Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-15/0027 of 20 September 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	EJOT / SORMAT SDF-14A
Product family to which the construction product belongs	Plastic anchor for redundant non-structural systems in concrete and masonry
Manufacturer	EJOT SE & Co. KG Astenbergstraße 21 57319 Bad Berleburg DEUTSCHLAND
Manufacturing plant	manufacturing plant EJOT 1, 2, 3 und 4
This European Technical Assessment contains	15 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-15/0027 issued on 30 January 2015

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Specific part

1 Technical description of the product

The frame fixing EJOT / SORMAT SDF-14A is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel, of galvanised steel with additional organic coating or of stainless steel.

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

The product description is given in Annex A.

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

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

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

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

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 1

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 2 and C 3
Edge distance and spacing (base material group a)	See Annex B 2
Edge distance and spacing (base material group b, c, d)	See Annex B 3 and B 4
Displacements under short-term and long-term loading	See Annex C 1 and C 3
Durability	See Annex B 1

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

In accordance with European Assessment Document EAD 330284-00-0604 the applicable European legal act is: 97/463/EC.

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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

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

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

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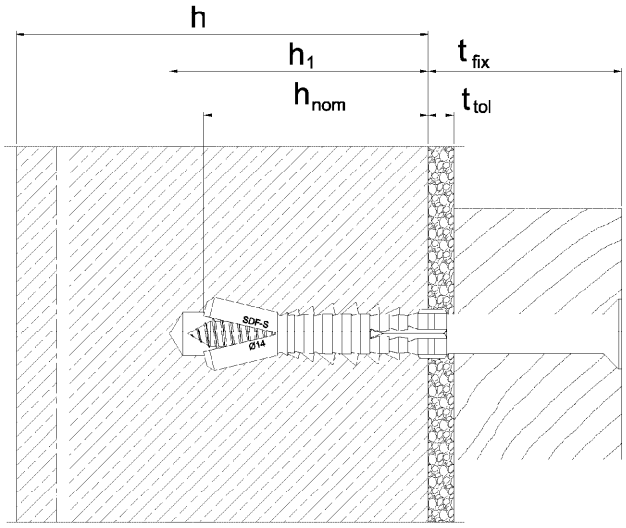
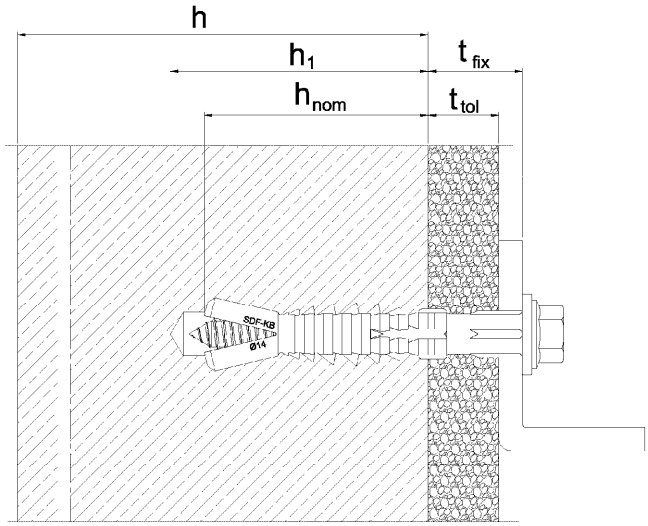
Intended use
Anchorage in concrete, solid-bricks, hollow-bricks and autoclaved aerated concrete



Picture 1: Intended use: screw head-type: countersunk (S)



Picture 2: Intended use: screw head-type: hexagon head with collar (KB)

Legend

h	=	Thickness of member
h_1	=	Depth of drilled hole to deepest point
h_{nom}	=	Overall plastic anchor embedment depth in base material
t_{tol}	=	Thickness of equalizing layer or non-load bearing coating
t_{fix}	=	t_{tol} + Thickness of fixture

EJOT / SORMAT SDF-14A	**Annex A 1**
Product description Installed condition	

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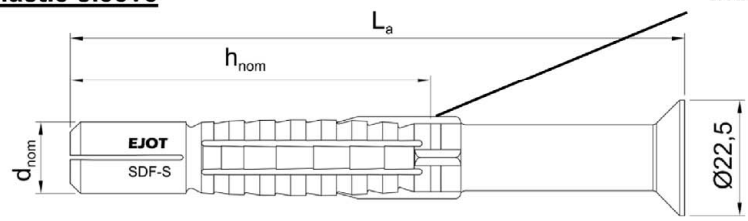
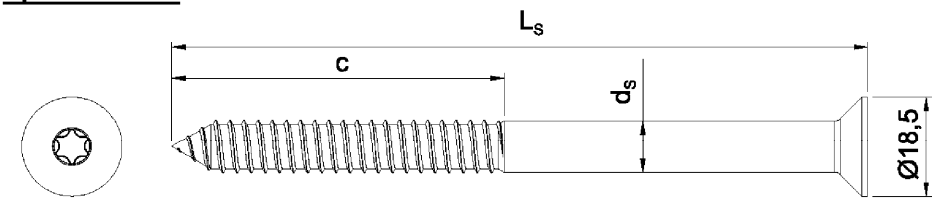
Plastic sleeve

Indication of setting depth - h_{nom}



Special screw



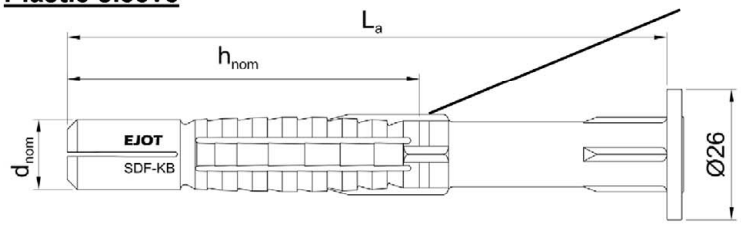
Picture 1: type of anchor: countersunk (S)

Anchor marking:
manufacturer, anchor type incl. Head type, diameter, length (at the anchor tip)
example: EJOT SDF-S-14A x 100

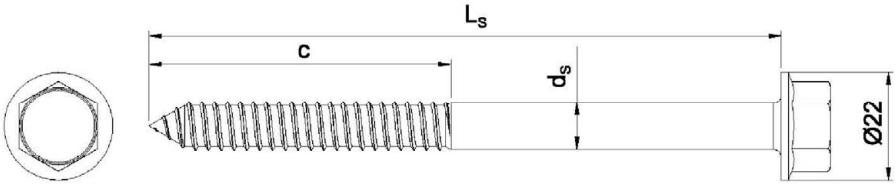
screw marking:
length of anchor (e.g. 100)

Plastic sleeve

Indication of setting depth - h_{nom}



Special screw



Picture 2: Type of anchor: collar with flange (KB)

Anchor marking:
manufacturer, anchor type incl. Head type, diameter, length (at the anchor tip)
example: EJOT SDF-KB-14A x 100

screw marking:
length of anchor (e.g. 100)

EJOT / SORMAT SDF-14A	Annex A 2
Product description Anchor types, marking of anchor sleeve and specific screw	

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Product designation key

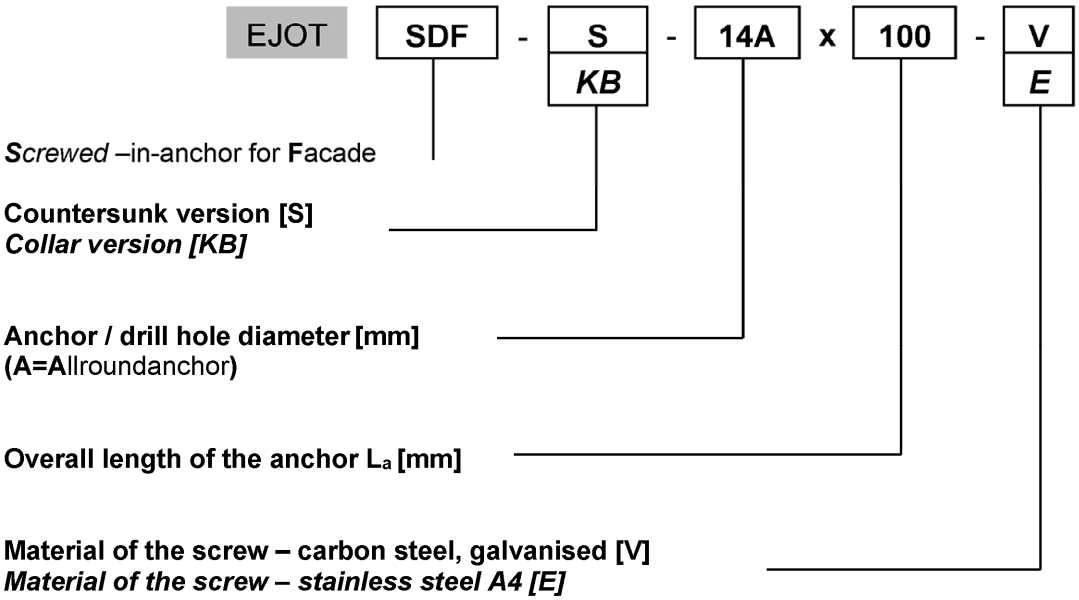

Table A3.1: Dimensions [mm]

Anchor type	Anchor sleeve					Specific screw		
	colour	d_{nom}	h_{nom}	min L_a	max L_a	L_s	d_s	c
SDF – KB - ø14	red	14	70	80	220	L_a + 8,0	9,6	60
SDF – S - ø14	red	14	70	80	360	L_a + 8,0	9,6	60

Designations: Annex A 2

Table A3.2: Materials

Element	Material
Anchor sleeve	Polyamide PA6, colour see Table A3.1
Special screw	Carbon steel, galvanized > 5 µm in accordance with EN ISO 4042:2018
	Carbon steel, galvanized > 5 µm in accordance with EN ISO 4042:2018 with additional organic coating (C1000)
	Stainless steel of corrosion resistance class CRC III in accordance with EN 1993-1-4:2006 + A1:2015

EJOT / SORMAT SDF-14A	**Annex A 3**
Product description Dimensions and materials	

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Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads.
- Redundant non-structural systems

Base materials:
- Reinforced or unreinforced compacted normal weight concrete without fibres with strength classes ≥ C12/15 (base material group a), in accordance with EN 206:2013+A1:2016, Annex C 2
- Solid brick masonry (base material group b), according to Annex C 2.
  Note: The characteristic resistance is also valid for larger brick sizes and larger compressive strength of the masonry unit.
- Hollow brick masonry (base material group c), according to Annex C 2.
- Autoclaved aerated concrete (base material group d), according to Annex C 3.
- Mortar strength class of the masonry ≥ M2,5 at minimum according to EN 998-2:2010.
- For other base materials of the (base material group a, b, c and d) the characteristic resistance of the anchor may be determined by job site tests accordance with TR 051:2018-04.

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 galvanized steel 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. Therefor 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 permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).
- Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:
- The anchorages are designed in accordance with TR 064:2018-05 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 position of the anchor is indicated on the design drawings

Installation:
- Hole drilling by the drill modes according to Annex C for base material group a,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 -10°C to +40°C
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks
- No ingress of water in the borehole at temperatures < 0 °C.

EJOT / SORMAT SDF-14A	Annex B 1
Intended use Specifications	

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Table B2.1: Installation parameters

Anchor type			SDF-KB–14A SDF–S–14A
Base material group[1]			a,b,c,d
Drill hole diameter	d_0 [mm]	=	14
Cutting diameter of drill bit	d_{cut} [mm]	≤	14,45
Depth of the drill hole to deepest point	h_1 [mm]	≥	85
Overall plastic anchor embedment depth[2]	h_{nom} [mm]	≥	70
Diameter of the clearance hole in the fixture	d_f [mm]	≤	15,4
Thickness of fixture	t_{fix} [mm]	≥	10
minimum temperature during installation process	[°C]		-20
Temperature range (c)	[°C]		30 - 50
Temperature range (b)	[°C]		50 - 80

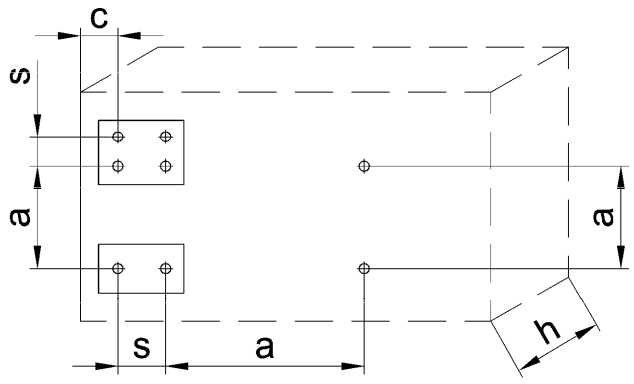
1) Base material group: a = concrete, b = solid masonry, c = hollow or perforated masonry, d = autoclaved aerated concrete
2) For masonry of hollow or perforated brick the influence h_{nom} > 70 mm has to be determined by job-site tests in accordance with TR 051:2018-04.

Table B2.2: Minimum member thickness, spacing and edge distance in concrete (base material group a)

Compressive strength of concrete	Minimum member thickness h_{min} [mm]	Characteristic edge distance $c_{cr,N}$ [mm]	Characteristic spacing a [mm]	Minimum spacing c_{min} [mm]	Minimum edge distance s_{min} [mm]
≥ C12/15	130	140	135	140	110
≥ C16/20	130	100	120	100	80

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

Scheme of spacing and edge distances in concrete



h = member thickness
c = edge distance
a = spacing
s = spacing within an anchor group

EJOT / SORMAT SDF-14A

Intended use
Installation parameters, member thickness, spacing and edge distance in concrete

Annex B 2

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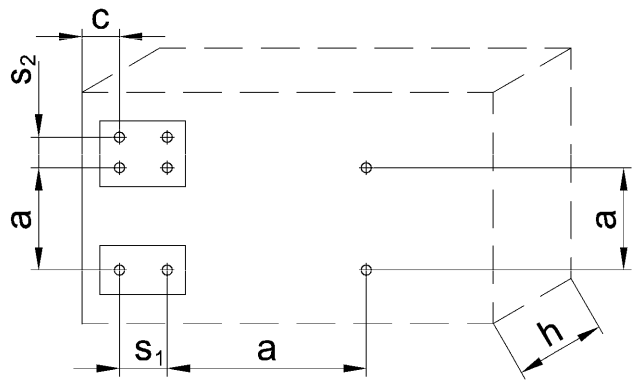
Table B3.1: Minimum member thickness, spacing and edge distance in masonry (base material group b and c)

Base Material	Minimum thickness of member h_{min} [mm]	Single Anchor		Anchor Group		
		Minimum edge distance c_{min} [mm]	Minimum spacing a [mm]	Minimum edge distance c_{min} [mm]	Minimum spacing $s_{1,min}$ [mm]	Minimum spacing $s_{2,min}$ [mm]
solid masonry						
771 1-001 Mz	115	120	250	120	120	120
771 2-009 KS	115	120	250	120	120	120
771 2-002 KS	240	125	250	125	120	120
771 3-006 V	175	120	250	120	120	120
hollow masonry						
771 1-002 Hlz	115	120	250	120	120	120
771 2-003 KSL	239	100	250	100	80	80
771 3-005 Hbl	175	100	250	100	80	250

Scheme of spacing and edge distances in masonry



h = member thickness
c = edge distance
a = spacing
s_1 = spacing (perpendicular to free edge) within an anchor group
s_2 = spacing (parallel to free edge) within an anchor group

EJOT / SORMAT SDF-14A

Intended use
Member thickness, spacing and edge distance in masonry

Annex B 3

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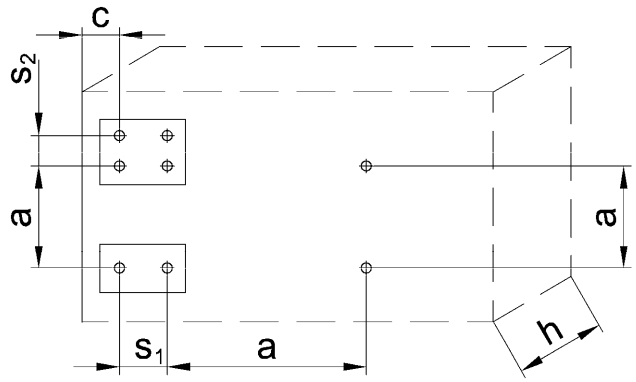
Table B4.1: Minimum distances and dimensions in autoclaved aerated concrete (base material group d)

			Autoclaved aerated concrete $f_{ck} \geq 2$ N/mm²	Autoclaved aerated concrete $f_{ck} \geq 4$ N/mm²
Nominal embedment depth	h_{nom}	[mm]	70	70
Single anchor				
Minimum thickness of member	h_{min}	[mm]	175	300
Minimum edge distance	c_{min}	[mm]	100	100
Minimum spacing	s_{min}	[mm]	250	250
Anchor Group				
Minimum thickness of member	h_{min}	[mm]	300	300
Minimum edge distance	$c_{1,min}$	[mm]	100	120
Minimum edge distance (perpendicular to $c_{1,min}$)	$c_{2,min}$	[mm]	120	150
Minimum spacing (perpendicular to free edge)	$s_{1,min}$	[mm]	80	100
Minimum spacing parallel to free edge	$s_{2,min}$	[mm]	100	120

Scheme of spacing and edge distances in autoclaved aerated concrete



h = member thickness
c = edge distance
a = spacing
s_1 = spacing (perpendicular to free edge) within an anchor group
s_2 = spacing (parallel to free edge) withinan anchor group

EJOT / SORMAT SDF-14A	Annex B 4
Intended use Member thickness, spacing and edge distance in autoclaved aerated concrete	

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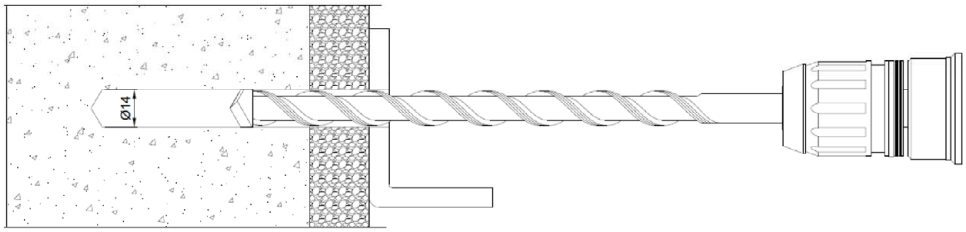
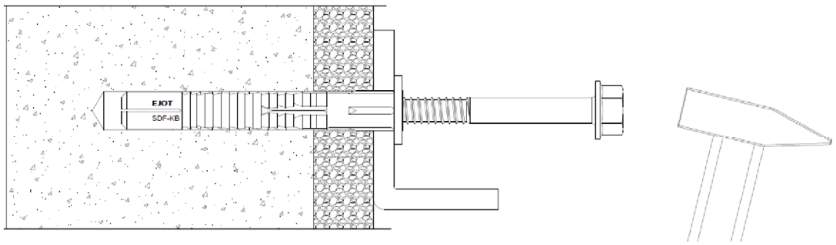
Installation instructions
(the following pictures show fixing through metall growing part exemplary)

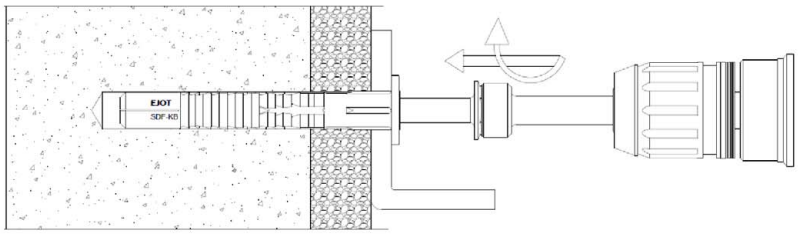
1. Drill the bore hole ø 14 mm using the drill method described in the corresponding Annex C



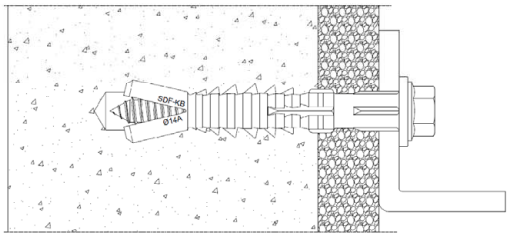
2. Clean the bore hole.
   Insert assembly group of anchor (screw and sleeve) using a hammer, until the plastic sleeve is flush with surface of fixture



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



4. Correctly installed anchor



EJOT / SORMAT SDF-14A	Annex B 5
Intended use Installation instructions	

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Table C1.1: Characteristic resistance of the screw

Failure of expansion element (special screw)		**SDF-14A**	
Material		**Galvanized steel**	**Stainless steel**
Characteristic tension resistance	$N_{Rk,s}$ [kN]	43,3	50,7
Partial safety factor	γ_{Ms} [1)]	*1,5*	*1,87*
Characteristic shear resistance	$V_{Rk,s}$ [kN]	21,7	25,3
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	62,5	72,9
Partial safety factor	γ_{Ms} [1)]	*1,25*	*1,56*

[1)] In absence of other national regulations

Table C1.2: Displacements [1)2)] under tension and shear loading in concrete, solid- and hollow masonry

Anchor Type	**Tension or shear load**	**Displacements under tension load**		**Displacements under shear load**	
SDF-14A	**F = N = V [kN]**	**δ_{N0} [mm]**	**$\delta_{N\infty}$ [mm]**	**δ_{V0} [mm]**	**$\delta_{V\infty}$ [mm]**
	3,4	0,71	0,84	2,42	3,63

[1)] Valid for all ranges of temperatures (b and c)
[2)] Intermediate values by linear interpolation

Table C1.3: Characteristic resistance for use in concrete

Pull-out failure		**Characteristic resistance**
Concrete ≥ C12/15		
Characteristic resistance	$N_{Rk,p}$ [2)3)] [kN]	**8,5**
Partial safety factor	γ_{Mc} [1)]	*1,8*

[1)] In absence of other national regulations
[2)] Valid for all ranges of temperatures (c and b)
[3)] Hammer drilling

Table C1.4: Values under fire exposure in concrete C20/25 to C50/60 in each load direction, no permanent centric tension load and without lever arm, fastening of facade systems (Fire resistance class R 90)

Characteristic tension resistance $F_{Rk,fi,90}$ [kN]	**≤ 0,8**
Partial safety factor $\gamma_{M,fi}$ [1)]	*1,0*

[1)] In absence of other national regulations

EJOT / SORMAT SDF-14A	**Annex C 1**
Performances Characteristic resistance, Displacements under tension and shear loading in concrete, masonry and autoclaved aerated concrete, values under fire exposure	

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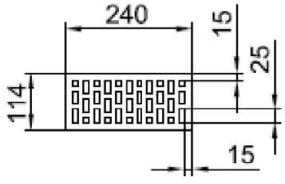
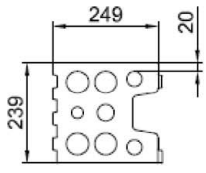
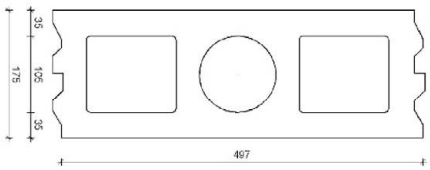
Table C2.1: Characteristic resistance F_{Rk} in solid- and hollow masonry

Base material	Minimum size (LxWxH) [mm]	Drilling method	Minimum compressive strength f_b [N/mm²]	c_{min} [mm]	F_{Rk} [3] [kN]
Solid masonry					
Clay brick Mz 2DF 20-1.8 (EN 771-1:2011+ A1:2015)	240x115x113	H [1]	20	120	**5,5 *(6,0)*** [4]
			10		**4,0**
Calcium silicate solid brick KS 2DF 20-2.0 (EN 771-2:2011+ A1:2015)	240x115x113	H [1]	20	250	**6,0**
			10		**4,0**
			20	120	**2,0**
			10		**1,5**
Calcium silicate solid brick KS 8DF 20-1.8 (EN 771-2:2011+ A1:2015)	249x240x238	H [1]	20	125	**7,0**
			10		**5,0**
Solid brick V 3DF 8-1.2 (EN 771-3:2011+ A1:2015)	240x175x113	H [1]	8	120	**3,0 *(4,0)*** [4]
			6		**2,0 *(3,0)*** [4]
			4		**1,5 *(2,0)*** [4]
			2		**0,75 *(0,9)*** [4]
Hollow or perforated masonry					
Vertically perforated clay brick – Hlz 2DF 28-1.2 (EN 771-1:2011+ A1:2015) (picture 1)	240x115x113	R [1]	28	120	**2,0 *(2,5)*** [4]
			20		**1,5 *(1,5)*** [4]
			10		**0,75 *(0,9)*** [4]
Hollow calc. silicate brick KSL 8DF 16-1.4 (picture 2) (EN 771-2:2011+ A1:2015)	249x239x238	H [1]	20	100	**2,5**
			10		**1,2**
Hollow brick leightweight concrete – Hbl 12DF 4-1.2 (EN 771-3:2011+ A1:2015) (picture 3)	490x175x239	R [1]	6	100	**2,5**
			4		**1,5**
			2		**0,75**
Partial safety factor γ_{Mm} [2]					*2,5*

Picture 1	***Picture 2***	***Picture 3***
		

1) **H** = Hammerdrilling **R** = Rotary Drilling
2) In absence of other national regulations
3) Temperature range b and c
4) Valid only for temperature range c

EJOT / SORMAT SDF-14A

Performances
Characteristic resistance in solid and hollow masonry

Annex C 2

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Table C3.1: Displacements under tension and shear loading in autoclaved aerated concrete

SDF-14A	Tension or shear load	Displacements under tension load[2)]		Displacements under shear load[2)]	
Autoclaved aerated concrete EN 771-4:2011+A1:2015	**F = N = V [kN]**	**δ_{N0} [mm]**	**$\delta_{N\infty}$ [mm]**	**δ_{V0} [mm]**	**$\delta_{V\infty}$ [mm]**
$f_{ck} \geq 2$ N/mm²	0,43	0,35	0,70	0,86	1,29
$f_{ck} \geq 3$ N/mm²	0,78	0,40	0,81	1,45	2,17
$f_{ck} \geq 4$ N/mm²	1,02	0,46	0,93	2,04	3,06
$f_{ck} \geq 5$ N/mm²	1,31	0,52	1,04	2,63	3,94
$f_{ck} \geq 6$ N/mm²	1,61	0,58	1,16	3,22	4,83

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

Table C3.2: Characteristic resistance F_{Rk}[2)] in autoclaved aerated concrete

	Minimum compressive strength f_{ck} [N/mm²]	F_{Rk} [1)] [kN]	F_{Rk} [1)] [kN]
		Temperature range c (30°C – 50°C)	**Temperature range b (50°C – 80°C)**
Uncracked aerated concrete (aerated concrete blocks) in accordance with EN 771-4:2011 +A1:2015	2	**1,2**	**0,9**
	3	**2,0**	**1,5**
	4	**2,5**	**2,5**
	5	**3,5**	**3,0**
	6	**4,5**	**3,5**
Partial safety factor	γ_{MAAC}[3)]	*2,0*	

1) Drilling method hammer drilling
2) Characteristic resistance for tension, shear or combined tension and shear loading.
3) In absence of other national regulations

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Performances Characteristic resistance and displacements in autoclaved aerated concrete	