

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-13/0224**  
**of 3 March 2022**

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

Modersohn Anchor Channel MBA

Product family  
to which the construction product belongs

Anchor channels

Manufacturer

Wilhelm Modersohn GmbH & Co. KG  
Industriestraße 23  
32139 Spenge  
DEUTSCHLAND

Manufacturing plant

Werk Spenge  
Industriestraße 23  
32139 Spenge

This European Technical Assessment  
contains

22 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

This version replaces

ETA-13/0224 issued on 26 March 2019

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## Specific Part

### 1 Technical description of the product

The Modersohn Anchor Channel MBA is system consisting of C-shaped channel profile of stainless steel and at least two metal anchors non-detachably fixed on the channel back and channel bolts.

The anchor channel is embedded surface-flush in the concrete. Modersohn channel bolts (hammerhead or hooked) with appropriate hexagon 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	$N_{Rk,s,l}^0 ; s_{l,N}$ see Annex C1
- Resistance to steel failure of channel bolt	$N_{Rk,s}$ see Annex C5
- Resistance to steel failure by exceeding the bending strength of the channel	$S_{max}$ see Annex A4 $M_{Rk,s,flex}$ 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 $k_{cr,N} ; k_{ucr,N}$ see Annex C2
- Minimum edge distances, spacing and member thickness to avoid concrete splitting during installation	$S_{min}$ see Annex A4 $c_{min} ; h_{min}$ see Annex B2
- 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 A3

Essential characteristic	Performance
<p>Characteristic resistance under shear load (static and quasi-static loading)</p> <ul style="list-style-type: none"> <li>- Resistance to steel failure of channel bolt under shear loading without lever arm</li> <li>- Resistance to steel failure by bending of the channel bolt under shear load with lever arm</li> <li>- 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)</li> <li>- Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis)</li> <li>- Factor for sensitivity to installation (longitudinal shear)</li> <li>- Resistance to steel failure of the anchor (longitudinal shear)</li> <li>- Resistance to steel failure of connection between anchor and channel (longitudinal shear)</li> <li>- Resistance to concrete pry-out failure</li> <li>- Resistance to concrete edge failure</li> </ul>	<p><math>V_{Rk,s}</math> see Annex C5</p> <p><math>M_{Rk,s}^0</math> see Annex C5</p> <p><math>V_{Rk,s,l,y}^0 ; s_{l,v} ; V_{Rk,s,c,y} ; V_{Rk,s,a,y}</math> see Annex C3</p> <p>No Performance assessed</p> <p>No Performance assessed</p> <p>No Performance assessed</p> <p>No Performance assessed</p> <p><math>k_8</math> see Annex C3</p> <p><math>k_{cr,y} ; k_{ucr,y}</math> see Annex C3</p>
<p>Characteristic resistance under combined tension and shear load (static and quasi-static load)</p> <ul style="list-style-type: none"> <li>- Resistance to steel failure of the anchor channel</li> </ul>	<p><math>k_{13} ; k_{14}</math> see Annex C4</p>
<p>Characteristic resistance under fatigue tension loading</p> <ul style="list-style-type: none"> <li>- Fatigue resistance to steel failure of the whole system (continuous or tri-linear function, test method A1, A2)</li> <li>- Fatigue limit resistance to steel failure of the whole system (test method B)</li> <li>- Fatigue resistance to concrete related failure (exponential function, test method A1, A2)</li> <li>- Fatigue limit resistance to concrete related failure (test method B)</li> </ul>	<p>No Performance assessed</p> <p>No Performance assessed</p> <p>No Performance assessed</p> <p>No Performance assessed</p>
<p>Displacements (static and quasi-static load)</p>	<p><math>\delta_{N0} ; \delta_{N\infty}</math> see Annex C2</p> <p><math>\delta_{v,y,0} ; \delta_{v,y,\infty} ; \delta_{v,x,0} ; \delta_{v,x,\infty}</math> see Annex C4</p>



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

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

**3.3 Aspects of durability**

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

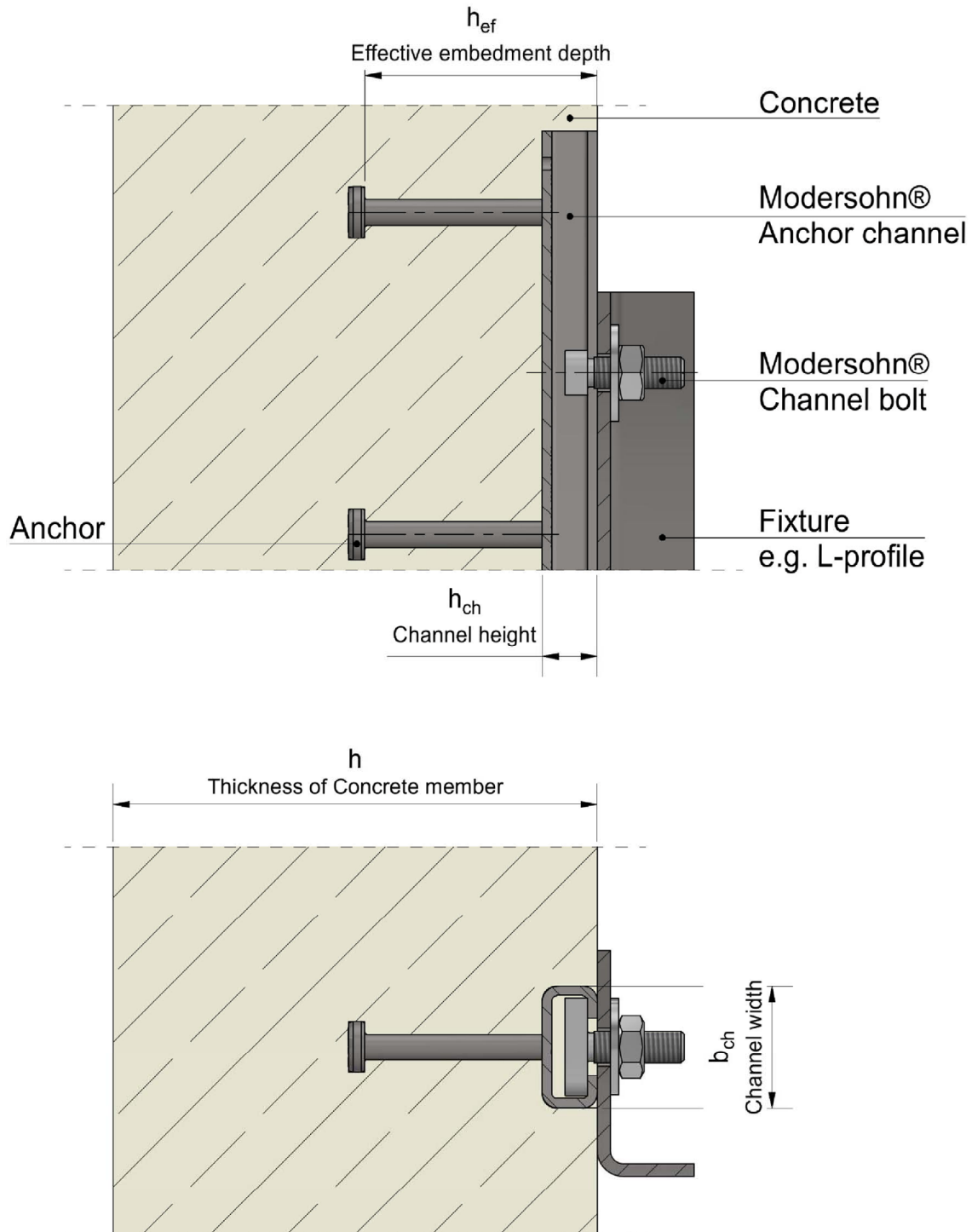
**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

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 3 March 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Müller

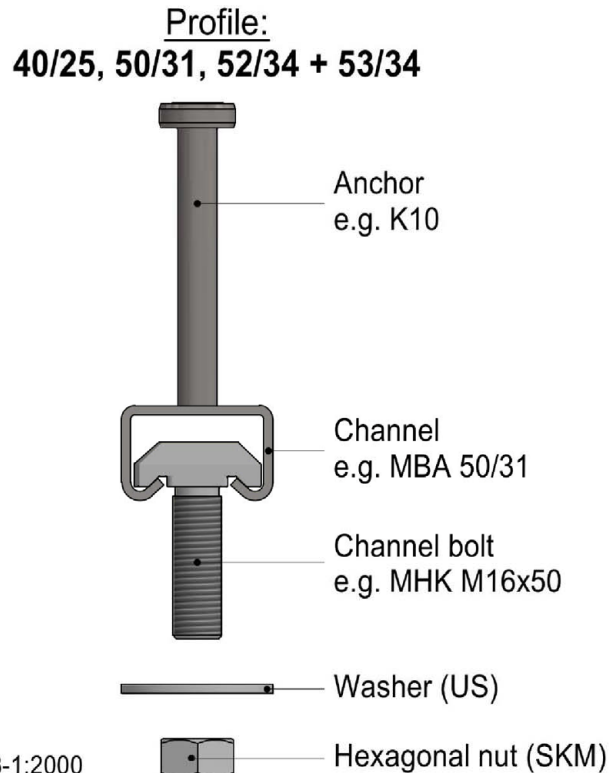
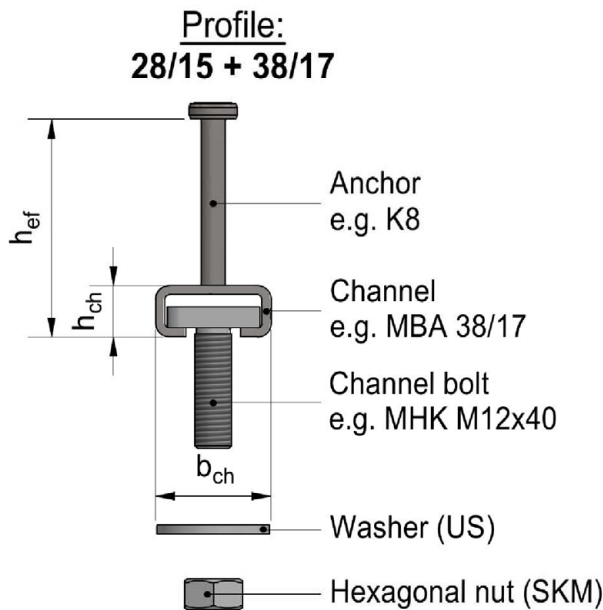


**Modersohn® Anchor Channel MBA**

**Product description  
Installed condition**

**Annex A1**

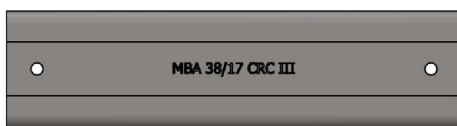
### Modersohn® anchor channel



**Legend**

- $h_{ch}$  Channel height
- $b_{ch}$  Channel width
- $h_{ef}$  Effective embedment depth
- US According to EN ISO 7089:2000 and EN ISO 7093-1:2000
- SKM According to EN ISO 4032:2012 (Strength grade of the nut according to strength grade of the channel bolt)

**Marking of the Modersohn® anchor channel, e.g.:**



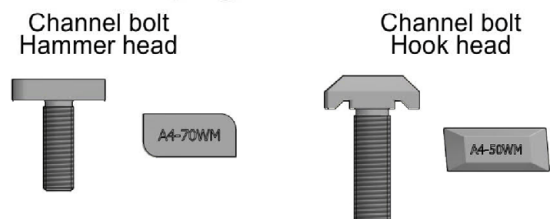
Stamping on back of channel:

- M Identifying mark of the producer
  - BA Type of anchor channel
  - 38/17 Size
  - CRC III Material
- Close to the anchor a nail hole is positioned.

**Material of the channel:**

- CRC I-V Corrosion resistance class according to EN 1993-1-4:2006 + A1:2015 (table A.3)

**Marking of the Modersohn® channel bolt, e.g.:**



- WM Identifying mark of the producer
- A4 Material

**Strength grade of the channel bolt**

- 50, 70 Strength grade

**Material of the channel bolt:**

Stamping	Corrosion resistance class according to EN 1993-1-4:2006 + A1:2015 (table A.3)
A2	CRC II
A4	CRC III
D6	CRC IV
D8	CRC V

**Modersohn® Anchor Channel MBA**

**Product description**  
**Anchor channel type and marking**

**Annex A2**

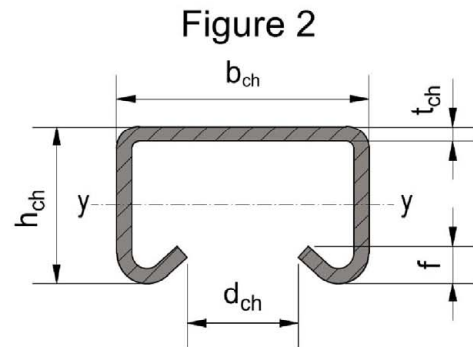
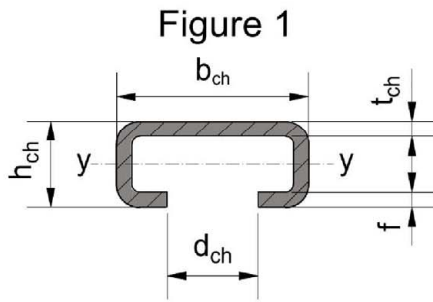
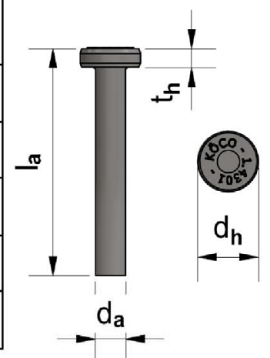


Table A1: Dimensions of profile

Anchor channel	Figure	Dimensions					Moment of inertia
		b <sub>ch</sub>	h <sub>ch</sub>	t <sub>ch</sub>	d <sub>ch</sub>	f	I <sub>y</sub>
		[mm]					[mm <sup>4</sup> ]
28/15	1	28,00	15,00	2,30	12,00	2,30	3874
38/17	1	38,00	17,00	3,00	18,00	3,00	7787
40/25	2	40,00	25,00	2,50	18,00	5,50	19095
50/31	2	50,00	31,00	3,00	22,00	7,35	44781
52/34	2	52,00	34,00	4,00	22,00	7,80	70663
53/34	2	53,00	34,00	4,50	22,00	7,70	76681

Table A2: Dimensions of anchor

Type	Anchor channel	Shaft	Head	Head thickness	l <sub>a</sub>	A <sub>h</sub>
		d <sub>a</sub>	d <sub>h</sub>	t <sub>h</sub>		
		[mm]				[mm <sup>2</sup> ]
K6	28/15	6	13	5	35	104,5
K8	38/17, 40/25	8	16	5	60	150,8
K10	50/31	10	19	7	75	205,0
K13	52/34, 53/34	13	25	8	125	358,1



Modersohn® Anchor Channel MBA

Product description  
Dimensions of profile and anchor

Annex A3

### Anchor positioning and channel length

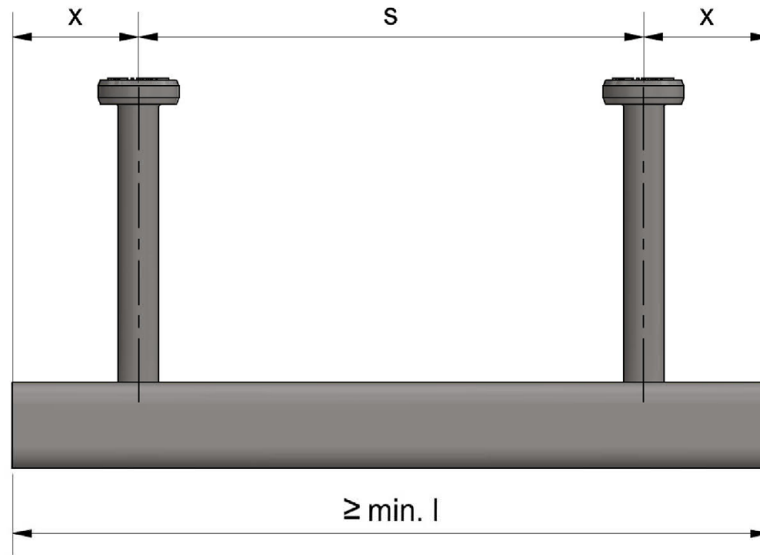


Table A3: Anchor positioning, channel length

Anchor channel	Anchor spacing		End spacing	Min. channel length
	$s_{\min}$	$s_{\max}$	$x$	min. $l$
	[mm]			
28/15 38/17	50	200	25	100
40/25 50/31	50	250	25	100
52/34 53/34	80	250	35	150

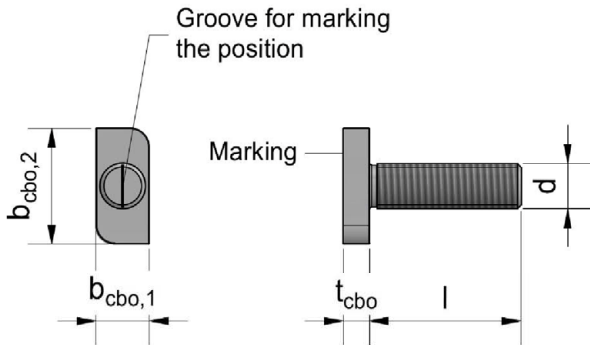
Modersohn® Anchor Channel MBA

Product description  
Anchor positioning, channel length

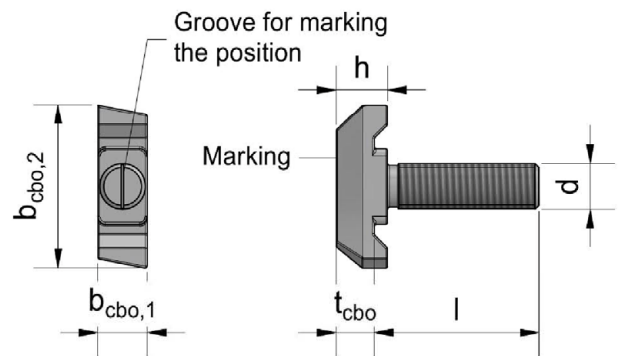
Annex A4

## Modersohn® channel bolt

### Hammer head geometry



### Hook head geometry



Marking according to annex A2

**Table A4: Dimensions of hammer head channel bolt [mm]**

MHK	Thread diameter	Hammer head geometry			Alternative hammer head geometry			Length l	Anchor channel
		Width $b_{cbo,1}$	Length $b_{cbo,2}$	Thickness $t_{cbo}$	Width $b_{cbo,1}$	Length $b_{cbo,2}$	Thickness $t_{cbo}$		
28/15	M10	10,5	22,5	4,5	10	22,5	6	20 - 200	28/15
38/17	M10	14,1	30,5	7	15	30,5	7	20 - 200	38/17
	M12	14,1	30,5	7	15	30,5	7	20 - 200	
	M16	16	31	8,5	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	20 - 200	

**Table A5: Dimensions of hook head channel bolt [mm]**

MHK	Thread diameter	Hook head geometry				Alternative hook head geometry				Length l	Anchor channel
		Width $b_{cbo,1}$	Length $b_{cbo,2}$	Thickness $t_{cbo}$	h all	Width $b_{cbo,1}$	Length $b_{cbo,2}$	Thickness $t_{cbo}$	h all		
40/25	M10	14	33,7	8	10,5	15	33,7	10	12,5	20 - 150	40/25
	M12	14	33,7	8	10,5	14	35	8,5	11	20 - 200	
	M16	17	32,7	9	12	17	34	9	11,5	30 - 200	
50/30	M12	13	43,3	10	13,5	15	43,3	12	15,5	20 - 200	50/31,
	M16	17	43,3	11	14,5	20	43,3	14	17,5	30 - 200	52/34,
	M20	21	43,3	12	15,5	20	43,3	15	18,5	30 - 200	53/34

**Table A6: Strength grade**

Strength grade	50	70
$f_{uk}$ [N/mm <sup>2</sup> ]	500	700
$f_{yk}$ [N/mm <sup>2</sup> ]	210	450

1) Product not available.

## Modersohn® Anchor Channel MBA

**Product description**  
**Dimensions, strength grade of channel bolts**

**Annex A5**



## 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:

- Compacted reinforced or unreinforced concrete without fibres according to EN 206:2013 + A1:2016
- Strength classes C12/15 to C90/105 according to EN 206:2013 + A1:2016
- Cracked or uncracked concrete

### Use conditions (Environmental conditions):

- According to EN 1993-1-4:2006 + A1:2015 relating to corrosion resistance class (CRC) of all parts of the Modersohn® anchor channel according to Annex A2
- In case of using the material of the channel profile in CRC III, the anchors of the channel may be used in CRC II.

### 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 into 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 reinforcements or to supports, etc.).
- For static and quasi-static loading the anchor channels are designed in accordance with EOTA TR 047 "Design of Anchor Channels", March 2018 or EN 1992-4:2018.

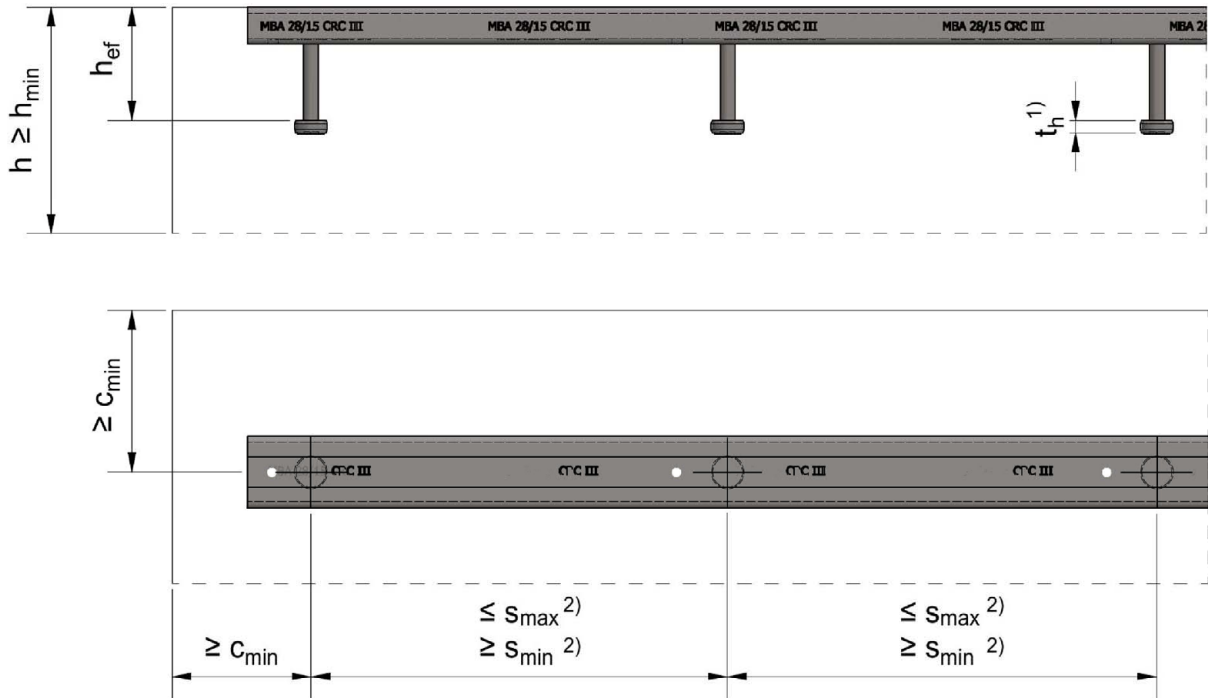
### Installation:

- 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 manipulations, repositioning or exchanging of channel components.
- Cutting of anchor channels is allowed only if pieces according to Annex A4, Table A3 are generated including end spacing and minimum channel length and if cutting is done professionally and contamination of cutting edges with corroding material is avoided.
- Installation in accordance with the installation instruction given in Annexes B4, 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 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 to the threaded bolt may be chosen based on Annex A2 and Annex A5 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 have to be applied by a calibrated torque wrench and must not be exceeded.

## Modersohn® Anchor Channel MBA

### Intended Use Specification and installation

## Annex B1



**Table B1: Effective embedment depth, minimum edge distance and member thickness**

Anchor channel		28/15	38/17	40/25	50/31	52/34	53/34	
[mm]	Effective embedment depth	$h_{ef}$	45	72	80	99	151	151
	Min. edge distance	$c_{min}$	40	50	50	75	100	100
	Minimum thickness of concrete member	$h_{min}$	75	100	110	130	185	185

1)  $t_h$  = anchor head thickness according to Annex A3, Table A2

2)  $s_{min}$ ,  $s_{max}$  according to Annex A4, Table A3

**Modersohn® Anchor Channel MBA**

**Intended use  
Installation parameters of Modersohn® anchor channel**

**Annex B2**



**Table B2: Minimum spacing and installation torque of Modersohn® channel bolt**

Anchor channel	Channel bolt d	Min. spacing $s_{min,cbo}$ of the channel bolt	Installation torque <sup>1)</sup>			
			$T_{inst,g}$		$T_{inst,s}$	
			General <sup>2)</sup>		Steel to steel contact <sup>3)</sup>	
			50 <sup>4)</sup>	70 <sup>4)</sup>	50 <sup>4)</sup>	70 <sup>4)</sup>
	[mm]	[mm]	[Nm]			
28/15	10	50	- <sup>5)</sup>	13 (10) <sup>6)</sup>	- <sup>5)</sup>	40
38/17	10	50	- <sup>5)</sup>	15	- <sup>5)</sup>	40
	12	60	- <sup>5)</sup>	25 (20) <sup>6)</sup>	- <sup>5)</sup>	50
	16	80	- <sup>5)</sup>	30 (27) <sup>6)</sup>	- <sup>5)</sup>	110
40/25	10	50	15	- <sup>5)</sup>	15	- <sup>5)</sup>
	12	60	25 (20) <sup>6)</sup>	25 (20) <sup>6)</sup>	25	50
	16	80	30	30	65	110
50/31	12	60	25	25	25	50
	16	80	60	60	65	110
	20	100	75	75	130	210
52/34 53/34	12	60	25	25	25	50
	16	80	60	60	65	110
	20	100	75	75	130	210

1)  $T_{inst,g}$  and  $T_{inst,s}$  must not be exceeded

2) According to Annex B7, Figure 1

3) According to Annex B7, Figure 2

4) Strength class

5) Product not available

6) Values in brackets for applications in concrete of strength classes C12/15 and C16/20

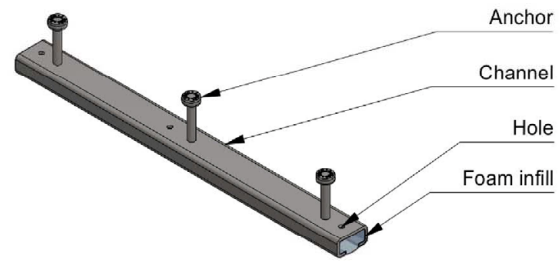
**Modersohn® Anchor Channel MBA**

**Intended use  
Installation parameters of Modersohn® channel bolt**

**Annex B3**

## Instructions for fixing the Modersohn® anchor channel

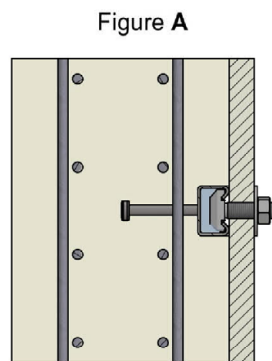
Modersohn® anchor channels are filled with foam and have pre-punched holes in the back. The foam has to be cut flush to the edge of the channel. The channels should be installed according to the reinforcement plans and even with the concrete surface. To avoid displacing them, the anchor channels have to be fixed to the formwork while pouring the concrete.



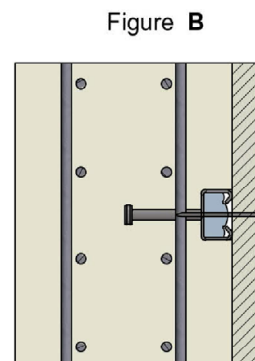
### Fixing the anchor channel to formwork

#### Steel formwork:

Fixing the anchor channel to the steel formwork with Modersohn® channel bolts and nuts.



Fixing the anchor channel to the formwork with rivets through the pre-punched holes in the back of the channel.

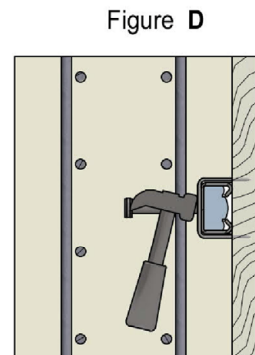


#### Timber formwork:

Fixing the anchor channel to the timber formwork with nails through the pre-punched holes in the back of the channel. Stainless steel channels and channels in external use are to be fixed with stainless steel nails.

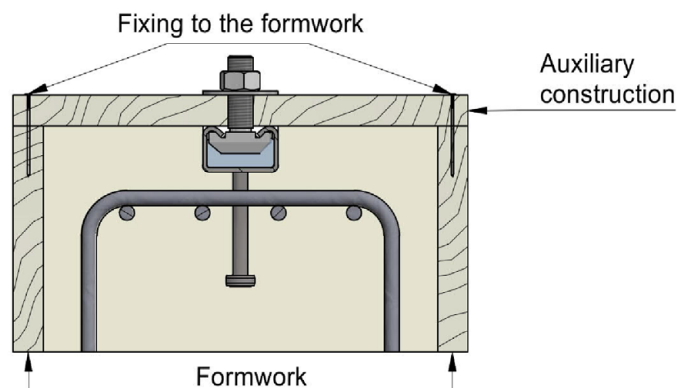


Fixing the anchor channel to the timber formwork with staples.



### Fixing the anchor channel at the top

If the anchor channel is installed on the top of the component, it has to be fixed to an auxiliary construction, e.g. with a Modersohn® channel bolt. This auxiliary construction prevents the displacing or slipping of the anchor channel while compacting the concrete.



**Modersohn® Anchor Channel MBA**

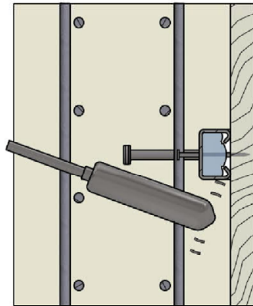
**Intended use**  
**Installation instructions for anchor channel - part 1**

**Annex B4**

## Regular compacting of concrete

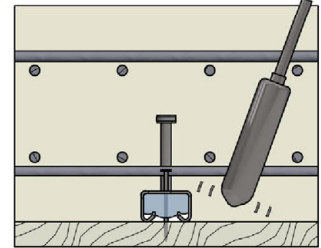
Figure E

If anchor channels are installed at the side of the component, the concrete below the anchor channel has to be thoroughly compacted. Improper compaction of the concrete can lead to air entrapments and thereby to reduced load capacity.



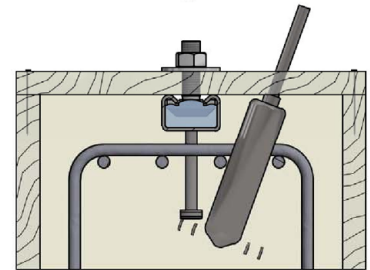
When installing an anchor channel at the bottom side of a member, the concrete needs to be compacted thoroughly to ensure a sufficient bonding.

Figure F



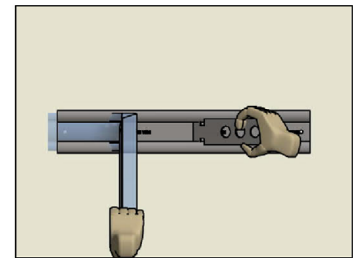
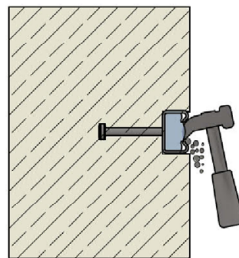
Anchor channels installed at the top of the component have to be fixed to an auxiliary construction to prevent displacing or slipping. A suitable vibrator has to be used to compact the concrete. If you press the anchor channel into the concrete, you have to compact the concrete with a vibrator!

Figure G



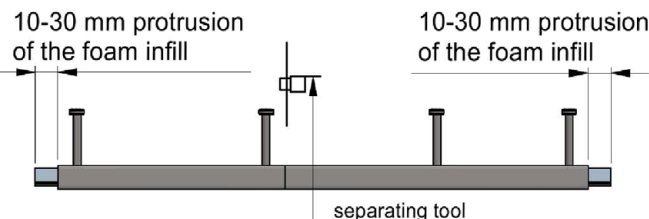
## How to remove the channel filling

After dismantling the formwork, remove the fixing material and the remaining concrete. Next remove the foam infill with a suitable tool, e.g. a screwdriver.



## Cutting to size long anchor channels

Modersohn® anchor channels will be delivered prefabricated. The channels can be cut to size at the construction site. Then please follow these instructions:



1. Every piece of channel at least has to have two anchors.
2. The channel has to be cut to size according to Annex A4 Table A3.
3. The protrusion of the foam infill with 10-30 mm (delivery condition) has to be cut flush to the edge of the Modersohn® anchor channel before installing.

**Modersohn® Anchor Channel MBA**

**Intended use**  
**Installation instructions for anchor channel - part 2**

**Annex B5**

### Fastening the Modersohn® channel bolt to the anchor channel

Figure 1

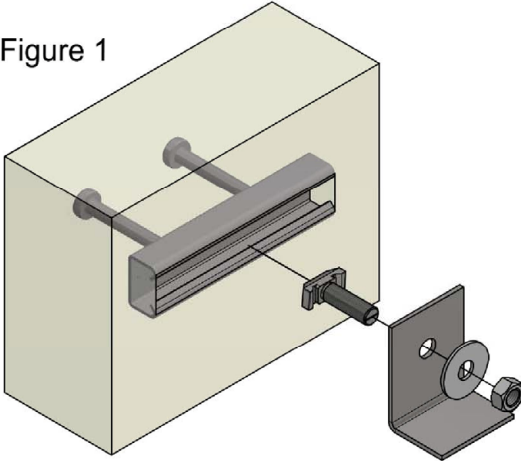


Figure 2

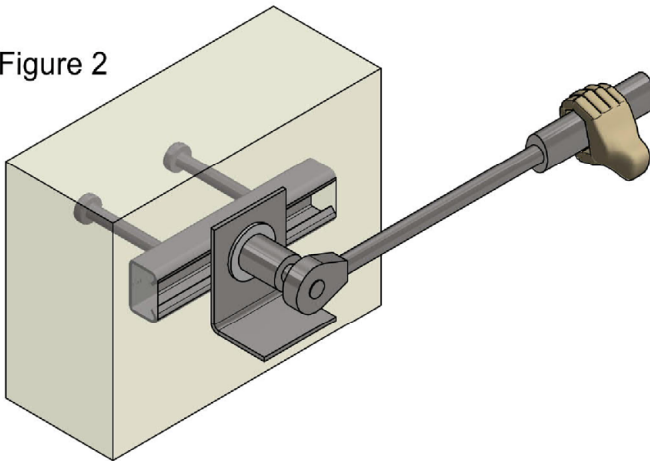
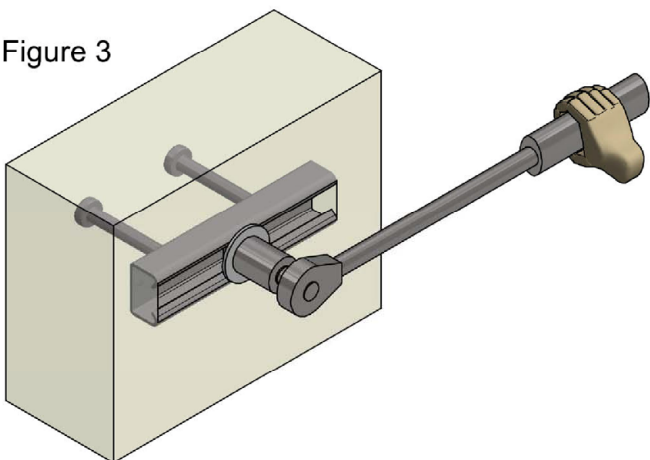


Figure 3



#### a) Installation torque (General)

1. Insert the Modersohn® channel bolt into the horizontal slot of the channel (Figure 1).
2. Turn the channel bolt 90° in clockwise direction, to lock the head of the bolt into position (Figure 1).
3. Minimum distance to the edge of the channel is to be set according to Annex A4, Table A3.
4. Place the washer under the nut (Figure 1).
5. Check the correct installation of the Modersohn® channel bolt.  
The groove at the bottom of the threaded bolt of the screw has to be set crosswise to the longitudinal axis.
6. Tighten the nut with the installation torque mentioned in Annex B3 Table B2 by using a calibrated torque wrench.  
The installation torque must not be exceeded.

#### b) Installation torque (Steel to steel contact)

1. Place a washer between the channel and the attachment to create a defined contact.
2. Tighten the nut with the installation torque mentioned in Annex B3, Table B2 by using a calibrated torque wrench.  
The installation torque must not be exceeded.

**Modersohn® Anchor Channel MBA**

**Intended use**  
**Installation instructions for anchor channel - part 3**

**Annex B6**

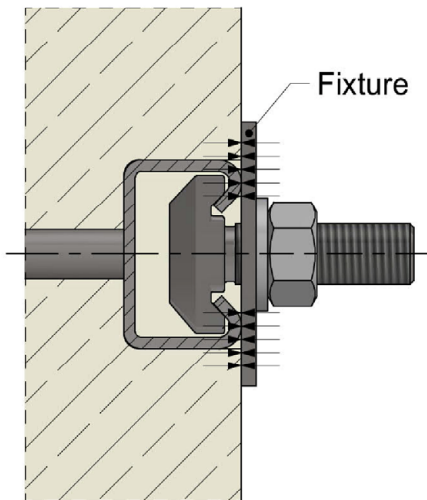


### General

The fixture is in contact with the channel profile and the concrete surface.

The installation torques according to Annex B3, Table B2 shall be applied and must not be exceeded.

Figure 1

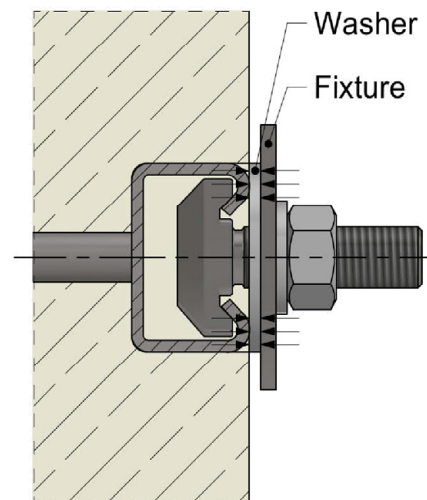


### Steel to steel contact

The fixture is not in contact with the concrete surface. The fixture is fastened to the anchor channel by suitable steel part (e.g. washer).

The installation torques according to Annex B3 Table B2 shall be applied and must not be exceeded.

Figure 2



**Modersohn® Anchor Channel MBA**

**Intended use  
Position of fixture**

**Annex B7**

**Table C1: Characteristic resistances under tension load  
steel failure of Modersohn® anchor channel**

Anchor channel	28/15	38/17	40/25	50/31	52/34, 53/34
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**Steel failure: Anchor**

Characteristic resistance	$N_{Rk,s,a}$	[kN]	15,3	27,1	27,1	42,4	71,7
Partial factor	$\gamma_{Ms}^{1)}$		1,85				

**Steel failure: Connection between anchor and channel**

Characteristic resistance	$N_{Rk,s,c}$	[kN]	18	28	20	32	76
Partial factor	$\gamma_{Ms,ca}^{1)}$		1,8				

**Steel failure: Local flexure of channel lips**

Characteristic spacing of channel bolts for $N_{Rk,s,l}$	$s_{l,N}$	[mm]	56	76	80	100	106
Characteristic resistance	$N_{Rk,s,l}^0$	[kN]	18	28	20	32	76
Partial factor	$\gamma_{Ms,l}^{1)}$		1,8				

**Steel failure: Flexure of channel**

Characteristic resistance of channel	$M_{Rk,s,flex}$	[Nm]	432	836	1262	2528	3297
Partial factor	$\gamma_{Ms,flex}^{1)}$		1,15				

1) In absence of other national regulations.

**Modersohn® Anchor Channel MBA**

**Characteristic resistances under tension load  
Steel failure of anchor channel**

**Annex C1**

**Table C2: Characteristic resistances under tension load  
concrete failure**

Anchor channel			28/15	38/17	40/25	50/31	52/34, 53/34
<b>Concrete failure: Pullout</b>							
Characteristic resistance in cracked concrete C12/15	$N_{Rk,p}$	[kN]	9,4	13,6	13,6	18,4	32,2
Characteristic resistance in uncracked concrete C12/15			13,2	19,0	19,0	25,8	45,1
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			
$\geq C60/75$	5,00						
Partial factor	$\gamma_{Mp} = \gamma_{Mc}^{1)}$		1,5				

**Concrete failure: Concrete cone**

Factor for cracked concrete	$k_{cr,N}$	7,2	7,8	7,9	8,1	8,7
Factor for uncracked concrete	$k_{ucr,N}$	10,3	11,1	11,3	11,6	12,4
Partial factor	$\gamma_{Mc}^{1)}$	1,5				

**Concrete failure: Splitting**

Characteristic edge distance	$C_{cr,sp}$	[mm]	3 · hef			
Characteristic spacing	$S_{cr,sp}$		6 · hef			
Partial factor	$\gamma_{Msp}^{1)}$		1,5			

1) In absence of other national regulations.

**Table C3: Displacements under tension load**

Anchor channel			28/15	38/17	40/25	50/31	52/34, 53/34
Tension load	N	[kN]	4,2	7,6	9,9	18,7	29,2
Short-term displacement	$\delta_{N0}$	[mm]	0,4	0,4	0,5	0,5	0,6
Long-term displacement	$\delta_{N\infty}$	[mm]	1,6	1,6	1,6	1,6	1,6

**Modersohn® Anchor Channel MBA**

**Characteristic resistances under tension load  
Concrete failure and displacements**

**Annex C2**

**Table C4: Characteristic resistances under shear load  
steel failure of Modersohn® anchor channel and concrete failure**

Anchor channel	28/15	38/17	40/25	50/31	52/34, 53/34
----------------	-------	-------	-------	-------	-----------------

**Steel failure: Anchor**

Characteristic resistance	$V_{RK,s,a,y}$	[kN]	18	30	31	59	74
Partial factor	$\gamma_{Ms,a}^{1)}$		1,54				

**Steel failure: Connection between anchor and channel**

Characteristic resistance	$V_{RK,s,c,y}$	[kN]	18	30	31	59	74
Partial factor	$\gamma_{Ms,ca}^{1)}$		1,8				

**Steel failure: Local flexure of channel lips**

Characteristic resistance	$V_{RK,s,l,y}^0$	[kN]	18	30	31	59	74
Partial factor	$\gamma_{Ms,l}^{1)}$		1,8				
Characteristic spacing of channel bolts for $V_{RK,s,l}$	$s_{l,v}$	[mm]	56	76	80	100	106

**Concrete failure: Pry-out**

Factor k	$k_8^{2)}$	1,0	2,0				
Partial factor	$\gamma_{Mc}^{1)}$		1,5				

**Concrete failure: Concrete edge**

Factor for cracked concrete	$k_{cr,v}$	3,1	7,3	6,5	5,6	6,4	
Factor for uncracked concrete	$k_{ucr,v}$	4,3	10,2	9,1	7,8	9,0	
Partial factor	$\gamma_{Mc}^{1)}$		1,5				

1) In absence of other national regulations.

2) Without reinforcement.

In case of supplementary reinforcement the factor  $k_8$  should be multiplied with 0,75.

**Modersohn® Anchor Channel MBA**

**Characteristic resistances under shear load  
Steel failure of anchor channel and concrete failure**

**Annex C3**



**Table C5: Displacements under shear load**

Anchor channel			28/15	38/17	40/25	50/31	52/34, 53/34
Shear load	V	[kN]	2,7	7,8	7,6	9,4	16,2
Short-term displacement	$\delta_{V,y,0}$	[mm]	0,4	0,6	0,6	0,8	0,9
Long-term displacement	$\delta_{V,y,\infty}$	[mm]	0,6	0,9	0,9	1,2	1,4

**Table C6: Characteristic resistances under combined tension and shear load**

Anchor channel			28/15	38/17	40/25	50/31	52/34, 53/34
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**Steel failure: Local flexure of channel lips**

Factor	$k_{13}$	values are taken from EN 1992-4:2018
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**Steel failure: Anchor and connection between anchor and channel**

Factor	$k_{14}$	values are taken from EN 1992-4:2018
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**Modersohn® Anchor Channel MBA**

**Displacements under shear load  
Characteristic resistances under  
combined tension and shear loads**

**Annex C4**

**Table C7: Characteristic resistances under tension load  
steel failure of Modersohn® channel bolt**

Channel bolt				28/15	38/17	40/25	50/30	
<b>Steel failure: Channel bolt</b>								
Characteristic resistance under tension	$N_{Rk,s}$	[kN]	M10	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	25,4	- <sup>3)</sup>
				70 <sup>1)</sup>	30,9	40,6	- <sup>3)</sup>	- <sup>3)</sup>
			M12	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	41,9	42,2
				70 <sup>1)</sup>	- <sup>3)</sup>	45,7	59,0	59,0
			M16	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	55,7	68,3
				70 <sup>1)</sup>	- <sup>3)</sup>	101,7	94,4	109,9
M20	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	88,9			
	70 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	145,2			
Partial factor	$\gamma_{Ms}$ <sup>2)</sup>			50 <sup>1)</sup>	2,86			
				70 <sup>1)</sup>	1,87			

**Table C8: Characteristic resistances under shear load  
steel failure of Modersohn® channel bolt**

Channel bolt				28/15	38/17	40/25	50/30	
<b>Steel failure: Channel bolt</b>								
Characteristic resistance under shear	$V_{Rk,s}$	[kN]	M10	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	17,4	- <sup>3)</sup>
				70 <sup>1)</sup>	24,4	24,4	- <sup>3)</sup>	- <sup>3)</sup>
			M12	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	25,3	25,3
				70 <sup>1)</sup>	- <sup>3)</sup>	35,4	35,4	35,4
			M16	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	47,1	47,1
				70 <sup>1)</sup>	- <sup>3)</sup>	65,9	65,9	65,9
M20	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	73,5			
	70 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	102,9			
Characteristic flexural resistance	$M_{Rk,s}^0$	[Nm]	M10	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	37,4	- <sup>3)</sup>
				70 <sup>1)</sup>	52,3	52,3	- <sup>3)</sup>	- <sup>3)</sup>
			M12	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	65,5	65,5
				70 <sup>1)</sup>	- <sup>3)</sup>	91,6	91,6	91,6
			M16	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	166,5	166,5
				70 <sup>1)</sup>	- <sup>3)</sup>	232,3	232,3	232,3
M20	50 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	324,5			
	70 <sup>1)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	453,8			
Partial factor	$\gamma_{Ms}$ <sup>2)</sup>			50 <sup>1)</sup>	2,38			
				70 <sup>1)</sup>	1,56			

1) Strength class

3) No performance assessed.

2) In absence of other national regulations.

**Modersohn® Anchor Channel MBA**

**Characteristic resistances under tension and shear load  
Steel failure of channel bolt**

**Annex C5**