

Allgemeine Bauartgenehmigung

Zulassungsstelle für Bauprodukte und Bauarten Bautechnisches Prüfamt

Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts
Mitglied der EOTA, der UEAtc und der WFTAO

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Nummer:

Z-21.2-2122

Geltungsdauer

vom: **9. Juli 2020**

bis: **9. Juli 2025**

Antragsteller:

EJOT Baubefestigungen GmbH
Geschäftsbereich Building Fasteners
In der Stockwiese 35
57334 Bad Laasphe

Gegenstand dieses Bescheides:

EJOT SDF-10V and EJOT SDF-10H for use as individual fixing in concrete

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Bautechnik**

The above-mentioned object of regulation is hereby generally approved by the building
authorities. This decision comprises five pages and nine annexes.

DIBt

I GENERAL PROVISIONS

- 1 The general construction technique permit is proof of the applicability of the subject matter of the regulations in terms of the building regulations of the federal states.
- 2 This notice does not replace the permits, consents and certificates required by law for the implementation of construction projects.
- 3 This notice is issued without prejudice to the rights of third parties, in particular private property rights.
- 4 Copies of this notice must be made available to the user of the subject matter of the regulation, without prejudice to more extensive provisions in the "Special Provisions". In addition, the user of the subject matter of the regulation must be informed that this notice must be available at the place of application. Copies must also be made available to the authorities involved on request.
- 5 This ruling may only be reproduced in full. Publication in extracts requires the consent of Deutsches Institut für Bautechnik. Texts and drawings of promotional literature may not contradict this notification; translations must contain the note "Translation of the German original version not checked by Deutsches Institut für Bautechnik".
- 6 This notice is revocable. The provisions may be supplemented and amended at a later date, in particular if new technical findings make this necessary.
- 7 This notification refers to the information and documents submitted by the applicant in the approval procedure on the subject matter of the regulations. Any change to these approval bases is not covered by this notice and must be disclosed to Deutsches Institut für Bautechnik without delay.
- 8 The general construction technique permit covered by this notice is at the same time a general technical approval for the design.

II SPECIAL PROVISIONS

1 Subject matter and scope

This general construction technique permit regulates the planning, design and execution of anchorages with EJOT SDF-10V with a total length of the plastic anchor in the base material $h_{\text{nom},2} = 50$ mm and EJOT SDF-10H with a total length of the plastic anchor in the base material $h_{\text{nom}} = 70$ mm according to ETA-10/0305 of 06 December 2017 as single fixing in concrete.

Annex 1 shows the anchor in installed condition.

The anchorages may be used under static and quasi-static load in reinforced and unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at maximum according to DIN EN 206-1:2000 "Concrete; properties, production, processing and quality control".

They can be used in cracked and non-cracked concrete.

They may be used for the following temperature ranges:

Temperature range (a): with a maximum short-term temperature of +50 °C and a maximum long-term temperature of +30 °C, e.g. inside residential buildings

Temperature range (b): with a maximum short-term temperature of +80 °C and a maximum long-term temperature of +50 °C, e.g. outdoors.

Anchoring with special screws made of galvanized steel:

The anchorages may be used in structures subject to dry internal conditions.

The anchorages may also be used outdoors if, after careful installation of the fixing unit, the area around the head of the screw is protected against moisture and driving rain in such a way that moisture cannot penetrate into the anchor shank. For this purpose a facade cladding or a ventilated curtain wall shall be fixed in front of the screw head and the screw head itself shall be provided with a soft plastic permanently elastic bitumen-oil combination coating (e.g. car underbody or cavity protection).

Anchorage with special stainless steel screws (1.4401, 1.4571, 1.4578 or 1.4362)

The anchorages may be used according to the corrosion resistance class CRC III of the special screw according to DIN EN 1993-1-4:2015-10 in connection with DIN EN 1993-1-4/NA:2017-01.

2 Provisions for planning, dimensioning and execution

2.1 Planning

The anchorages are to be planned by an engineer. Verifiable calculations and design drawings are to be prepared taking into account the loads to be anchored, the component dimensions and tolerances.

2.2 Dimensioning

The anchorages shall be designed in accordance with DIN EN 1992-4:2019-04, unless otherwise specified below.

The characteristic anchor properties for the check according to design method A are summarised in the tables in Annexes 6 to 10. For combined tension and shear loads, the interaction condition according to DIN EN 1992 4:2019-04, equation (7.56) shall be applied.

The characteristic anchor values for the check according to design method B are given in Annex 9. For anchor groups under shear stress at the edge only the most unfavourable anchor or the two most unfavourable anchors at the edge of the component or at the corner of the component may be considered.

For the diameter of the through hole in the fixture Annex 3, Table 3 of this decision is decisive and not DIN EN 1992-4:2019-04, Table 6.1.

If the specified clearance hole in the component to be connected cannot be complied with, special measures must be taken (e.g. reinforced washer) due to the risk of pull-through.

Shear loads may be assumed to act on the anchors without a lever arm if, in addition to the conditions given in Section 6.2.2.3 of DIN EN 1992-4:2019-04, the diameter of the through hole in the fixture is 12 mm.

The proof of the direct local application of force into the concrete is provided by the design according to DIN EN 1992-4:2019-04. The transmission of the loads to be anchored in the component must be verified.

Additional loads which may occur in the anchor, in the component to be connected or in the component in which the anchor is anchored as a result of restraint due to deformation (e.g. due to temperature changes) shall be taken into account.

The expected displacements are given in Annex 6, 7 and 8, Table 6, 8 and 10. They apply to the associated loads indicated in the tables.

2.3 Design

2.3.1 General information

The anchor to be anchored shall be installed in accordance with the design drawings prepared as described in paragraph 2.1 and the installation instructions given in Annex 4. Before placing the anchor, the concrete strength class shall be determined by means of the construction documents or by strength tests. The concrete strength class shall not be less than C20/25 and not exceed C50/60.

2.3.2 Borehole production

The position of the borehole in reinforced concrete walls must be coordinated with the reinforcement in such a way that damage to the reinforcement is avoided.

The drill hole is to be drilled at right angles to the surface of the anchoring base with a carbide hammer drill.

The nominal drill diameter and the cutting edge diameter shall correspond to the specifications given in Annex 3, Table 3.

Masonry drills made of hard metal shall comply with the specifications of the leaflet of the German Institute for Building Technology and the German Association of the Tool Industry (Fachverband Werkzeugindustrie e.V.) on "Characteristics, requirements and tests of masonry drills with cutting edges made of hard metal used for making the drill holes of anchorages for wall plugs", version January 2002. Compliance with the drill characteristic values shall be demonstrated in accordance with Section 5 of the Code of Practice.

The drill dust must be removed from the drill hole.

In case of a wrong drilling a new drill hole shall be drilled at a distance of at least 2 x depth of the wrong drilling. When placing the anchor closer than 2 x depth of the false hole, the false hole shall be filled with a high-strength low-shrinkage mortar and shall not be in the direction of force.

2.3.3 Placing the dowel

Tolerances of the anchoring base have to be compensated in such a way that no unwanted stresses occur during installation of the anchor. The compensation has to be done in such a way that the compressive forces can be transferred from the add-on part to the base material.

If relinings are necessary to compensate for dimensional inaccuracies of the anchor base, the anchoring depth of the anchor sleeve must be maintained and the screw-in length of the screw must be ensured.

When screwing in the screw, the temperature of the anchoring base must not be below 10 °C.

It must be possible to insert the pre-assembled anchor into the drilled hole with a hand hammer with only light tapping until the edge of the anchor rests on the object to be installed. The screw must be fully tightened to the edge of the anchor sleeve so that the tip of the screw penetrates the anchor sleeve.

The anchor is properly anchored if, after the screw has been fully inserted, neither turning of the anchor sleeve occurs nor slight further turning of the screw is possible.

The anchor may only be installed once.

2.3.4 Control of the execution

When anchorages are to be installed, the contractor entrusted with the anchorage of anchors or the site manager appointed by him or a competent representative of the site manager must be present on the construction site. He must ensure that the work is carried out properly.

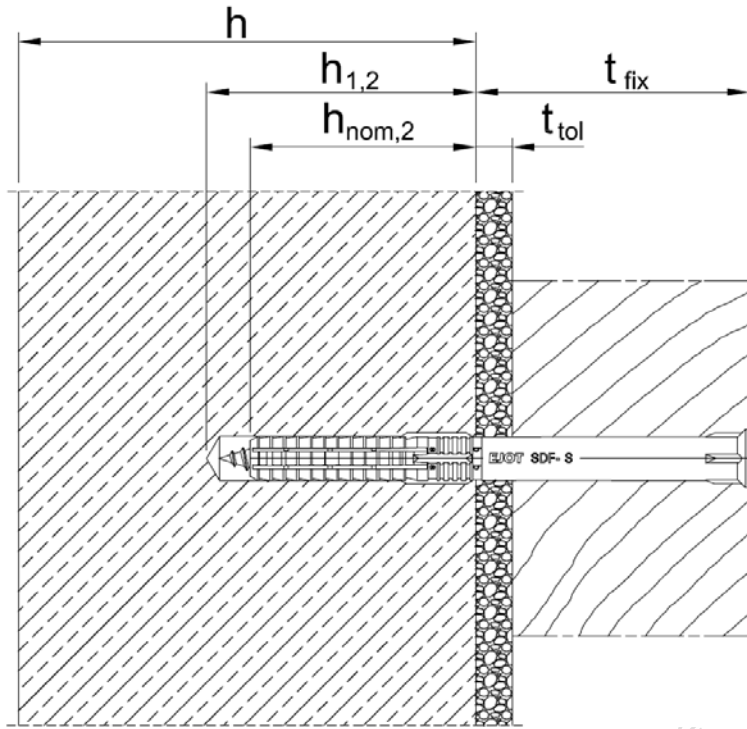
During the production of the anchorages, the site manager or his representative shall keep records of the verification of the existing concrete strength class and the proper installation of the anchorages. The records shall be available on site during the construction period and shall be presented to the person in charge of the inspection on request. Like the delivery notes, they shall be kept by the company for at least 5 years after completion of the work.

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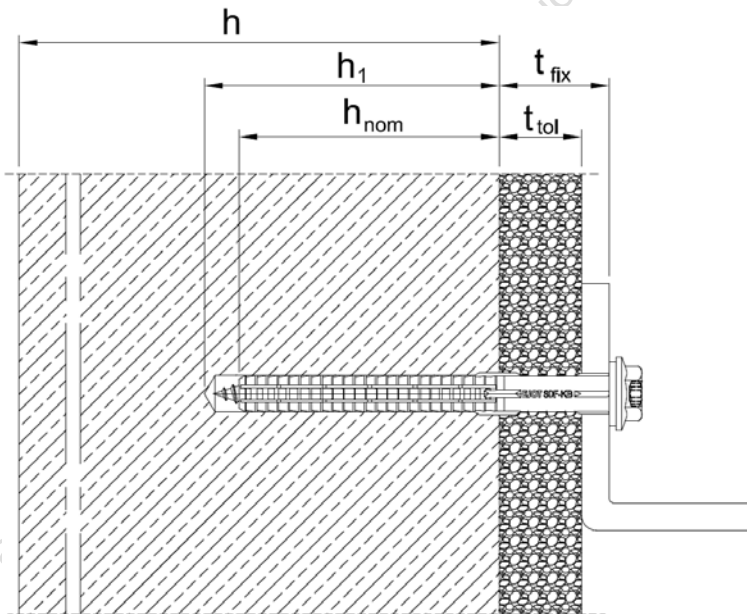
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SDF-10V in the installed condition



- Legend:**
- $h_{nom,2}$: nominal anchorage depth SDF-10V
 - h_{nom} : nominal anchorage depth SDF-10H
 - $h_{1,2}$: Borehole depth SDF-10V
 - h_1 : Borehole depth SDF-10H
 - h : Component thickness
 - t_{fix} : Mounting thickness
 - t_{tol} : Tolerance range / non-load-bearing layer

SDF-10H in the installed condition



EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Dowel in installed condition

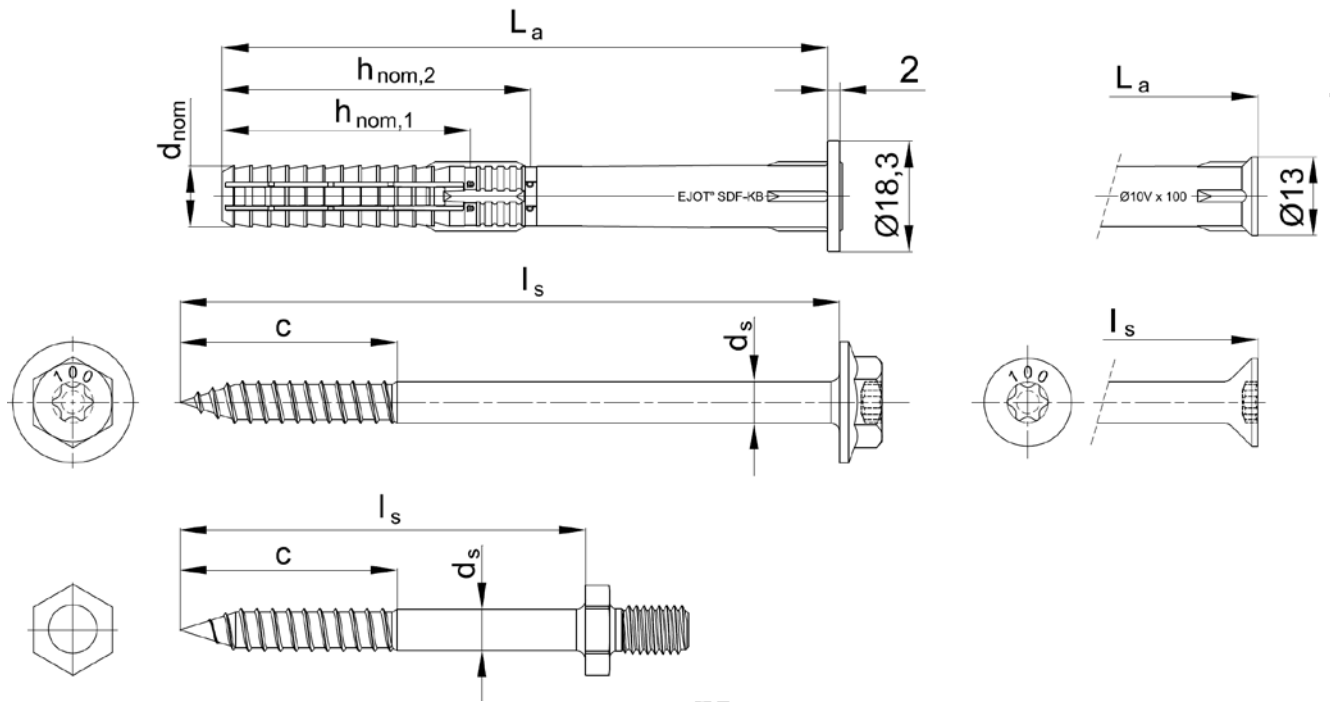
Annex 1

Allgemeine Bauartgenehmigung

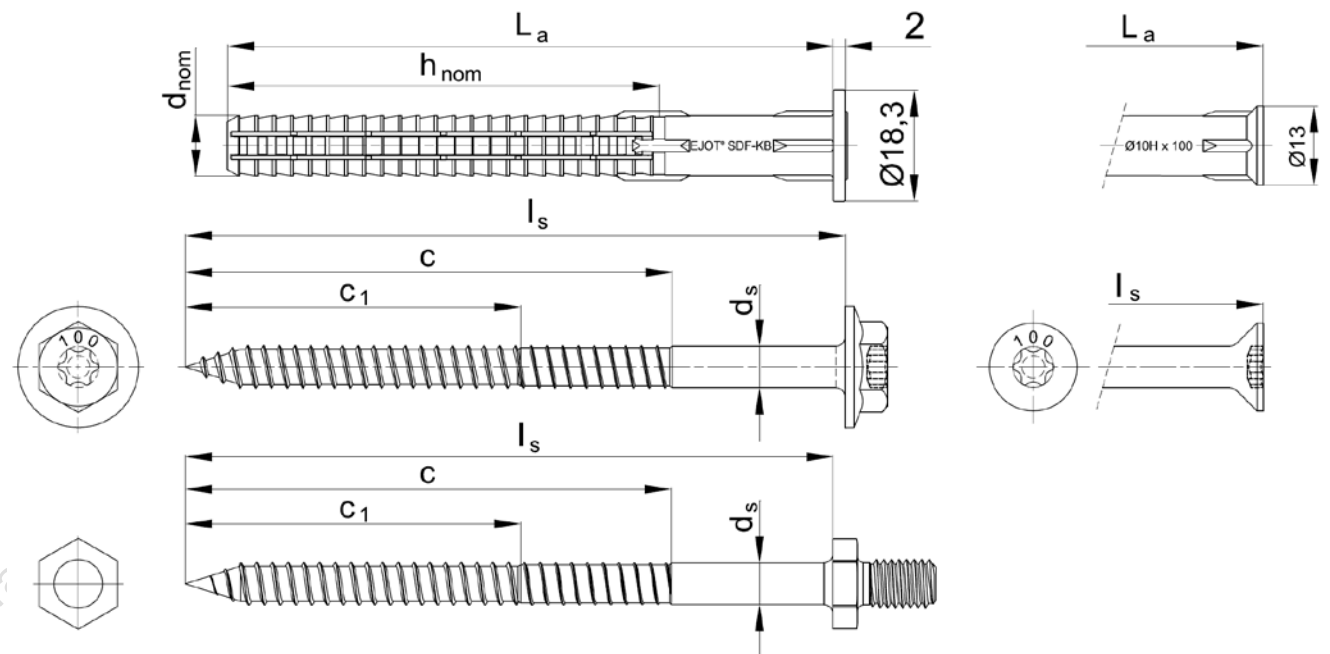
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Dowel sleeves and screws SDF-10V



Dowel sleeves and screws SDF-10H



EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Dowel types and special screw

Annex 2

Table 1: Anchor dimensions [mm]

Dowel type	Dowel sleeve						Special screw			
	Colour	d _{nom}	h _{nom}	min L _{a1}	min L _{a2}	max L _a	L _s	d _s	C ₁	C
SDF-10V	blue	10	50	50	60	220	L _a + 8,0	7,0	--	35
SDF-10H	orange	10	70	80		220	L _a + 8,0	7,0	55	80

Table 2: Materials

Element	Material
Dowel sleeve	Polyamid PA6
Special-screw	Steel, electrogalvanised > 5 µm according to DIN EN ISO 4042:2018-11
	stainless steel according to DIN EN 10088-3:2012-01, e.g. 1.4401 / 1.4571 / 1.4578 / 1.4362, Strength class ≥ A4-70

Table 3: Installation parameters

Dowel type		SDF-10V	SDF-10H
Drill diameter	d ₀ [mm] =	10	10
Cutting edge diameter of the drill	d _{cut} [mm] ≤	10,45	10,45
Depth of the borehole to the deepest point	h _{1,2} [mm] ≥	60	-
	h ₁ [mm] ≥	-	80
Total length of anchor in anchor base	h _{nom,2} [mm] ≥	50	-
	h _{nom} [mm] ≥	-	70
Diameter of the through-hole in the component to be connected	d _f [mm] ≤	10,5 ¹⁾	10,5 ¹⁾
Minimum temperature when placing the anchor	[°C]	-10	
Temperature range (c)	[°C]	30 - 50	
Temperature range (b)	[°C]	50 - 80	

¹⁾ d_f ≤ 12 mm, if special measures are taken to prevent the anchor from being pulled through.

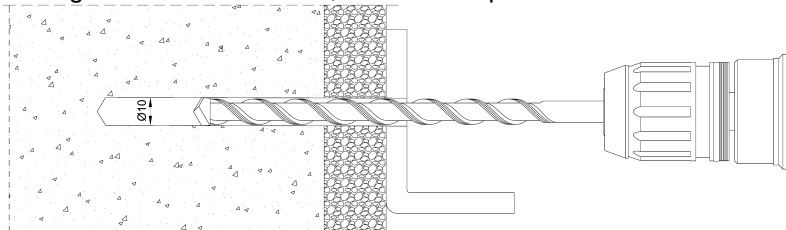
EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Anchor dimensions, materials and installation parameters

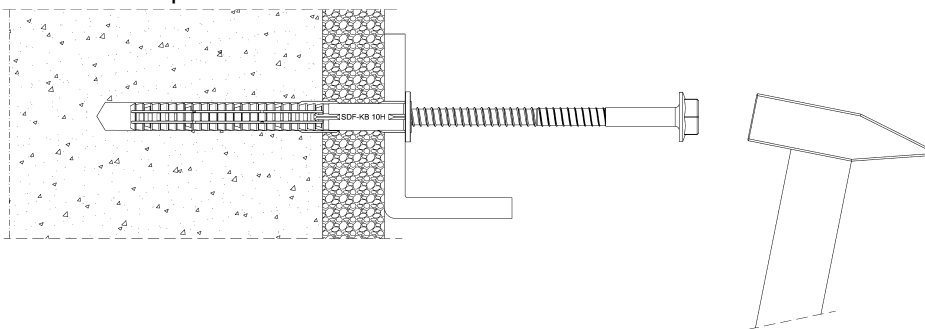
Annex 3

Assembly instructions

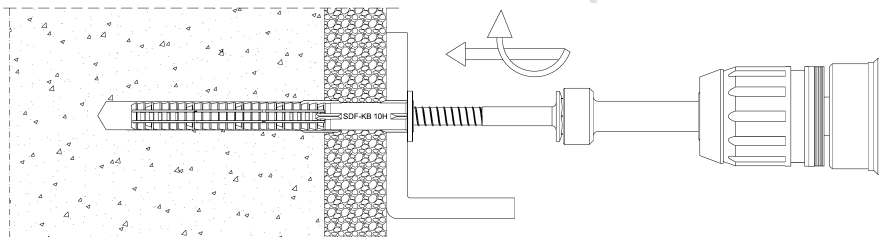
1. Drilling a borehole \varnothing 10 mm, Borehole depth = $h_1 + t_{tol}$



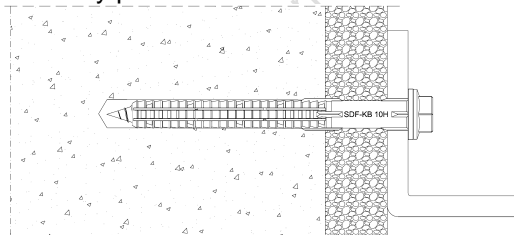
2. Cleaning the borehole
Hammer the fastening unit (screw and dowel sleeve) with a hammer until the dowel sleeve is flush with the surface of the part to be fastened.



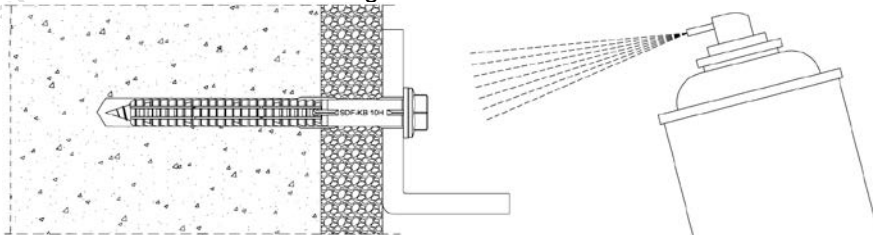
3. The screw is screwed in until the screw head rests on the dowel sleeve.



4. Correctly placed dowel.



5. Coat the screw head of electrogalvanized screws.



EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

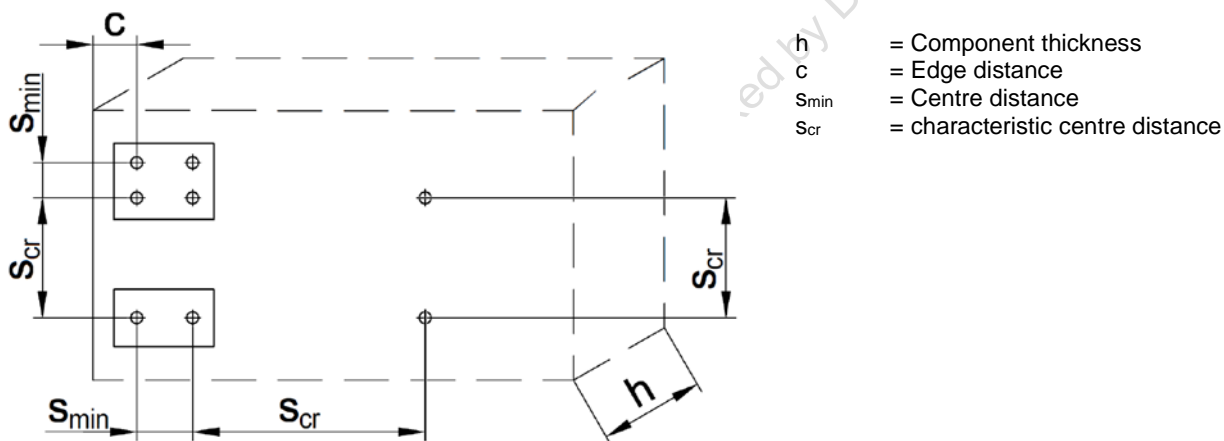
Assembly instructions

Annex 4

Table 4: Minimum component thickness, minimum axial and edge distance for cracked and non-cracked concrete

Dowel type		Minimum Component thickness h_{min} [mm]	Minimum edge distance c_{min} [mm]	Minimum Centre distance s_{min} [mm]
SDF-10V	Concrete C20/25 till C50/60	100	50	60
SDF-10H			50	60

Scheme of axial and edge distances in concrete



EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Minimum component thickness, minimum axis and edge distance

Annex 5

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Characteristic values for design method A

Design of the anchorages shall be carried out according to DIN EN 1992-4:2019-04.

Table 5: Characteristic values of the tensile strength

Dowel type		SDF-10V	
		Steel, electrogalvanised	Stainless steel
Material of the special screw			
Steel failure			
Characteristic tensile strength	$N_{Rk,s}$ [kN]	22,2	25,9
Partial safety factor	γ_{Ms} [-]	1,5	1,87
Pull-out failure			
Characteristic load bearing capacity in cracked concrete C20/25 - C50/60			
Temperature range I: 30°C/50°C $N_{Rk,p}$ [kN]		3,00	
Temperature range II: 50°C/80°C $N_{Rk,p}$ [kN]		2,50	
Characteristic load bearing capacity in non-cracked concrete C20/25 - C50/60			
Temperature range I: 30°C/50°C $N_{Rk,p}$ [kN]		3,50	
Temperature range II: 50°C/80°C $N_{Rk,p}$ [kN]		3,00	
Partial safety factor	γ_{Mp} [-]	2,16	
Concrete cone failure			
Effective anchorage depth	in cracked concrete	h_{ef} [mm]	30 ¹⁾
	in uncracked concrete	h_{ef} [mm]	30 ¹⁾
Characteristic centre distance	$s_{cr,N}$ [mm]	3 x h_{ef}	
Characteristic edge distance	$c_{cr,N}$ [mm]	1,5 x h_{ef}	
Partial safety factor	γ_{Mc} [-]	2,16	
Splitting failure			
Effective anchorage depth	in cracked concrete	h_{ef} [mm]	30 ¹⁾
	in uncracked concrete	h_{ef} [mm]	30 ¹⁾
Characteristic centre distance	$s_{cr,sp}$ [mm]	160	
Characteristic edge distance	$c_{cr,sp}$ [mm]	80	
Partial safety factor	γ_{Msp} [-]	2,16	

¹⁾ value calculated from $N_{Rk,p}$

Table 6: Displacements under tensile load

Dowel type		SDF-10V		
		N [kN]	δ_{NO} [mm]	$\delta_{n\infty}$ [mm]
Load and associated short-term and long-term displacement				
In cracked concrete	Temperature range I: 30°C/50°C	1,14	0,15	0,37
	Temperature range II: 50°C/80°C	0,93	0,14	0,37
In uncracked concrete	Temperature range I: 30°C/50°C	1,50	0,15	0,37
	Temperature range II: 50°C/80°C	1,29	0,15	0,37

EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Design method A
Characteristic values of the tensile load capacity, displacements under load for the SDF-10V

Annex 6

Allgemeine Bauartgenehmigung

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Characteristic values for design method A

Design of the anchorages shall be carried out according to DIN EN 1992-4:2019-04.

Table 7: Characteristic values of the tensile strength

Dowel type		SDF-10H	
		Steel, electrogalvanised	Stainless steel
Material of the special screw			
Steel failure			
Characteristic tensile strength	$N_{Rk,s}$ [kN]	18,7	21,8
Partial safety factor	γ_{Ms} [-]	1,5	1,87
Pull-out failure			
Characteristic resistance in cracked concrete C20/25 - C50/60			
Temperature range I: 30°C/50°C $N_{Rk,p}$ [kN]		3,50	
Temperature range II: 50°C/80°C $N_{Rk,p}$ [kN]		3,00	
Characteristic resistance in non-cracked concrete C20/25 - C50/60			
Temperature range I: 30°C/50°C $N_{Rk,p}$ [kN]		3,50	
Temperature range II: 50°C/80°C $N_{Rk,p}$ [kN]		3,50	
Partial safety factor	γ_{Mp} [-]	2,52	
Concrete cone failure			
Effective anchorage depth	in cracked concrete h_{ef} [mm]	40 ¹⁾	
	in uncracked concrete h_{ef} [mm]	40 ¹⁾	
Characteristic centre distance	$s_{Cr,N}$ [mm]	3 x h_{ef}	
Characteristic edge distance	$c_{Cr,N}$ [mm]	1,5 x h_{ef}	
Partial safety factor	γ_{Mc} [-]	2,52	
Splitting failure			
Effective anchorage depth	in cracked concrete h_{ef} [mm]	40 ¹⁾	
	in uncracked concrete h_{ef} [mm]	40 ¹⁾	
Characteristic centre distance	$s_{Cr,sp}$ [mm]	160	
Characteristic edge distance	$c_{Cr,sp}$ [mm]	80	
Partial safety factor	γ_{Msp} [-]	2,52	

²⁾ value calculated from $N_{Rk,p}$

Table 8: Displacements under tensile load

Dowel type		SDF-10H			
		N [kN]	δ_{NO} [mm]	$\delta_{n\infty}$ [mm]	
Load and associated short-term and long-term displacement					
	In cracked concrete	Temperature range I: 30°C/50°C	1,38	0,19	0,44
		Temperature range II: 50°C/80°C	1,33	0,19	0,44
In uncracked concrete	Temperature range I: 30°C/50°C	1,39	0,15	0,44	
	Temperature range II: 50°C/80°C	1,36	0,15	0,44	

EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Design method A
Characteristic values of tensile load capacity, displacements under load for the SDF-10H

Annex 7

Table 9: Characteristic values of the shear load capacity

Dowel type		SDF-10V		SDF-10H	
		Steel, electro-galvanised	Stainless steel	Steel, electro-galvanised	Stainless steel
Material of the dowel screw					
Steel failure					
Shear load without lever arm					
Characteristic shear load capacity	$V_{Rk,s}$ [kN]	11,1	12,9	9,4	10,9
Partial safety factor	γ_{Ms} [-]	1,25	1,56	1,25	1,56
Shear load with lever arm					
Characteristic bending moment	$M^0_{Rk,s}$ [Nm]	22,8	26,6	17,7	20,6
Partial safety factor	γ_{Ms} [-]	1,25	1,56	1,25	1,56
Concrete breakout on the side facing away from the load					
Factor according to DIN EN 1992-4:2019-04, section 7.2.2.4	k_8 [-]	1,0	1,0	2,0	2,0
Partial safety factor	γ_{Mc} [-]	2,16	2,16	2,52	2,52
Concrete edge failure					
Effective dowel length under shear load	l_f [mm]	50	50	70	70
Characteristic outer diameter	d_{nom} [mm]	10	10	10	10
Partial safety factor	γ_{Mc} [-]	2,16	2,16	2,52	2,52

Table 10: Displacement under shear load

Dowel type			SDF-10V			SDF-10H		
			V [kN]	δ_{v0} [mm]	$\delta_{v\infty}$ [mm]	V [kN]	δ_{v0} [mm]	$\delta_{v\infty}$ [mm]
Load and associated short-term and long-term displacement								
In cracked concrete	Temperature range I:	30°C/50°C	1,19	2,84	4,26	3,95	4,38 ¹⁾	6,57
	Temperature range II:	50°C/80°C	1,19	2,84	4,26	3,95	4,38 ¹⁾	6,57
In uncracked concrete	Temperature range I:	30°C/50°C	1,69	0,41	0,62	5,00	1,14 ²⁾	1,71
	Temperature range II:	50°C/80°C	1,69	0,41	0,62	5,00	1,14 ²⁾	1,71

¹⁾ Shear tensile test with diameter of the through hole in the mounting part $d_f = 12,0$ mm

²⁾ Shear tensile test with diameter of the through hole in the mounting part $d_f = 10,5$ mm, for $10,5 \text{ mm} < d_f \leq 12,0$ mm the deformations in cracked concrete must be taken over

EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Design method A
Characteristic values of the shear load capacity, displacement under shear load

Annex 8

Allgemeine Bauartgenehmigung

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Anchor characteristic values for design method B

The design of the anchorages shall be carried out according to DIN EN 1992-4:2019-4.

Table 11: Design values for design method B

Dowel type		SDF-10V	SDF-10H
Material of the dowel screw		Steel, galvanized and stainless steel	Steel, galvanized and stainless steel
Design value of resistance of an anchor for tension, shear and angular contact at any angle in cracked and non-cracked concrete of strength classes C20/25 - C50/60			
Temperature range I: 30°C/50°C	F_{Rd}^0 [kN]	1,4	1,4
Temperature range II: 50°C/80°C	F_{Rd}^0 [kN]	1,2	1,2
Centre distance	s_{cr} [mm]	160	160
Edge distance	c_{cr} [mm]	80	80
Minimum component thickness	h_{min} [mm]	100	100
Minimum centre distance	s_{min} [mm]	60	60
Minimum edge distance	c_{min} [mm]	50	50

EJOT SDF-10V und EJOT SDF-10H für die Anwendung als Einzelbefestigung in Beton

Design method B
Anchor characteristic values

Annex 9