]	Characteristic resistance F_{Rk} **SXR 8** [kN] 50/80 °C
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011 e.g. **Wienerberger,** *HLz*	 2 DF (240x115x113) by rotary drilling	20/1.2	**1,2**
		8/1,2	**0,5**
Clay brick, HLz acc. DIN EN 771-1:2011+ A1:2014, e.g. **Wienerberger,** *BS*	 DF (240x110x52) by hammer drilling	28/1,5	**2,5**
		20/1,5	**1,2 / 1,5**[2)]
		10/1,5	**0,6 / 0,9**[2)]
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011 e.g. **Schlagmann,** *HLz*	 2 DF (240x115x113) by rotary drilling	12/1,0	**0,6**
		8/1,0	**0,4**
	 (260x240x440) by rotary drilling	8/0,9	**0,9**
		6/0,9	**0,6**
		4/0,9	**0,4**
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011, **Schlagmann** *Planfüllziegel*	 12 DF (380x240x240) by rotary drilling	6/0,7	**1,2**
		4/0,7	**0,75**
		2/0,7	**0,4**
Partial safety factor		γ_{Mm}[3)]	**2,5**

Footnotes see Annex C3

fischer frame fixing SXR / SXRL	**Annex C 4**
Performances Characteristic resistance SXR 8 for use in hollow or perforated masonry	

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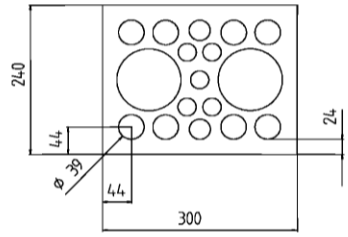
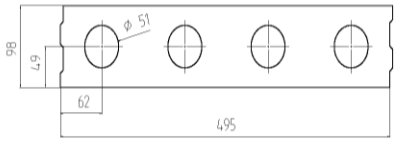
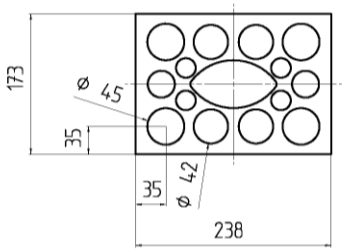
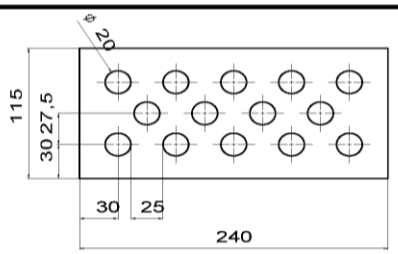
Table C5.1: SXR 8 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry ("c")

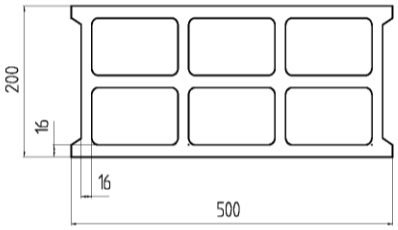
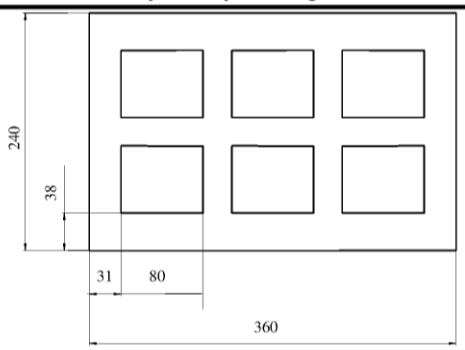
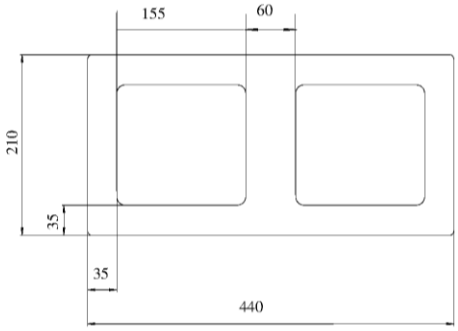
Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ≥ ρ [kg/dm³]	Characteristic resistance F_{RK} **SXR 8** [kN] 50/80 °C
Hollow calcium silicate brick acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding,** *KSL*	 5 DF (300x240x115) by hammer drilling	16/1,4	**2,0**
		6/1,4	**0,75 /0,9**[2)]
	 P10 (495x98x248) by hammer drilling	6/1,2	**1,2 / 1,5**[2)]
		2/1,2	**0,4 / 0,5**[2)]
	 3 DF (240x175x113) by hammer drilling	20/1,4	**1,2 / 1,5**[2)]
		8/1,4	**0,5 / 0,6**[2)]
	 2 DF (240x115x113) by hammer drilling	12/1,4	**2,0**
		6/1,4	**0,9**
Partial safety factor		γ_{Mm}[3)]	**2,5**

Footnotes see Annex C3

fischer frame fixing SXR / SXRL	**Annex C 5**
Performances Characteristic resistance SXR 8 for use in hollow or perforated masonry	

Deutsches Institut für Bautechnik DIBt

Table C6.1: SXR 8 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry ("c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	min. compressive strength f_b [N/mm²] / bulk density ≥ ρ [kg/dm³]	Characteristic resistance F_{Rk} **SXR 8** [kN] 50/80 °C
Hollow block lightweight concrete, acc. to NF-P 14-301, EN 771-3:2011, e.g. **Sepa Parpaing,** *Hbl*	 (500x200x200) by rotary drilling	4/0,9	**0,3 / 0,4**[2)]
Hollow brick lightweight concrete, e.g. acc. to DIN V 18151-100:2005-10, EN 771-3:2011, e.g. **KLB, Hbl**	 (240x240x360) by hammer drilling	6/1,0	**1,5**
Hollow brick lightweight concrete, e.g. acc. to EN 771-3:2011, e.g. **Roadstone masonry**	 (440x210x215) by hammer drilling	10/1,2	**2,5**
		6/1,2	**1,5**
Partial safety factor		γ_{Mm} [3)]	**2,5**

Footnotes see Annex C3

fischer frame fixing SXR / SXRL	**Annex C 6**
Performances Characteristic resistance SXR 8 for use in hollow or perforated masonry	

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Table C7.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in solid masonry (use category "b")

Base material [**Supplier** *Title*]	Min. DF or min. size (L x W x H) [mm]	Min. compressive strength f_b [N/mm²] / bulk density ≥ ρ [kg/dm³]	Drill method [1]	Characteristic resistance F_{Rk} [kN]	
				SXR 10 h_{nom} ≥ 50mm	**SXRL 10** h_{nom} ≥ 70mm
				50/80 °C	50/80 °C
Clay brick, Mz e.g. acc. to DIN 105-100:2012-01, EN 771-1:2011, e.g. **Schlagmann**, *Mz*	NF (240x115x71)	36/1,8	H	**5,0**	**4,0 / 5,5**[3]
		20/1,8		**3,0 / 3,5**[4]	**4,0 / 5,5**[3]
		12/1,8		**2,0**	**4,0 / 5,5**[3]
		10/1,8		**2,0**	**3,5 / 4,5**[3]
	3 DF (240x175x113)	20/1,8	H	**2,0**	-
				4,0[2] **/ 4,5**[2][4]	-
		10/1,8		**1,5**	-
				3,0[2]	-
Clay brick, Mz e.g. acc. to DIN EN 771-1:2011 + A1:2014, e.g. **Wienerberger,** *MS*	DF (240x115x52)	28/1,8	H	**3,0**	**5,5 / 6,5**[3]
		20/1,8		**2,0**	**4,0 / 4,5**[3]
		10/1,8		**1,2**	**2,5 / 3**[3]
Clay brick, Mz e.g. acc. to DIN 105-100:2012-01 EN 771-1:2011	NF (240x111x71)	20/1,8	H	**3,0**	-
		10/1,8		**2,0**	-
Calcium silicate solid brick KS e.g. acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding**, *KS*	NF (240x115x71)	20/1,8	H	**2,5 / 4,0**[2]	**3,5**
		10/1,8		**1,5**	**2,5**
	NF (240x115x71)	36/2,0	H	**5,0**	-
		20/2,0		**3,0 / 3,5**[4]	-
		10/2,0		**2,0**	-
	(500x175x240)	28/2,0	H	**5,0**	-
		20/2,0		**4,5**	-
		12/1,8		-	**6,5 / 8,5**[2]
		10/2,0		**3,0**	**5,5 / 7,0**[2]
Lightweight solid brick, e.g. acc. to DIN V 18152-100:2005, EN 771-3:2011, e.g. **Liapor** *Super-K*	(500x240x248)	2/0,8	R	-	**0,5**
Partial safety factor			γ_{Mm} [5]	**2,5**	

1) H = Hammer drilling, R = Rotary drilling.
2) Only for edge distance c ≥ 200 mm; intermediate values by linear interpolation.
3) Only for edge distance c ≥ 150 mm; intermediate values by linear interpolation.
4) The value F_{Rk} is valid for temperature range 30/50 °C only.
5) In absence of other national regulations.

fischer frame fixing SXR / SXRL

Performances
Characteristic resistance SXR 10 / SXRL 10 for use in solid masonry

Annex C 7

Deutsches Institut für Bautechnik DIBt

Table C8.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in solid masonry (use category"b")

Base material [**Supplier** *Title*]	Min. DF or min. size (L x W x H) [mm]	Min. compressive strength f_b [N/mm²] / bulk density ≥ ρ [kg/dm³]	Drill method [1]	Characteristic resistance F_{Rk} [kN]	
				SXR 10 h_{nom} ≥ 50mm	**SXRL 10 h_{nom} ≥ 70mm**
				50/80 °C	50/80 °C
Lightweight solid brick, e.g. acc. to DIN V 18152-100:2005 EN 771-3:2011 e.g. **KLB,** *V*	2 DF (240x115x113)	4/1,4	H	**0,75**	**2,5**
		2/1,2		**0,75 / 0,9** [3]	**1,2**
	(490x115x240)	2/1,2	H	**1,2**	**1,2**
	(250x240x245)	10/1,6	H	**2,5**	**7,5**
		6/1,6		**2,5**	**4,5**
	(490x115x240)	8/1,6	H	**3,0**	**3,0**
	(490x115x240)	12/1,8	H	-	**3,0 / 4,5** [3]
		8/1,8		-	**2,0 / 3,0** [3]
Solid block normal concrete VBN acc. to DIN 18153-100:2005, EN 771-3:2011 e.g. **Adolf Blatt**, *Vbn*	(250x240x250)	20/1,8	H	**4,5**	-
		10/1,8		**3,0**	-
Partial safety factor			γ_{Mm} [5]	**2,5**	

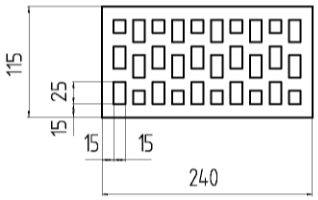
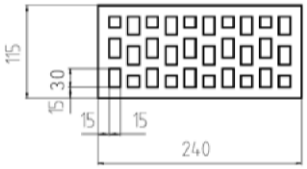
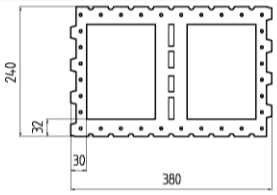
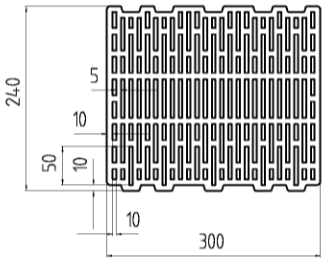
Footnotes see Annex C7

fischer frame fixing SXR / SXRL
Performances
Characteristic resistance SXR 10 / SXRL 10 for use in solid masonry

Annex C 8

Deutsches Institut für Bautechnik DIBt

Table C9.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{RK} [kN]	
			SXR 10 h_{nom} 50mm	**SXRL 10 h_{nom} 70mm**
			50/80 °C	50/80 °C
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011 e.g. **Wienerberger**	 2DF (240x115x113) by rotary drilling	20/1,0	**2,0**	-
		10/1,0	**1,2**	-
		20/1,2	**2,5 / 3,0**[3)4)]	-
		10/1,2	**1,5 / 2,0**[4)]	-
Clay brick HLz acc. to EN 771-1:2011	 2DF (240x115x113) by rotary drilling	28/1,2	-	**2,0**
		20/1,2		**1,2**
		10/1,2		**0,6**
		12/1,0	**0,9**	**0,75**
		10/1,0	**0,75**	**0,6**
		8/1,0	**0,6**	-
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011, e.g. **Schlagmann** *Planfüllziegel*	 12 DF(380x240x240) by rotary drilling	6/0,7	**2,0**	-
Clay brick Form B, HLz acc. to DIN 105-100:2012-01, EN 771-1:2011 e.g. **Schlagmann** *Poroton T14*	 (240x300x240) by rotary drilling	6/0,7	**0,3 / 0,4**[4)]	**0,5**
Partial safety factor		γ_{Mm}[5)]	**2,5**	

Footnotes see Annex C7

fischer frame fixing SXR / SXRL	**Annex C 9**
Performances Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry	

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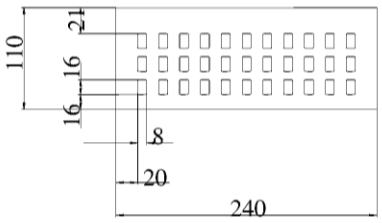
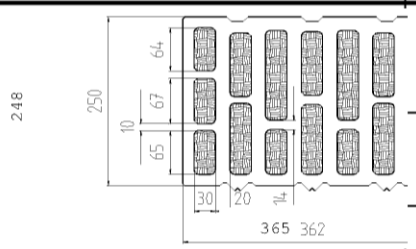
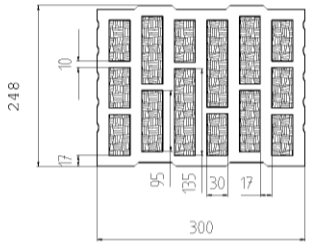
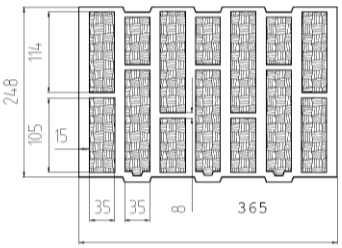
Table C10.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{RK} [kN]	
			SXR 10 h_{nom} 50mm	**SXRL 10 h_{nom} 70mm**
			50/80 °C	50/80 °C
Clay brick, HLz acc. to DIN EN 771-1:2011 +A1:2014, e.g. **Wienerberger,** *BS*	 DF (240x110x52) by hammer drilling	28/1,5	**2,5**	-
		20/1,5	**2,0**	-
		10/1,5	**1,2**	-
Clay brick, HLz acc. to EN 771-1:2011, e.g. **Schlagmann** *Poroton S 11*	 (248x365x250) by rotary drilling	8/0,8	-	**1,5**
		6/0,8	-	**1,2**
		4/0,8	-	**0,75**
Clay brick, HLz acc. to EN 771-1:2011, e.g. **Schlagmann** *Poroton S 10*	 (248x300x249) by rotary drilling	6/0,7	-	**1,5**
		4/0,7	-	**0,9**
Clay brick, HLz acc. to EN 771-1:2011, e.g. **Schlagmann** *Poroton T8*	 (248x365x249) by rotary drilling	4/0,6	-	**1,2**
		2/0,6	-	**0,6**
Partial safety factor		γ_{Mm} [5)]	**2,5**	

Footnotes see Annex C7

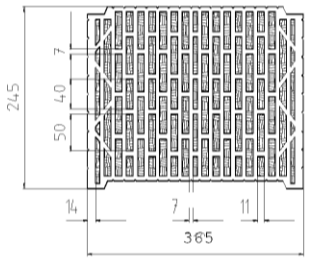
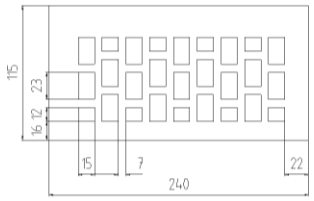
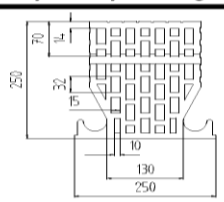
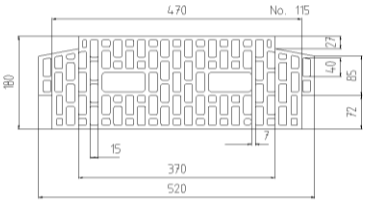
fischer frame fixing SXR / SXRL

Annex C 10

Performances
Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry

Deutsches Institut für Bautechnik DIBt

Table C11.1: SXRL 10 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

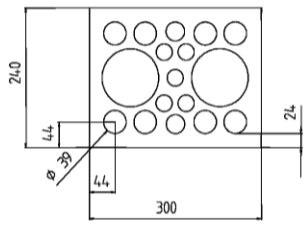
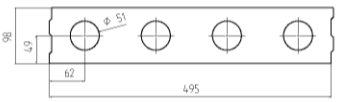
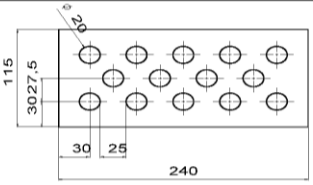
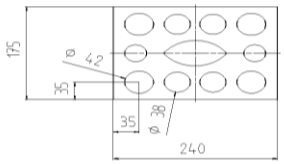
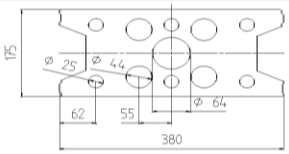
Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{RK} [kN] **SXRL 10** h_{nom} **70mm** 50/80 °C
Clay brick, HLz acc. to EN 771-1:2011, e.g.**Hörl & Hartmann** *Coriso WS 09*	 (245x365x248) by rotary drilling	6/0,8	**0,9**
		4/0,8	**0,6**
		2/0,8	**0,3**
Clay brick, KHLz acc. to EN 771-1:2011, e.g. **Wienerberger** *VHLz*	 2 DF (240x115x113) by rotary drilling	48/1,6	**4,5**
		20/1,6	**1,5**
		10/1,6	**0,9**
Ceiling block acc. to DIN 4159:2014-05, e.g.**Hörl & Hartmann** *ceiling block*	 (250x250x190) by rotary drilling	10/0,7	**2,0**
		8/0,7	**1,5**
		6/0,7	**1,2**
Ceiling clay block acc. to EN 15037-3:2011, e.g.**Hörl & Hartmann** *block for beam-and-block ceilings*	 (250x520x180) by rotary drilling	8/0,7	**1,5**
		6/0,7	**1,2**
		4/0,7	**0,9**
Partial safety factor		γ_{Mm} [5)]	**2,5**

Footnotes see Annex C7

fischer frame fixing SXR / SXRL	**Annex C 11**
Performances Characteristic resistance SXRL 10 for use in hollow or perforated masonry	

Deutsches Institut für Bautechnik DIBt

Table C12.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{RK} [kN]	
			SXR 10 h_{nom} 50mm	**SXRL 10 h_{nom} 70mm**
			50/80 °C	50/80 °C
Hollow calcium silicate brick,acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding,** *KSL*	 5 DF(300x240x115) by hammer drilling	16/1,4	**3,0 / 3,5**[3)4)]	-
		10/1,4	**1,5**	
	 P10 (495x98x248) by hammer drilling	6/1,2	**1,5**	-
			2,0[3)] **/ 2,5** [3)4)]	
Hollow calcium silicate brick acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding,** *KSL*	 2 DF (240x115x113) by hammer drilling	12/1,4	**2,0 / 2,5**[4)]	**2,5**
		10/1,4	**2,0**	**2,0**
		8/1,4	**1,5**	**1,5**
	 3 DF (240x175x113) by hammer drilling	16/1,4	-	**1,5**
		10/1,4	-	**0,9**
		8/1,4	-	**0,75**
		6/1,4	-	**0,6**
Hollow calcium silicate brick acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **Xella,** *KS*	 9 DF (380x175x240) by hammer drilling	20/1,4	-	**3,5**
		10/1,4	-	**2,0**
Partial safety factor		γ_{Mm}[5)]	**2,5**	

Footnotes see Annex C7

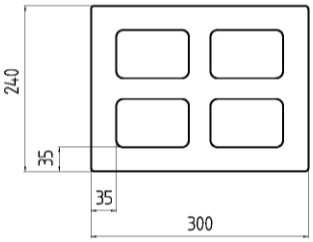
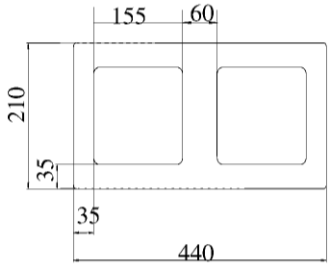
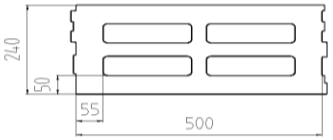
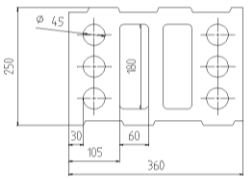
fischer frame fixing SXR / SXRL

Performances
Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry

Annex C 12

Deutsches Institut für Bautechnik DIBt

Table C13.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in hollow or perforated masonry (use category "c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{RK} [kN]	
			SXR 10 h_{nom} **50mm**	**SXRL 10** h_{nom} **70mm**
			50/80 °C	50/80 °C
Hollow brick normal concrete,e.g. acc. to DIN V 18151-100:2005, EN 771-3:2011, e.g. **Adolf Blatt**, *Hbn*	 (300x240x240) by hammer drilling	6/1,6	**2,5**	**2,0**
Hollow brick lightweight concrete, e.g. acc. to DIN V18153-100:2005-10, EN 771-3, e.g. **KLB,** *Hbl*		2/1,2	**1,5**	-
Hollow brick lightweight concrete, e.g. acc. to EN 771-3, e.g. **Roadstone masonry**	 (440x210x215) by hammer drilling	10/1,2	-	**2,5**
		8/1,2	**2,5**	**2,0**
		6/1,6	**2,0**	**1,5**
Hollow brick lightweight concrete, acc. to EN 771-3, e.g. **Knobel**	 (240x500x240) by rotary drilling	2/0,7	-	**2,5**
Hollow brick lightweight concrete, e.g. acc. to DIN V 18151-100, EN 771-3, e.g. **KLB,** *Hbl*	 (250x360x250) by rotary drilling	2/0,9	-	**0,75**
Partial safety factor		γ_{Mm} [5)]	**2,5**	

Footnotes see Annex C7

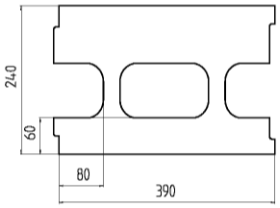
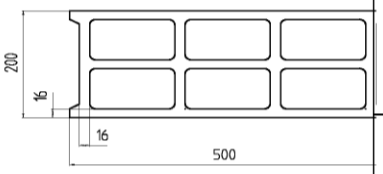
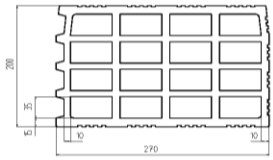
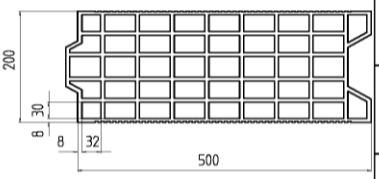
fischer frame fixing SXR / SXRL

Performances
Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry

Annex C 13

Deutsches Institut für Bautechnik DIBt

Table C14.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in solid masonry and hollow or perforated masonry (use categories "b" + "c")

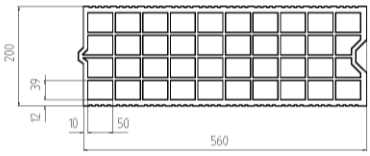
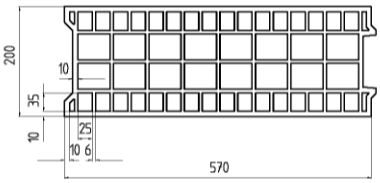
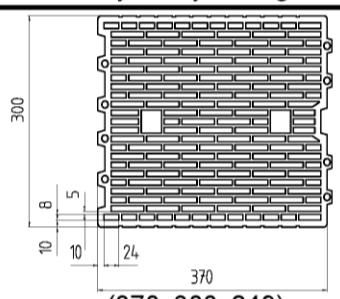
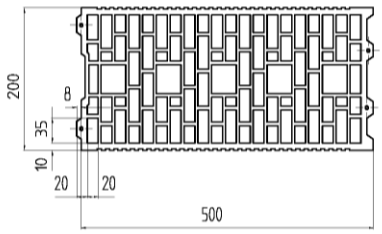
Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{Rk} [kN]	
			SXR 10 h_{nom} 50mm	**SXRL 10 h_{nom} 70mm**
			50/80 °C	50/80 °C
Solid brick, normal weight concrete, e.g. **Tarmac,** *Vbn*	(440x100x215) by hammer drilling	16/1,8	**4,0 / 4,5[4])**	**5,5**
		10/1,8	**2,5 / 3,0[4])**	**3,5**
Solid brick, lightweight concrete, e.g. **Tarmac,** *Vbl*	(440x100x215) by rotary drilling	6/1,4	**2,0 / 2,5[2])**	**2,0 / 3,0[3])**
Heat insulation block e.g. **Gisoton** *WDB*	 10 DF (390x240x240) by hammer drilling	2/0,7	**1,5**	-
Hollow block, lightweight concrete, acc. to NF-P 14-301, EN 771-3:2011, e.g. **Sepa Parpaing,** *Hbl*	 (500x200x200) by rotary drilling	6/0,9	-	**0,5**
		4/0,9	**0,9/1,2[2])/1,5[2])[4])**	**0,3**
Clay bricks, HLz acc. to NF-P 13-301 EN 771-1:2011, e.g. **Imerys** *Gelimatic*	 (500x200x270) by rotary drilling	6/0,6	**0,6 / 0,75[2])[4])**	**1,5**
		4/0,6	-	**0,9**
		2/0,6		**0,5**
Clay bricks, HLz acc. to NF-P 13-301 EN 771-1:2011, e.g. **Terreal** *Calibric*	 (500x200x220) by rotary drilling	8/0,7	**0,6 / 0,75[2])[4])**	**0,9**
		6/0,7	-	**0,75**
		4/0,7		**0,4**
Partial safety factor		γ_{Mm}[5)]	**2,5**	

Footnotes see Annex C7

fischer frame fixing SXR / SXRL	**Annex C 14**
Performances Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry	

Deutsches Institut für Bautechnik DIBt

Table C15.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in solid masonry and hollow or perforated masonry (use category "c")

Base material [**Supplier** *Title*]	Geometry and DF or size (L x W x H) and drilling method [mm]	Min. compressive strength f_b [N/mm²] / bulk density ρ [kg/dm³]	Characteristic resistance F_{Rk} [kN]	
			SXR 10 h_{nom} 50mm	**SXRL 10 h_{nom} 70mm**
			50/80 °C	50/80 °C
Clay bricks Form B, HLz acc. to NF-P 13-301, EN 771-1:2011, e.g. **Imerys** *Optibric*	 (560x200x275) by rotary drilling	10/0,6	**1,2**	**1,5**
		8/0,6	-	**1,2**
		6/0,6	-	**0,9**
		4/0,6	-	**0,6**
Clay brick, HLz acc. to NF-P 13-301, EN 771-1:2011, e.g. **Bouyer Leroux** *BGV*	 (570x200x315) by rotary drilling	6/0,6	**0,75 /0,9[3]/ 1,2[3)4)]**	**0,9**
Clay brick, HLz acc. to NF-P 13-301, EN 771-1:2011, e.g. **Wienerberger** *Porotherm 30 R*	 (370x300x249) by rotary drilling	10/0,7	**0,5 / 0,6[3)]**	-
Clay brick Form B, Hlz acc. NF-P 13-301 EN 771-1:2011, e.g. **Wienerberger** *Porotherm GF R20*	 (500x200x299) by rotary drilling	10/0,7	**0,6 / 0,75[3)]**	**0,9**
Partial safety factor		γ_{Mm}[5)]	**2,5**	

Footnotes see Annex C7

fischer frame fixing SXR / SXRL	**Annex C 15**
Performances Characteristic resistance SXR 10 / SXRL 10 for use in hollow or perforated masonry	

Deutsches Institut für Bautechnik DIBt

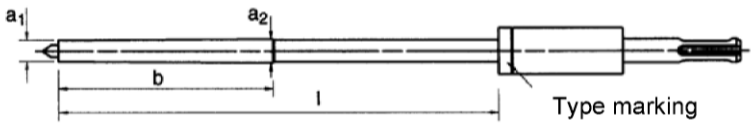
Table C16.1: SXR 10 / SXRL 10 characteristic resistance F_{Rk} in [kN] in autoclaved aerated concrete (AAC) , use category "d"

Base material	Min. compressive strength f_b [N/mm²]	Characteristic resistance F_{RK} [kN] SXR 10			Characteristic resistance F_{RK} [kN] SXRL 10		
		Drilling method	h_{nom} 50mm		Drilling method	50/80 °C	
			30/50 °C	50/80 °C		h_{nom1} 70mm	h_{nom2} 90mm
Autoclaved aerated concrete blocks, e.g. AAC acc. to DIN V 4165-100: 2005-10, EN 771-4	2	with AAC hole punch[2], using the hammer drilling of the power drill	**0,5**	**0,4**	hammer or rotary drilling	**0,75**	**0,9**
	3		**0,5**	**0,4**		**1,2**	**1,5**
	4	Drill bit, rotary drilling-	**0,9**	**0,75**		**2,0**	**2,5**
	6		**0,9**	**0,75**		**3,0**	**4,0**
Partial safety factor					γ_{MAA} [1]	**2,0**	

1) In absence of other national regulations.
2) For the fixing in autoclaved aerated concrete with a nominal compressive strength f_{ck} < 4 N/mm² the hole is made by using the accompanying AAC Hole Punch according Table C15.2.

Table C15.2: Assignment AAC Hole Punch type – anchor type (length) only for AAC2 SXR 10

Hole Punch only for SXR 10 h_{nom} = 50 mm in AAC2					Anchor type (length)
Type	a_1	a_2	b	l	
GBS 10 x 80	9	10	80	85	SXR 10 x **52** SXR 10 x **60** SXR 10 x **80**
GBS 10 x 100			90	105	SXR 10 x **100**
GBS 10 x 135				140	SXR 10 x **120**
GBS 10 x 160				165	SXR 10 x **140** SXR 10 x **160**
GBS 10 x 185				190	SXR 10 x **180**
GBS 10 x 230				235	SXR 10 x **200** SXR 10 x **230**



fischer frame fixing SXR / SXRL

Performances
Characteristic resistance SXR 10 / SXRL 10 for use in autoclaved aerated concrete

Annex C 16