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-11/0093 of 28 August 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 concrete screw FBS 5 and FBS 6
Product family to which the construction product belongs	Concrete screw size 5 and 6 for multiple use for non-structural applications in concrete and in prestressed hollow core slabs
Manufacturer	fischerwerke GmbH & Co. KG Klaus-Fischer-Straße 1 72178 Waldachtal DEUTSCHLAND
Manufacturing plant	fischerwerke
This European Technical Assessment contains	14 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 "Metal anchors for use in concrete", ETAG 001 Part 6: "Anchors for multiple use for non-structural applications", Edition August 2010, 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 concrete screw FBS in size of 5 and 6 is an anchor made of zinc-plated steel respectively steel with zinc flake coating (FBS) or made of stainless steel (FBS A4, FBS C). The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and 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 anchor 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 A1
Resistance to fire	See Annex C 2

3.3 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads as well as bending moments in concrete	See Annex C 1 and C 2
Edge distances and spacing	See Annex C 1

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

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [97/161/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 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 28 August 2015 by Deutsches Institut für Bautechnik

Uwe Bender
Abteilungsleiter

beglaubigt:
Müller

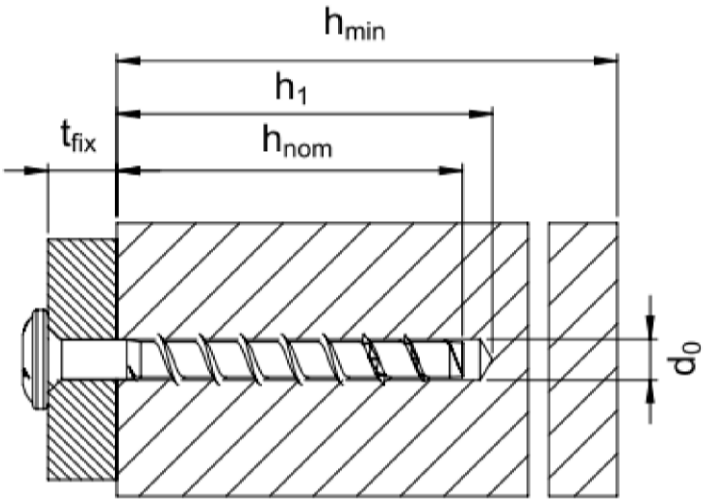
Deutsches Institut für Bautechnik

product and installed condition

fischer concrete screw FBS 5 and FBS 6

FBS

FBS
FBS A4
FBS C



d_0	=	nominal drill bit diamter
h_{nom}	=	nominal anchorage depth
h_1	=	depth of the drill hole
h_{min}	=	minimum thickness of member
t_{fix}	=	thickness of fixture

fischer concrete screw FBS	**Annex A 1**
Product description Installed condition	

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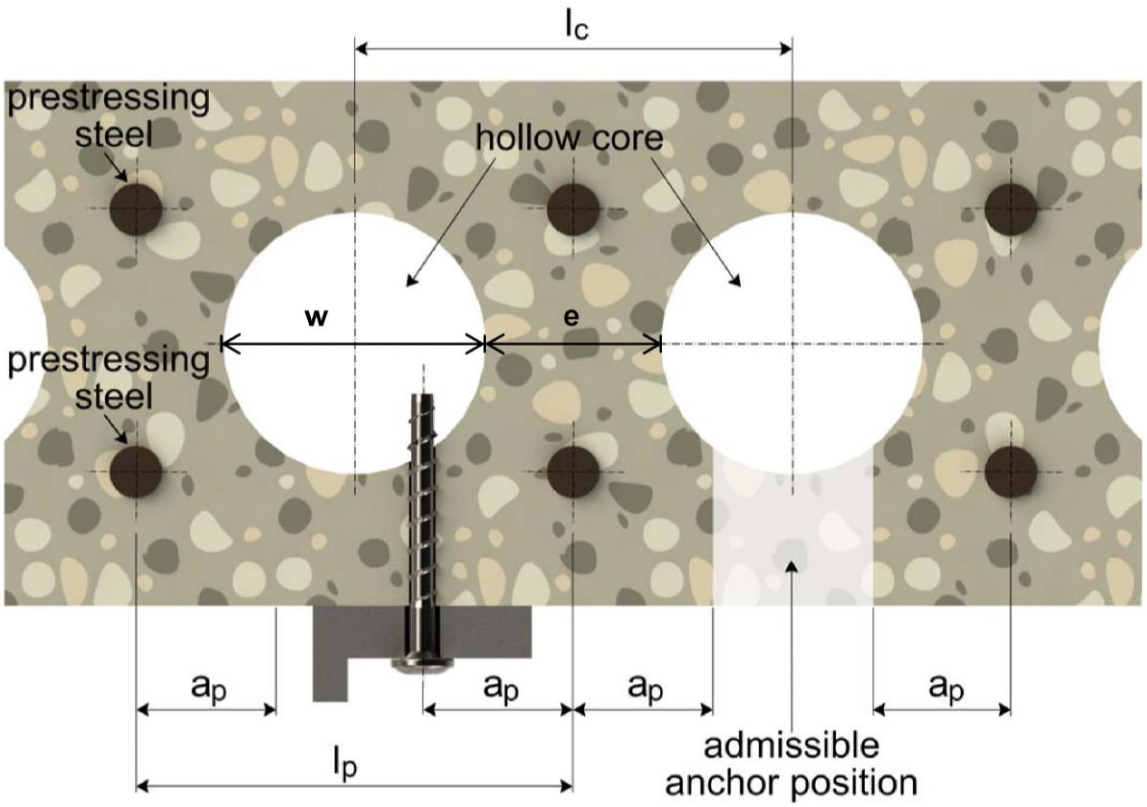
installed condition in precast prestressed hollow core slabs



w / e ≤ 4,2

fischer concrete screw FBS	
Product description Installed condition	**Annex A 2**

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Table A 1: materials and variants

part	name	Material
1, 2, 3, 4 ,5, 6, 7, 8	Screw anchor	FBS: Steel EN 10263-4 galvanized acc. to EN ISO 4042 or zinc flake coating acc. to EN ISO 10683 (≥ 5µm) FBS A4: 1.4401, 1.4404, 1.4571, 1.4578 FBS C: 1.4529 nominal characteristic steel yield strength f_{yk} [N/mm²] 600 nominal characteristic steel ultimate strength f_{uk} [N/mm²] 700


1) Anchor version with connection thread


2) Anchor version with washer, hexagon head and TORX


3) Anchor version with washer, hexagon head and


4) Anchor version with hexagon head


5) Anchor version with countersunk head


6) Anchor version with pan head


7) Anchor version with countersunk head and connection thread


8) Anchor version with hexagon head and connection thread

fischer concrete screw FBS

Product description

Material and screw types

Annex A 3

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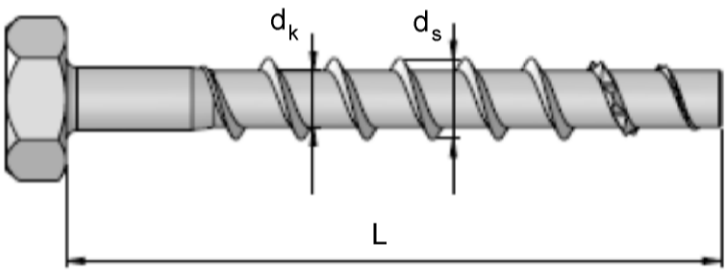
Table A 2: dimensions and markings

Anchorsize			**FBS 5**	**FBS 6**
Length of the anchor	L ≤	[mm]	200	
Diameter of shaft	d_k	[mm]	4,2	5,2
Diameter of thread	d_s	[mm]	6,5	7,5



Marking:

Anchor type: FBS / TSM B or TSM BC
FBS A4 / TSM BS
FBS C / TSM BSH

Anchor size: 6

Length of the anchor: 60

Marking "k" or "x" for anchors with connection thread and h_{nom} = 35 mm

fischer concrete screw FBS	**Annex A 4**
Product descriptions Dimensions and markings	

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Intended use

Anchorages subject to:

- static and quasi static loads
- Used only for multiple use for non-structural application according to ETAG 001, Part 6
- Used for anchorages in prestressed hollow core slabs
- Used for anchorages with requirements related to resistance of fire (not for using in prestressed hollow core slabs)

Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000
- strength classes C20/25 to C50/60 according to EN 206-1:2000
- cracked and non-cracked concrete

Use conditions (Environmental conditions):

- The anchor may only be used in dry internal conditions: All screw types
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exits: screw types made of stainless steel with marking A4 or BS
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exits: screw types made of stainless steel with marking C or BSH
  Note: Such 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 chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi-static actions are designed for design method A in accordance with:
  - ETAG 001, Annex C, Edition August 2010 or
  - CEN/TS 1992-4:2009.
- Anchorages under fire exposure are designed in accordance with:
  - EOTA Technical Report TR 020, Edition May 2004 or
  - CEN/TS 1992-4:2009, Annex D (It must be ensured that local spalling of the concrete cover does not occur).

Installation:

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.

fischer concrete screw FBS	
Intended use Specifications	**Annex B 1**

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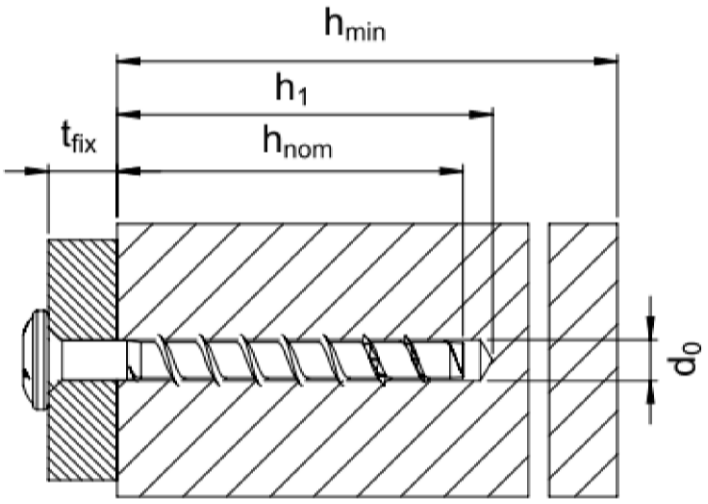
Table B 1: Installation parameters

Anchorsize			**FBS 5**	**FBS 6**	
Nominal embedment depth			h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
nominal drill bit diameter	d_0	[mm]	5	6	
cutting diameter opf drill bit	$d_{cut} \leq$	[mm]	5,40	6,40	
depth of drill hole	$h_1 \geq$	[mm]	40	40	60
Nominal embedment depth	$h_{nom} \geq$	[mm]	35	35	55
diameter of clearing hole in the fixture	$d_f \leq$	[mm]	7	8	
Installation torque	T_{inst}	Nm	8	10	
Maximum nominal torque for installation with an impact screwdriver		Nm	120	150	

Table B 2: Minimum thickness of member, minimum edge distance and minimum spacing

Anchorsize			**FBS 5**	**FBS 6**	
Nominal embedmenth depth			h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
minimum thickness of member	h_{min}	[mm]	80	80	100
minimum edge distance	c_{min}	[mm]	35	35	40
minimum spacing	s_{min}	[mm]	35	35	40



fischer concrete screw FBS

Intended use

Installation parameters

Annex B 2

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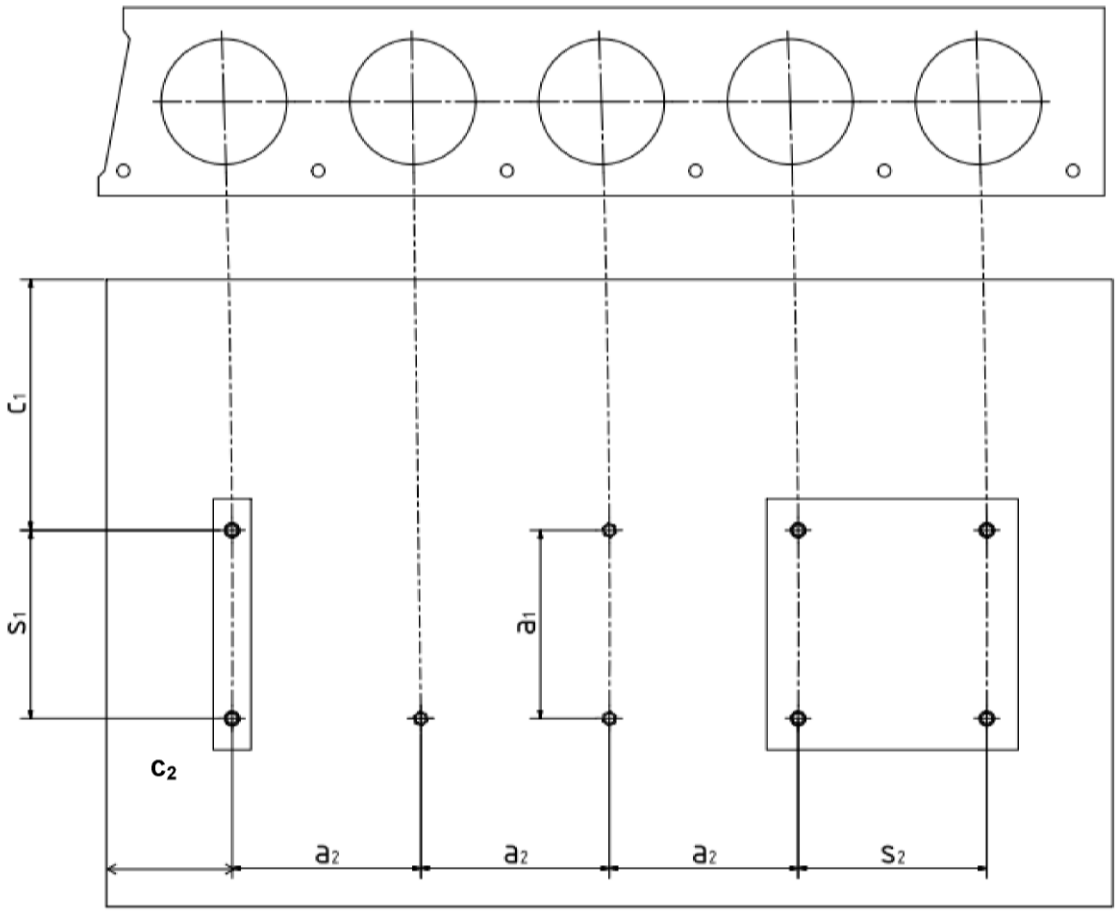
Installation parameters for anchorages in precast prestressed hollow core slabs



c_1, c_2	edge distance
s_1, s_2	anchor spacing
a_1, a_2	distance between anchor groups

Minimum edge distance	c_{min}	≥ 100 mm
Minimum anchor spacing	s_{min}	≥ 100 mm
Minimum distance between anchor groups	a_{min}	≥ 100 mm

fischer concrete screw FBS	**Annex B 3**
Intended use Installation parameters for anchorages in precast prestressed hollow slabs	

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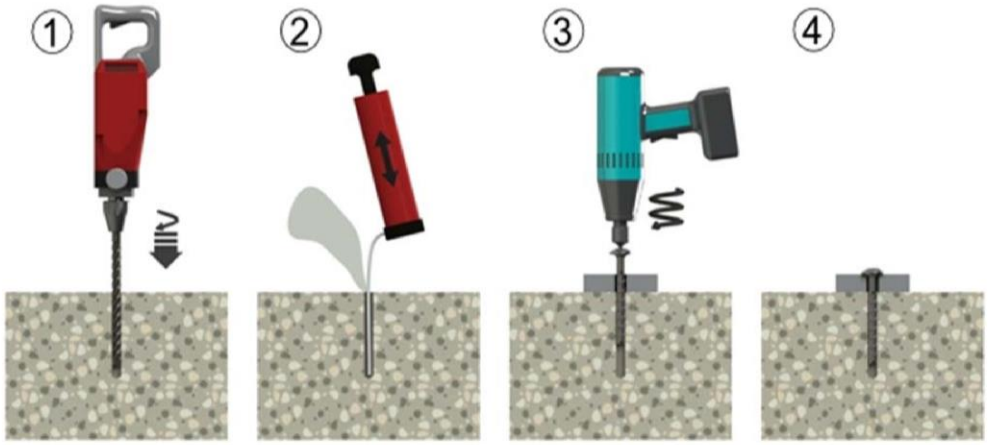
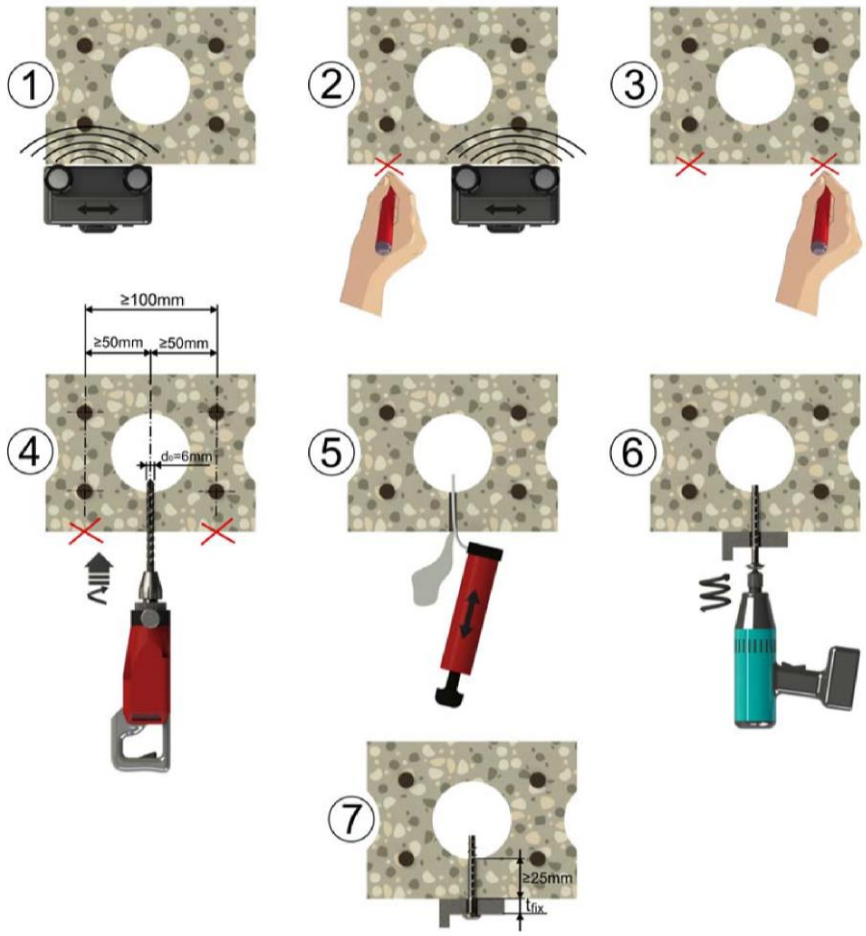
Installation instructions



Installation instructions for anchorages in prestressed hollow slabs



fischer concrete screw FBS

Intended use

Installation instructions

Annex B 4

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Table C 1: Characteristic values for design method A according to ETAG 001, Annex C or CEN/TS 1992-4

Anchorsize				**FBS 5**	**FBS 6**	
Nominal embedment depth				h_{nom} = 35 mm	h_{nom} = 35 mm	h_{nom} = 55 mm
steel failure for tension- and sear load						
characteristic load		$N_{Rk,s}$	[kN]	8,7	13,7	
		$V_{Rk,s}$	[kN]	4,4	7,0	
		$M^0_{Rk,s}$	[Nm]	5,3	10,0	
pull-out failure						
characteristic tension load in concrete C20/25		$N_{Rk,p}$	[kN]	1,5	1,5	7,5
increasing factor concrete for $N_{Rk,p}$		Ψ_C	C30/37	1,22		
			C40/50	1,41		
			C50/60	1,55		
concrete cone and splitting failure						
effective anchorage depth		h_{ef}	[mm]	27	27	44
factor for	cracked	k_{cr} [1]	[-]	7,2		
	non cracked	k_{ucr} [1]	[-]	10,1		
concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}		
	edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}		
splitting failure	spacing	$s_{cr,Sp}$		120	120	160
	edge distance	$c_{cr,Sp}$		60	60	80
installation safety factor		γ_2 [1] = γ_{inst} [2]	[-]	1,2	1,2	1,0
concrete pry out failure (pry-out)						
k-Factor		k [1] = k_3 [2]	[-]	1,0		
concrete edge failure						
effective length of anchor		$l_f = h_{ef}$	[mm]	27	27	44
outside diameter of anchor		d_{nom}	[mm]	5	6	

[1] Parameter relevant only for design according to CEN/TS 1992-4:2009

[2] Parameter relevant only for design according ETAG 001 Annex C

fischer concrete screw FBS

Performances

Characteristic values for design method A

Annex C 1

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Table C2: Characteristic values of resistance in precast prestressed hollow core slabs C30/37 to C50/60

Anchorsize			**FBS 6**		
bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
characteristic resistance	F_{Rk}	[kN]	1	2	3
installation safety factor	γ_2 [1] = γ_{inst} [2]	[mm]	1,2		

[1] Parameter relevant only for design according to CEN/TS 1992-4:2009

[2] Parameter relevant only for design according ETAG 001 Annex C

Table C 3: Characteristic values of resistance to fire exposure [1]

Anchorsize				**FBS 6**		
Nominal embedment depth				h_{nom} = 35 mm	h_{nom} = 55 mm	
fire resistance class						
R 30	characteristic resistance	$F_{Rk,fi30}$	[kN]	0,38	0,9	1,2
R 60	characteristic resistance	$F_{Rk,fi60}$	[kN]	0,38	0,8	1,2
R 90	characteristic resistance	$F_{Rk,fi90}$	[kN]	0,38	0,6	1,2
R 120	characteristic resistance	$F_{Rk,fi120}$	[kN]	0,30	0,4	0,8
R 30 bis R 120	spacing	$s_{cr,fi}$	[mm]	108	176	
	edge distance	$c_{cr,fi}$		54	88	

[1] Not for using in prestressed hollow core slabs

fischer concrete screw FBS

Performances
Characteristic values for anchorages in precast prestressed hollow core slabs and characteristic values of resistance to fire exposure

Annex C 2