DÉCLARATION DES PERFORMANCES

DoP 0377

pour le rail d'ancrage cranté fischer InnoLock FES-RS-S avec les boulons de rail crantés fischer FBC-S (rail d'ancrage pour utilisation dans le béton) FR

1. Code d'identification unique du type de produit: **DoP 0377**

2. Usage(s) prévu(s): **Rails d'ancrage pour utilisations dans le béton fissuré et non fissuré, voir annexes, en particulier les annexes B1- B6.**

3. Fabricant: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Allemagne**

4. Mandataire: **–**

5. Système(s) d'évaluation et de vérification de la constance des performances: **1**

6. Document d'évaluation européen: **EAD 330008-04-0601, Edition 07/2024**
   Evaluation Technique Européenne: **ETA-22/0035; 2025-05-23**
   Organisme d'évaluation technique: **DIBt- Deutsches Institut für Bautechnik**
   Organisme(s) notifié(s): **2873 TU Darmstadt**

7. Performance(s) déclarée(s):

Résistance mécanique et stabilité (BWR 1)

Résistance caractéristique à la charge de traction (charge statique et quasi-statique):

1) Résistance à la rupture de l'acier de l'ancrage: Annexe C1
2) Résistance à la rupture de l'acier de la connexion entre l'ancrage et le rail: Annexe C1
3) Résistance à la rupture de l'acier des lèvres du rail et extraction glissement du boulon: Annexe C1
4) Résistance à la rupture de l'acier du boulon: Annexe C6
5) Résistance à la rupture de l'acier par dépassement de la résistance à la flexion du rail: Annexes A5, C1
6) Couple de serrage maxi. pour éviter les dommages lors de l'installation: Annexe B4
7) Résistance à l'extraction glissement de l'ancrage: Annexe C2
8) Résistance à la rupture du cône béton: Annexes B3, C2
9) Distance au bord, entraxe et épaisseur du support mini. pour éviter la rupture par fendage lors de l'installation: Annexes A5, B3
10) Distance au bord et entraxe caractéristiques pour éviter la rupture par fendage sous charge: Annexe C2
11) Résistance à la rupture par éclatement- zone d'appui de la tête: Annexe A4

Résistance caractéristique à la charge de cisaillement (charge statique et quasi-statique):

12) Résistance à la rupture de l'acier du boulon sous charge de cisaillement sans bras d levier: Annexe C6
13) Résistance à la rupture de l'acier par flexion du boulon sous charge de cisaillement sans bras d levier: Annexe C7
14) Résistance à la rupture de l'acier des lèvres du rail, à la rupture de l'acier de la connexion entre l'ancrage et le rail ou à la rupture de l'acier du rail d'ancrage (charge de cisaillement perpendiculaire au rail): Annexe C4
15) Résistance à la rupture de l'acier de la connexion entre les lèvres du rail et le boulon (charge de cisaillement dans l'axe longitudinal du rail): Annexe C5
16) Coefficient de sécurité pour l'installation (Cisaillement longitudinal): Annexe C5
17) Résistance à la rupture de l'acier de l'ancrage (Cisaillement longitudinal): Annexe C4
18) Résistance à la rupture de l'acier de la connexion entre ancrage et rail (charge de cisaillement dans l'axe longitudinal du rail): Annexe C5
19) Résistance à la rupture par effet de levier : Annexe C5
20) Résistance à la rupture du béton en bord de dalle: Annexe C5

Résistance caractéristique sous charge combinée de traction et de cisaillement (charges statiques et quasi-statiques)

21) Résistance à la rupture de l'acier du rail d'ancrage: Annexe C6

Résistance caractéristique sous charge de fatigue sous sollicitation en traction:

22) Résistance à la fatigue jusqu'à la rupture de l'acier de l'ensemble du système (fonction continue ou trilinéaire,Méthode d'évaluation A1, A2):
23) Résistance limite à la fatigue de l'ensemble du système à la rupture de l'acier (Méthode d'évaluation B): NPD
24) Résistance à la fatigue jusqu'à la rupture de l'acier de l'ensemble du système (Fonction linéarisée,Méthode d'évaluation C): Annexe C8
25) Résistance à la fatigue à la rupture du béton (fonction exponentielle, Méthode d'évaluation A1, A2): NPD
26) Résistance limite à la fatigue à la rupture du béton (Méthode d'évaluation B): NPD
27) Résistance à la fatigue à la rupture du béton (Fonction linéarisée, Méthode d'évaluation C): Annexe C9

Résistance caractéristique sous charge sismique (catégorie de performance sismique C1)

28) Résistance à la rupture de l'acier sous charge sismique en traction (catégorie de performance sismique C1): Annexes C10, C12
29) Résistance à la rupture de l'acier sous charge sismique de cisaillement pour effort tranchant en direction transversale (catégorie de performance sismique C1): Annexes C11, C12
30) Résistance à la rupture de l'acier sous charge sismique de cisaillement pour effort tranchant selon l'axe longitudinal du canal (catégorie de performance sismique C1): Annexe C11

Résistance caractéristique sous charge de traction et/ou de cisaillement statique et quasi-statique

31) Déplacements: Annexes C3, C6

Sécurité en cas d'incendie (BWR 2)

32) Réaction au feu: Classe (A1)

33) Résistance au feu: Annexes C13, C14

Durabilité:

34) Durabilité: Annexes A7, B1

8. Documentation technique appropriée et/ou documentation technique spécifique: --

Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.

Signé pour le fabricant et en son nom par:

Dr. Ronald Mihala, Director general de Investigación y Desarrollo

Dieter Pfaff, Chef de la Fédération Internationale de Production et Gestion de la Qualité

Tumlingen, 2025-06-12

Cette DoP a été préparée en plusieurs langues. En cas de différend relatif à l'interprétation, la version anglaise prévaudra.

L'annexe comprend des informations volontaires et complémentaires en langue anglaise dépassant les exigences légales (spécifiées de manière neutre).

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Guide de traduction des caractéristiques essentielles et des paramètres de performance pour les annexes

Mechanical resistance and stability (BWR 1) **Résistance mécanique et stabilité (BWR 1)**		
Characteristic resistance to tension load (static and quasi-static loading): **Résistance caractéristique à la charge de traction (charge statique et quasi-statique):**		
1	Resistance to steel failure of anchors: **Résistance à la rupture de l'acier de l'ancrage:**	$N_{Rk,s,a}$
2	Resistance to steel failure of the connection between anchors and channel: **Résistance à la rupture de l'acier de la connexion entre l'ancrage et le rail:**	$N_{Rk,s,c}$
3	Resistance to steel failure of channel lips and sunsequently pullout of channel bolt: **Résistance à la rupture de l'acier des lèvres du rail et extraction glissement du boulon:**	$N^0_{Rk,s,l}$; $s_{l,N}$
4	Resistance to steel failure of channel bolt: **Résistance à la rupture de l'acier du boulon:**	$N_{Rk,s}$
5	Resistance to steel failure by exceeding the bending strength of the channel: **Résistance à la rupture de l'acier par dépassement de la résistance à la flexion du rail:**	$M_{Rk,s,flex}$; s_{max}
6	Maximum installation torque moment to avoid damage during installation: **Couple de serrage maxi. pour éviter les dommages lors de l'installation:**	$T_{inst,g}$; ($T_{inst,s}$)
7	Resistance to pull-out failure of the anchor: **Résistance à l'extraction glissement de l'ancrage:**	$N_{Rk,p}$
8	Resistance to concrete cone failure: **Résistance à la rupture du cône béton:**	$k_{cr,N}$; $k_{ucr,N}$; h_{ef}
9	Minimum edge distance, spacing, member thickness to prevent concrete splitting during installation: **Distance au bord, entraxe et épaisseur du support mini. pour éviter la rupture par fendage lors de l'installation:**	$s_{min;}$ $c_{min;}$ h_{min}
10	Characteristic edge distance and spacing to avoid splitting of concrete under load: **Distance au bord et entraxe caractéristiques pour éviter la rupture par fendage sous charge:**	$s_{cr,sp}$; $c_{cr,sp}$
11	Resistance to blowout failure- bearing area of head: **Résistance à la rupture par éclatement- zone d'appui de la tête:**	A_h
Characteristic resistance to shear load (static and quasi-static loading): **Résistance caractéristique à la charge de cisaillement (charge statique et quasi-statique):**		
12	Resistance to steel failure of channel bolt under shear loading without lever arm: **Résistance à la rupture de l'acier du boulon sous charge de cisaillement sans bras d levier:**	$V_{Rk,s}$
13	Resistance to steel failure by bending of the channel bolt under shear load with lever arm: **Résistance à la rupture de l'acier par flexion du boulon sous charge de cisaillement sans bras d levier:**	$M^0_{Rk,s}$
14	Resistance to steel failure of channel lips, steel failure of connection between anchor and channel or steel failure of anchor (shear load in transverse direction): **Résistance à la rupture de l'acier des lèvres du rail, à la rupture de l'acier de la connexion entre l'ancrage et le rail ou à la rupture de l'acier du rail d'ancrage (charge de cisaillement perpendiculaire au rail):**	$V^0_{Rk,s,l,y}$; $s_{l,V}$; $V_{Rk,s,c,y}$; $V_{Rk,s,a,y}$
15	Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis): **Résistance à la rupture de l'acier de la connexion entre les lèvres du rail et le boulon (charge de cisaillement dans l'axe longitudinal du rail):**	$V_{Rk,s,l,x}$
16	Factor for sensistivity to installation: **Coefficient de sécurité pour l'installation (Cisaillement longitudinal):**	γ_{inst}
17	Resistance to steel failure of the anchor: **Résistance à la rupture de l'acier de l'ancrage (Cisaillement longitudinal):**	$V_{Rk,s,a,x}$
18	Resistance to steel failure of connection between anchor and channel (shear load in longitudinal channel axis): **Résistance à la rupture de l'acier de la connexion entre ancrage et rail (charge de cisaillement dans l'axe longitudinal du rail):**	$V_{Rk,s,c,x}$
19	Resistance to concrete pry-out failure: **Résistance à la rupture par effet de levier :**	k_8
20	Resistance to concrete edge failure: **Résistance à la rupture du béton en bord de dalle:**	$k_{cr,v}$; $k_{ucr,V}$
Characteristic resistance under combined static and quasi-static tension and shear loading **Résistance caractéristique sous charge combinée de traction et de cisaillement (charges statiques et quasi-statiques)**		
21	Resistance to steel failure of the anchor channel: **Résistance à la rupture de l'acier du rail d'ancrage:**	k_{13}, k_{14}
Characteristic resistance under fatigue tension loading: **Résistance caractéristique sous charge de fatigue sous sollicitation en traction:**		
22	Fatigue resistance to steel failure of the whole system (continuous or tri-linear function): **Résistance à la fatigue jusqu'à la rupture de l'acier de l'ensemble du système (fonction continue ou trilinéaire,Méthode d'évaluation A1, A2):**	$\Delta N_{Rk,s,0,n}$ (n=1 to n=∞)
23	Fatigue limit resistance to steel failure of the whole system: **Résistance limite à la fatigue de l'ensemble du système à la rupture de l'acier (Méthode d'évaluation B):**	$\Delta N_{Rk,s,0,\infty}$
24	Fatigue resistance to steel failure of the whole system (linearized function,assessment method C): **Résistance à la fatigue jusqu'à la rupture de l'acier de l'ensemble du système (Fonction linéarisée,Méthode d'évaluation C):**	$\Delta N_{Rk,s,l0,n}$; $N_{lok,s,n}$ (n=10^4 to n=∞)
25	Fatigue resistance to concrete related failure (exponential function): **Résistance à la fatigue à la rupture du béton (fonction exponentielle, Méthode d'évaluation A1, A2):**	$\Delta N_{Rk,c,0,n}$; $\Delta N_{Rk,p,0,n}$ (n=1 to n=∞)
26	Fatigue limit resistance to concrete related failure: **Résistance limite à la fatigue à la rupture du béton (Méthode d'évaluation B):**	$\Delta N_{Rk,c,0,\infty}$; $\Delta N_{Rk,p,0,\infty}$
27	Fatigue resistance to concrete related failure (linearized function, assessment method C): **Résistance à la fatigue à la rupture du béton (Fonction linéarisée, Méthode d'évaluation C):**	$\Delta N_{Rk,c,E,n}$; $N_{Rk,p,E,n}$ (n=10^4 to n=∞)

Characteristic resistance under seismic loading (seismic performance category C1) **Résistance caractéristique sous charge sismique (catégorie de performance sismique C1)**		
28	Resistance to steel failure under seismic tension loading (seismic performance category C1): **Résistance à la rupture de l'acier sous charge sismique en traction (catégorie de performance sismique C1):**	$N_{Rk,s,a,eq}$; $N_{Rk,s,c,eq}$; $N^0_{Rk,s,l,eq}$; $N_{Rk,s,eq}$; $M_{Rk,s,flex,eq}$
29	Resistance to steel failure under seismic shear loading for shear load in transverse direction (seismic performance category C1): **Résistance à la rupture de l'acier sous charge sismique de cisaillement pour effort tranchant en direction transversale (catégorie de performance sismique C1):**	$V_{Rk,s,eq}$; $V^0_{Rk,s,l,y,eq}$; $V_{Rk,s,c,y,eq}$; $V_{Rk,s,a,y,eq}$
30	Resistance to steel failure under seismic shear loading for shear load in longitudinal channel axis (seismic performance category C1): **Résistance à la rupture de l'acier sous charge sismique de cisaillement pour effort tranchant selon l'axe longitudinal du canal (catégorie de performance sismique C1):**	$V_{Rk,s,l,x,eq}$; $V_{Rk,s,a,x,eq}$; $V_{Rk,s,c,x,eq}$
Characteristic resistance under static and quasi-static tension and / or shear loading: **Résistance caractéristique sous charge de traction et/ou de cisaillement statique et quasi-statique**		
31	Displacements: **Déplacements:**	δ_{N0}; $\delta_{N\infty}$; $\delta_{V,y,0}$; $\delta_{V,y,\infty}$ $\delta_{V,x,0}$; $\delta_{V,x,\infty}$
Safety in case of fire (BWR 2) **Sécurité en cas d'incendie (BWR 2)**		
32	Reaction to fire: **Réaction au feu:**	Class
33	Resistance to fire: **Résistance au feu:**	$N_{Rk,s,fi}$; $V_{Rk,y,s,fi}$, $c_{min,fi}$; $s_{min,fi}$
Durability: **Durabilité:**		
34	Durability: **Durabilité:**	Description

Specific Part

1 Technical description of the product

The fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S 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 Serrated Channel Bolts.

The anchor channel is embedded surface-flush in the concrete. fischer Serrated 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 static and quasi-static tension loading	
- Resistance to steel failure of anchors	$N_{Rk,s,a}$ see Annex C1
- Resistance to steel failure of the connection between anchors and channel	$N_{Rk,s,c}$ see Annex C1
- Resistance to steel failure of channel lips and subsequently pull-out of channel bolt	$N^{0}_{Rk,s,l}$; $s_{l,N}$ see Annex C1
- Resistance to steel failure of channel bolt	$N_{Rk,s}$ see Annex C6
- Resistance to steel failure by exceeding the bending strength of the channel	s_{max} see Annex A5 $M_{Rk,s,flex}$ see Annex C1
- Maximum installation torque to avoid damage during installation	$T_{inst,g}$; $T_{inst,s}$ see Annex B4
- Resistance to pull-out failure of the anchor	$N_{Rk,p}$ see Annex C2
- Resistance to concrete cone failure	h_{ef} see Annex B3 $k_{cr,N}$; $k_{ucr,N}$ see Annex C2
- Minimum edge distances, spacing and member thickness to avoid concrete splitting during installation	s_{min} see Annex A5 c_{min} ; h_{min} see Annex B3
- Characteristic edge distance and spacing to avoid splitting of concrete under load	$s_{cr,sp}$; $c_{cr,sp}$ see Annex C2
- Resistance to blowout failure - bearing area of anchor head	A_h see Annex A4

Essential characteristic	Performance
Characteristic resistance under static and quasi-static shear loading	
- Resistance to steel failure of channel bolt under shear loading without lever arm	$V_{Rk,s}$ see Annex C6
- Resistance to steel failure by bending of the channel bolt under shear load with lever arm	$M^{0}_{Rk,s}$ see Annex C7
- Resistance to steel failure of channel lips, steel failure of connection between anchor and channel and steel failure of anchor (shear load in transverse direction)	$V^{0}_{Rk,s,l,y}$; $s_{l,V}$; $V_{Rk,s,c,y}$; $V_{Rk,s,a,y}$ see Annex C4
- Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis)	$V_{Rk,s,l,x}$ see Annex C5
- Factor for sensitivity to installation (longitudinal shear)	γ_{inst} see Annex C5
- Resistance to steel failure of the anchor (longitudinal shear)	$V_{Rk,s,a,x}$ see Annex C4
- Resistance to steel failure of connection between anchor and channel (longitudinal shear)	$V_{Rk,s,c,x}$ see Annex C4
- Resistance to concrete pry-out failure	k_8 see Annex C5
- Resistance to concrete edge failure	$k_{cr,V}$; $k_{ucr,V}$ see Annex C5
Characteristic resistance under combined static and quasi-static tension and shear loading	
- Resistance to steel failure of the anchor channel	k_{13} ; k_{14} see Annex C6
Characteristic resistance under fatigue tension loading	
- Fatigue resistance to steel failure of the whole system (continuous or tri-linear function, assessment method A1, A2)	No Performance assessed
- Fatigue limit resistance to steel failure of the whole system (assessment method B)	No Performance assessed
- Fatigue resistance to steel failure of the whole system (linearized function, assessment method C)	$\Delta N_{Rk,s,lo,n}$; $N_{lok,s,n}$ (n = 10^4 to n = ∞) see Annex C8
- Fatigue resistance to concrete related failure (exponential function, assessment method A1, A2)	No Performance assessed
- Fatigue limit resistance to concrete related failure (assessment method B)	No Performance assessed
- Fatigue resistance to concrete related failure (linearized function, assessment method C)	$\Delta N_{Rk,c,E,n}$; $\Delta N_{Rk,p,E,n}$ (n = 10^4 to n = ∞) see Annex C9

Characteristic resistance under seismic loading (seismic performance category C1)	
- Resistance to steel failure under seismic tension loading (seismic performance category C1)	$N_{Rk,s,a,eq}$; $N_{Rk,s,c,eq}$; $N^0{}_{Rk,s,l,eq}$; $M_{Rk,s,flex,eq}$ see Annex C10 $N_{Rk,s,eq}$ see Annex C12
- Resistance to steel failure under seismic shear loading for shear load in transverse direction (seismic performance category C1)	$V^0{}_{Rk,s,l,y,eq}$; $V_{Rk,s,c,y,eq}$; $V_{Rk,s,a,y,eq}$ see Annex C11 $V_{Rk,s,eq}$ see Annex C12
- Resistance to steel failure under seismic shear loading for shear load in longitudinal channel axis (seismic performance category C1)	$V_{Rk,s,l,x,eq}$; $V_{Rk,s,a,x,eq}$; $V_{Rk,s,c,x,eq}$ see Annex C11
Characteristic resistance under static and quasi-static tension and/or shear loading	
- Displacements	δ_{N0} ; $\delta_{N\infty}$ see Annex C3 $\delta_{V,y,0}$; $\delta_{V,y,\infty}$; $\delta_{V,x,0}$; $\delta_{V,x,\infty}$ see Annex C6

3.2 Safety in case of fire (BWR 2)

Essential characteristic	**Performance**
Reaction to fire	Class A1
Characteristic resistance to fire	See Annex C13 and C14

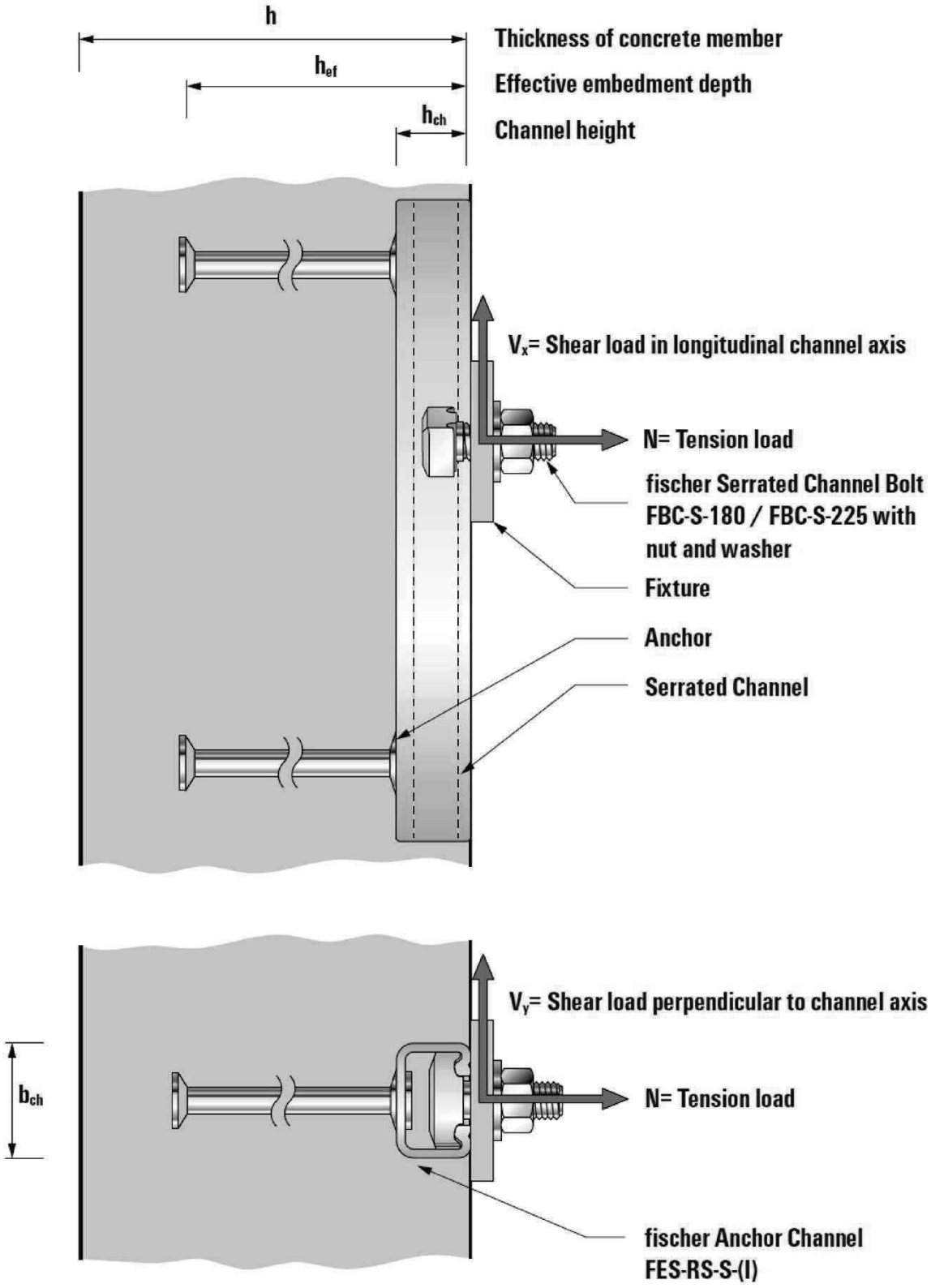
3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	**Performance**
Durability	See Annex B1

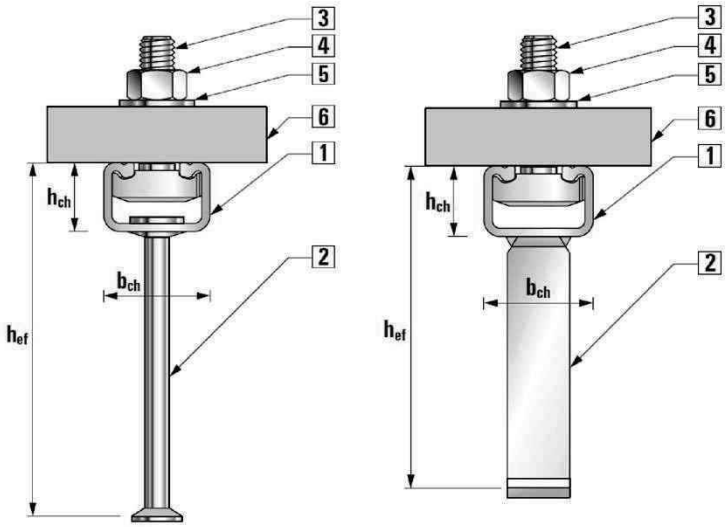
4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 330008-04-0601, the applicable European legal act is: [2000/273/EC].

The system to be applied is: 1



fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S	
Product description Installed conditions	**Annex A1** Appendix 4 / 30



Round anchor

I-anchor

fischer Anchor Channel
FES-RS-S
1 Serrated channel profile
2 Anchor
3 Serrated channel bolt
4 Hexagonal nut
5 Washer
6 Fixture

Marking of the fischer anchor channel FES-RS-S:

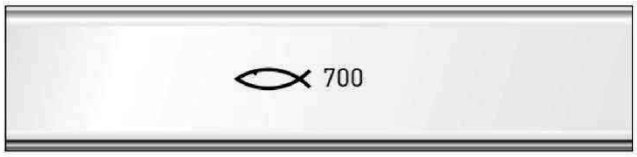
e. g.: 700

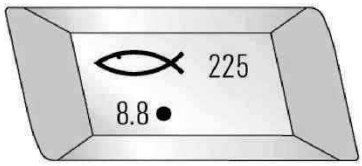
	= Identifying mark of the manufacturer
I	= Additional marking for I-anchors No marking for round anchors
700	= Size of the anchor channel (e.g. 700, 600, 500)

Marking of the fischer channel bolt FBC-S:

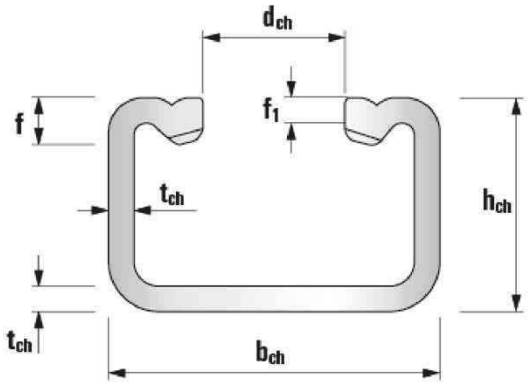
e. g.: 8.8 225 / 8.8 180

	= Identifying mark of the manufacturer
8.8	= Strength grade
A4-70	= Stainless steel
225, 180	= Width of anchor channel opening d_{ch}
●	= Coating electro-plated No marking for hot-dip galvanised





Stamped into back of channel
Optional: printed on channel web or channel lips
RS = Roll-shaped, S = Serrated
No marking for material acc. Table A7.1 (Channel profile)



Serrated anchor channel FES-RS-S-(I)-

Table A3.1: Dimensions of channel profile

Anchor channel FES-RS-S-(I)-	b_{ch} [mm]	h_{ch} [mm]	t_{ch} [mm]	d_{ch} [mm]	f [mm]	f_1 [mm]	Iy [mm^4]
500	40,0	27,5	2,6	18,0	5,6	2,6	28.420
600	50,5	29,0	3,0	22,5	6,0	3,0	41.862
700	52,5	34,0	4,0	22,5	7,0	4,0	79.168

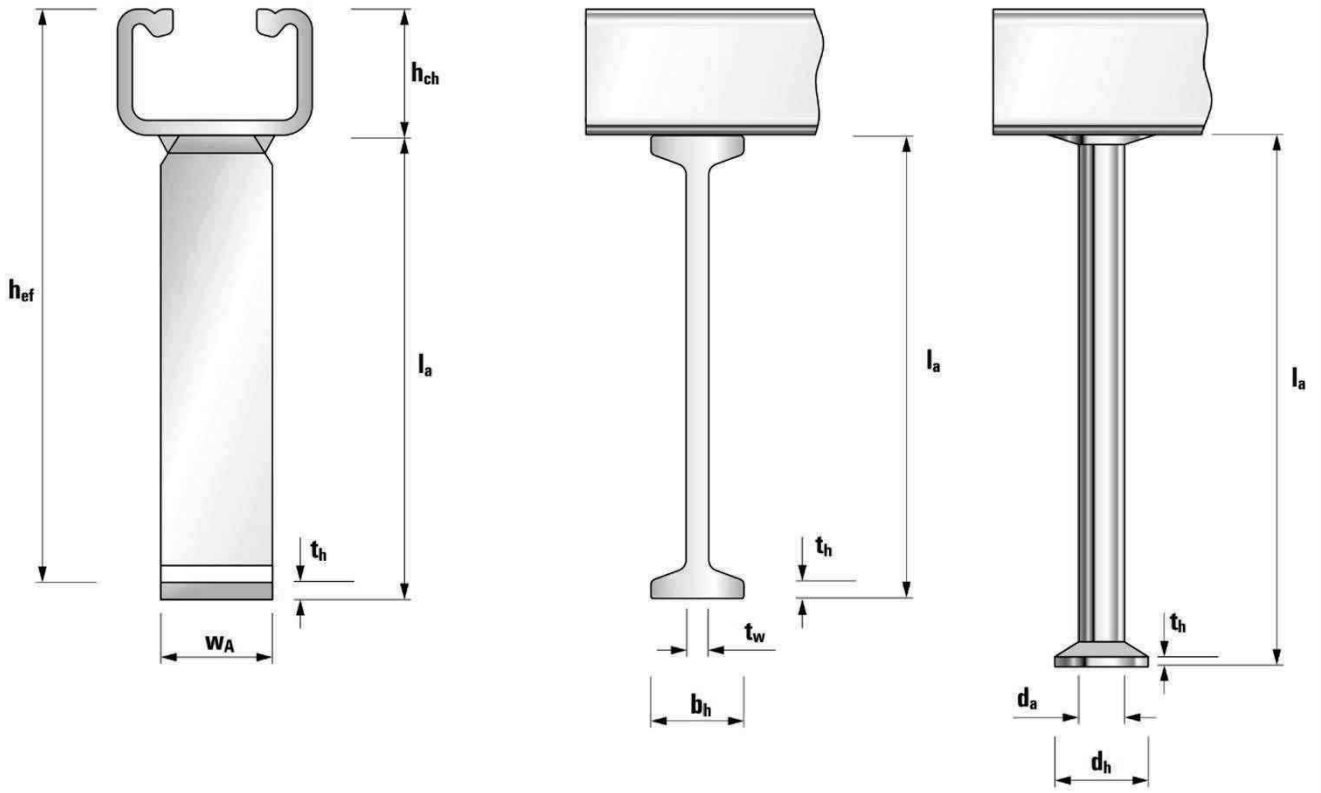
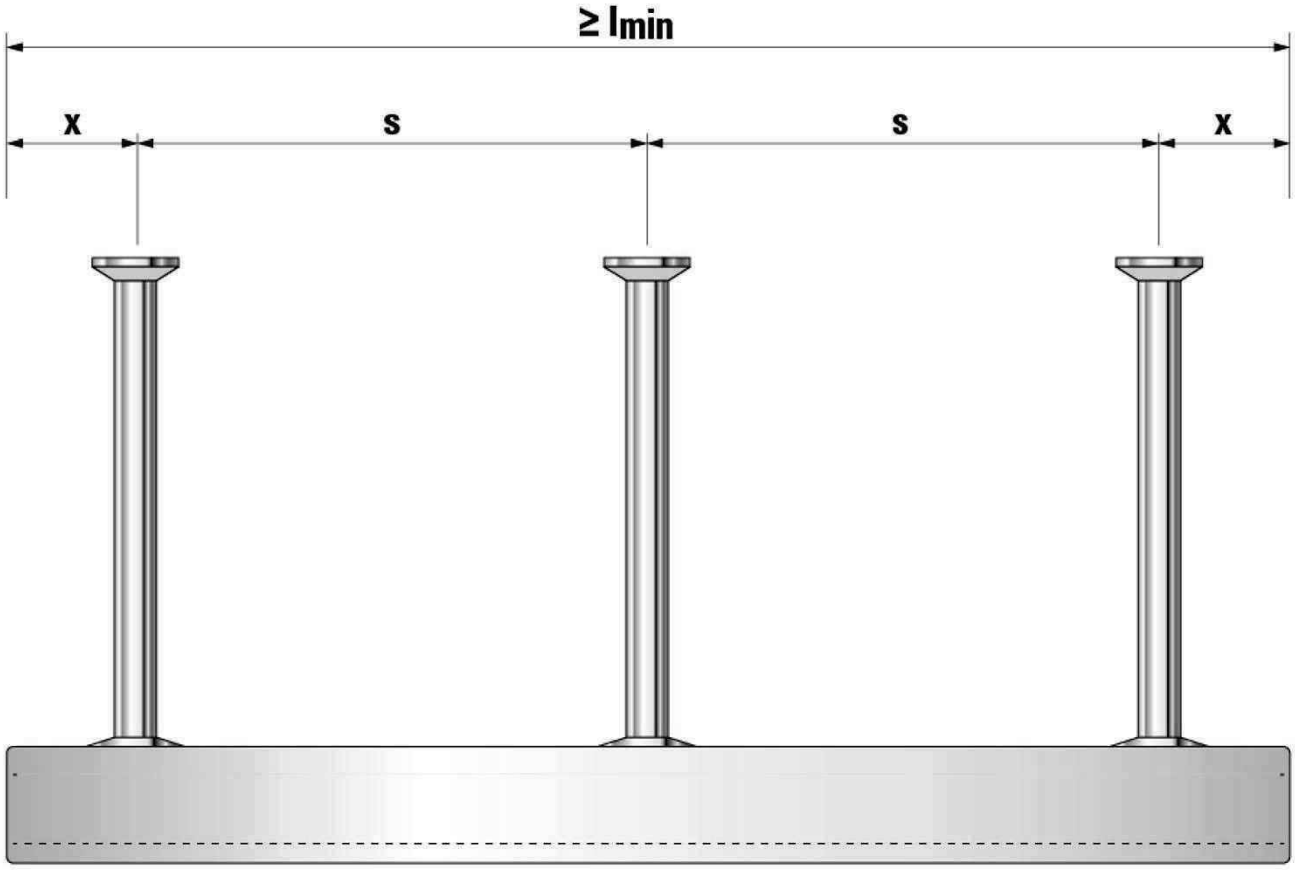


Table A4.1: Dimensions of anchor (welded I-anchor or forged round anchor)

Anchor channel FES-RS-S-(l)-	I-anchor						Round anchor				
	$l_{a,min}$ [mm]	$t_{w,min}$ [mm]	$b_{h,min}$ [mm]	t_h [mm]	$w_{A,min}$ [mm]	$A_{h,min}$ [mm²]	$l_{a,min}$ [mm]	d_a [mm]	d_h [mm]	t_h [mm]	A_h [mm²]
500	89	5	20	5	25	375	85,0	9,6	22,0	2,5	308
600	125	6	25	5	30	570	123,5	11,0	24,3	2,5	368
700	125	6	25	5	30	570	144,0	12,8	26,0	3,0	402

Table A5.1: Anchor position

Anchor channel FES-RS-S-(l)-	Anchor type	s_{min} [mm]	s_{max} [mm]	x_{min} [mm]	x_{max} [mm]	l_{min} [mm]	l_{max} [mm]
500	Round or welded I	80	250	35	40	150	5.700
600				30	35	140	6.070
700							



fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S

Product description
Anchor position and channel length

Annex A5

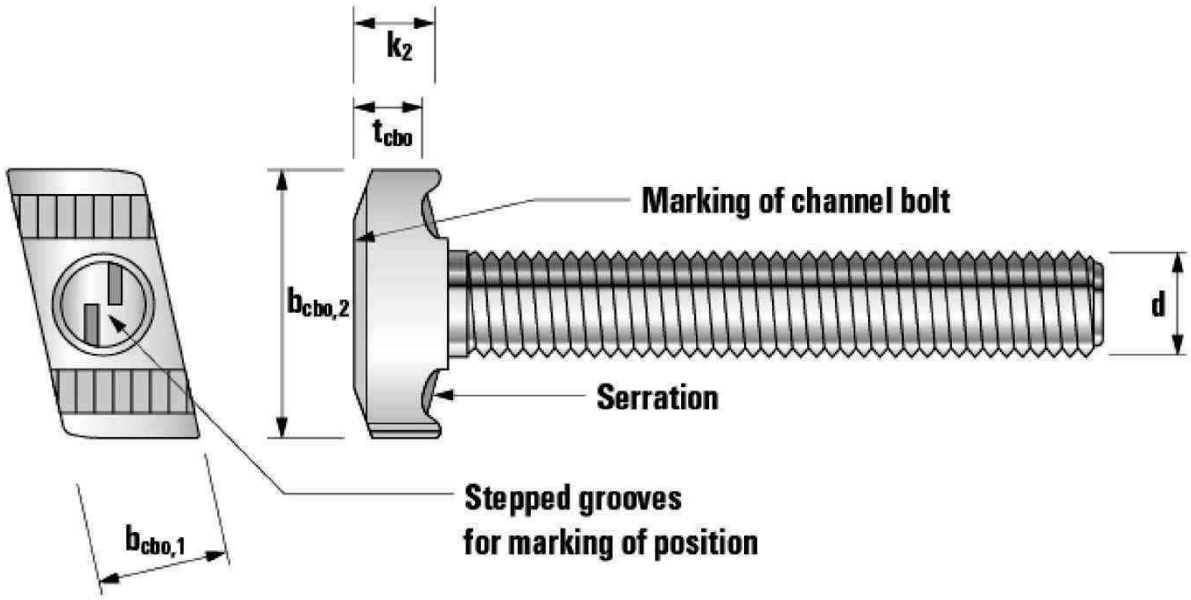
Table A6.1: Strength grade and Coating

Channel bolt	Carbon steel [1)]	Stainless steel [1)]
Strength grade	8.8	A4-70
f_{uk} [N/mm²]	800 / 830	700
f_{yk} [N/mm²]	640 / 660 [2)]	450
Coating	F[3)] or Electroplated	-

[1)] Material properties according to Annex A7.

[2)] Material properties according to EN ISO 898-1:2013.

[3)] Hot-dip galvanised.



Serrated channel bolt FBC-S-225 / FBC-S-180

Table A6.2: Dimensions of fischer channel bolt FBC and matching fischer anchor channels FES

Anchor channel FES-RS-S-(I)-	Channel bolt FBC-S	Material	d [mm]	$b_{cbo,1}$ [mm]	$b_{cbo,2}$ [mm]	t_{cbo} [mm]	k_2 [mm]
500	180	8.8	10 12 16	16,5	33,9	9,3	10,6
600	225	8.8, A4-70	12 16 20	21,0	43,0	10,7	15,0
700							

Table A7.1: Materials and properties

Component	Carbon steel			Stainless steel
	Mechanical properties	Coating		Mechanical properties
1	2	2a	2b	3
Channel profile	1.0976 acc. to EN 10149:2013	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	- [2]
Round anchor	1.5525 acc. to EN 10263:2017	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	- [2]
I-anchor	1.0045, 1.0976 acc. to EN 10149:2013	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	Hot-dip galvanised ≥ 55 µm acc. to EN ISO 1461:2022	- [2]
Channel bolt	Strength grade 8.8 acc. to EN ISO 898-1:2013	Electroplated acc. to EN ISO 4042:2022	Hot-dip galvanised ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009	Steel grade 70 acc. to EN ISO 3506-1:2020
Plain washer [1] acc. to EN ISO 7089:2000 and EN ISO 7093-1:2000	Hardness class A ≥ 200 HV	Electroplated acc. to EN ISO 4042:2022	Hot-dip galvanised ≥ 50 µm acc. to EN ISO 10684:2004 + AC:2009	Hardness class A ≥ 200 HV 1.4401, 1.4404, 1.4571, 1.4578 acc. to EN 10088-1:2023
Hexagonal nut acc. to EN ISO 4032:2023	Property class 8 acc. to EN ISO 898-2:2022	Electroplated acc. to EN ISO 4042:2022	Hot-dip galvanised ≥ 50 µm acc. to ISO 10684:2004 + AC:2009	Property class 70 or 80 acc. to EN ISO 3506-2:2023 1.4401, 1.4404, 1.4571, 1.4578

[1] Not in the scope of delivery.
[2] Product not available.

Specifications of intended use

Anchor channels and channel bolts subject to:

- Static and quasi-static tension, shear perpendicular to the longitudinal axis of the channel and shear in the direction of the longitudinal axis of the channel.
- Fatigue cyclic tension loads
  (anchor channels and channel bolts according to Annex C8).
- Seismic tension, seismic shear perpendicular to the longitudinal axis of the channel and seismic shear in the direction of the longitudinal axis of the channel (seismic performance category C1)
  (anchor channels and channel bolts according to Annex C10).
- Fire exposure for concrete strength class C20/25 to C50/60 for tension and shear perpendicular to the longitudinal axis
  (anchor channels and channel bolts according to Annex C13).

Base materials:

- Reinforced or unreinforced compacted normal weight concrete without fibres according to EN 206:2013+A2:2021.
- Strength classes C12/15 to C90/105 according to EN 206:2013+A2:2021.
- Cracked or uncracked concrete.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
  (anchor channels and channel bolts according to Annex A7, Table A7.1, column 2a, 2b and 3).
- 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 A7.1, column 2b and 3).
- According to EN 1993-1-4:2006 +A1:2015 +A2:2020 relating to corrosion resistance class CRC III
  (anchor channels, channel bolts, washers and nuts made of stainless steel number 1.4401, 1.4404, 1.4571 and 1.4578 according to Table A7.1, column 3).

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 seismic loading (performance category C1) and fire exposure the anchor channels are designed in accordance with EN 1992-4:2018 and EOTA TR 047 "Design of Anchor Channels", May 2021.
- For fatigue loading the anchor channels are designed in accordance with EOTA TR 50 "Calculation method for the performance of Anchor channels under Fatigue Cyclic Loading", October 2023.
- The characteristic resistances are calculated with the minimum effective embedment depth.

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 A5.1 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 and B6.
- 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.
- Washer may be chosen according to Annex A7 and provided separately by the user.
- Orientating the channel bolt (groove according to Annex B6) rectangular to the channel axis.
- The required installation torque given in Annex B4 must be applied and must not be exceeded.

Installation parameters

Table B3.1: Installation parameters

Anchor channel FES-RS-S-			**500**	**I-500**	**600**	**I-600**	**700**	**I-700**
Minimum effective embedment depth	$h_{ef,min}$	[mm]	110	112	150	154	175	154
Minimum edge distance	c_{min}		50	50	75	75	75	75
Minimum thickness of concrete member	h_{min} [1)]		113	117	153	159	178	178

[1)] For corrosion protection $h_{min} = h_{ef} + t_h + c_{nom}$; c_{nom} acc. to EN 1992-1-1:2004 + AC:2010.

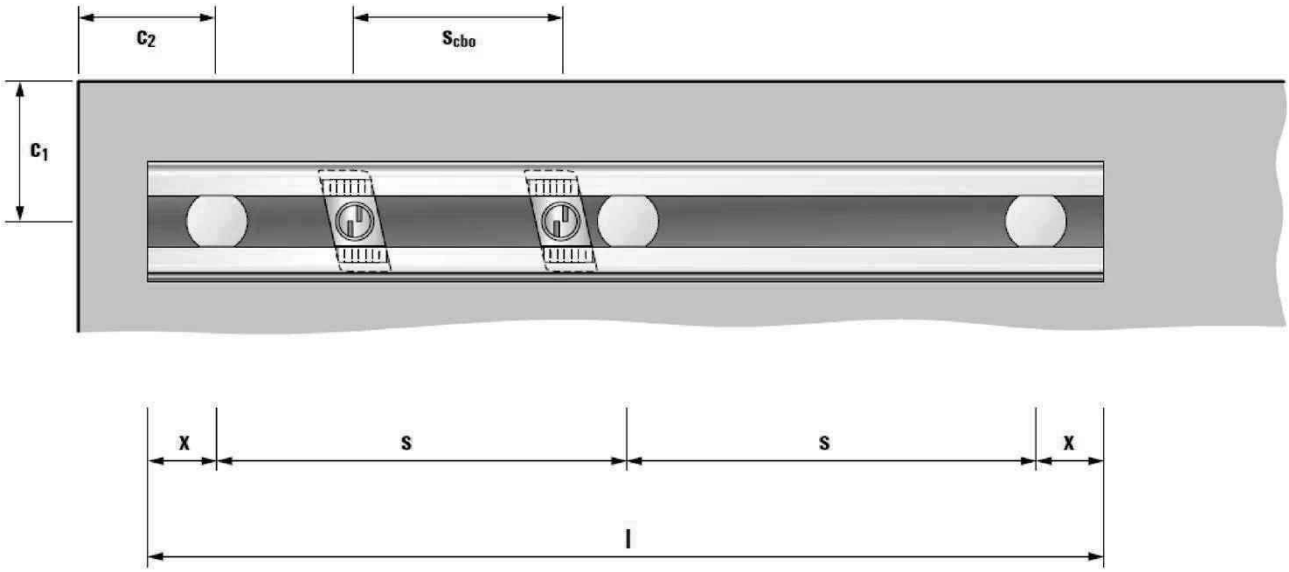


Table B3.2: Minimum spacing for channel bolts

Channel bolt FBC-S-			M10	M12	M16	M20
Minimum spacing between channel bolts	$s_{cbo,min}$	[mm]	50	60	80	100

fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S

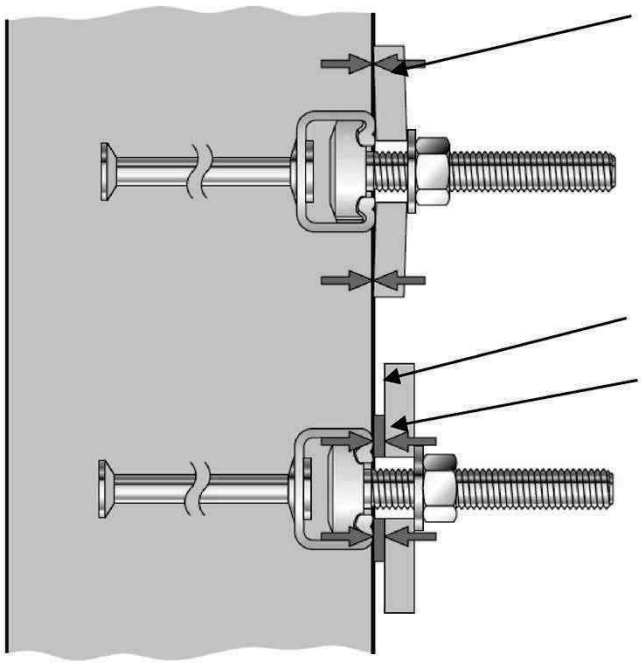
Intended Use
Installation parameters for fischer anchor channels FES-RS-S and channel bolt FBC-S spacing

Annex B3

Table B4.1: Installation torque T_{inst}

fischer anchor channel FES-RS-S-(I)-	fischer channel bolt FBC-S	Thread diameter	T_{inst} [1] [Nm]			
			General $T_{inst,g}$		Steel – steel contact $T_{inst,s}$	
			8.8	A4-70	8.8	A4-70
500	180	M10	35	-	35 - 40	-
		M12	55	-	55 - 70	-
		M16	75	-	75 - 150	-
600	225	M12	80	-	80 - 100	-
		M16	100	120	100 - 200	120 - 130
700		M20	120	-	120 - 360	-

[1] Max. T_{inst} must not be exceeded.

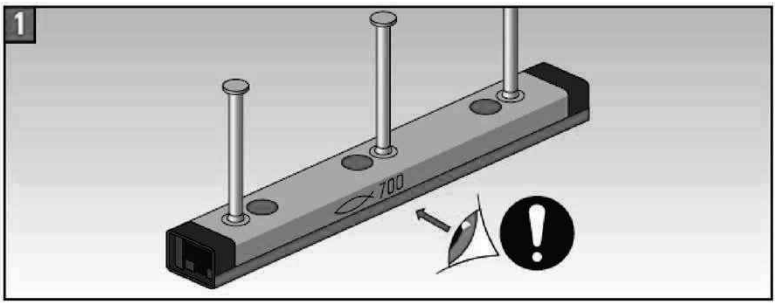


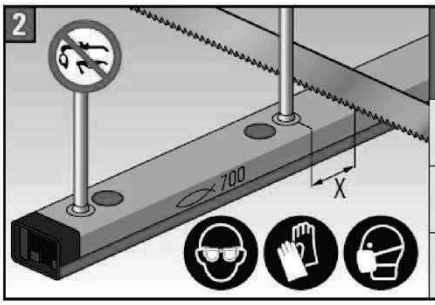
General:
The fixture is in contact with the channel profile and the concrete surface by tightening with $T_{inst,g}$.

Gap

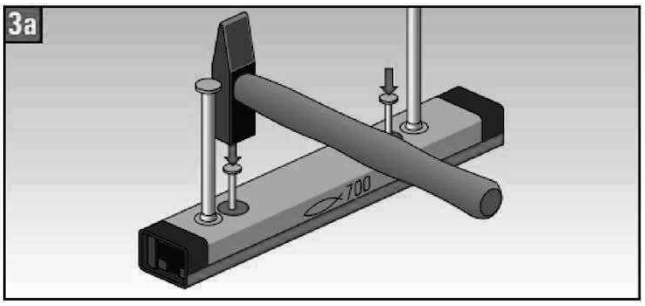
Steel-to-steel contact:
The fixture is not in contact with the concrete surface. The fixture is fastened to the anchor channel by a suitable steel part (e.g. washer) by tightening with $T_{inst,s}$.
($T_{inst,s} \geq T_{inst,g}$)

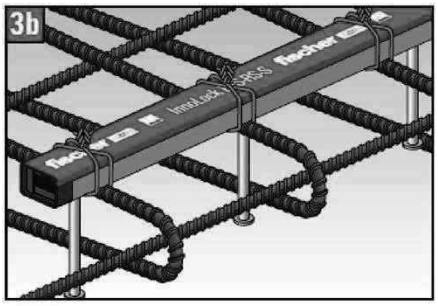
Anchor channel FES-RS-S

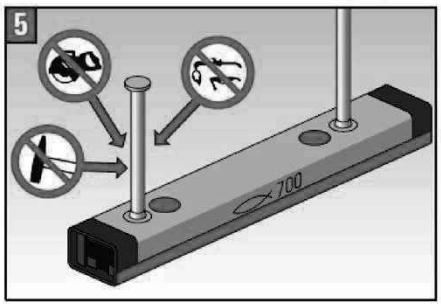


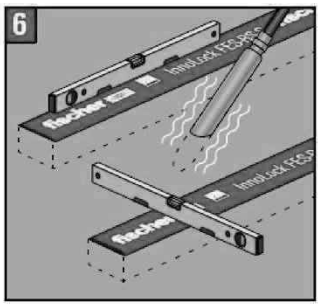


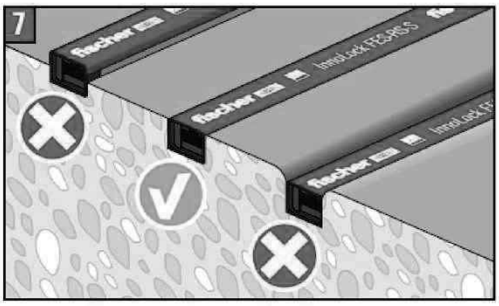
X	FES-RS-S
35 - 40 mm	500
30 - 35 mm	600
30 - 35 mm	700

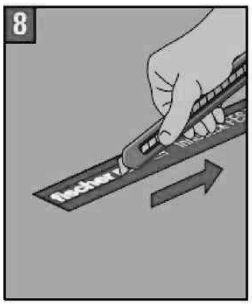


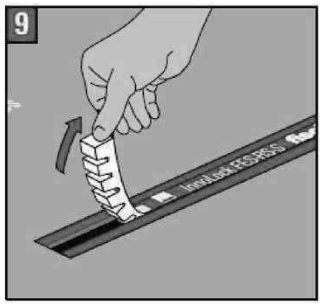










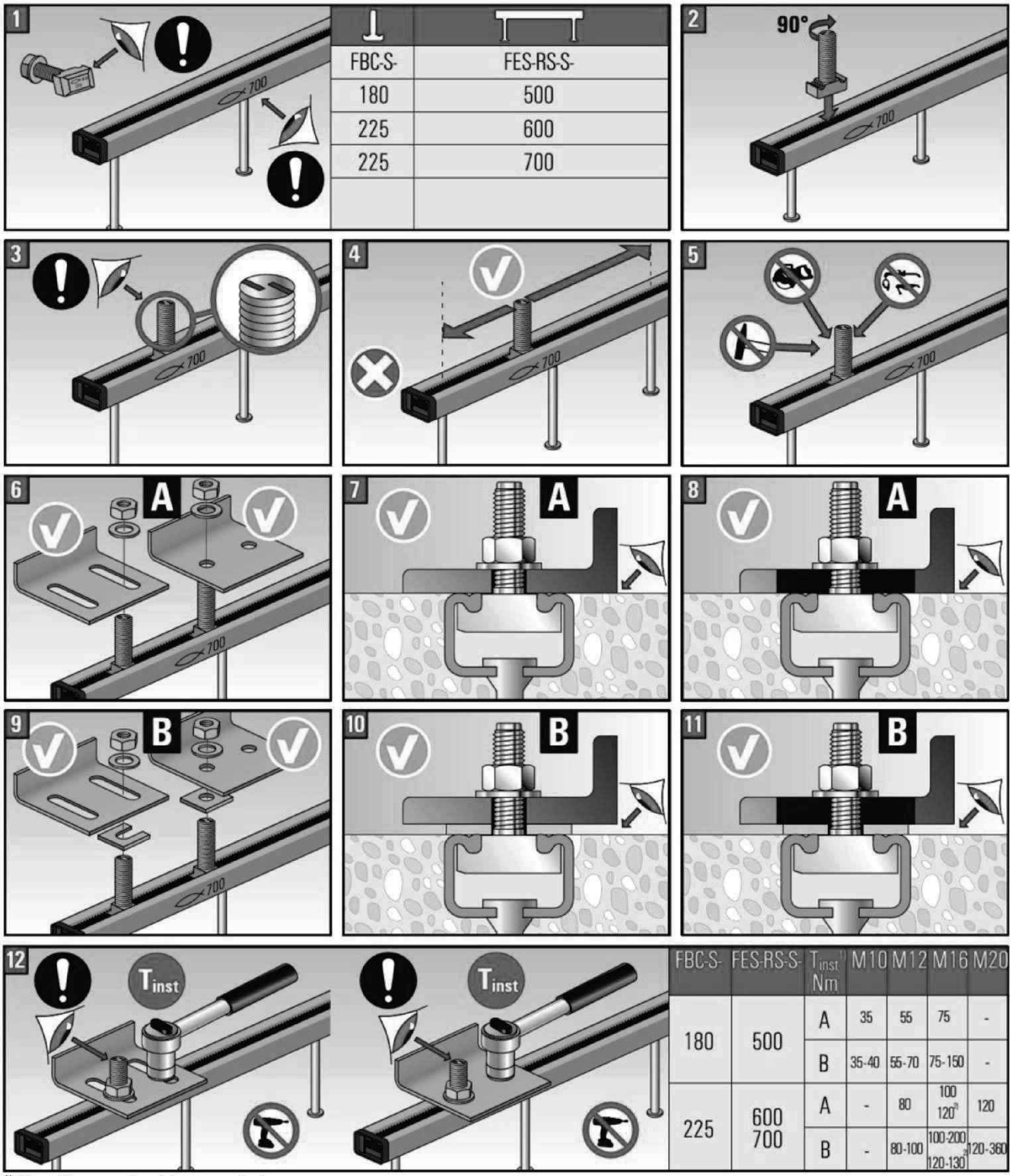


fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S

Intended Use
Installation instruction for fischer anchor channel FES-RS-S

Annex B5

Serrated Channel bolt FBC-S



FBC-S-	FES-RS-S-
180	500
225	600
225	700

FBC-S-	FES-RS-S-	T_{inst} [1] Nm	M10	M12	M16	M20
180	500	A	35	55	75	-
		B	35-40	55-70	75-150	-
225	600 700	A	-	80	100 120 [2]	120
		B	-	80-100	100-200 120-130 [2]	120-360

[1] Max. T_{inst} must not be exceded.
[2] Stainless steel.

fischer Serrated Anchor Channel InnoLock FES-RS-S with fischer Serrated Channel Bolts FBC-S

Intended Use
Installation instruction for serrated fischer channel bolt FBC-S

Annex B6

Table C1.1: Characteristic resistances under tension load – steel failure of anchor channels

Anchor channel FES-RS-S-			**500**	**I-500**	**600**	**I-600**	**700**	**I-700**
Steel failure: Anchor								
Characteristic resistance	$N_{Rk,s,a}$	[kN]	43,4	44,5	55,2	57,0	73,3	81,0
Partial factor	γ_{Ms} [1)]	[-]	1,8					
Steel failure: Connection between anchor and channel								
Characteristic resistance	$N_{Rk,s,c}$	[kN]	43,3	44,5	55,2	57,0	73,0	80,0
Partial factor	γ_{Ms} [1)]	[-]	1,8					
Steel failure: Local flexure of the channel lips								
Characteristic spacing of channel bolts for $N_{Rk,s,l}$	$s_{l,N}$	[mm]	80		101		105	
Characteristic resistance	$N^0_{Rk,s,l}$	[kN]	43,8		64,0		80,0	
Partial factor	γ_{Ms} [1)]	[-]	1,8					

[1)] In absence of other national regulations.

Table C1.2: Characteristic flexural resistance of the channel

Anchor channel FES-RS-S-			**500**	**600**	**700**
Steel failure: Flexure of channel					
Characteristic flexural resistance of channel	$M_{Rk,s,flex}$	[Nm]	1572	2581	3749
Partial factor	$\gamma_{Ms,flex}$ [1)]	[-]	1,15		

[1)] In absence of other national regulations.

Table C2.1: Characteristic resistances under tension load – concrete failure

Anchor channel FES-RS-S-			**500**	**I-500**	**600**	**I-600**	**700**	**I-700**
Concrete failure: Pull-out failure								
Characteristic resistance in cracked concrete C12/15	$N_{Rk,p}$	[kN]	27,7	33,7	33,1	51,3	36,2	51,3
Characteristic resistance in uncracked concrete C12/15	$N_{Rk,p}$	[kN]	38,7	47,2	46,4	71,8	50,7	71,8
Increasing factor of $N_{Rk,p} = N_{Rk,p}(C12/15)*\psi_c$	C16/20 C20/25 C25/30 C30/37 C35/45 C40/50 C45/55 C50/60 C55/67 ≥C60/75	ψ_c[-]	1,33 1,67 2,08 2,50 2,92 3,33 3,75 4,17 4,58 5,00					
Partial factor	$\gamma_{Mp} = \gamma_{Mc}$ [1)]	[-]	1,5					
Concrete failure: Concrete cone failure								
Product factor k_1	$k_{cr,N}$	[-]	8,3	8,3	8,6	8,6	8,9	8,7
	$k_{ucr,N}$	[-]	11,8	11,8	12,3	12,4	12,6	12,5
Partial factor	γ_{Mc} [1)]	[-]	1,5					
Concrete failure: Concrete splitting failure								
Characteristic edge distance	$c_{cr,sp}$	[mm]	330	334	450	462	525	462
Characteristic spacing	$s_{cr,sp}$	[mm]	660	669	900	942	1050	942
Partial factor	$\gamma_{MSp} = \gamma_{Mc}$ [1)]	[-]	1,5					

[1)] In absence of other national regulations.

Table C3.1: Displacements under tension load

Anchor channel FES-RS-S-(l)-			**500**	**600**	**700**
Tension load	N	[kN]	17,9	21,4	31,4
Short-term displacement [1)]	δ_{N0}	[mm]	2,3	2,1	2,1
Long-term displacement [1)]	$\delta_{N\infty}$	[mm]	4,5	4,2	4,2

[1)] 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.

Table C4.1: Characteristic resistances under shear load – steel failure of anchor channels

Anchor channel FES-RS-S-			**500**	**I-500**	**600**	**I-600**	**700**	**I-700**
Steel failure: Anchor								
Characteristic resistance	$V_{Rk,s,a,y}$	[kN]	74,2	74,2	98,5	98,5	120,0	120,0
	$V_{Rk,s,a,x}$		26,1	35,3	34,2	50,7	44,0	48,6
Partial factor	γ_{Ms} [1)]	[-]	1,8					
Steel failure: Connection between anchor and channel								
Characteristic resistance	$V_{Rk,s,c,y}$	[kN]	74,2	74,2	98,5	98,5	120,0	120,0
	$V_{Rk,s,c,x}$		26,0	26,7	33,1	34,9	43,8	48,0
Partial factor	γ_{Ms} [1)]	[-]	1,8					
Steel failure: Local flexure of the channel lips								
Characteristic spacing of channel bolts for $V_{Rk,s,l}$	$s_{l,V}$	[mm]	80		101		105	
Characteristic resistance	$V^0_{Rk,s,l,y}$	[kN]	50,5		77,7		92,0	
Partial factor	γ_{Ms} [1)]	[-]	1,8					

[1)] In absence of other national regulations.

Table C5.1: Characteristic resistance for shear load in direction of the longitudinal axis of the channel – steel failure

Anchor channel FES-RS-S-(l)-				**500**	**600**	**700**
Steel failure: Connection between channel lips and serrated channel bolt						
Characteristic resistance	$V_{Rk,s,l,x}$	[kN]	FBC-S-180-M10-8.8	15,6	-[2)]	-[2)]
			FBC-S-180-M12-8.8	17,3	-[2)]	-[2)]
			FBC-S-180-M16-8.8	17,3	-[2)]	-[2)]
			FBC-S-225-M12-8.8	-[2)]	17,6	-[2)]
			FBC-S-225-M16-8.8	-[2)]	17,6	22,5
			FBC-S-225-M16-A4-70	-[2)]	16,3	16,3
			FBC-S-225-M20-8.8	-[2)]	17,6	22,5
Installation factor	γ_{Inst}[1)]	[-]	8.8	1,0	M12: 1,4 M16: 1,0 M20: 1,0	1,2
			A4-70	-[2)]	1,4	1,4

[1)] In absence of other national regulations.

[2)] No performance assessed.

Table C5.2: Characteristic resistance of the anchor channel under shear load – concrete failure

Anchor channel FES-RS-S-(l)-				**500**	**600**	**700**
Concrete failure: Pry-out failure						
Product factor		k_8	[-]	2,0	2,0	2,0
Partial factor		γ_{Mc}[1)]	[-]	1,5		
Concrete failure: Concrete edge failure						
Product factor k_{12}	Cracked concrete	$k_{cr,V}$	[-]	7,4	7,5	7,5
	Uncracked concrete	$k_{ucr,V}$	[-]	10,4	10,5	10,5
Partial factor		γ_{Mc}[1)]	[-]	1,5		

[1)] In absence of other national regulations.

Table C6.1: Displacements under shear load

Anchor channel FES-RS-S-(l)-			500	600	700
Shear load perpenticular to the longitudinal axis of the channel	V_y	[kN]	34,1	30,5	36,5
Short-term displacement [1]	$\delta_{V,y,0}$	[mm]	2,7	2,5	2,9
Long-term displacement [1]	$\delta_{V,y,\infty}$	[mm]	4,0	3,7	4,4
Shear load in direction of the longitudinal axis of the channel	V_x	[kN]	11,4	7,0	6,6
Short-term displacement [2]	$\delta_{V,x,0}$	[mm]	0,8	0,9	1,2
Long-term displacement [2]	$\delta_{V,x,\infty}$	[mm]	1,2	1,3	1,8

[1] 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.
[2] Displacements of the anchor channel, including slip of channel bolt, deformation of channel lips and slip of the anchor channel in concrete.

Table C6.2: Characteristic resistances under tension and shear load – steel failure of channel bolts

Channel bolt FBC-S-[2]				M10	M12	M16	M20
Steel failure:							
Characteristic resistance	$N_{Rk,s}$	[kN]	8.8	46,4	67,4	125,6	170,0
			A4-70	-[3]	-[3]	109,9	-[3]
Partial factor	γ_{Ms}[1]	[-]	8.8	1,5			
			A4-70	1,87			
Characteristic resistance	$V_{Rk,s}$	[kN]	8.8	23,2	33,7	62,8	98,0
			A4-70	-[3]	-[3]	65,9	-[3]
Partial factor	γ_{Ms}[1]	[-]	8.8	1,25			
			A4-70	1,56			

[1] In absence of other national regulations.
[2] Material according to Annex A7, Table A7.1.
[3] No performance assessed.

Table C6.3: Characteristic resistances under combined tension and shear load

Anchor channel FES-RS-S-(l)-			500	600	700
Steel failure: Local flexure of channel lips and flexure of channel					
Product factor	k_{13}	[-]	acc. to EN 1992-4:2018, 7.4.3.1		
Steel failure: Anchor and connection between anchor and channel					
Product factor	k_{14}	[-]	acc. to EN 1992-4:2018, 7.4.3.1		

Table C7.1: Characteristic resistances under shear load with lever arm – steel failure of channel bolts

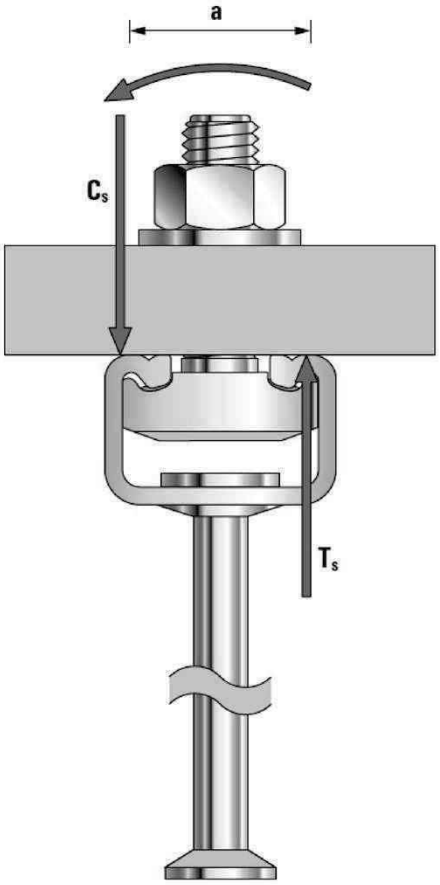
Channel bolt thread diameter [2]					**M10**	**M12**	**M16**	**M20**
Steel failure:								
Characteristic flexural resistance	$M^0_{Rk,s}$	[Nm]	FBC-S-	8.8	59,8	104,8	266,4	519,3
				A4-70	-[3]	-[3]	233,0	-[3]
Partial factor	γ_{Ms}[1]	[-]	FBC-S-	8.8	1,25			
				A4-70	1,56			
Internal lever arm	a	[mm]	FBC-S-180	8.8	24,0	25,3	27,3	-[3]
			FBC-S-225	8.8	-[3]	29,8	31,8	34,2
				A4-70	-[3]	-[3]	31,8	-[3]

[1] In absence of other national regulations.

[2] Materials according to Annex A7, Table A7.1.

[3] No performance assessed.

The characteristic flexure resistance according to Table C7.1 is limited as follows:



$M^0_{Rk,s} \le 0{,}5 \cdot N^0_{Rk,s,l} \cdot a$ ($N^0_{Rk,s,l}$ according to Table C1.1)

$M^0_{Rk,s} \le 0{,}5 \cdot N_{Rk,s} \cdot a$ ($N_{Rk,s}$ according to Table C6.2)

a = Internal lever arm according to Table C7.1

T_s = Tension force acting on the channel lips

C_s = Compression force acting on the channel lips

Table C8.1: Combination of anchor channels and channel bolts under fatigue tension load (Design method I or II for assessment method C according to EOTA TR050, October 2023)

Anchor channel FES-RS-S-	Channel bolt	Diameter	Steel grade	Corrosion protection
600 700	FBC-S-225	M16 M20	8.8	G[1)] F[2)]

[1)] Electroplated.

[2)] Hot-dip galvanised.

Table C8.2: Characteristic resistances under fatigue tension load – steel failure with n load cycles without static preload (N_{ed} = 0) (Design method I according to EOTA TR050, October 2023)

Anchor channel FES-RS-S-		600	700
Steel failure:	n	$\Delta N_{Rk,s,0,n}$ [kN]	
Characteristic resistances under fatigue tension load without static preload	$\leq 10^4$	18,9	29,4
	$\leq 10^5$	9,5	13,9
	$\leq 10^6$	4,8	6,6
	$\leq 2 \cdot 10^6$	3,9	5,2
	$\leq 5 \cdot 10^6$	3,0	3,9
	$\geq 5 \cdot 10^6$		

Table C9.1: Reduction factor $\eta_{c,fat}$ with n load cycles without static preload (N_{ed} = 0) (Design method I or II for assessment method C according to EOTA TR050, October 2023)

Pull-out failure **Concrete cone failure**		$\eta_{k,c,fat} = \eta_{k,p,fat}$ [-]								
	n	S_{lok}								
Reduction factor for		0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8
$\Delta N_{Rk,p,E,n} = \eta_{k,c,fat} \cdot N_{Rk,p}$ $\Delta N_{Rk,c,E,n} = \eta_{k,p,fat} \cdot N_{Rk,c}$ $S_{lok} = 2{,}25 \cdot N_{Elok} / N_{Rk,c(p)}$ [1)] With: $N_{Rk,p}$ according to Annex C2 $N_{Rk,c}$ calculated according to EN 1992-4:2018 and EOTA TR047, May 2021	$\leq 10^4$	0,725	0,668	0,600	0,527	0,450	0,370	0,288	0,205	0,120
	$2 \cdot 10^4$	0,704	0,650	0,585	0,514	0,439	0,360	0,279	0,197	0,114
	$5 \cdot 10^4$	0,677	0,627	0,566	0,497	0,424	0,347	0,268	0,188	0,106
	$1 \cdot 10^5$	0,656	0,610	0,551	0,484	0,412	0,337	0,260	0,181	0,100
	$2 \cdot 10^5$	0,636	0,592	0,536	0,471	0,401	0,328	0,251	0,174	0,094
	$5 \cdot 10^5$	0,608	0,569	0,516	0,454	0,386	0,315	0,240	0,164	0,087
	$1 \cdot 10^6$	0,588	0,551	0,501	0,441	0,375	0,305	0,232	0,157	0,081
	$2 \cdot 10^6$	0,567	0,534	0,486	0,428	0,364	0,295	0,223	0,150	0,075
	$5 \cdot 10^6$	0,539	0,511	0,466	0,411	0,349	0,282	0,212	0,140	0,067
	$1 \cdot 10^7$	0,519	0,493	0,451	0,398	0,337	0,272	0,204	0,133	0,061
	$2 \cdot 10^7$	0,498	0,476	0,436	0,385	0,326	0,262	0,195	0,126	0,055
	$5 \cdot 10^7$	0,471	0,453	0,416	0,367	0,311	0,250	0,184	0,116	0,047
	$\geq 10^8$	0,450	0,435	0,401	0,354	0,300	0,240	0,176	0,109	0,041

[1)] N_{Elok} characteristic lower cycle load.

Table C9.2: Characteristic resistances under fatigue load with n ➔ ∞ load cycles without static preload (N_{ed} = 0) (Design method II according to EOTA TR050, October 2023)

Anchor channel FES-RS-S-		**600**	**700**
Steel failure:	n	$\Delta N_{Rk,s,0,n}$ [kN]	
$\Delta N_{Rk,s,0,\infty}$	[kN]	3,0	3,9
Concrete cone and pull-out failure			
$\eta_{c,fat}$	[-]	0,5	

In absence of other national regulations, the following partial safety factors γ_M and $\gamma_{M,fat}$ are recommended for design method I according to TR050, October 2023:

γ_M according to Annex C1
$\gamma_{M,fat}$ = 1,35

In absence of other national regulations, the following partial safety factor $\gamma_{M,fat}$ is recommended for design method II according to EOTA TR 050, October 2023:

$\gamma_{M,fat}$ = 1,35

Table C10.1: Combination of anchor channels and channel bolts under seismic load (performance category C1)

Anchor channel FES-RS-S-	Channel bolt	Diameter	Steel grade	Corrosion protection
600	FBC-S-225	M16	8.8	G[1]
700		M20		F[2]

[1] Electroplated.

[2] Hot-dip galvanised.

Table C10.2: Characteristic resistances under seismic tension load – steel failure of anchor channels (performance category C1)

Anchor channel FES-RS-S-			600	I-600	700	I-700
Steel failure: Anchor						
Characteristic resistance	$N_{Rk,s,a,eq}$	[kN]	55,2	57,0	73,3	81,0
Partial factor	$\gamma_{Ms,eq}$[1]	[-]	1,8			
Steel failure: Connection between anchor and channel						
Characteristic resistance	$N_{Rk,s,c,eq}$	[kN]	55,2	57,0	73,0	80,0
Partial factor	$\gamma_{Ms,eq}$[1]	[-]	1,8			
Steel failure: Local flexure of the channel lips						
Characteristic resistance	$N^0_{Rk,s,l,eq}$	[kN]	64,0		80,0	
Partial factor	$\gamma_{Ms,eq}$[1]	[-]	1,8			

[1] In absence of other national regulations.

Table C10.3: Characteristic flexural resistance of the channel under seismic tension load (performance category C1)

Anchor channel FES-RS-S-			600	700
Steel failure: Flexure of channel				
Characteristic flexural resistance of channel	$M_{Rk,s,flex,eq}$	[Nm]	2581	3749
Partial factor	$\gamma_{Ms,flex,eq}$[1]	[-]	1,15	

[1] In absence of other national regulations.

Table C11.1: Characteristic resistances for seismic shear load – steel failure of anchor channels (performance category C1)

Anchor channel FES-RS-S-			**600**	**I-600**	**700**	**I-700**
Steel failure: Anchor						
Characteristic resistance	$V_{Rk,s,a,y,eq}$	[kN]	98,5	98,5	120,0	120,0
	$V_{Rk,s,a,x,eq}$		34,2	50,7	44,0	48,6
Partial factor	$\gamma_{Ms,eq}$ [1)]	[-]	1,8			
Steel failure: Connection between anchor and channel						
Characteristic resistance	$V_{Rk,s,c,y,eq}$	[kN]	98,5	98,5	120,0	120,0
	$V_{Rk,s,c,x,eq}$		33,1	34,9	43,8	48,0
Partial factor	$\gamma_{Ms,eq}$ [1)]	[-]	1,8			
Steel failure: Local flexure of the channel lips						
Characteristic resistance	$V^0_{Rk,s,l,y,eq}$	[kN]	77,7		92,0	
Partial factor	$\gamma_{Ms,eq}$ [1)]	[-]	1,8			

1) In absence of other national regulations.

Table C11.2: Characteristic resistance for seismic shear load in direction of the longitudinal axis of the channel – steel failure (performance category C1)

Anchor channel FES-RS-S-(I)-				**600**	**700**
Steel failure: Connection between channel lips and serrated channel bolt					
Characteristic resistance	$V_{Rk,s,l,x,eq}$	[kN]	FBC-S-225-M12-8.8	-2)	-2)
			FBC-S-225-M16-8.8	17,6	22,5
			FBC-S-225-M20-8.8	17,6	22,5
Installation factor	$\gamma_{Inst,eq}$ [1)]	[-]		M16: 1,0 M20: 1,0	1,2

1) In absence of other national regulations.

2) No performance assessed.

Table C12.1: Characteristic resistance under seismic tension and seismic shear load – steel failure of channel bolts (performance category C1)

Channel bolt FBC-S-225				**M12**	**M16**	**M20**
Steel failure:						
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	8.8	-[2)]	125,6	170,0
Partial factor	$\gamma_{Ms,eq}$[1)]	[-]	8.8		1,5	
Characteristic resistance	$V_{Rk,s,eq}$	[kN]	8.8	-[2)]	62,8	98,0
Partial factor	$\gamma_{Ms,eq}$[1)]	[-]	8.8		1,25	

[1)] In absence of other national regulations.

[2)] No performance assessed.

Table C13.1: Characteristic resistances under fire exposure – steel failure

Channel bolt					**M10**	**M12**	**M16**	**M20**
Steel failure: Anchor, connection between anchor and channel, local bending of channel lip								
Characteristic resistance under fire exposure	$N_{Rk,s,fi}$ $=V_{Rk,s,y,fi}$	[kN]	FES-RS-S(-I)-500	R30	-[2)]	-[2)]	-[2)]	-[2)]
				R60	-[2)]	-[2)]	-[2)]	-[2)]
				R90	-[2)]	-[2)]	-[2)]	-[2)]
				R120	-[2)]	-[2)]	-[2)]	-[2)]
			FES-RS-S-(I)-600	R30	-[2)]	2,5	4,8	12,0
				R60	-[2)]	2,0	4,2	8,7
				R90	-[2)]	1,4	3,5	5,2
				R120	-[2)]	1,2	3,1	3,4
			FES-RS-S-(I)-700	R30	-[2)]	2,5	4,8	12,0
				R60	-[2)]	2,0	4,2	8,7
				R90	-[2)]	1,4	3,5	5,2
				R120	-[2)]	1,2	3,1	3,4
Partial factor	$\gamma_{Ms,fi}$[1)]	[-]			1,0			

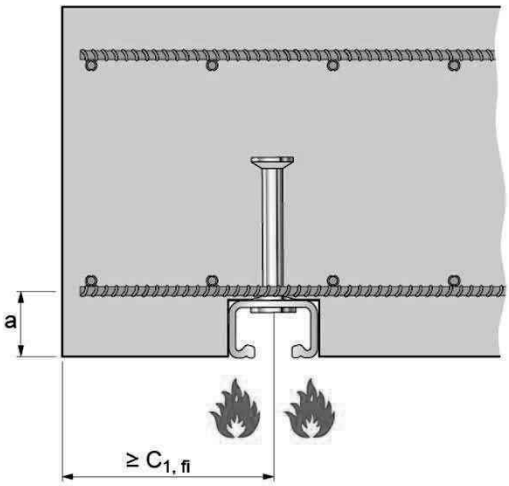
[1)] In absence of other national regulations.

[2)] No performance assessed.

Table C14.1: Minimum axis distance of reinforcement

Anchor channel FES-RS-S-(I)-			**500**	**600**	**700**
Min. axis distance	R30	a [mm]	35	35	50
	R60		35	35	50
	R90		45	45	50
	R120		60	60	65

Fire exposure from one side only



Fire exposure from more than one side