Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

# European Technical Assessment ETA-22/0874 of 30 June 2023

English translation prepared by DIBt - Original version in German language

**General Part**

| | |
|---|---|
| Technical Assessment Body issuing the European Technical Assessment: | Deutsches Institut für Bautechnik |
| Trade name of the construction product | Fashida anchor channels FPH with fashida channel bolts FST |
| Product family to which the construction product belongs | Anchor channel |
| Manufacturer | FASHIDA (Dalian) Industrial Group Co., Ltd<br>No. 478 Zhongshan Road<br>DALIAN<br>VOLKSREPUBLIK CHINA |
| Manufacturing plant | |
| This European Technical Assessment contains | 20 pages including 3 annexes which form an integral part of this assessment |
| This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of | EAD 330008-03-0601, Edition 06/2021 |

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

## Specific Part

### 1 Technical description of the product

The Fashida anchor channels FPH with Fashida channel bolts FST 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 FASHIDA Channel Bolts.

The anchor channel is embedded surface-flush in the concrete. Fashida 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 load (static and quasi-static 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<br>$M_{Rk,s,flex}$ see Annex C1 |
| - Maximum installation torque to avoid damage during installation | $T_{inst,g}$ ; $T_{inst,s}$ see Annex B3 |
| - Resistance to pull-out failure of the anchor | $N_{Rk,p}$ see Annex C2 |
| - Resistance to concrete cone failure | $h_{ef}$ see Annex B2<br>$k_{cr,N}$ ; $k_{ucr,N}$ see Annex C2 |
| - Minimum edge distances, spacing and member thickness to avoid concrete splitting during installation | $s_{min}$ see Annex A5<br>$c_{min}$ ; $h_{min}$ 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 shear load (static and quasi-static loading) | |
| - Resistance to steel failure of channel bolt under shear loading without lever arm | $V_{Rk,s}$ see Annex C3 |
| - Resistance to steel failure by bending of the channel bolt under shear load with lever arm | $M^0_{Rk,s}$ see Annex C3 |
| - 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 C3 |
| - Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis) | No Performance assessed |
| - Factor for sensitivity to installation (longitudinal shear) | No Performance assessed |
| - Resistance to steel failure of the anchor (longitudinal shear) | No Performance assessed |
| - Resistance to steel failure of connection between anchor and channel (longitudinal shear) | No Performance assessed |
| - Resistance to concrete pry-out failure | $k_8$ see Annex C3 |
| - Resistance to concrete edge failure | $k_{cr,V}$ ; $k_{ucr,V}$ see Annex C3 |
| Characteristic resistance under combined tension and shear load (static and quasi-static load) | |
| - Resistance to steel failure of the anchor channel | $k_{13}$ ; $k_{14}$ see Annex C2 |
| Characteristic resistance under fatigue tension loading | |
| - Fatigue resistance to steel failure of the whole system (continuous or tri-linear function, test method A1, A2) | No Performance assessed |
| - Fatigue limit resistance to steel failure of the whole system (test method B) | No Performance assessed |
| - Fatigue resistance to concrete related failure (exponential function, test method A1, A2) | No Performance assessed |
| - Fatigue limit resistance to concrete related failure (test method B) | No Performance assessed |
| Displacements (static and quasi-static load) | $\delta_{N0}$ ; $\delta_{N\infty}$ see Annex C2<br>$\delta_{V,y,0}$ ; $\delta_{V,y,\infty}$ see Annex C3 |

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

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

### 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. 330008-03-0601, the applicable European legal act is: [2000/273/EC].

The system to be applied is: 1

## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

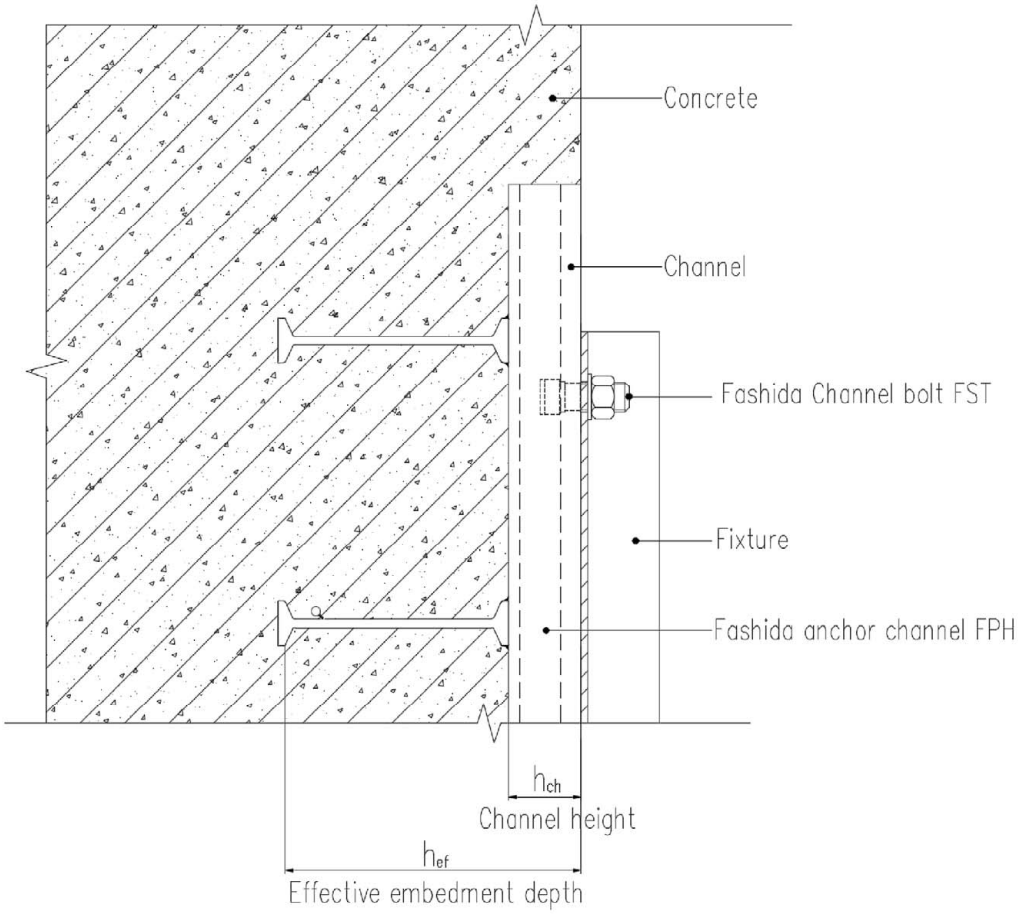
Issued in Berlin on 30 June 2023 by Deutsches Institut für Bautechnik

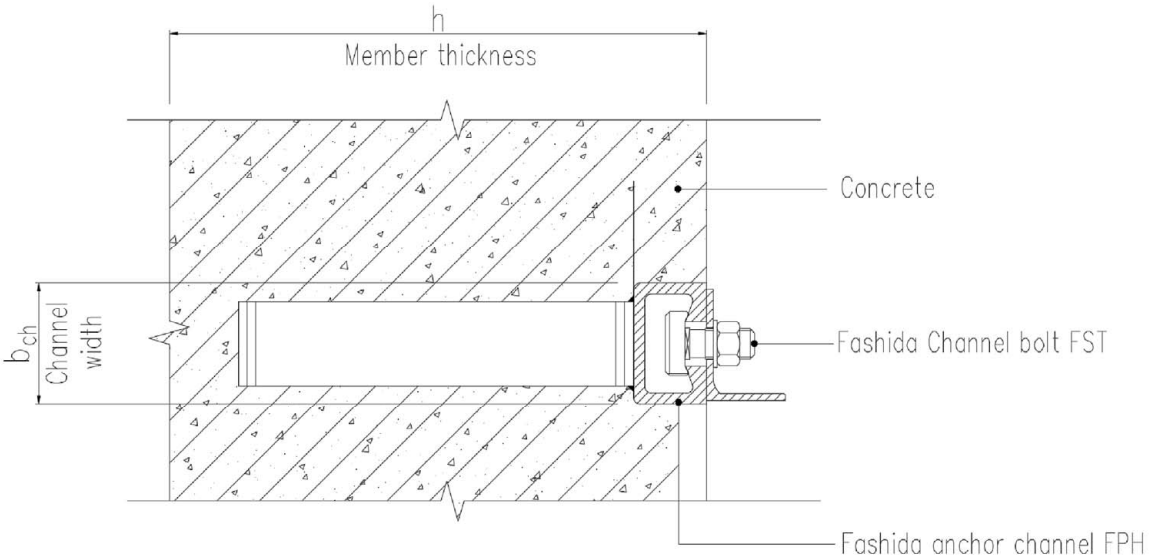
Dipl.-Ing. Beatrix Wittstock
Head of Section

*beglaubigt:*
Müller

Deutsches Institut für Bautechnik DIBt

## Product and installation condition

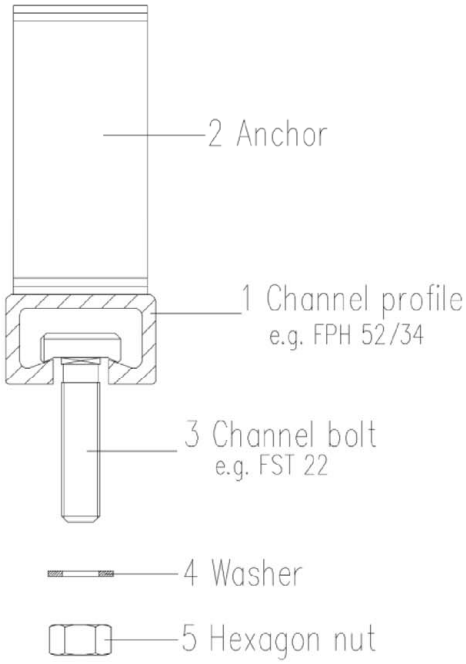


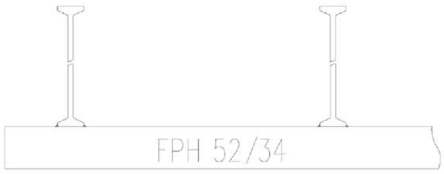

| | |
|---|---|
| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex A1** |
| **Product description**<br>Installed condition | |

Deutsches Institut für Bautechnik DIBt

## Anchor channel type: Hot-rolled profile



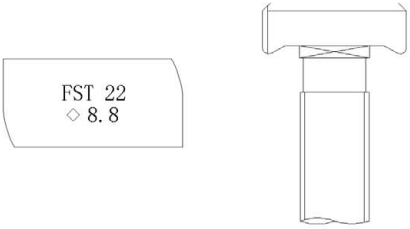

Marking of the FASHIDA anchor channel, e.g. FPH 52/34




| | |
|---|---|
| F or Fashida: | Identifying mark of the producer |
| PH: | Anchor channel type |
| 52/34: | Size |

Material:
Carbon steel
Hot-dip galvanized ≥ 80µm

Marking of the FASHIDA- channel bolt, e.g. FST 22 8.8




| | |
|---|---|
| F or Fashida: | Identifying mark of the producer |
| ST: | Channel bolt type |
| 22: | Size |
| 8.8: | Strength class |

Type of coating:
hot-dip-galvanized ≥ 50µm

**Fashida anchor channels FPH with Fashida channel bolts FST**

**Product description**
Anchor channel types and marking

**Annex A2**

Deutsches Institut für Bautechnik DIBt

## Materials

| Item no. | Specification | Intended use | |
|---|---|---|---|
| | | 1 | 2 |
| | | Anchor channels may only be used in structures subject to dry internal conditions | Anchor channels may also be used in structures subject to internal conditions with usual humidity |
| | | Materials | |
| 1 | **Channel profile** | Carbon steel according to EN 10025-1:2004[1)]<br>hot-dip galvanized ≥ 80 µm | |
| 2 | **Anchor** | Carbon steel according to EN 10025-1:2004[2)]<br>hot-dip galvanized ≥ 80 µm | |
| 3 | **Channel bolts shaft and thread according to EN ISO 4018:2022** | Carbon steel according to EN ISO 898-1:2013,<br>strength grade 8.8<br>hot-dip galvanized ≥ 50 µm | |
| 4 | **Washer according to EN ISO 7089:2000 and EN ISO 7093-1:2000 production class A, 200 HV** | Carbon steel according to EN 10025-1:2004<br>hot-dip galvanized ≥ 50 µm | |
| 5 | **Hexagonal nuts EN ISO 4032:2012** | Carbon steel according to EN ISO 898-2:2012,<br>strength grade 8<br>hot-dip galvanized ≥ 50 µm | |

1) $f_{uk}$=500 N/mm², 2) $f_{uk}$=460 N/mm²

**Fashida anchor channels FPH with Fashida channel bolts FST**

**Product description**
Materials and intended use

**Annex A3**

Deutsches Institut für Bautechnik DIBt

## Channel profile

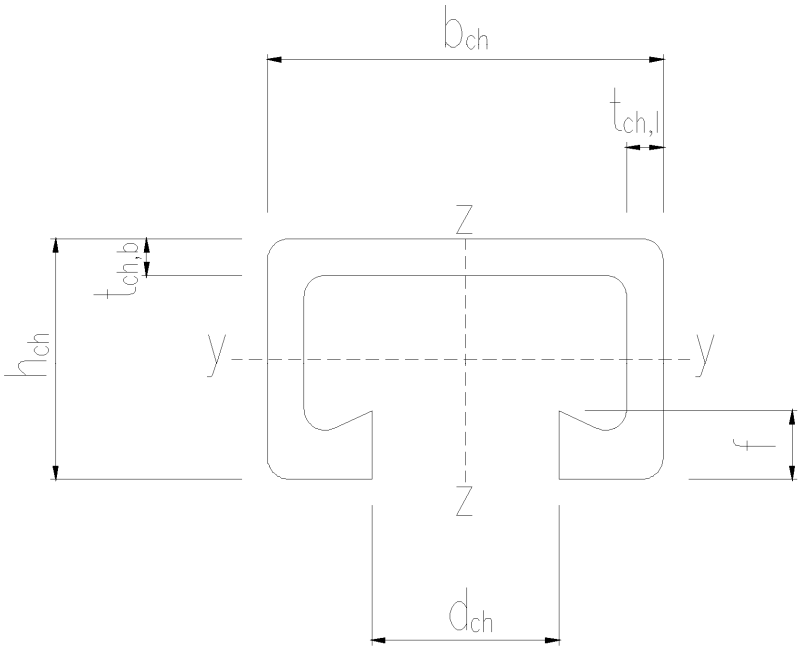



Table A1: Dimensions of profiles

| Profile | Geometry | | | | | | $I_y$ |
|---|---|---|---|---|---|---|---|
| | $b_{ch}$ | $h_{ch}$ | $t_{ch,b}$ | $t_{ch,l}$ | $d_{ch}$ | f | |
| [-] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm⁴] |
| 52/34 | 52 | 34 | 4 | 4 | 22 | 11 | 96.084 |

**Fashida anchor channels FPH with Fashida channel bolts FST**

**Product description**
Dimensions of channel profile

**Annex A4**

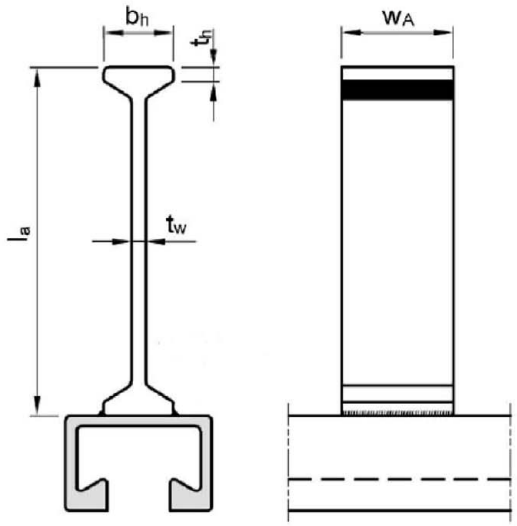



Table A2: Dimensions of the anchor

| Anchor channel | Anchor type | $t_w$ | $t_h$ | $l_a$ | $w_A$ | $b_h$ | $A_h$ |
|---|---|---|---|---|---|---|---|
| [-] | [-] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm²] |
| 52/34 | I | 6 | 6 | 125 | 39 | 25 | 741 |

**Fashida anchor channels FPH with Fashida channel bolts FST**

**Product description**
Dimensions of anchors

**Annex A5**

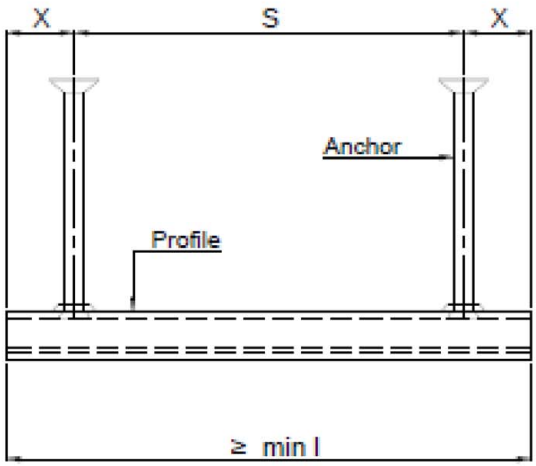



Table A3: Minimum and maximum spacing, end distance and minimum channel length

| Anchor channel | Anchor spacing | | End distance | minimum channel length |
|---|---|---|---|---|
| | $s_{min}$ | $s_{max}$ | x | min l |
| | [mm] | | | |
| 52/34 | 250 | 250 | 25 | 300 |

| | |
|---|---|
| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex A6** |
| **Product description**<br>Anchor positioning and channel length | |

Deutsches Institut für Bautechnik DIBt

## Channel bolts

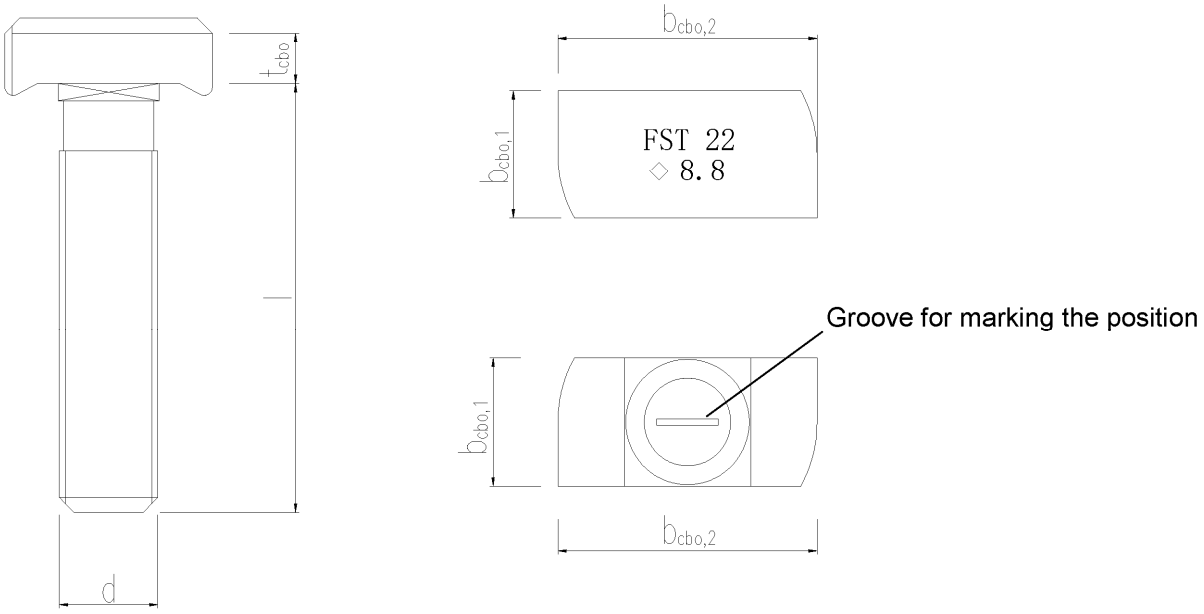



Table A4: Dimensions of the channel bolt

| Profile | Channel bolt | Thread diameter | Geometry | | | | Material | | |
|---|---|---|---|---|---|---|---|---|---|
| | | d | $b_{cbo,1}$ | $b_{cbo,2}$ | $t_{cbo}$ | l | Strength grade | $f_{yk}$ | $f_{uk}$ |
| [-] | [-] | [-] | [mm] | | | | [-] | [N/mm²] | [N/mm²] |
| 52/34 | FST 22 | M20 | 20,5 | 41,5 | 10 | ≥ 35 | 8.8 | 640 | 800 |

Marking of the channel bolt according to Annex A2

| | |
|---|---|
| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex A7** |
| **Product description**<br>Dimensions and material for channel bolts | |

Deutsches Institut für Bautechnik DIBt

## Specification of intended use

**Anchor channels and channel bolts subject to:**

- Static and quasi-static tension and shear perpendicular to the longitudinal axis of the channel.

**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
  (anchor channels and channel bolts acc. to Annex A3, column 1 and 2).
- Structures subject to internal conditions with usual humidity (e.g. kitchen, bath and laundry in residential buildings, exceptional permanent damp conditions and application under water)
  (anchor channels and channel bolts acc. to Annex A3, column 2).

**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 bolt are indicated on the design drawings (e. g. position of the anchor channel relative to reinforcement or to supports).
- For static and quasi-static loading the anchor channels are designed in accordance with EN 1992-4:2018 and EOTA TR 047 “Calculation Method for the Performance of Anchor Channels” May 2021. 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.
- Installation in accordance with the installation instruction given in Annexes B4 and B5.
- 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 under 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 A3 and provided separately by the user.
- Orientating the channel bolt (groove according to Annex B5) rectangular to the channel axis.
- The required installation torques given in Annex B3, Table B2 must be applied and must not be exceeded.

| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex B1** |
|---|---|
| **Intended use**<br>Specifications | |

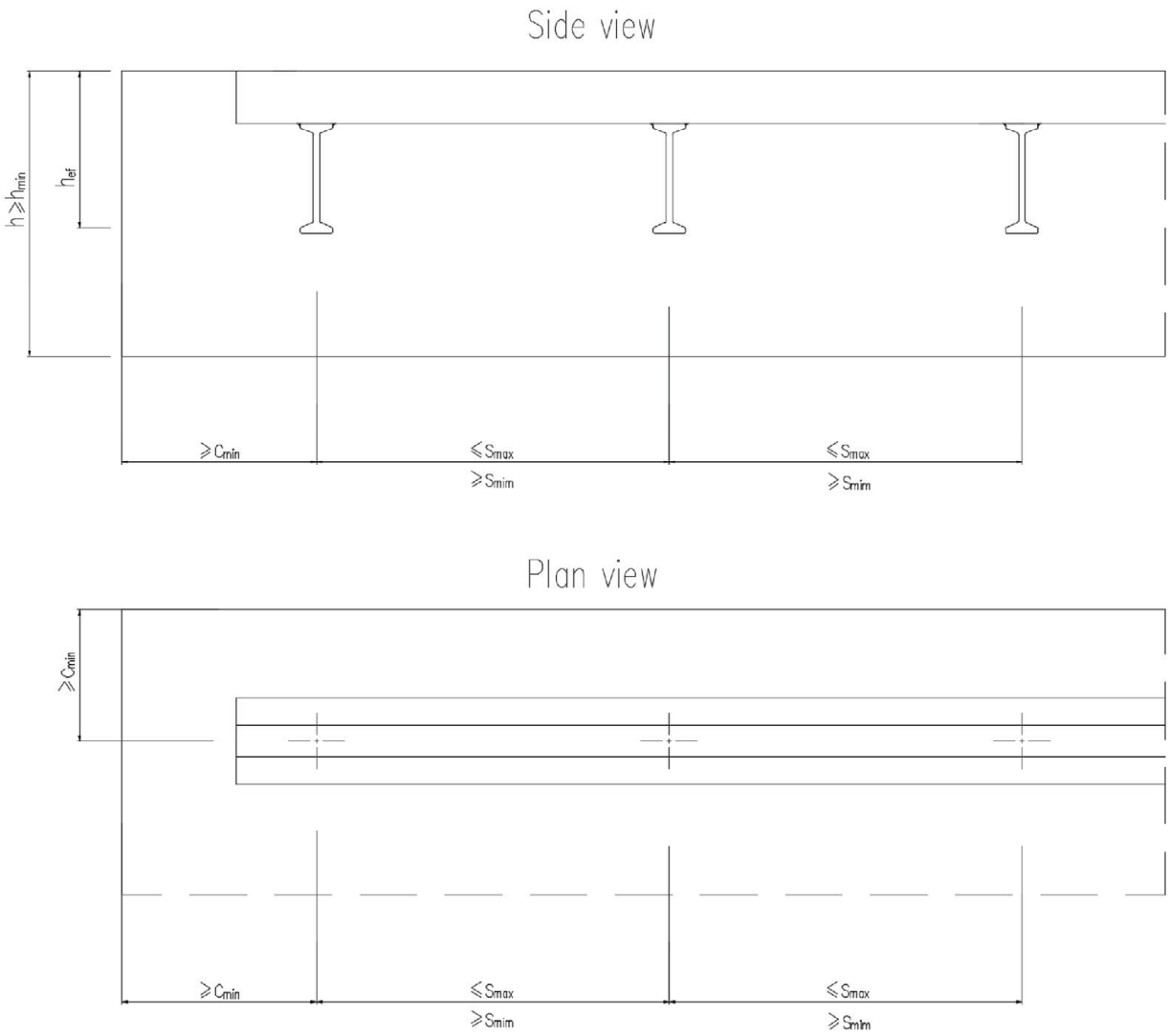



Table B1: Minimum effective embedment, edge distances and member thicknesses

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| min. effective embedment depth | $h_{ef,min}$ | [mm] | 153 |
| min. edge distance | $c_{min}$ | | 100 |
| min. thickness of concrete member | $h_{min}$ | | 175 |
| | | | $h_{ef}+t_h$ [1)] $+c_{nom}$ [3)] |

1) $t_h$ = Thickness of anchor head
2) $s_{min}$, $s_{max}$ according to Annex A5, Table A3
3) $c_{nom}$ according to EN 1992-1-1:2004 + A1:2014 and $c_{nom} \geq 30$ mm

| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex B2** |
|---|---|
| **Intended use**<br>Installation parameters of the anchor channels | |

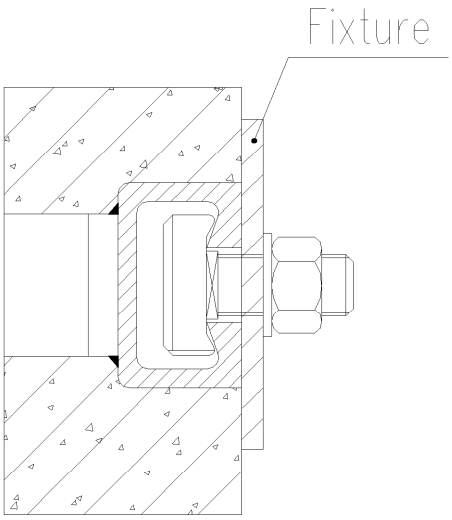
Deutsches Institut für Bautechnik DIBt

Table B2: Minimum spacing and installation torque of the channel bolts

| Anchor channel | Channel bolt d | Min. spacing $s_{min,cbo}$ of the channel bolt | Installation torque $T_{inst}$ 3) | |
|---|---|---|---|---|
| | | | $T_{inst,g}$ General application 1) | $T_{inst,s}$ Steel-steel contact 2) |
| [-] | [mm] | [mm] | [Nm] | |
| 52/34 | 20 | 100 | 180 | 180 |

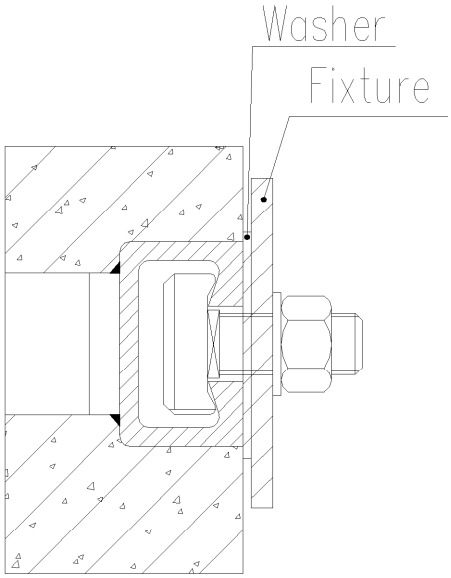
1) according to Fig. 1
2) according to Fig. 2
3) $T_{inst}$ must not exceeded

Fig. 1: General application




The fixture is in contact with the channel profile and the concrete surface. The installation torque $T_{inst,g}$ according to Table B2 shall be applied and must not be exceeded.

Fig. 2: Steel-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). The installation torque $T_{inst,s}$ according to Table B2, shall be applied and must not be exceeded.

**Fashida anchor channels FPH with Fashida channel bolts FST**

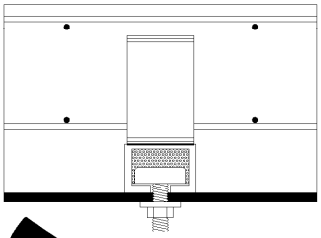
**Intended use**
Installation parameters for channel bolts

**Annex B3**

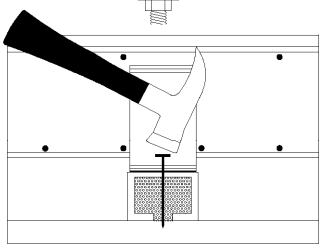
Deutsches Institut für Bautechnik DIBt

**1. Fixing anchor channel**

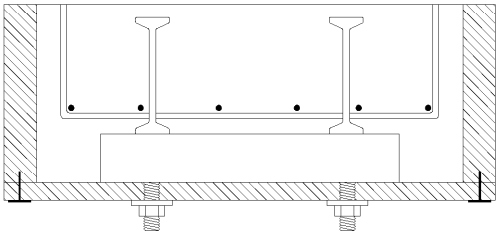
Install the channel surface flush and fix the channel undisplaceable to the formwork or to the reinforcement.



a) Fixing to steel formwork
With Fashida channel bolt FST and nuts, with rivets, cramps or with magnet fixings.



b) Fixing to timber formwork
With nails through the pre punched holes in the back of the channels and with staples.

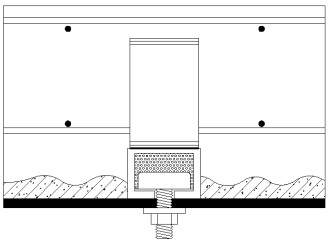


c) Fixing to anchor channels at the top

- To timber batten on the side formwork (e.g. with Fashida channel bolts FST).
- Fixing from above directly to the reinforcement or to a mounting rebar, attach the channel by wire binding.

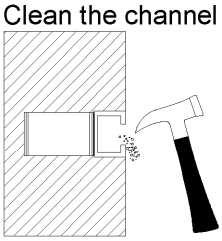
**2. Pouring concrete and regular compacting of concrete**

Compact the concrete properly around the channel and the anchors.

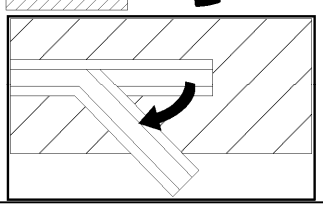


**3. Removing of the infill**

Clean the channel on the outside after removing the formwork



a) PS foam infill
With a hammer or a hook.

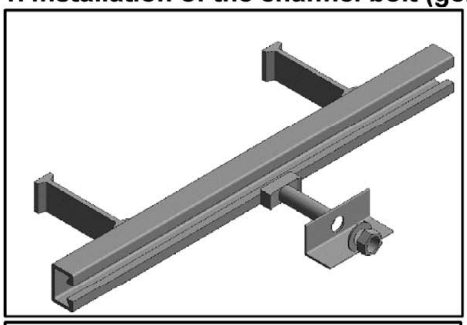


b) PE foam infill
By hand or with help of a screw driver in one piece.

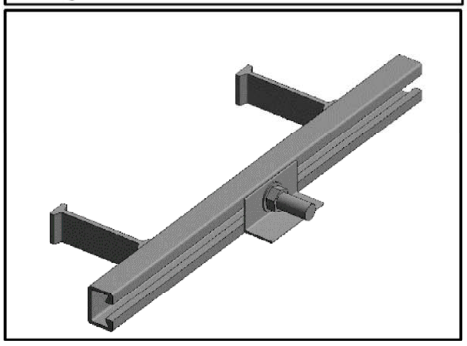
| | |
|---|---|
| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex B4** |
| **Intended use**<br>Installation instructions of anchor channel | |

Deutsches Institut für Bautechnik DIBt

**1. Installation of the channel bolt (general application)**

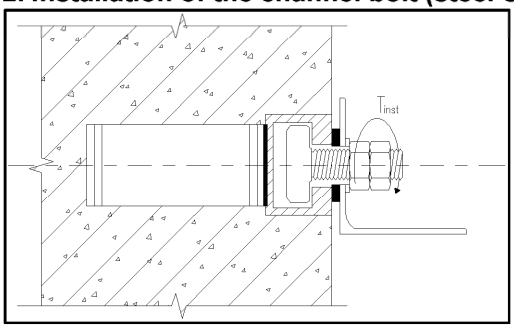


Insert the Fashida channel bolt FST into the channel slot at any point along the channel length between the anchors. The channel bolt may not be installed at the end of the channel within the end spacing x.
After 90° clockwise rotation the Fashida channel bolt locks into position.
Use a washer under the nut.



Check the correct fit of the channel bolt. The groove of the shaft of the channel bolt must be perpendicular to the longitudinal axis of the channel.
Tighten the nuts to the installation torque $T_{inst,g}$ = 180 Nm.
The installation torque must not be exceeded.

**2. Installation of the channel bolt (steel-steel contact)**




Use washers between the channel bolt and the fixture to create a defined contact.
Tighten the nuts to the installation torque $T_{inst,s}$ = 180 Nm.
The installation torque must not be exceeded.

| | |
|---|---|
| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex B5** |
| **Intended use**<br>Installation instructions of channel bolt | |

Deutsches Institut für Bautechnik DIBt

## Table C1: Characteristic resistances under tension load – steel failure anchor channel

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| **Steel failure: Anchor** | | | |
| Characteristic resistance | $N_{Rk,s,a}$ | [kN] | 107,6 |
| Partial factor | $\gamma_{Ms}$ 1) | | 1,64 |
| **Steel failure: Connection between anchor and channel** | | | |
| Characteristic resistance | $N_{Rk,s,c}$ | [kN] | 73,3 |
| Partial factor | $\gamma_{Ms,ca}$ 1) | | 1,8 |
| **Steel failure: Local flexure of channel lips** | | | |
| Spacing of the channel bolts for $N_{Rk,s,l}$ | $s_{l,N}$ | [mm] | 104 |
| Characteristic resistance | $N^0_{Rk,s,l}$ | [kN] | 73,3 |
| Partial factor | $\gamma_{Ms,l}$ 1) | | 1,8 |

1) in absence of other national regulations

## Table C2: Characteristic flexural resistance of channel

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| **Steel failure: Flexure of channel** | | | |
| Characteristic flexural resistance of channel | $M_{Rk,s,flex}$ | [Nm] | 5.117 |
| Partial factor | $\gamma_{Ms,flex}$ 1) | | 1,15 |

1) in absence of other national regulations

## Table C3: Characteristic resistance under tension load – steel failure of channel bolt

| **Channel bolt, 8.8** | **Thread diameter** | | **M20** |
|---|---|---|---|
| **Steel failure: Channel bolt** | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 136,5 |
| Partial factor | $\gamma_{Ms}$ 1) | | 1,50 |

1) in absence of other national regulations

| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex C1** |
|---|---|
| **Performance**<br>Characteristic resistance of anchor channel and channel bolt under tension load | |

Deutsches Institut für Bautechnik DIBt

## Table C4: Characteristic resistance under tension load – concrete failure

| **Anchor channel** | | | | **52/34** |
|---|---|---|---|---|
| **Concrete failure: Pull-out** | | | | |
| Characteristic resistance in cracked concrete C12/15 | | $N_{Rk,p}$ | [kN] | 66,7 |
| Characteristic resistance in uncracked concrete C12/15 | | $N_{Rk,p}$ | [kN] | 93,4 |
| Increasing factor for $N_{Rk,p} = N_{Rk,p}(C12/15) \cdot \psi_c$ | C20/25 | $\psi_c$ | [-] | 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 |
| | ≥ C60/75 | | | 5,00 |
| Partial factor | | $\gamma_{Mp}$ 1) | [-] | 1,5 |
| **Concrete failure: Concrete cone** | | | | |
| Product factor cracked concrete | | $k_{cr,N}$ | [-] | 8,6 |
| Product factor uncracked concrete | | $k_{ucr,N}$ | [-] | 12,3 |
| Partial factor | | $\gamma_{Mc}$ 1) | | 1,5 |
| **Concrete failure: Splitting** | | | | |
| Characteristic edge distance | | $c_{cr,sp}$ | [mm] | 459 |
| Characteristic spacing | | $s_{cr,sp}$ | [mm] | 918 |
| Partial factor | | $\gamma_{M,sp}$ 1) | [-] | 1,5 |

1) in absence of other national regulations

## Table C5: Displacements under tension loads

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| Tension load | N | [kN] | 29,1 |
| Short-term displacement | $\delta_{N0}$ | [mm] | 1,6 |
| Long-term displacement | $\delta_{N\infty}$ | [mm] | 3,2 |

## Table C6: Characterisitc resistances under combined tension and shear load

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| **Steel failure: Local flexure of channel lips and failure by flexure of channel** | | | |
| Product factor | $k_{13}$ | [-] | Values according to EN 1992-4:2018, Section 7.4.3.1 |
| **Steel failure: Failure of anchor and connection between anchor and channel** | | | |
| Product factor | $k_{14}$ | [-] | Values according to EN 1992-4:2018, Section 7.4.3.1 |

**Fashida anchor channels FPH with Fashida channel bolts FST**

**Performance**
Characteristic resistances and displacements under tension load, characteristic resistances under combined tension and shear loads

**Annex C2**

Deutsches Institut für Bautechnik DIBt

## Table C7: Characteristic resistances under shear load – failure of anchor channel

| **Anchor channel** | | | | **52/34** |
|---|---|---|---|---|
| **Steel failure: Anchor** | | | | |
| Characteristic resistance | | $V_{Rk,s,a,y}$ | [kN] | 85,6 |
| Partial factor | | $\gamma_{Ms}$ [1)] | | 1,37 |
| **Steel failure: Connection between anchor and channel** | | | | |
| Characteristic resistance | | $V_{Rk,s,c,y}$ | [kN] | 85,6 |
| Partial factor | | $\gamma_{Ms,ca}$ [1)] | | 1,8 |
| **Steel failure: Local flexure of channel lips** | | | | |
| Characteristic spacing of channel bolts for $V_{Rk,s,l}$ | | $s_{l,V}$ | [mm] | 104 |
| Characteristic resistance | | $V^0_{Rk,s,l,y}$ | [kN] | 85,6 |
| Partial factor | | $\gamma_{Ms,l}$ [1)] | | 1,8 |
| **Concrete failure: pry-out** | | | | |
| Product factor | | $k_8$ [2)] | | 2,0 |
| Partial factor | | $\gamma_{Mc}$ [1)] | | 1,5 |
| **Concrete failure: Concrete edge** | | | | |
| Product factor $k_{12}$ | cracked concrete | $k_{cr,V}$ | | 5,9 |
| | uncracked concrete | $k_{ucr,V}$ | | 8,2 |
| Partial factor | | $\gamma_{Mc}$ [1)] | | 1,5 |

1) in absence of other national regulations
2) without supplementary reinforcement; in case of supplementary reinforcement, the factor $k_8$ should be multiplied with 0,75

## Table C8: Characteristic resistances under shear loads – steel failure of channel bolts

| **Channel bolt, 8.8** | **Thread diameter** | | **M20** |
|---|---|---|---|
| **Steel failure** | | | |
| Characteristic resistance | $V_{Rk,s}$ | [kN] | 98,0 |
| Characteristic bending resistance | $M^0_{Rk,s}$ | [Nm] | 518,6 |
| Partial factor | $\gamma_{Ms}$ [1)] | | 1,25 |

1) in absence of other national regulations

## Table C9: Displacements under shear load

| **Anchor channel** | | | **52/34** |
|---|---|---|---|
| Shear load | $V_y$ | [kN] | 34,0 |
| Short-term displacement | $\delta_{V0,y}$ | [mm] | 1,8 |
| Long-term displacement | $\delta_{V\infty,y}$ | [mm] | 2,7 |

| **Fashida anchor channels FPH with Fashida channel bolts FST** | **Annex C3** |
|---|---|
| **Performance**<br>Characteristic resistances of anchor channels and channel bolts under shear load, displacements under shear load | |