

## TELJESÍTMÉNYNYILATKOZAT

### DoP 0228

fischer FES ankersín fischer FBC síncsavarral (ankersinek betonban történő alkalmazására)

HU

1. <u>A terméktípus egvedi azonosító kódja:</u>	<b>DoP 0228</b>	
2. <u>Felhasználás célja(i):</u>	<b>Ankersinek repedéses vagy repedésmentes betonban történő alkalmazására</b>	
3. <u>Gyártó:</u>	<b>ld. a Mellékletet, különösen ezt a mellékletet B1- B8 fischerwerke GmbH &amp; Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Németország</b>	
4. <u>A meghatalmazott képviselő:</u>	-	
5. <u>Az AVCP-rendszer(ek):</u>	1	
6. <u>Az európai értékelési dokumentum:</u>	<b>EAD 330008-03-0601</b>	
Európai műszaki értékelés:	<b>ETA-18/0862; 2020-06-16</b>	
A műszaki értékelést végző szerv:	<b>DIBt- Deutsches Institut für Bautechnik</b>	
Bejelentett szerv(ek):	<b>1343 MPA Darmstadt / 2873 TU Darmstadt</b>	
7. <u>A nyilatkozatban szereplő teljesítmény(ek):</u>		
<b>Mechanikus szilárdság és stabilitás (BWR 1)</b>		
Karakterisztikus ellenállás húzásra (statikus és kvázi-statisztikus terhelések):	Ellenállás horgony acél tönkremenetel esetén: Horgony és ankersín közötti kapcsolat acél tönkremeneteli móddal szembeni ellenállása: Acélsín peremének lokális hajlítása és síncsavar kihúzódással szembeni ellenállás: Acél síncsavar szakadása:	Mellékletet C1 Mellékletet C1 Mellékletet C1 Mellékletet C5
	Acél ankersín deformálódása/hajlítószilárdságának túllépésével szembeni ellenállása: Maximális meghúzási nyomoték a sérülés elkerülése érdekében a telepítés során: Ellenállás kihúzóadás tönkremenetel esetén:	Mellékletet C1 Mellékletet B4 Mellékletet C2
	Ellenállás beton szakadókúp tönkremenetel esetén: Minimális peremtávolság, tengelytávolság, anyag vastagság a beton hasadásának megakadályozása érdekében a telepítés során Jellemző perem-és tengelytávolság a beton hasadásának elkerülése érdekében terhelés határára Beton lerepedéssel szembeni ellenállás:	Mellékletet B3, C2 Mellékletet B3 Mellékletet C2 Mellékletet A4
Karakterisztikus ellenállás nyírásra (statikus és kvázi-statisztikus terhelések):	Síncsavar elnyíródásával szembeni ellenállása (erőkar nélkül): Síncsavar erőkkarral történő hajlítással szembeni ellenállása: Acél ankersín peremének lokális hajlításával szembeni-, a horgony és sín között lévő acélsatlakozással szembeni -és acélsatlakozással szembeni ellenállás a horgony és sín között (keresztirányú nyíróterhelés): Az acélsatlakozással szembeni ellenállás a sín perem és síncsavar között (nyíróterhelés a sín hosszirányában): A telepítés érzékenységeinek tényezője: Acélhorgony szakadással szembeni ellenállása: acélsatlakozással szembeni ellenállás a horgony és ankersín között: Ellenállás pry-out tönkremenetel esetén: Ellenállás beton kitérés tönkremenetel esetén: Az ankersín acél tönkremeneteli módjával szembeni ellenállása: Tartósság: Elmozdulások:	Mellékletet C5 Mellékletet C6 Mellékletet C3 Mellékletet C3 NPD Mellékletet C3 Mellékletet C3 Mellékletet C4 Mellékletet C4 Mellékletet C4 Mellékletet A4, B1 Mellékletet C2, C4
Karakterisztikus ellenállás húzó-fáradó terhelésre:	NPD	
<b>Biztonság tűz esetén (BWR 2)</b>		
Tűzzel szembeni viselkedés:	Osztály (A1)	
Tűzállóság:	NPD	



8. Megfelelő műszaki dokumentáció és/vagy egyedi műszaki dokumentáció:

A fent azonosított termék teljesítménye megfelel a bejelentett teljesítmény(ek)nek. A 305/2011/EU rendeletnek megfelelően e teljesítménynyilatkozat kiadásáért kizárólag a fent meghatározott gyártó a felelős

A gyártó nevében és részéről aláíró személy:

Thilo Pregartner, Dr.-Ing.  
Tumlingen, 2020-06-30

Peter Schillinger, Dipl.-Ing.

Ez a Teljesítmény nyilatkozat különböző nyelveken elkészült. Vitás értelmezés esetén az angol verzió az irányadó.

A melléklet a (nyelvsemleges formában megadott) törvényi előírásokon túl önkéntesen megadott, kiegészítő információkat is tartalmaz angolul.

## Specific Part

### 1 Technical description of the product

The fischer Anchor Channel FES with fischer Channel Bolts FBC is a system consisting of a C-shaped channel profile of steel and at least two metal anchors non-detachably fixed on the channel back and fischer Channel Bolts.

The anchor channel is embedded surface-flush in the concrete. fischer Channel Bolts with appropriate hexagonal nuts and washers are fixed to the channel.

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 channel 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 channel 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)

Essential characteristic	Performance
Characteristic resistance under tension loading (static and quasi-static loading)	See Annex A4 and A5, Annex B3 and B4, Annex C1, C2 and C5
Characteristic resistance under shear loading (static and quasi-static loading)	See Annex C3 to C6
Characteristic resistance under combined tension and shear loading (static and quasi-static loading)	See Annex C4
Characteristic resistances under fatigue tension loading	No performance assessed
Displacements (static and quasi-static loading)	See Annex C2 and C4
Durability	See Annex B1

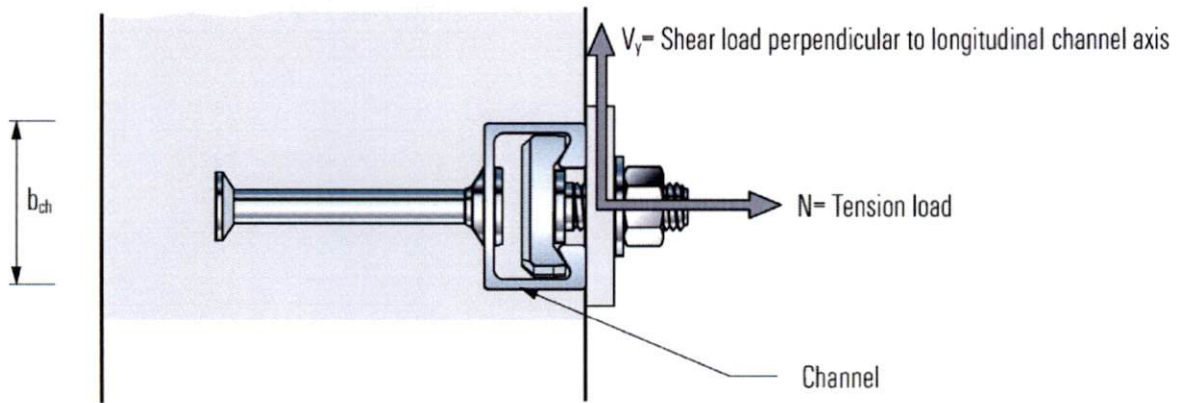
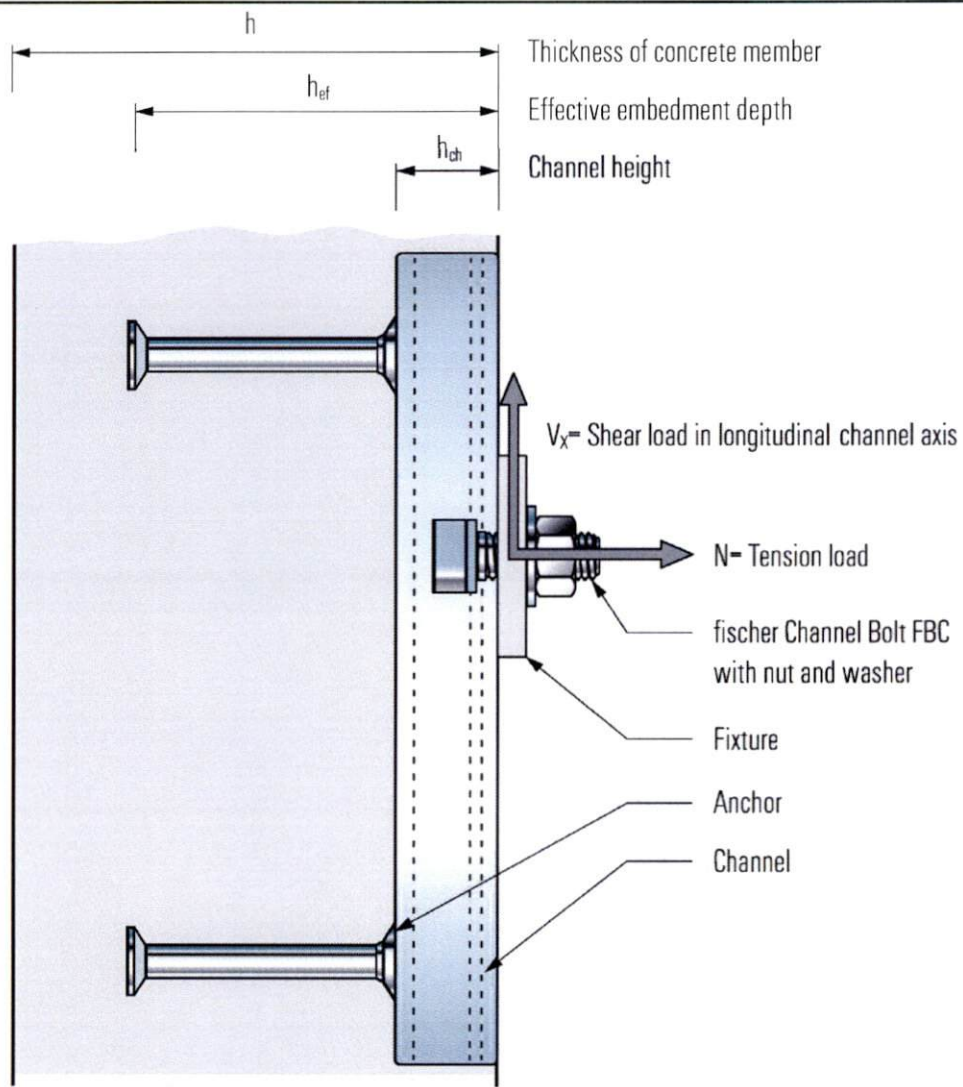
### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Characteristic resistance to fire	No performance assessed

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

In accordance with EAD No. 330008-03-0601, the applicable European legal act is: [2000/273/EC].

The system to be applied is: 1

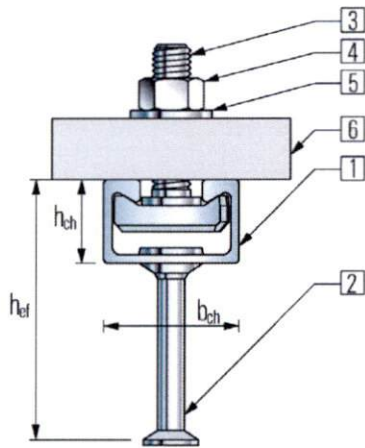


**fischer Anchor Channel FES with fischer Channel Bolts FBC**

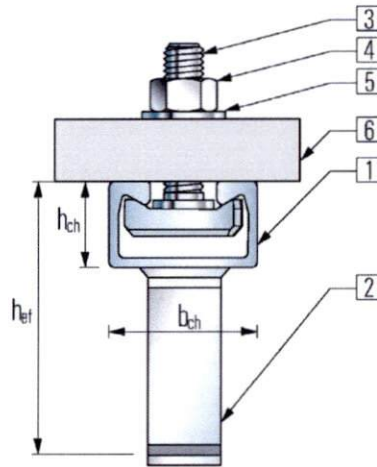
**Product Description**  
Installed condition

Annex A1

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Round anchor



I-anchor

fischer Anchor Channel FES

- 1 Channel profile
- 2 Anchor
- 3 Channel bolt
- 4 Hexagonal nut
- 5 Washer
- 6 Fixture

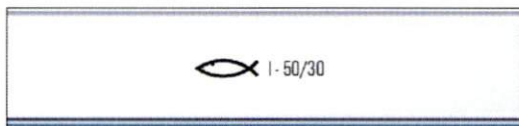
**Marking of the fischer anchor channel FES:**

e. g.:  I-50/30

 = Identifying mark of the manufacturer

I = Additional marking for I-anchors  
No marking for round anchors

50/30 = Anchor channel size  
(29/20; 38/23; 40/22; 50/30; 52/34,  
28/15; 38/17; 40/25; 49/30; 54/33)



Stamped into back of channel


Optional: printed on channel web or channel lips

H = Hot rolled channel, C = Cold formed channel

No marking for material acc. A7 Table 6 (Channel profile)

**Marking of the fischer channel bolt FBC:**

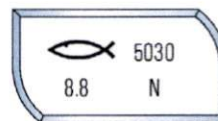
e. g.:  5030 8.8

 = Identifying mark of the manufacturer

5030 = Type of channel bolt

8.8 = Steel grade

N = Notching channel bolt (if applicable)



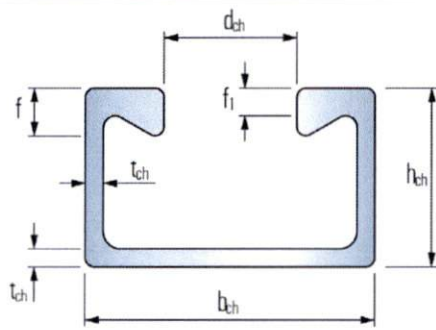
Marking of channel bolt type (smooth, serrated, notching head) according to Annex A6

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

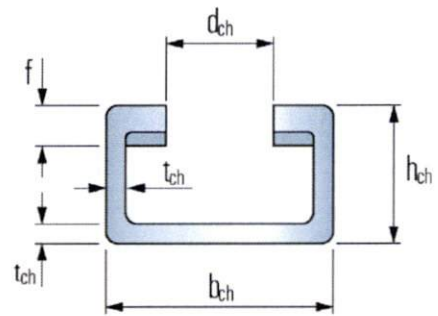
**Product Description**  
Marking and materials

Annex A2

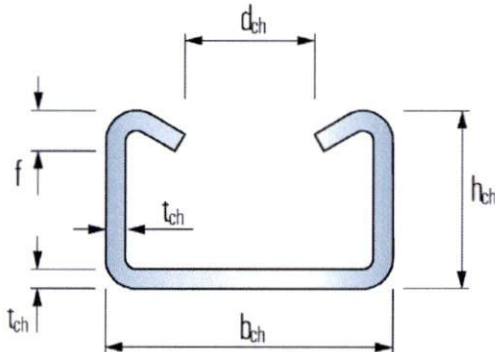
Appendix 4/ 23



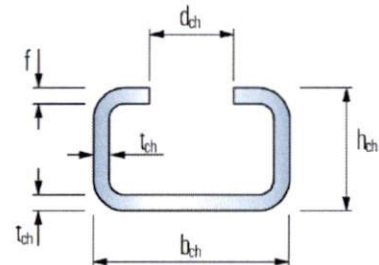
FES-H-(I)-40/22, -50/30, -52/34



FES-H-S-29/20, -38/23 (serrated)



FES-C-40/25, -49/30, -54/33



FES-C-28/15, -38/17

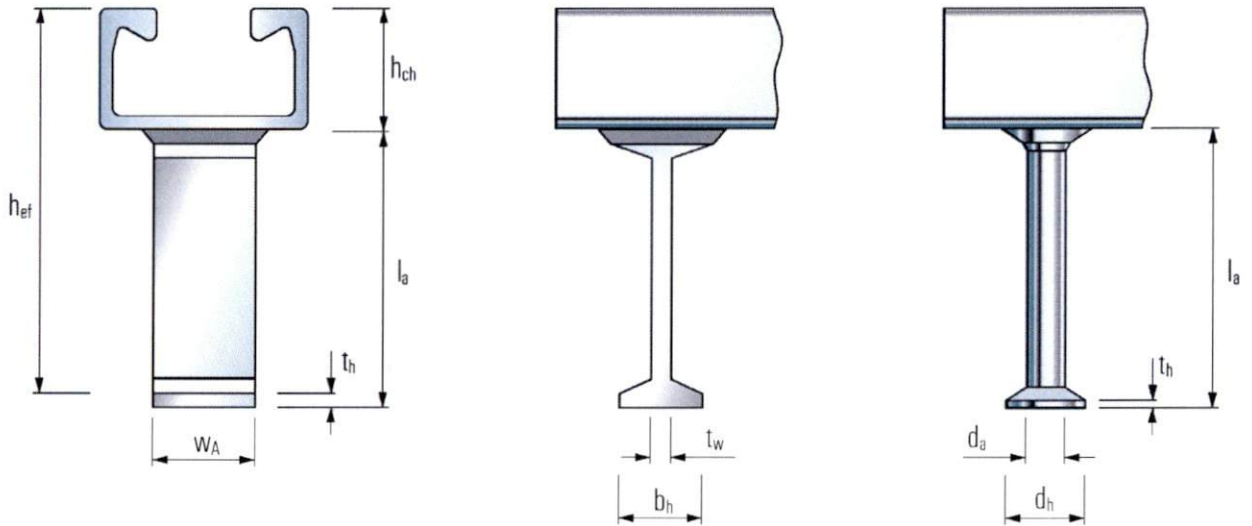
**Table 1: Dimensions of hot-rolled and cold-formed channel profile**

Anchor Channel FES-	$b_{ch}$ [mm]	$h_{ch}$ [mm]	$t_{ch}$ [mm]	$d_{ch}$ [mm]	$f$ [mm]	$f_1$ [mm]	$I_y$ [mm <sup>4</sup> ]
C-28/15	28,0	15,5	2,3	12,0	2,3	-	4280
C-38/17	38,0	17,3	3,0	18,0	3,0	-	8240
C-40/25	40,0	25,0	2,8	18,0	6,0	-	20340
C-49/30	50,0	30,0	3,3	22,0	7,0	-	43080
C-54/33	54,0	33,0	5,0	22,0	8,5	-	74090
H-S-29/20	30,0	20,0	3,0	14,0	5,2	-	11150
H-S-38/23	38,0	23,0	3,3	18,0	6,0	-	21070
H-(I)-40/22	40,0	23,5	2,6	18,0	6,2	3,6	21660
H-(I)-50/30	50,0	30,0	3,0	22,5	8,1	5,5	54960
H-(I)-52/34	52,5	34,0	4,0	22,5	11,5	8,3	96330

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Product Description**  
Dimensions of channels

Annex A3  
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**Table 2: Dimensions of anchor (welded I-anchor or forged round anchor)**

Anchor Channel FES -	I-anchor						Round anchor				
	$l_{a,min}$ [mm]	$t_{w,min}$ [mm]	$b_{h,min}$ [mm]	$t_h$ [mm]	$W_A$ [mm]	$A_{h,min}$ [mm <sup>2</sup> ]	$l_{a,min}$ [mm]	$d_a$ [mm]	$d_h$ [mm]	$t_h$ [mm]	$A_h$ [mm <sup>2</sup> ]
C-28/15	-	-	-	-	-	-	31,0	6	12,0	1,3	85
C-38/17	-	-	-	-	-	-	60,8	8	16,0	2,0	151
C-40/25	-	-	-	-	-	-	56,0	8	16,0	2,0	151
C-49/30	-	-	-	-	-	-	66,0	10	20,0	2,2	236
C-54/33	-	-	-	-	-	-	124,5	11	24,3	2,5	369
H-S-29/20	-	-	-	-	-	-	59,5	10	20,0	2,5	236
H-S-38/23	-	-	-	-	-	-	76,2	10	20,0	2,2	236
H-(I-)40/22	62	5	20	5	20	300	68,5	8	16,0	2,0	151
H-(I-)50/30	69	5	20	5	25	375	66,2	10	20,0	2,2	236
H-(I-)52/34	126	5 <sup>1)</sup>	20 <sup>1)</sup>	5	40	600	123,5	11	24,3	2,5	369

<sup>1)</sup> Alternative I-anchor:  $t_w = 6$  mm,  $b_h = 25$  mm

fischer Anchor Channel FES with fischer Channel Bolts FBC

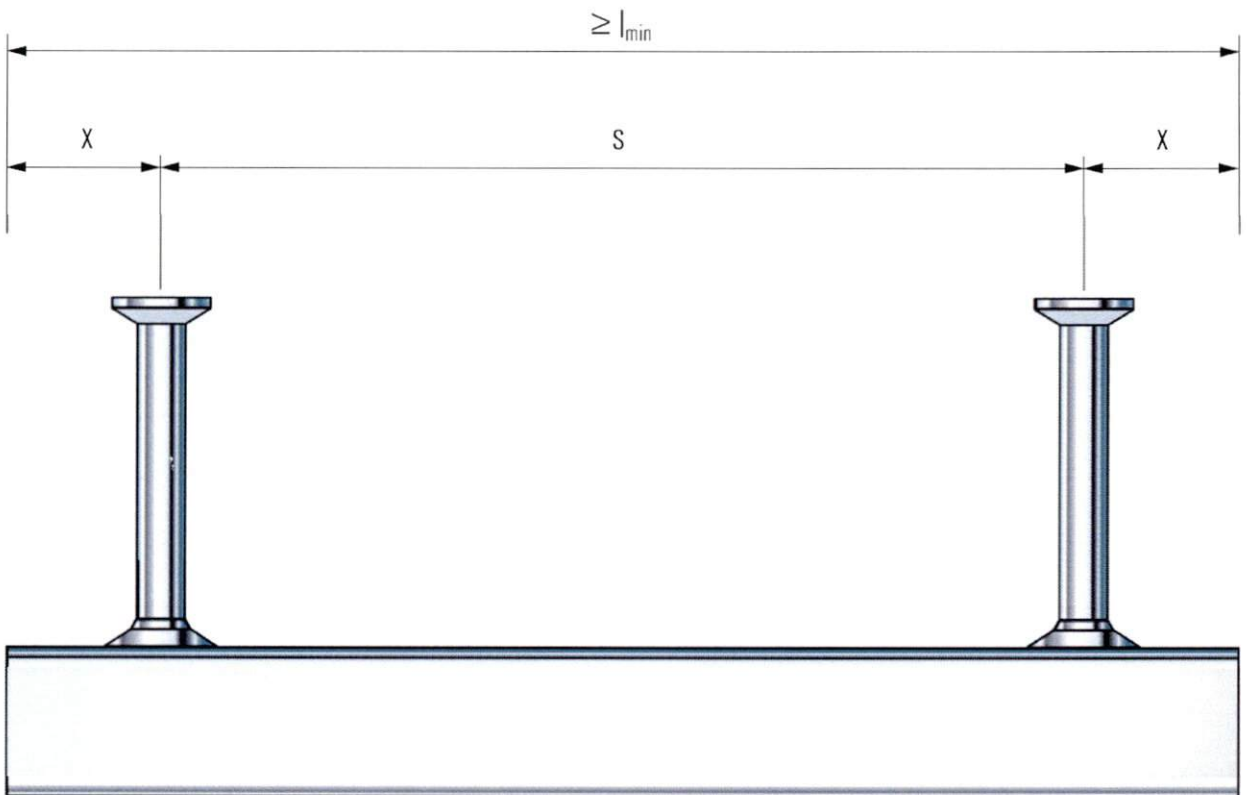
**Product Description**  
Dimensions of anchors

Annex A4  
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**Table 3: Dimensions of Anchor Channels FES-**

Anchor channel FES-	Anchor type	S <sub>min</sub> [mm]	S <sub>max</sub> [mm]	X <sub>min</sub> [mm]	X <sub>max</sub> [mm]	l <sub>min</sub> [mm]	l <sub>max</sub> [mm]
C-28/15	round	100	200	25	35	150	6.070
C-38/17							
C-40/25							
C-49/30							
C-54/33							
H-S-29/20							
H-S-38/23	round or I	250					
H-(I)-40/22							
H-(I)-50/30	round or I						
H-I-52/34	I						
H-52/34	round			35		170	



**fischer Anchor Channel FES with fischer Channel Bolts FBC**

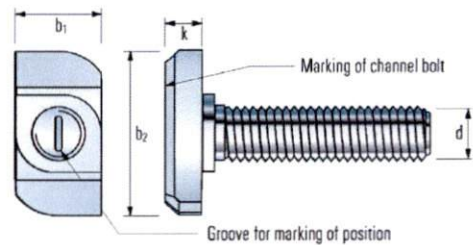
**Product Description**  
Anchor position and channel length

Annex A5  
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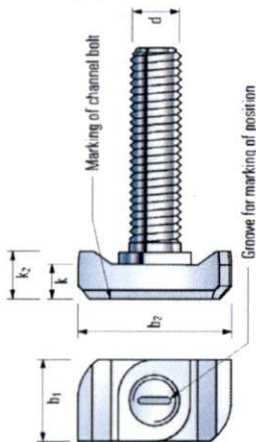
**Table 4: Steel grade and corrosion class**

Channel Bolt	Carbon steel <sup>1)</sup>
Steel grade	8.8
$f_{uk}$ [N/mm <sup>2</sup> ]	800 / 830
$f_{yk}$ [N/mm <sup>2</sup> ]	640 / 660 <sup>2)</sup>
Corrosion protection	G <sup>3)</sup> F <sup>4)</sup>

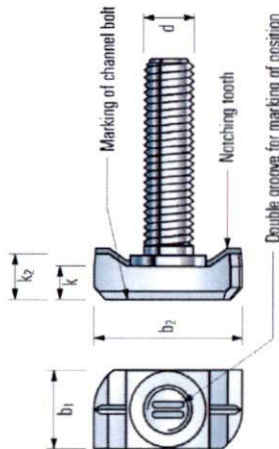
- 1) Material properties according to Annex A7  
 2) Material properties according to EN ISO 898-1  
 3) Electroplated  
 4) Hot-dip galvanized



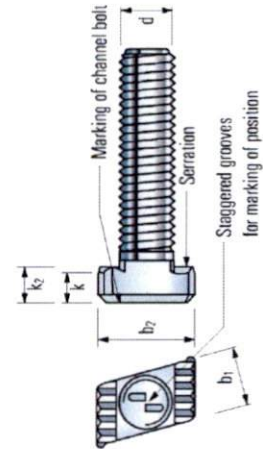
Channel Bolt FBC-28/15, FBC-38/17



Channel Bolt  
FBC-40/22, FBC-50/30



Notching Channel Bolt  
FBC-N-50/30-M20



Serrated Channel Bolt  
FBC-S-29/20, FBC-S-38/23

**Table 5: Dimensions of fischer Channel Bolts FBC and matching fischer Anchor Channels FES**

Anchor Channel FES-	Channel Bolt FBC-	Dimensions				
		Thread d	b1 [mm]	b2 [mm]	k [mm]	k2 [mm]
C-28/15	28/15	M8	11	22,2	5	-
		M10			5	-
		M12			7	-
C-38/17	38/17	M10	16	30	6	-
		M12			7	-
H-S-29/20	S-29/20	M12	13	22	6,5	8
H-S-38/23 C-38/17	S-38/23	M12 M16	16,7	29,1	5,8	7,3
H(-I)-40/22 C-40/25	40/22	M10	14	32,5	8	11
		M12	14			
		M16	17			
C-49/30 H(-I)-50/30 C-54/33 H(-I)-52/34	50/30	M10	17,1	40,5	9	11,5
		M12	17,1		10	12,5
		M16	17,1		11	13,5
		M20	20,5		12	14,5
H(-I)-50/30 H(-I)-52/34	N-50/30	M20	21	40,5	12	16

fischer Anchor Channel FES with fischer Channel Bolts FBC

Product Description  
Channel bolts

Annex A6

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**Table 6: Materials and properties**

Component	Steel		
	Mechanical properties	Coating	Coating
1	2a	2b	2c
Channel profile	1.0038, 1.0044 acc. to EN 10025:2004 1.0976, 1.0979 acc. to EN 10149:2013	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009
Anchor	1.0038, 1.0213, 1.0214 acc. to EN 10025:2004 1.5525, 1.5535 acc. to EN 10263:2017 1.5523	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009
Channel bolt	Steel grade 8.8 acc. to EN ISO 898-1:2013	Electroplated acc. to EN ISO 4042:2018	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009
Plain washer <sup>1)</sup> acc. to EN ISO 7089:2000 and EN ISO 7093-1:2000	Hardness class A ≥ 200 HV	Electroplated acc. to EN ISO 4042:2018	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009
Hexagonal nut acc. to EN ISO 4032:2012	Property class 5 or 8 acc. to EN ISO 898-2:2012	Electroplated acc. to EN ISO 4042:2018	Hot dip galvanized ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009

<sup>1)</sup> Not in the scope of delivery

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Product Description**  
Materials

Annex A7

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## Specification of intended use

### Anchor channels and channel bolts subject to:

- Static and quasi-static loads in tension and shear perpendicular to the longitudinal axis of the channel for FES in combination with channel bolt FBC.
- Static and quasi-static loads in tension and shear, shear perpendicular to the longitudinal axis of the channel and shear in the direction of the longitudinal axis of the channel for FES-H(-I)-50/30 or FES-H(-I)-52/34 in combination with notching channel bolt FBC-N-50/30-M20
- Static and quasi-static loads in tension and shear, shear perpendicular to the longitudinal axis of the channel and shear in the direction of the longitudinal axis of the channel for serrated anchor channels FES-H-S in combination with serrated channel bolts FBC-S.

### Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C12/15 to C90/105 according to EN 206-1:2000
- Cracked or uncracked concrete.

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (e.g. accommodations, bureaus, schools, hospitals, shops, exceptional internal conditions with usual humidity) (anchor channels and channel bolts according to Annex A7, Table 6, column 2b and 2c).
- Structures subject to internal conditions with usual humidity (e.g. kitchens, bathrooms and laundries in residential buildings, exceptional permanent damp conditions and application under water) (anchor channels and channel bolts according to Annex A7, Table 6, column 2c).

### Design:

- Anchor channels 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 channel and channel bolts are indicated on the design drawings (e.g. position of the anchor channel relative to the reinforcement or to supports).
- For static and quasi-static loading as well as fire exposure the anchor channels have to be designed in accordance with EOTA TR 047 "Calculation Method for the Performance of Anchor Channels", March 2018 or EN 1992-4:2018.
- The characteristic resistances are calculated with the minimum effective embedment depth.

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Intended Use**  
Specifications

Annex B1  
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**Installation:**

- The installation of anchor channels is carried out by appropriately qualified personnel under the supervision of the person responsible for the technical matters on site.
- Use of the anchor channels only as supplied by the manufacturer - without any manipulations, repositioning or exchanging of channel components.
- Cutting of anchor channels is allowed only if pieces according to Annex A5, Table 3 are generated including end spacing  $x$  and minimum channel length  $l_{min}$  and only to be used in dry internal conditions.
- Installation in accordance with the installation instruction given in Annexes B5, B6, B7 or B8.
- The anchor channels are fixed on the formwork, reinforcement or auxiliary construction such that no movement of the channels will occur during the time of laying the reinforcement and of placing and compacting the concrete.
- The concrete around the head of the anchors is properly compacted. The channels are protected from penetration of concrete into the internal space of the channels.
- Washers may be chosen according to Annex A7 and provided separately by the user.
- Orientating the channel bolt (groove according to Annex B6, B7 and B8) rectangular to the channel axis.
- The required installation torque given in Annex B4 must be applied and must not be exceeded.
- Notching channel bolts FBC-N-50/30 may be used only once after applying the installation torque  $T_{inst,s}$ .

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

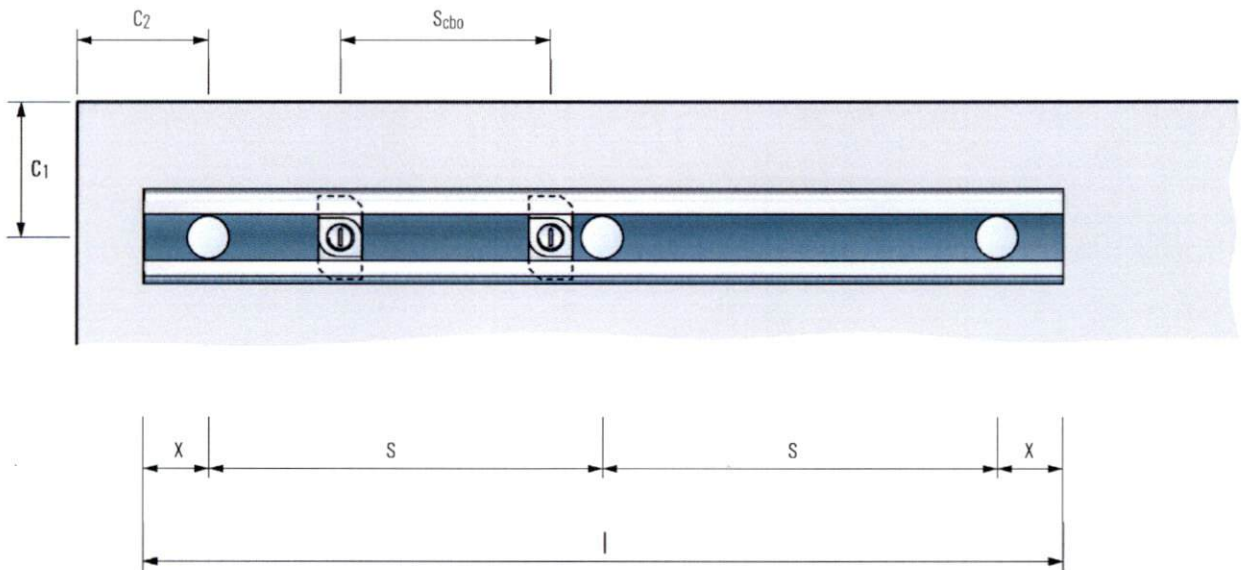
**Intended Use**  
Specification

Annex B2  
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**Table 7: Installation parameters**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
Minimum effective embedment depth	$h_{ef,min}$	[mm]	45	76	77	97	79 90 79	94 94 94	155 155 155
Minimum edge distance	$C_{min}$		40	50	75	100	50 50 50	75 75 75	100 100 100
Minimum thickness of concrete member	$h_{min}^{1)}$		70	100	100	100	100 100 100	100 100 100	160 160 170

<sup>1)</sup>  $h_{min} = h_{ef} + t_h + C_{nom}$ ;  $C_{nom}$  according to EN 1992-1-1:2004 + AC:2010



**Table 8: Minimum spacing for channel bolts**

Channel bolt			M8	M10	M12	M16	M20
Minimum spacing between channel bolts	$S_{cbo,min}$	[mm]	40	50	60	80	100

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Intended Use**  
Installation parameters for fischer Anchor Channels FES

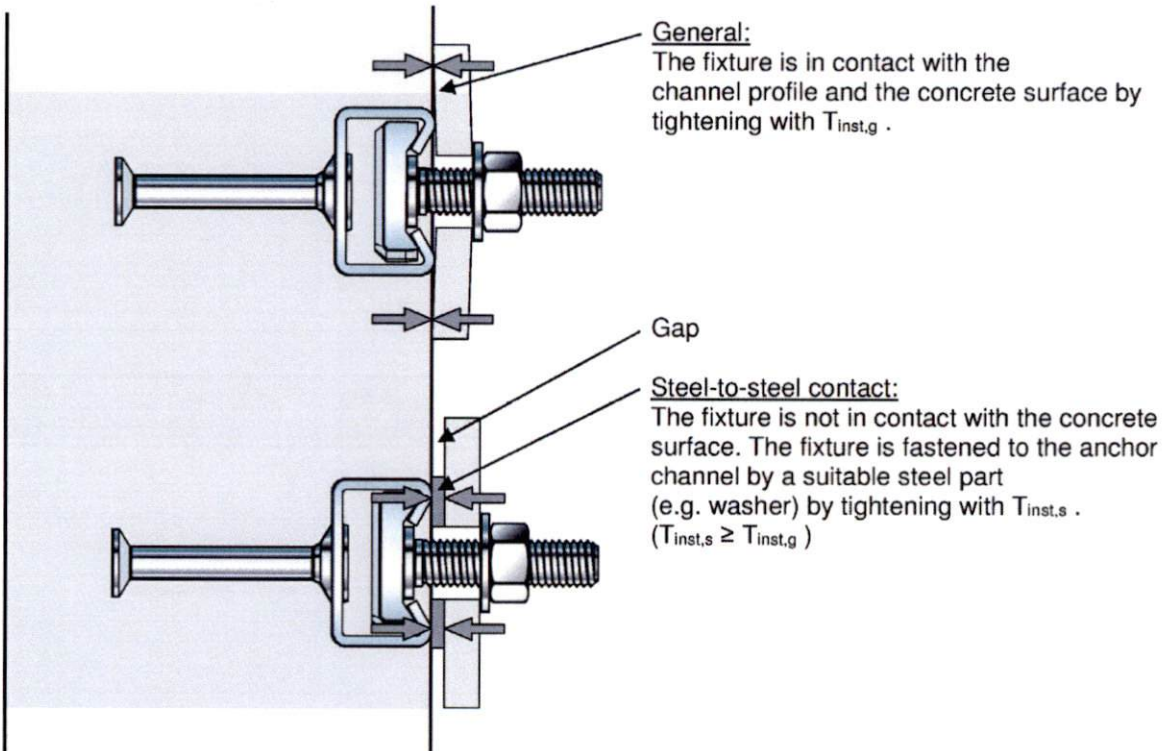
Annex B3  
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**Table 9: Required installation torque  $T_{inst}$**

fischer Anchor channel FES-	fischer Channel Bolt FBC-		$T_{inst}^{1)}$ [Nm]	
			General $T_{inst,g}$	Steel - steel contact $T_{inst,s}$
C-28/15	28/15	M8	7	15
		M10	10	30
		M12	13	45
C-38/17	38/17	M10	15	30
		M12	20	45
H-S-29/20	S-29/20	M12	80	80
H-S-38/23	S-38/23	M12	80	80
		M16	100	100
C-38/17	S-38/23	M12	40	80
		M16	50	100
H(-I)-40/22 C-40/25	40/22	M10	15	30
		M12	25	45
		M16	50	100
C-49/30 H(-I)-50/30 C-54/33 H(-I)-52/34	50/30	M10	15	30
		M12	25	45
		M16	60	100
		M20	75	230
H(-I)-50/30, H(-I)-52/34	N-50/30	M20	-2)	400

1)  $T_{inst}$  must not be exceeded

2) No performance assessed



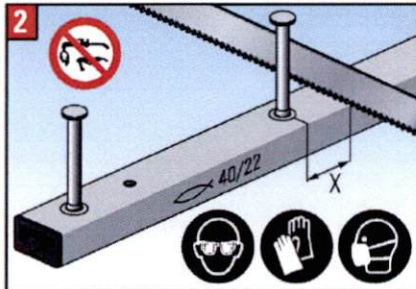
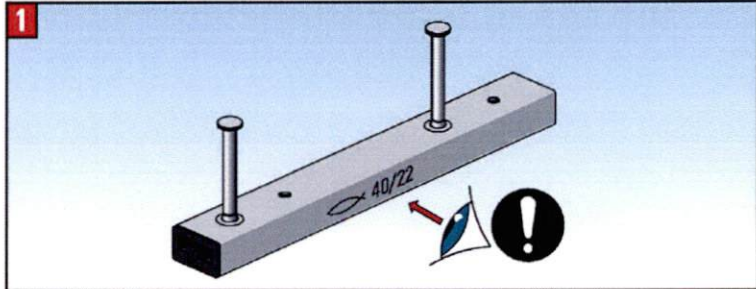
**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Intended Use**

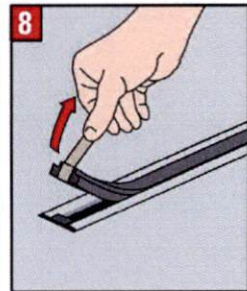
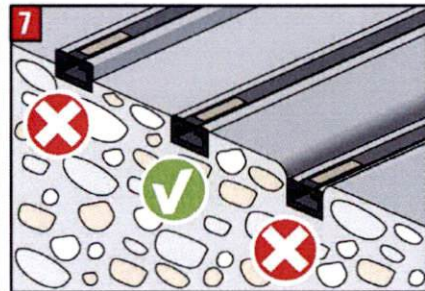
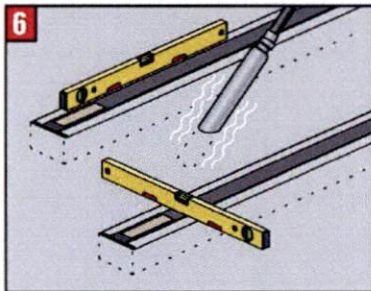
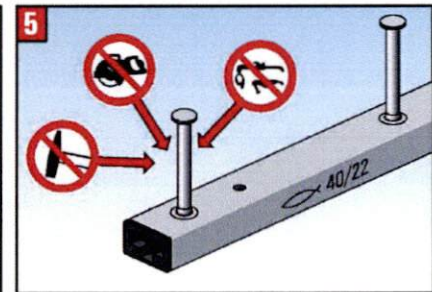
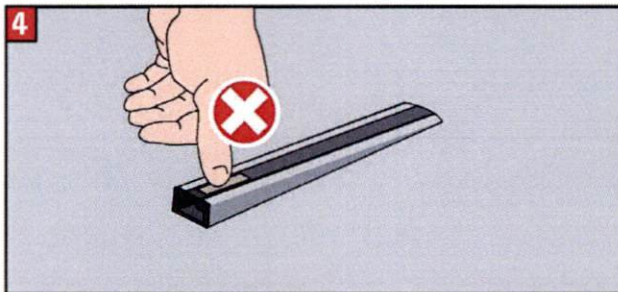
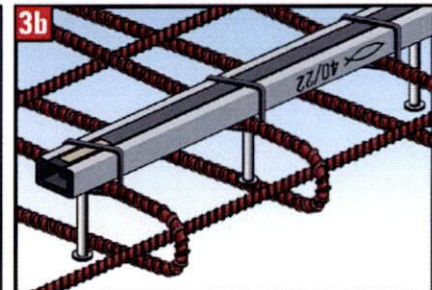
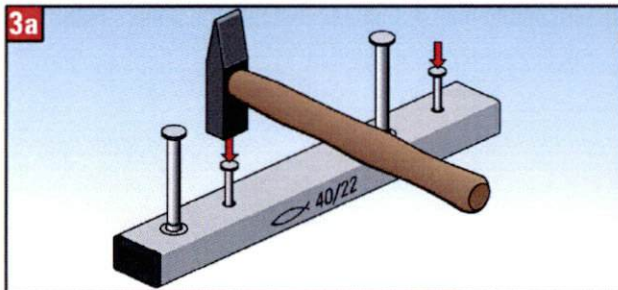
Installation parameters for fischer Channel Bolts FBC

Annex B4

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X	T	
	FES - H-	FES - C-
25 - 35 mm	S - 28 / 20	28 / 15
	S - 38 / 23	38 / 17
	(I-) 40 / 22	40 / 25
	(I-) 50 / 30	49 / 30
35 mm	I - 52 / 34	54 / 33
	52 / 34	-

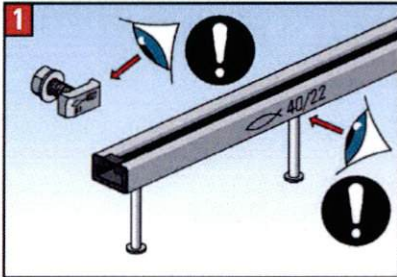





### fischer Anchor Channel FES with fischer Channel Bolts FBC

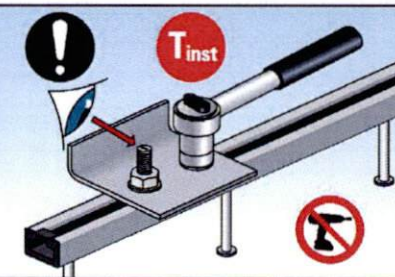
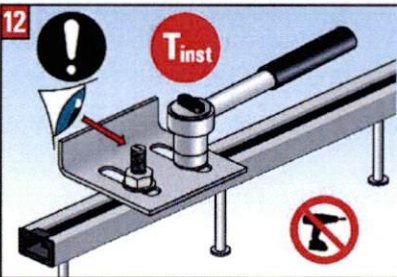
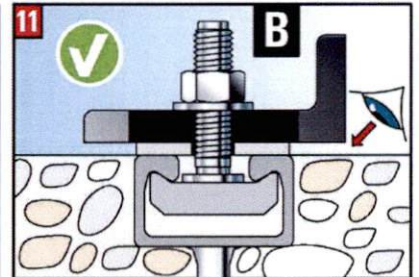
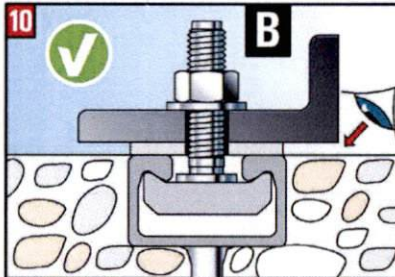
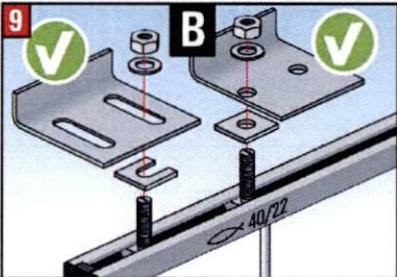
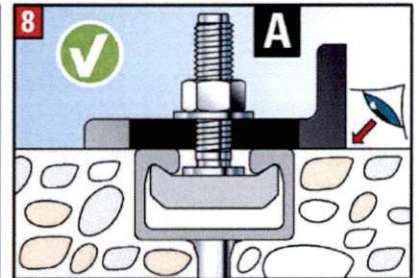
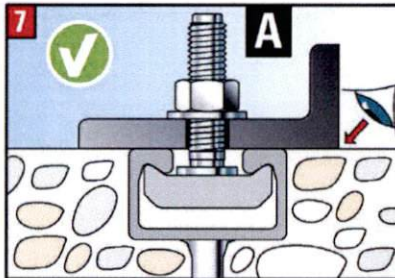
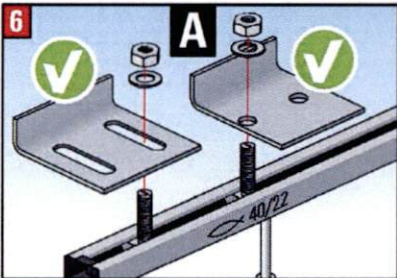
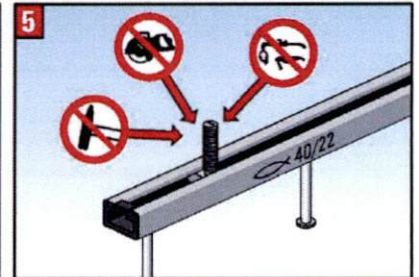
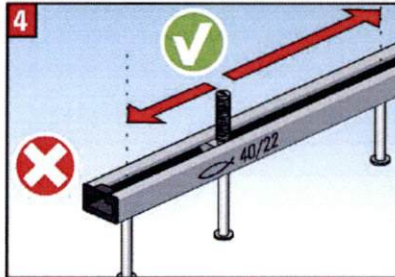
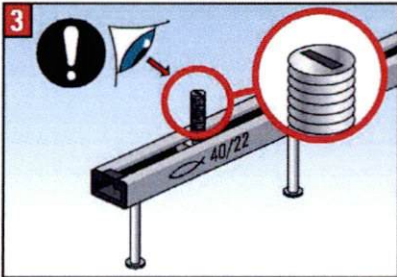
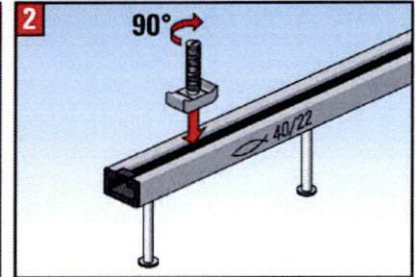
**Intended Use**  
Installation instruction for fischer Anchor Channels FES

Annex B5  
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FBC -	FES - H - (I -)	FES - C -	
2815	-	28 / 15	
3817	-	38 / 17	
4022	40 / 22	40 / 25	
5030	50 / 30 52 / 34	49 / 30 54 / 33	



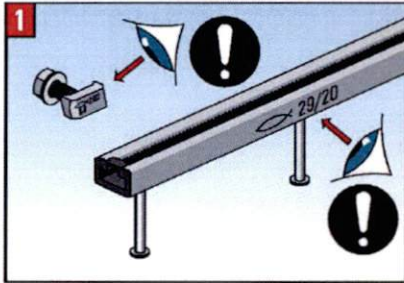
FBC	T <sub>inst</sub> [Nm]	M8	M10	M12	M16	M20
2815	A	7	10	13	-	-
	B	15	30	45	-	-
3817	A	-	15	20	-	-
	B	-	30	45	-	-
4022	A	-	15	25	50	-
	B	-	30	45	100	-
5030	A	-	15	25	60	75
	B	-	30	45	100	230




T<sub>inst</sub> must not be exceeded.

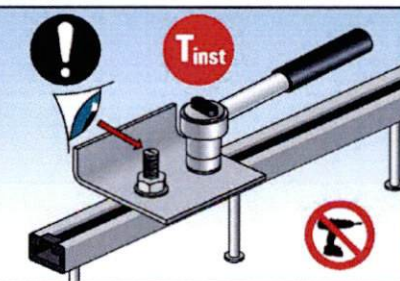
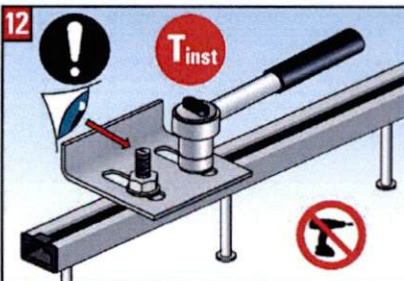
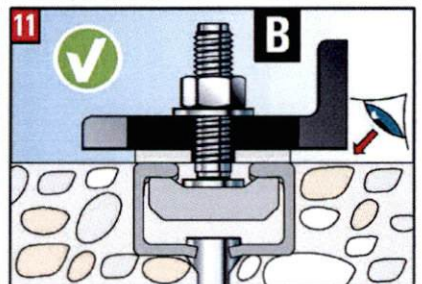
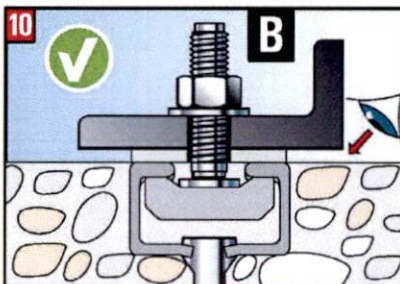
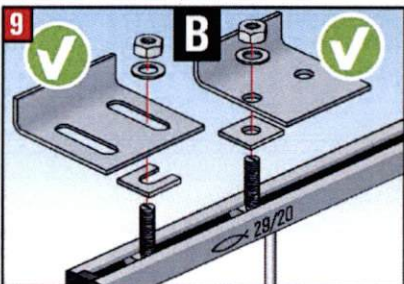
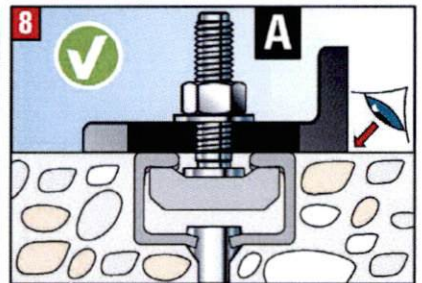
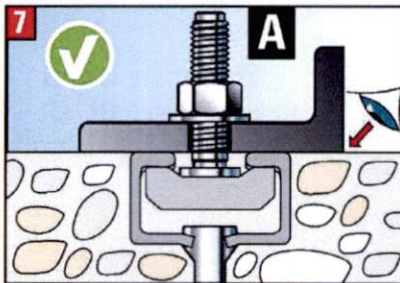
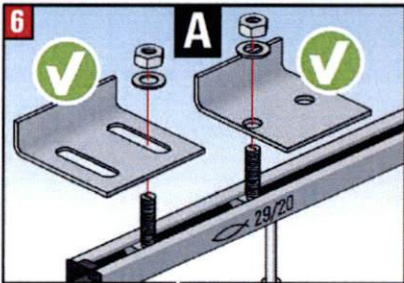
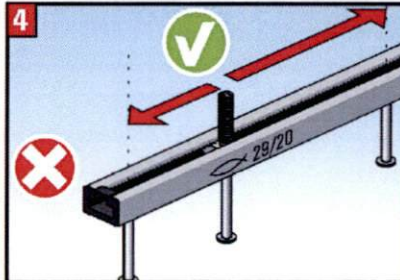
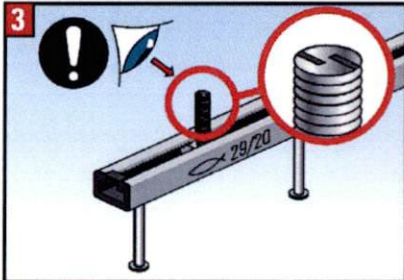
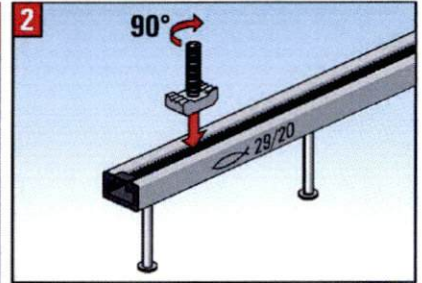
### fischer Anchor Channel FES with fischer Channel Bolts FBC

**Intended Use**  
Installation instruction for fischer Channel Bolts FBC

Annex B6  
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FBC - S -	FES - H - S -	FES - C -	
2920	29 / 20	-	
3823	38 / 23	38 / 17	



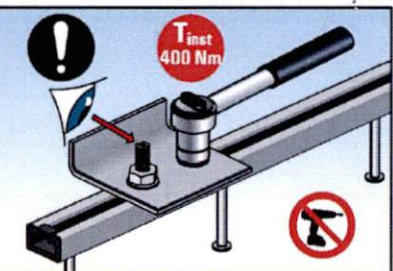
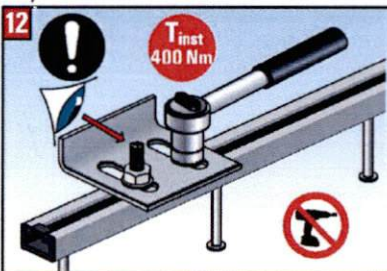
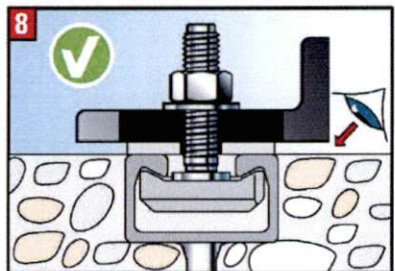
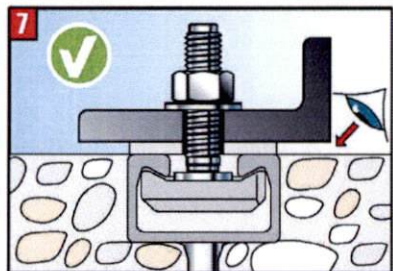
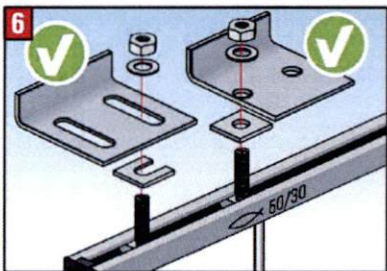
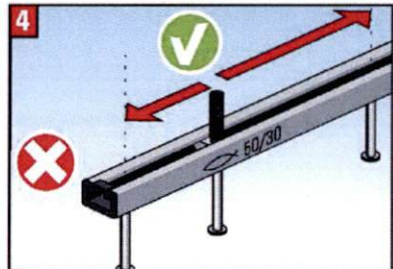
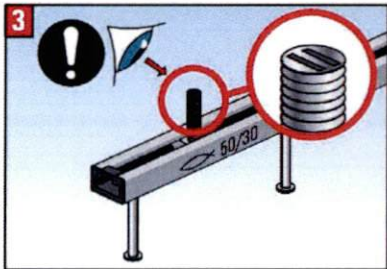
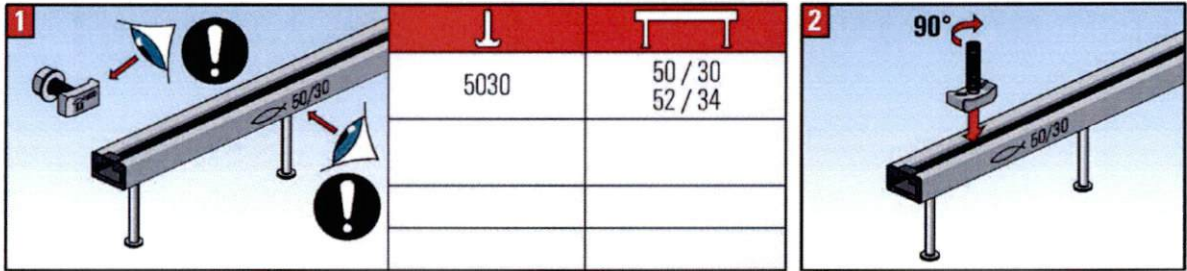
FBC - S -	FES -	T <sub>inst</sub> [Nm]	M12	M16
2920	H - S - 29 / 20	A	80	-
		B	80	-
3823	H - S - 38 / 23	A	80	100
		B	80	100
	C - 38 / 17	A	40	50
		B	80	100

T<sub>inst</sub> must not be exceeded.

### fischer Anchor Channel FES with fischer Channel Bolts FBC

**Intended Use**  
Installation instruction for Serrated fischer Channel Bolts FBC-S

Annex B7  
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$T_{inst}$  must not be exceeded.

fischer Anchor Channel FES with fischer Channel Bolts FBC

**Intended Use**  
Installation instruction for Notching fischer Channel Bolts FBC-N

Annex B8  
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**Table 10: Characteristic resistances under tension load – steel failure of anchor channel**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Steel failure: Failure of anchor</b>									
Characteristic resistance	$N_{Rk,s,a}$	[kN]	9	20	31	31	20 20 35	31 31 44	55 55 70,4
Partial factor	$\gamma_{Ms}^1$	[-]	1,8						
<b>Steel failure: Failure of connection between anchor and channel</b>									
Characteristic resistance	$N_{Rk,s,c}$	[kN]	9	18	20,2	30,3	20 20 38	31 31 40	55 55 70,4
Partial factor	$\gamma_{Ms}^1$	[-]	1,8						
<b>Steel failure: Local failure by flexure of channel lips</b>									
Characteristic spacing of channel bolts for $N_{Rk,s,l}$	$s_{l,N}$	[mm]	56	76	60	76	80 80 80	100 100 100	108 105 105
Characteristic resistance	$N^0_{Rk,s,l}$	[kN]	9	18	20,2	30,3	20 38 38	31 43 43	55 72 72
Partial factor	$\gamma_{Ms}^1$	[-]	1,8						

<sup>1)</sup> In absence of other national regulations

**Table 11: Characteristic flexural resistance of channel under tension load**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Stahlversagen: Biegung der Schiene</b>									
Characteristic flexural resistance of channel	$M_{Rk,s,flex}$	[Nm]	310	567	745	1.241	915 1.118 1.118	1.554 2.185 2.185	2.350 3.163 3.670
Partial factor	$\gamma_{Ms,flex}^1$	[-]	1,15						

<sup>1)</sup> In absence of other national regulations

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Performance**

Characteristic resistances of anchor channels under tension load

Annex C1

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**Table 12: Characteristic resistances under tension load – concrete failure**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Pullout failure</b>									
Characteristic resistance in cracked concrete C12/15	$N_{Rk,p}$	[kN]	7,6	13,6	21,2	21,2	13,6 27,0	21,2 33,8	33,2 54,0
Characteristic resistance in uncracked concrete C12/15	$N_{Rk,p}$	[kN]	10,7	19,0	29,7	29,7	19,0 37,8	29,7 47,3	46,5 75,6
Factor of $N_{Rk,p}$	C16/20	$\psi_c$ [-]	1,33						
	C20/25		1,67						
	C25/30		2,08						
	C30/37		2,50						
	C35/45		2,92						
	C40/50		3,33						
	C45/55		3,75						
	C50/60		4,17						
C55/67	4,58								
$\leq C60/75$	5,00								
Partial factor	$\gamma_{Mp} = \gamma_{Mc}^{1)}$	[-]	1,5						
<b>Concrete cone failure,</b>									
factor $k_1$									
Cracked concrete	$k_{cr,N}$	[-]	7,2	7,8	7,8	8,1	7,9 8,0 7,9	8,1 8,1 8,1	8,7 8,7 8,7
Uncracked concrete	$k_{ucr,N}$	[-]	$= 1,427 * k_{cr,N}$						
Partial factor	$\gamma_{Mc}^{1)}$	[-]	1,5						
<b>Splitting failure,</b>									
Characteristic edge distance	$C_{cr,sp}$	[mm]	$= 3 * h_{ef}$						
Characteristic spacing	$S_{cr,sp}$	[mm]	$= 2 * C_{cr,sp} = 6 * h_{ef}$						
Partial factor	$\gamma_{Msp}$	[-]	1,5						

<sup>1)</sup> In absence of other national regulations

**Table 13: Displacements under tension load**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
Tension load	N	[kN]	3,6	7,1	8,0	12,0	7,9 15,1 15,1	12,3 17,1 17,1	21,8 28,6 28,6
Short term displacement <sup>1)</sup>	$\delta_{N0}$	[mm]	0,7	1,3	1,4	2,0	1,5 2,2 2,2	1,4 1,5 1,5	1,2 1,9 1,9
Long term displacement <sup>1)</sup>	$\delta_{N\infty}$	[mm]	1,4	2,6	2,8	4,0	3,0 4,5 4,5	2,8 2,9 2,9	2,4 3,7 3,7

<sup>1)</sup> Displacements in midspan of the anchor channel, including slip of channel bolt, deformation of channel lips, bending of the channel and slip of the anchor channel in concrete

**fischer Anchor Channel FES with fischer Channel Bolts FBC**
**Performance**

Characteristic resistances of anchor channels and displacements under tension load

Annex C2

Appendix 19/ 23

**Table 14: Characteristic resistances under shear load – steel failure of anchor channel**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Steel failure: Failure of anchor</b>									
Characteristic resistance	$V_{Rk,s,a,y}$	[kN]	9	18	20,2	30,3	20 40 40	31 60 60	55 100 100
	$V_{Rk,s,a,x}$	[kN]	-.2)	-.2)	18,8	18,8	-.2) -.2) -.2)	-.2) 18,8 26,4	-.2) 33,0 42,2
Partial factor	$\gamma_{Ms}^{1)}$	[-]	1,8						
<b>Failure of connection between anchor and channel</b>									
Characteristic resistance	$V_{Rk,s,c,y}$	[kN]	9	18	20,2	30,3	20 40 40	31 60 60	55 100 100
	$V_{Rk,s,c,x}$	[kN]	-.2)	-.2)	12,1	18,2	-.2) -.2) -.2)	-.2) 18,6 24,0	-.2) 33,0 42,2
Partial factor	$\gamma_{Ms}^{1)}$	[-]	1,8						
<b>Local failure by flexure of channel lips under shear load perpendicular to the longitudinal axis of the channel</b>									
Characteristic spacing of channel bolts for $V_{Rk,s,l}$	$s_{l,v}$	[mm]	56	76	60	76	80 80 80	100 100 100	108 108 108
Characteristic resistance	$V_{Rk,s,l,y}^0$	[kN]	9	18	20,2	30,3	20 40 40	31 60 60	55 100 100
Partial factor	$\gamma_{Ms}^{1)}$	[-]	1,8						

1) In absence of other national regulations

2) No performance assessed.

**Table 15: Characteristic resistance for shear load in direction of the longitudinal axis of the channel – steel failure**

Anchor Channel FES-			H-S-29/20	H-S-38/23	H-40/22 H-I-40/22	H-50/30 H-I-40/22	H-52/34 H-I-52/34	
<b>Steel failure: Connection between channel lips and channel bolt</b>								
Characteristic resistance	$V_{Rk,s,l,x}$	[kN]	FBC-S-29/20-M12-8.8	22,5	-.2)	-.2)	-.2)	-.2)
			FBC-S-38/23-M12-8.8	-.2)	23,2	-.2)	-.2)	-.2)
			FBC-S-38/23-M16-8.8	-.2)	30,3	-.2)	-.2)	-.2)
			FBC-N-50/30-M20-8.8	-.2)	-.2)	-.2)	18,7	18,7
Installation factor	$\gamma_{inst}^{1)}$	[-]	1,2	1	-.2)	1,4	1,4	

1) In absence of other national regulations

2) No performance assessed.

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Performance**

Characteristic resistances of anchor channels under shear load

Annex C3

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**Table 16: Characteristic resistances under shear load – concrete failure**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Pryout failure</b>									
Product factor	$k_8$	[-]	1	2	2	2	2	2	2
Partial factor	$\gamma_{Mc}^{1)}$	[-]	1,5						
<b>Concrete edge failure <math>k_{12}</math></b>									
Cracked concrete	$k_{cr,V}$	[-]	5,8	6,9	5,6	5,6	7,5	7,5	7,5
Uncracked concrete	$k_{ucr,V}$	[-]	8,1	9,7	7,8	7,8	10,5	10,5	10,5
Partial factor	$\gamma_{Mc}^{1)}$	[-]	1,5						

<sup>1)</sup> In absence of other national regulations

**Table 17: Displacements under shear load**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
Shear load perpendicular to the longitudinal axis of the channel	$V_y$	[kN]	3,6	7,1	8,0	12,0	7,9 15,9 15,9	12,3 23,8 23,8	21,8 39,7 39,7
Short time displacement <sup>1)</sup>	$\delta_{V,y,0}$	[mm]	0,7	1,3	1,4	2,0	1,5 2,1 2,1	1,4 3,7 3,7	1,2 4 4
Long time displacement <sup>1)</sup>	$\delta_{V,y,\infty}$	[mm]	1,1	2,0	2,1	3,0	2,3 3,2 3,2	2,1 5,5 5,5	1,8 5,9 5,9
Shear load in direction of the longitudinal axis of the channel	$V_x$	[kN]	<sup>-3)</sup>	<sup>-3)</sup>	6,6	12,0	<sup>-3)</sup> <sup>-3)</sup> <sup>-3)</sup>	5,1 5,1 5,1	5,1 5,1 5,1
Short time displacement <sup>2)</sup>	$\delta_{V,x,0}$	[mm]	<sup>-3)</sup>	<sup>-3)</sup>	0,6	0,8	<sup>-3)</sup> <sup>-3)</sup> <sup>-3)</sup>	0,5 0,5 0,5	0,5 0,5 0,5
Long time displacement <sup>2)</sup>	$\delta_{V,x,\infty}$	[mm]	<sup>-3)</sup>	<sup>-3)</sup>	0,9	1,3	<sup>-3)</sup> <sup>-3)</sup> <sup>-3)</sup>	0,8 0,8 0,8	0,8 0,8 0,8

<sup>1)</sup> Displacements in midspan of the anchor channel, including slip of channel bolt, deformation of channel lips and slip of the anchor channel in concrete

<sup>2)</sup> Displacements of the anchor channel, including slip of channel bolt, deformation of channel lips and slip of the anchor channel in concrete

<sup>3)</sup> No performance assessed.

**Table 18: Characteristic resistances under combined tension and shear load**

Anchor Channel FES-			C-28/15	C-38/17	H-S-29/20	H-S-38/23	C-40/25 H-40/22 H-I-40/22	C-49/30 H-50/30 H-I-50/30	C-54/33 H-52/34 H-I-52/34
<b>Steel failure: Local failure by flexure of channel lips and failure by flexure of channel</b>									
Product factor	$k_{13}$	[-]	according to EN 1992-4:2019, 7.4.3.1						
<b>Steel failure: Failure of anchor and connection between anchor and channel</b>									
Product factor	$k_{14}$	[-]	according to EN 1992-4:2019, 7.4.3.1						

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Performance**

Displacement and characteristic resistances of anchor channels under shear load, characteristic resistance under combined tension and shear load

Annex C4

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**Table 19: Characteristic resistances under tension and shear load – steel failure of channel bolts**

Channel bolt			M8	M10	M12	M16	M20
<b>Steel failure, Characteristic tension resistance</b>							
FBC-28/15	N <sub>Rk,s</sub>	[kN]	29,2	33,0	45,1	- <sup>2)</sup>	- <sup>2)</sup>
FBC-38/17			- <sup>2)</sup>	46,4	67,4	- <sup>2)</sup>	- <sup>2)</sup>
FBC-S-29/20			- <sup>2)</sup>	- <sup>2)</sup>	48,5	- <sup>2)</sup>	- <sup>2)</sup>
FBC-S-38/23			- <sup>2)</sup>	- <sup>2)</sup>	67,4	71,5	- <sup>2)</sup>
FBC-40/22			- <sup>2)</sup>	46,4	55,1	82,2	- <sup>2)</sup>
FBC-50/30			- <sup>2)</sup>	46,4	67,4	96,5	127,2
FBC-N-50/30			- <sup>2)</sup>	- <sup>2)</sup>	- <sup>2)</sup>	- <sup>2)</sup>	142,5
Partial factor	γ <sub>Ms</sub> <sup>1)</sup>	[-]	1,5				
<b>Characteristic shear resistance</b>							
	V <sub>Rk,s,x</sub> = V <sub>Rk,s,y</sub>	[kN]	14,6	23,2	33,7	62,8	98,0
Partial factor	γ <sub>Ms</sub> <sup>1)</sup>	[-]	1,25				

<sup>1)</sup> In absence of other national regulations

<sup>2)</sup> Combination not available

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Performance**

Characteristic resistances of channel bolts under tension and shear load

Annex C5

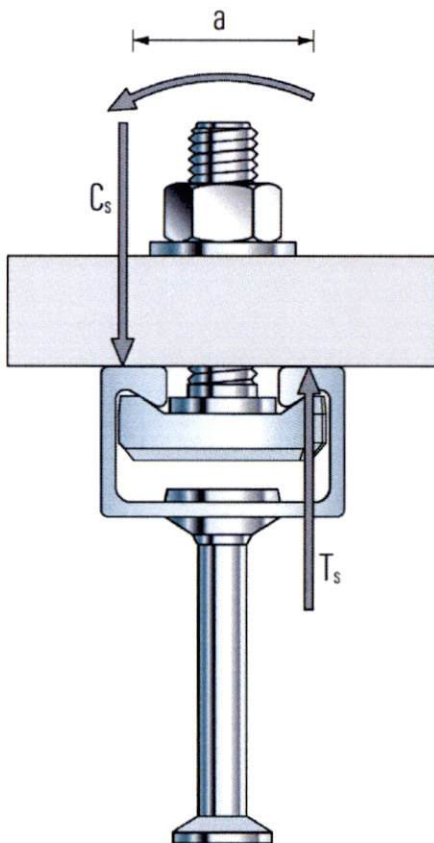
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**Table 20: Characteristic resistances under shear load with lever arm – steel failure of channel bolts**

Channel bolt <sup>2)</sup>			M8	M10	M12	M16	M20	
<b>Steel failure</b>								
Characteristic bending resistance	$M_{Rk,s}^{0,3)}$	[Nm]	FBC-(S-) (N-)	30,0	59,8	104,8	266,4	519,3
Partial factor	$\gamma_{Ms}^{1)}$	[-]		1,25				
Internal lever arm	a	[mm]	FBC-28/15	16,7	18,1	19,4	- <sup>3)</sup>	- <sup>3)</sup>
			FBC-38/17	- <sup>3)</sup>	22,7	24,0	- <sup>3)</sup>	- <sup>3)</sup>
			FBC-S-29/20	- <sup>3)</sup>	- <sup>3)</sup>	20,0	- <sup>3)</sup>	- <sup>3)</sup>
			FBC-S-38/23	- <sup>3)</sup>	- <sup>3)</sup>	23,7	25,7	- <sup>3)</sup>
			FBC-40/22	- <sup>3)</sup>	23,5	24,8	26,8	- <sup>3)</sup>
			FBC-50/30	- <sup>3)</sup>	27,7	29,0	31,0	33,3
			FBC-N-50/30	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	34,0

- 1) In absence of other national regulations
- 2) Materials according to Annex A7, Table 6
- 3) Combination not available
- 4) The characteristic flexure resistance according to Table 19 is limited as follows:



$$M_{Rk,s}^0 \leq 0,5 \cdot N_{Rk,s,l}^0 \cdot a \quad (N_{Rk,s,l}^0 \text{ according to Annex C1, Table 10})$$

$$M_{Rk,s}^0 \leq 0,5 \cdot N_{Rk,s} \cdot a \quad (N_{Rk,s} \text{ according to Annex C5, Table 18})$$

a = Internal lever arm according to Table 19

$T_s$  = Tension force acting on the channel lips

$C_s$  = Compression force acting on the channel lips

**fischer Anchor Channel FES with fischer Channel Bolts FBC**

**Performance**

Characteristic flexural resistances of channel bolts under shear load

Annex C6

Appendix 23/ 23