Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-14/0297 of 5 September 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	SXRL 14
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 Weinhalde 14-18 72178 Waldachtal DEUTSCHLAND
Manufacturing plant	fischerwerke
This European Technical Assessment contains	15 pages including 11 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non", ETAG 020 structural Applications - Part 1: "General", 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

Technical description of the product

1 The fischer frame fixing SXRL 14 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw 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 1

3.3 Hygiene, health and the environment (BWR 3)

Not applicable

3.4 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annex C 1 – C 4
Characteristic resistance for bending moments	See Annex C 1
Displacements under shear and tension loads	See Annex C 1 + C 4
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 11 September 2014 by Deutsches Institut für Bautechnik

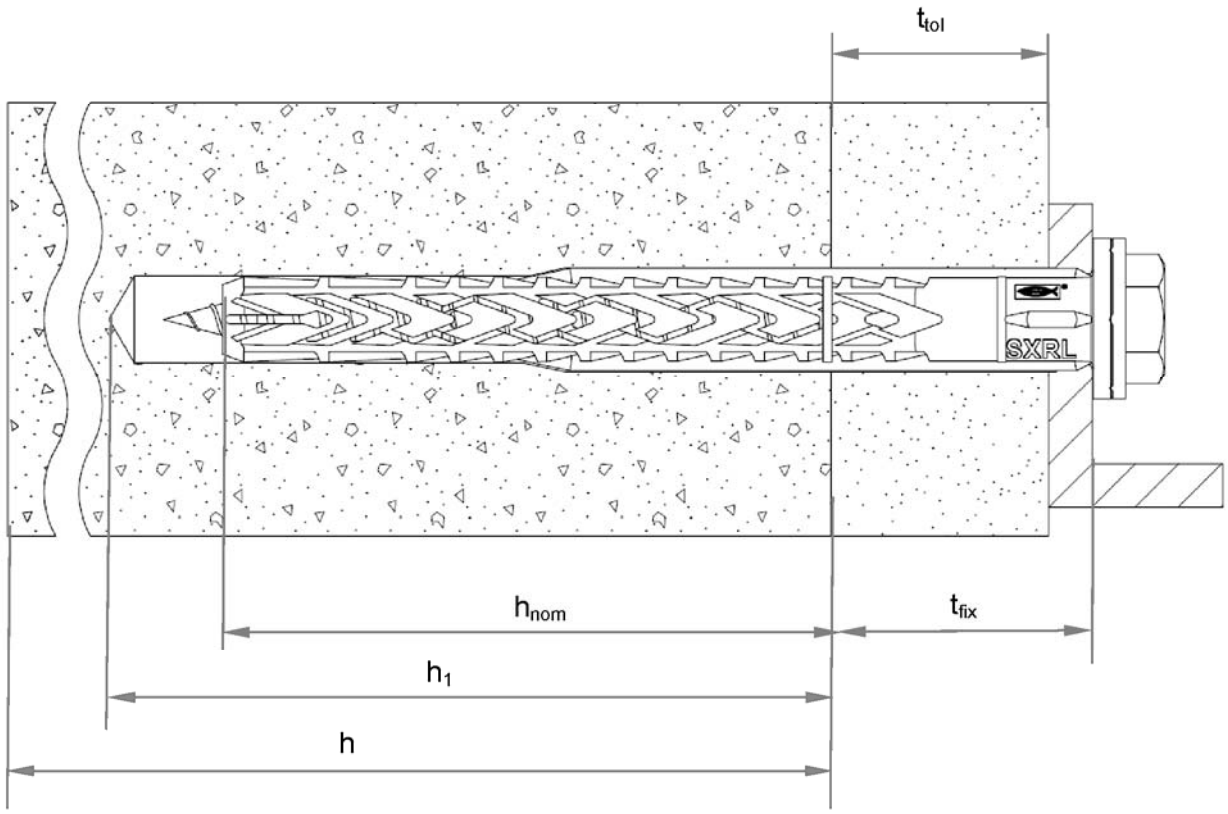
Uwe Bender
Head of Department

beglaubigt:
Ziegler

Deutsches Institut für Bautechnik

DIBt

SXRL 14



Legend

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

h_1 = Depth of drilled hole to deepest point

h = Thickness of member

t_{tol} = Thickness of equalizing layer or non–load bearing coating

t_{fix} = Thickness of fixture + t_{tol}

SXRL 14	**Annex A 1**
Product description Installed anchor	

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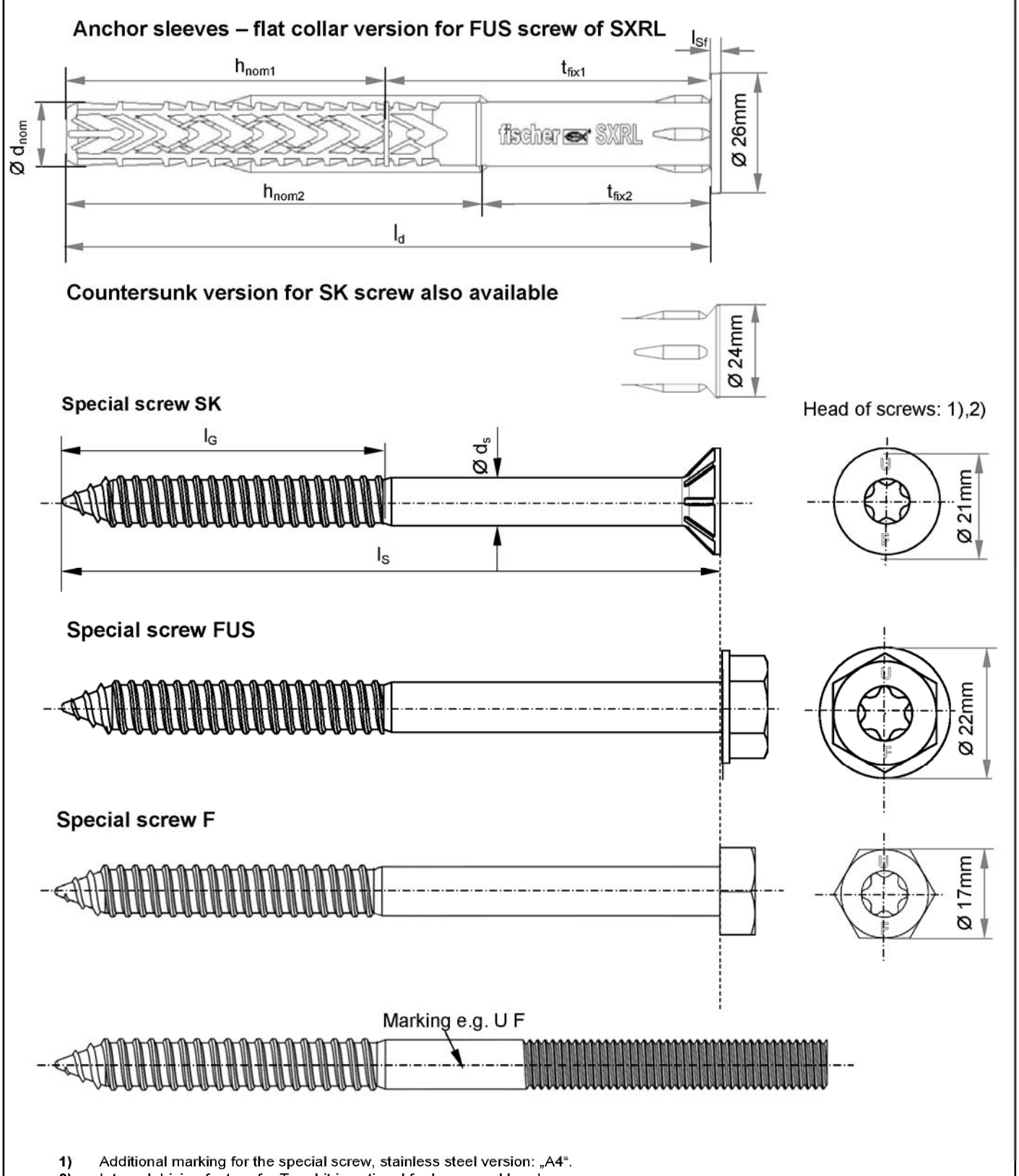

1) Additional marking for the special screw, stainless steel version: „A4".
2) Internal driving feature for Torx bit is optional for hexagonal head

SXRL 14	**Annex A 2**
Product description Anchor types / specific screw	

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Table A3.1: Dimensions

Anchor type	Anchor sleeve						Special screw		
	h_{nom1} [mm]	h_{nom2} [mm]	Ø d_{nom} [mm]	t_{fix} [mm]	l_d [mm]	l_{Sf} [mm]	Ø d_s [mm]	l_G [mm]	l_s [mm]
SXRL 14	**70**	**90**	**14**	**≥ 1**	71-600	**3,1**	**9,6**	**63**	≥ **81** [1]

1) To insure that the screw penetrates the anchor sleeve, l_s must be $l_d + l_{Sf}$ [2] + 10 mm
2) Only valid for flat collar version

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 10 088-3:2012, e.g. 1.4401, 1.4571, 1.4578, 1.4362, …

SXRL 14	**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 C2.
  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 C3.
- Autoclaved aerated concrete (use category d), according to Annex C4.
- 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:
- 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 drill modes according to Annex C1 – C4 for use category 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 -5°C to + 40°C
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks

SXRL 14	**Annex B 1**
Intended Use Specifications	

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Table B2.1: Installation instructions

Anchor type				SXRL 14
Drill hole diameter	d_0	=	[mm]	14
Cutting diameter of drill bit	d_{cut}	≤	[mm]	14,45
Depth of drill hole to deepest point [1]	$h_{1,1}$	≥	[mm]	85
Depth of drill hole to deepest point [1]	$h_{1,2}$	≥	[mm]	105
Overall plastic anchor embedment depth in the base material [1) 2)]	h_{nom1}	≥	[mm]	70
Overall plastic anchor embedment depth in the base material [1) 2)]	h_{nom2}	≥	[mm]	90
Diameter of clearance hole in the fixture	d_f	≤	[mm]	15,40

1) See Annex 1
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 B.

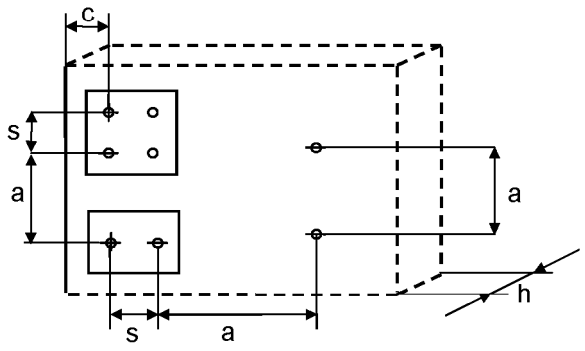
Table B2.2: Minimum thickness of member, edge distance and spacing in concrete

Anchor type SXRL 14		Minimum thickness of member h_{min} [mm]	Characteristic edge distance $c_{cr,N}$ [mm]	Characteristic spacing a [mm]	Minimum edge distances and spacing [3)] [mm]
Reinforced Concrete	≥ C16/20	110	100	120	s_{min} = 60 for c ≥ 100 c_{min} = 60 for s ≥ 125
	C 12/15	110	140	135	s_{min} = 85 for c ≥ 140 c_{min} = 85 for s ≥ 175
Unreinforced Concrete	≥ C16/20	110	100	120	c_{min} = 100 and s_{min} = 80
	C 12/15	110	140	135	c_{min} = 140 and s_{min} = 110

3) Intermediate values by linear interpolation

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

Scheme of distance and spacing in concrete



SXRL 14	Annex B 2
Intended Use Installation parameters, edge distances and spacing's for use in concrete	

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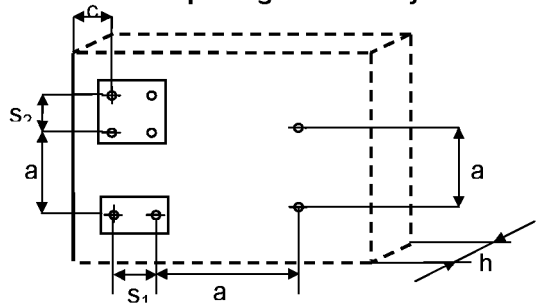
Table B3.1: Minimum distances and dimensions in masonry

Anchor type			**SXRL 14**
Minimum thickness of member	h_{min}	[mm]	115
Single anchor			
Minimum spacing	a_{min}	[mm]	250
Minimum edge distance	c_{min}	[mm]	100
Anchor Group			
Minimum spacing perpendicular to free edge	$s_{1,min}$	[mm]	100
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	100
Minimum edge distance	c_{min}	[mm]	100

Table B3.2: Minimum distances and dimensions in AAC

Anchor type SXRL 14			**AAC $f_b \geq 2$ N/mm²**		**AAC $f_b \geq 4$ N/mm²**	
Nominal embedment depth	h_{nom}	[mm]	**70**	**90**	**70**	**90**
Single anchor						
Minimum thickness of member	h_{min}	[mm]	175	175	300	300
Minimum spacing	a_{min}	[mm]	250	250	250	250
Minimum edge distance	c_{min}	[mm]	80	80	100	120
Anchor Group						
Minimum thickness of member	h_{min}	[mm]	240	300	300	300
Minimum spacing perpendicular to free edge	$s_{1,min}$	[mm]	80	80	80	100
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	80	100	80	125
Minimum edge distance	$c_{1,min}$	[mm]	120	120	120	150
Minimum edge distance perpendicular to c_1	$c_{2,min}$	[mm]	150	150	150	150

Scheme of distance and spacing in masonry and AAC



SXRL 14

Intended Use
Installation parameters, edge distances and spacing's for use in masonry and AAC

Annex B 3

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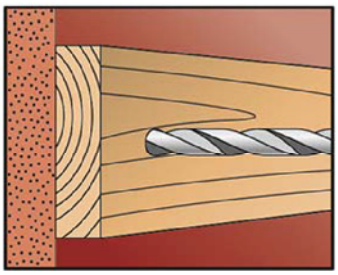
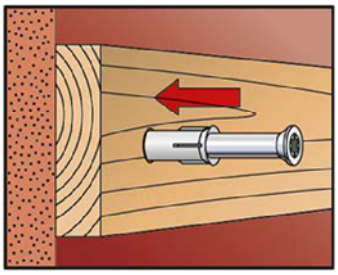
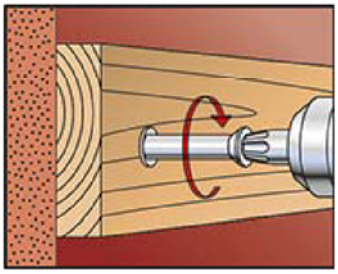
Installation instructions (the following pictures show fixing through timber)



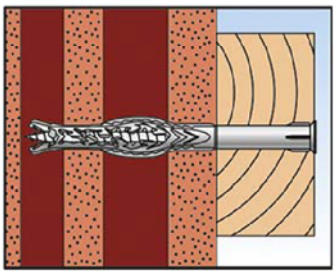
1. Drill the bore hole Ø 14 mm using the drill method described in the corresponding annex.



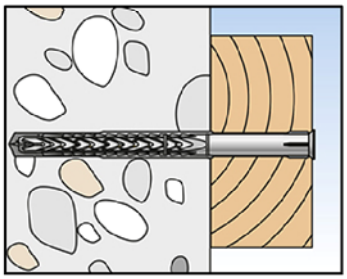
2. Insert assembly group of anchor (screw and plug) using a hammer until the plastic sleeve is flush with surface of fixture.



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



4. Correctly installed anchor in hollow masonry.



5. Correctly installed anchor in concrete.

SXRL 14	**Annex B 4**
Intended use Installation instructions	

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Table C1.1: Characteristic bending resistance of the screw

Anchor type		**SXRL 14**			
Material		Galvanised steel		Stainless steel	
Overall plastic anchor embedment depth in the base material		h_{nom1} 70mm	h_{nom2} 90mm	h_{nom1} 70mm	h_{nom2} 90mm
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	48,7	62,5	47,0	60,5
Partial safety factor	γ_{Ms} [1]	1,25		1,29	

[1] In absence of other national regulations

Table C1.2: Characteristic resistance of the screw

Failure of expansion element (special screw)		**SXRL 14**	
		Galvanized steel	Stainless steel
Characteristic tension resistance	$N_{Rk,s}$ [kN]	43,4	42,0
Partial safety factor for $N_{Rk,s}$	γ_{Ms} [1]	1,50	1,55
Characteristic shear resistance	$V_{Rk,s}$ [kN]	21,7	21,0
Partial safety factor for $V_{Rk,s}$	γ_{Ms} [1]	1,25	1,29

[1] In absence of other national regulations

Table C1.3: Characteristic resistance for use in concrete

Pull-out failure (plastic sleeve)		**SXRL 14**
Temperature range		**50/80 °C | 30/50 °C**
Concrete ≥ C12/15		
Characteristic resistance	$N_{Rk,p}$ [2] [kN]	8,5
Partial safety factor	γ_{Mc} [1]	1,8

[1] In absence of other national regulations
[2] Hammer drilling

Table C1.4: Displacements under tension und shear loading in concrete and masonry

Anchor type	**Tension or shear load**	**Displacements under tension load** [3], [4]		**Displacements under shear load** [3], [4]	
	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
SXRL 14	3,40	0,39	0,63	2,79	4,19

[3] Valid for all ranges of temperatures
[4] Intermediate values by linear interpolation

Tabelle C1.5: 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

Fire resistance class	**F_{Rk}**
R 90	≤ 0,8 kN

SXRL 14	**Annex C 1**
Performances Characteristic resistance, Displacements under tension and shear loading in concrete and masonry	

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Table C2.1: SXRL 14 characteristic resistance F_{Rk} in [kN] in solid masonry (use category "b")

Base material [Supplier]	Min. DF or min. size (L x W x H) [mm]	Minimum compressive strength f_b [N/mm²] bulk density ≥ ρ [kg/dm³]	Drilling method[1]	Characteristic resistance SXRL 14 F_{RK} [kN]	
				h_{nom1} ≥ 70mm	
				50/80 °C	30/50 °C
Clay brick, Mz e.g. acc. to DIN 105-100:2012-01, EN 771-1:2011,Mz e.g. **Ebersdobler Mz**	NF (240x115x71)	20/1,8	H	**4,0 / 6,0**[2]	**4,0 / 7,0**[2]
		10/1,8		**3,0 / 4,5**[2]	**3,0 / 5,0**[2]
Calcium silicate solid brick KS e.g. acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **Wemding KSV**	NF (240x115x71)	20/1,8	H	**4,5 / 5,0**[2]	**4,5 / 6,0**[2]
		10/1,8		**3,0 / 3,5**[2]	**3,0 / 4,0**[2]
	12 DF (495x175x240)	12/1,8	H	**4,0 / 11,0**[2]	**4,0 / 11,5**[2]
		10/1,8		**3,5 / 9,0**[2]	**3,5 / 9,5**[2]
		8/1,8		**2,5 / 7,5**[2]	**2,5 / 7,5**[2]
		6/1,8		**2,0 / 5,5**[2]	**2,0 / 5,5**[2]
		4/1,8		**1,2 / 3,5**[2]	**1,2 / 3,5**[2]
Lightweight solid brick,V, e.g. acc. to DIN V 18152-100:2005-10 EN 771-3:2011, e.g. **KLB VL**	(250x240x245)	10/1,6	H	**3,5 / 6,0**[2]	**3,5 / 7,0**[2]
		8/1,6		**3,0 / 5,0**[2]	**3,0 / 6,0**[2]
		6/1,6		**2,0 / 3,5**[2]	**2,0 / 4,5**[2]
		4/1,6		**1,5 / 2,5**[2]	**1,5 / 3,0**[2]
	2DF (240x115x113)	2/1,2		**0,9**	**1,2**
Partial safety factor			γ_{Ms}[3]	**2,5**	

1) H = Hammer drilling, R = Rotary drilling

2) Only for edge distance c ≥ 200 mm; intermediate values by linear interpolation

3) In absence of other national regulations

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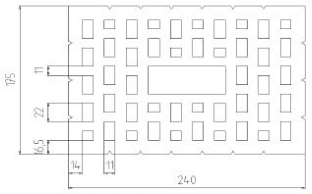
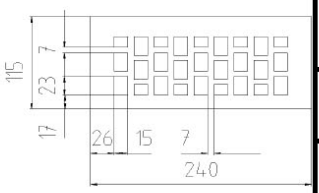
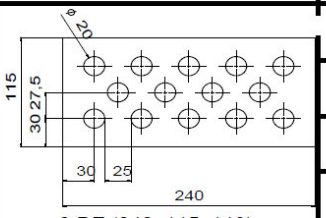
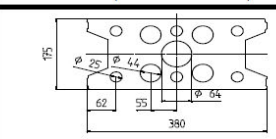
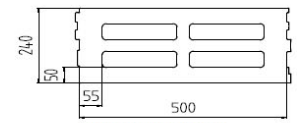
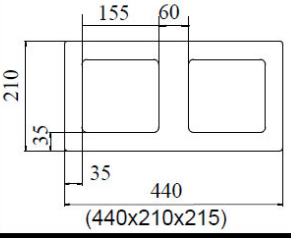
Table C3.1: SXRL 14 characteristic resistance F_{Rk} in [kN] in hollow masonry (use category "c")

Base material [**Supplier**]	Geometry and min. DF or min. size (L x W x H) [mm]	Min. compressive strength f_b [N/mm²] / bulk density ≥ ρ [kg/dm³]	Drilling method[1)]	Characteristic resistance F_{Rk} **SXRL 14** [kN]			
				h_{nom1} 70mm*		h_{nom2} 90mm*	
				50/80 °C	30/50 °C	50/80 °C	30/50 °C
Vertically perforated clay bricks e.g. acc. to DIN 105-100:2012-01, EN 771-1:2011, **Schlagmann HLz**	 3 DF (240x175x113)	12/1,0	R	**2,0**		**2,5**	
		10/1,0		**2,0**		**2,0**	
		8/1,0		**1,5**		**1,5**	
		6/1,0		**1,2**		**1,2**	
Vertically perforated clay bricks e.g. acc. to DIN 105-100:2012-01, EN 771-1:2011, **Wienerberger HLz**	 NF (240x115x71)	48/1,6	R	**4,5**	**5,0**	**4,5**	**5,0**
		28/1,6		**2,5**	**3,0**	**2,5**	**3,0**
		20/1,6		**1,5**	**2,0**	**1,5**	**2,0**
Hollow calcium silicate brick KSL, acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **KS Wemding KSL**	 2 DF (240x115x113)	12/1,4	H	**1,5**	**2,0**	**2,5**	
		10/1,4		**1,5**		**2,0**	
		8/1,4		**1,2**		**1,5**	
		6/1,4		**0,9**		**1,2**	
Hollow calcium silicate brick acc. to DIN V 106:2005-10, EN 771-2:2011 e.g. **Xella KS**	 9 DF (380x175x240)	20/1,4	H	**3,5**	**4,0**	**1,5**	**2,0**
		10/1,4		**1,5**	**2,0**	**0,75**	**0,9**
Hollow brick leightweight concrete, e.g. acc. to DIN V 18153-100: 2005-10, EN 771-3:2011, e.g. **KLB, Hbl**	 (240x500x240)	2/0,7	R	**1,2**	**1,5**	**0,75**	
Hollow brick leightweight concrete, e.g. acc. to DIN V 18153-100: 2005-10, EN 771-3:2011, e.g. **Masonry Roadstone**	 (440x210x215)	10/1,2	R	**3,0**		**-**	
		8/1,2		**2,5**		**-**	
		6/1,2		**2,0**		**-**	
		4/1,2		**1,2**		**-**	
		2/1,2		**0,6**		**-**	
Partial safety factor			γ_{Ms} [3)]	**2,5**			

Foot prints see Annex C2 * Intermediate values by linear interpolation

SXRL 14

Performances
Characteristic resistance for use in hollow or perforated masonry

Annex C 3

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Table C4.1: Characteristic resistance F_{RK} in [kN] in autoclaved aerated concrete (AAC) (use category "d")

Base material	Minimum compressive strength $f_b \geq$ [N/mm²]	Characteristic resistance F_{RK} SXRL 14		
		Drilling method	Temp. range "b" and "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 771-4:2011	6	Hammer drilling	**4,0**	**5,0**
	4		**2,5**	**3,0**
	3		**1,5**	**2,0**
	2		**0,9**	**1,2**

Table C4.2: Displacements under tension and shear loading in autoclaved aerated concrete (AAC)

Anchor type	Tension or shear load	Displacements under tension load [2]		Displacements under shear load [2]	
SXRL 14	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	δ_{VO} [mm]	$\delta_{V\infty}$ [mm]
h_{nom} = 70/90mm $f_b \geq$ 2 N/mm²	**0,32/0,43**	0,19/0,25	0,38/0,50	0,64/0,86	0,96/1,29
h_{nom} = 70/90mm $f_b \geq$ 3 N/mm²	**0,60/0,77**	0,23/0,31	0,45/0,63	1,19/1,54	1,79/2,31
h_{nom} = 70/90mm $f_b \geq$ 4 N/mm²	**0,88/1,11**	0,26/0,38	0,53/0,76	1,75/2,22	2,62/3,33
h_{nom} = 70/90mm $f_b \geq$ 6 N/mm²	**1,43/1,79**	0,34/0,51	0,68/1,02	2,86/3,58	4,29/5,37

[1] Valid for all ranges of temperatures
[2] Intermediate values by linear interpolation