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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-20/0943 of 2021/02/16

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	atc 2815, atc 3817, atc 4025, atc 4930, atc 4022, atc 4022P, atc 5030, atc 5030P, atc 5234
Product family to which the above construction product belongs:	Anchor channels
Manufacturer:	ancotech GmbH Spezialbewehrungen – Edelstahlteile Am Westhover Berg 30 DE-51149 Köln Telephone: +49 2203 599280 www.ancotech.de
Manufacturing plant:	ancotech GmbH Spezialbewehrungen – Edelstahlteile Am Westhover Berg 30 DE-51149 Köln Telephone: +49 2203 599280 www.ancotech.de
This European Technical Assessment contains:	25 pages including 17 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	European Assessment Document (EAD) 330008-03-0601: "Anchor Channels" version February 2019
Note:	This ETA is a corrigenda prepared on 2021-06-17

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The ancotech atc anchor channels are made of hot-dipped galvanized steel and stainless steel A4.

A fixture is connected to the anchor channel by locking channel bolts (M8, M10, M12, M16 and M20, each in materials 4.6, 8.8, A4-50 and A4-70) on the channel bolt head (hammer- or hook head bolt) with appropriate hexagon nuts and washers.

The product description and further elaboration of the intended use is given in Annex A and B1.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The anchor channel is intended to be used in cracked and uncracked concrete. The anchor channel is embedded surface-flush in the concrete and shall be secured at their position during installation such that no movement of the channel will occur during the time of laying the reinforcement and placing and compacting the concrete.

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 A and B1.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor channels of 50 years, provided the manufacturers conditions for the packaging, transport, storage, installation, use, maintenance, and repair are met.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body 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

Characteristic | **Assessment of characteristic**

3.1 Mechanical resistance and stability (BWR1)

Characteristic resistance under static and quasi-static tension loading

Resistance to steel failure of anchors
$N_{Rk,s,a}$ [kN]

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel	16,7	29,7	29,7	46,3	29,7	46,3	46,3	66,7	66,7
Hot-dip galvanized	12,2	21,6	24,6	38,5	21,6	33,8	38,5	55,4	55,4

Resistance to steel failure of the connection between anchors and channel
$N_{Rk,s,c}$ [kN]

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel	12,3	32,6	29,4	33,7	31,0	43,6	49,2	47,2	72,5
Hot-dip galvanized	10,0	20,4	15,1	26,7	22,2	33,5	33,4	32,2	40,0

Resistance to steel failure of channel lips and subsequently pull-out of channel bolt
$N^0_{Rk,s,l}$ [kN]
$s_{l,N}$ [mm]

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel $N^0_{Rk,s,l}$	12,3	32,6	29,4	33,7	31,0	43,6	49,2	47,2	72,5
$s_{l,N}$	56	76	80	80	80	98	100	100	104
Hot-dip galvanized $N^0_{Rk,s,l}$	10,0	20,4	15,1	26,7	22,2	33,5	33,4	32,2	40,0
$s_{l,N}$	56	76	80	80	80	98	100	100	104

Resistance to steel failure of channel bolt
$N_{Rk,s}$ [kN]

See Annex C2

Resistance to steel failure by exceeding the bending strength of the channel
$M_{Rk,s,flex}$ [Nm]

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel	324	593	1580	1580	1071	1708	3184	3184	3373
Hot-dip galvanized	317	580	1406	1406	1099	1673	2830	2830	3373

Maximum installation torque moment to avoid damage during installation
$T_{inst,g}$ [Nm]
$T_{inst,s}$ [Nm]

$T_{inst,g}$	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
M6	3								
M8	8								
M10	13	15	15	15	15	15	15	15	15
M12	15	25	25	25	25	25	25	25	25
M16		40	45	45	45	60	60	60	60
M20						75	75	75	120

$T_{inst,s}$	4.6	A4-50	A4-70	8.8
M6	3	8		
M8	8	8	15	20
M10	15	15	30	40
M12	25	25	50	70
M16	65	60	130	180
M20	130	120	250	360

Characteristic	**Assessment of characteristic**
Resistance to pull-out failure of the anchor $N_{Rk,p}$ [kN]	See Annex C3
Resistance to concrete cone failure $k_{cr,N}$ [$N^{0,5}/mm^{0,5}$] $k_{ucr,N}$ [$N^{0,5}/mm^{0,5}$] h_{ef}[mm]	
Minimum edge distances, spacing and member thickness to avoid concrete splitting during installation [s_{min}; c_{min}; h_{min}]	S_{min} see annex A6 c_{min} & h_{min} see annex B2
Characteristic edge distance and spacing to avoid splitting of concrete under load $s_{cr,sp}$[mm] $c_{cr,sp}$[mm]	
Resistance to blowout failure - bearing area of anchor head A_h [mm²]	

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
h_{ef}	48	78,5	83,5	90,5	86,5	97	97	106	158
$k_{cr,N}$	7,30	7,86	7,93	8,03	7,97	8,11	8,11	8,22	8,73
$k_{ucr,N}$	10,42	11,21	11,32	11,46	11,38	11,58	11,58	11,73	12,45

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
$s_{cr,sp}$	96	157	167	181	173	194	194	212	316
$c_{cr,sp}$	144	235,5	250,5	271,5	259,5	291	291	318	474

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
A_h	84,8	150,8	150,8	150,8	235,6	150,8	235,6	339,3	339,3

Characteristic resistance under static and quasi-static shear loading	
Resistance to steel failure of anchor bolt under shear loading without lever arm [$V_{Rk,s}$]	See Annex C5
Resistance to steel failure by bending of the channel bolt under shear load with lever arm [$M^0_{Rk,s}$]	See Annex C5
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) $V^{\vartheta}_{Rk,s,l,y}$[kN]	
Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis) $V_{Rk,s,l,x}$	No performance assessed
Factor for sensitivity to installation γ_{inst}	No performance assessed
Resistance to steel failure of the anchor $V_{Rk,s,a,x}$ [kN]	

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel	20,8	29,0	58,5	44,0	50,3	79,0	92,2	65,5	76,8
Hot-dip galvanized	16,0	27,1	46,2	40,5	43,1	50,9	73,8	78,7	90,5

	atc 2815	atc 3817	atc 4022	atc 4022 P	atc 4025	atc 4930	atc 5030	atc 5030 P	atc 5234
Stainless steel	10,0	17,8	17,8	17,8	27,8	17,8	27,8	40,0	40,0
Hot-dip galvanized	7,3	13,0	14,8	14,8	20,3	13,0	23,1	33,3	33,3

<table>
<tr><th>Characteristic</th><th>Assessment of characteristic</th></tr>
<tr><td>Resistance to steel failure of connection between anchor and channel
$V_{Rk,s,c,x}$ [kN]</td><td>
<table>
<tr><th></th><th>atc 2815</th><th>atc 3817</th><th>atc 4022</th><th>atc 4022 P</th><th>atc 4025</th><th>atc 4930</th><th>atc 5030</th><th>atc 503 0P</th><th>atc 5234</th></tr>
<tr><td>Stainless steel</td><td>7,3</td><td>19,5</td><td>17,6</td><td>20,2</td><td>18,6</td><td>26,1</td><td>29,5</td><td>28,3</td><td>43,5</td></tr>
<tr><td>Hot-dip galvanized</td><td>6,0</td><td>12,2</td><td>9,0</td><td>16,0</td><td>13,3</td><td>20,1</td><td>20,0</td><td>19,3</td><td>24,0</td></tr>
</table>
</td></tr>
<tr><td>Resistance to concrete pry-out failure
k_8</td><td>
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<tr><th></th><th>atc 2815</th><th>atc 3817</th><th>atc 4022</th><th>atc 4022 P</th><th>atc 4025</th><th>atc 4930</th><th>atc 5030</th><th>atc 5030 P</th><th>atc 5234</th></tr>
<tr><td>k_s</td><td>1,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td></tr>
</table>
</td></tr>
<tr><td>Resistance to concrete edge failure
[$k_{cr,V}$; $k_{ucr,V}$]</td><td>The factors $k_{cr,V}$ = 4,5 and $k_{ucr,V}$ = 6,3 are accepted.</td></tr>
<tr><td colspan="2">Characteristic resistance under combined static and quasi-static tension and shear loading</td></tr>
<tr><td>Resistance to steel failure of the anchor channel
[k_{13}; k_{14}]</td><td>k13 = k14 = 1,0</td></tr>
<tr><td colspan="2">Characteristic resistance under fatigue tension loading</td></tr>
<tr><td>Fatigue resistance to steel failure of the whole system (continuous or tri-linear function)
[$\Delta N_{Rk,s,0,n}$ (n = 1 to $n = \infty$)]</td><td>No performance assessed</td></tr>
<tr><td>Fatigue limit resistance to steel failure of the whole system
[$\Delta N_{Rk,s,0,\infty}$]</td><td>No performance assessed</td></tr>
<tr><td>Fatigue resistance to concrete related failure (exponential function)
[$\Delta N_{Rk,c,0,n}$; $\Delta N_{Rk,p,0,n}$; (n = 1 to $n = \infty$)]</td><td>No performance assessed</td></tr>
<tr><td>Fatigue limit resistance to concrete related failure
[$\Delta N_{Rk,c,0,\infty}$; $\Delta N_{Rk,p,0,\infty}$]</td><td>No performance assessed</td></tr>
<tr><td>Displacements
[δ_{N0}, $\delta_{N\infty}$, $\delta_{V,y,0}$, $\delta_{V,y,\infty}$, $\delta_{V,x,0}$, $\delta_{V,x,\infty}$]</td><td>No performance assessed</td></tr>
<tr><td>Durability</td><td>No performance assessed</td></tr>
<tr><td>3.2 Safety in case of fire (BWR2)</td><td></td></tr>
<tr><td>Reaction to fire</td><td>The anchor channels are made from steel classified as class A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364.</td></tr>
<tr><td>Resistance to fire
$N_{Rk,s,fi}$
$V_{Rk,s,fi}$</td><td>No performance assessed</td></tr>
</table>

3.3 Methods of verification

The product is fully covered by EAD 330008-03-0601, February 2019. According to the Regulation (EU) No 305/2011.

3.4 General aspects related to the fitness for use of the product

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

The ancotech atc anchor channels are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

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

4.1 AVCP system

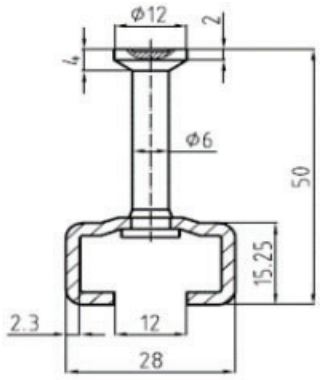
According to the decision 2000/273/EC of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance is system 1 (see Annex V to Regulation (EU) No 305/2011).

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

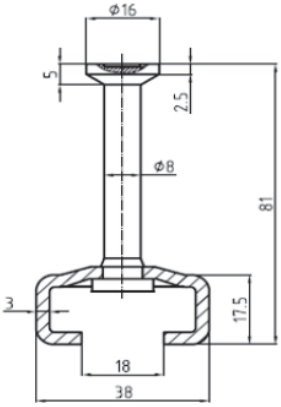
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2021-02-16 by

Thomas Bruun
Managing Director, ETA-Danmark



atc2815



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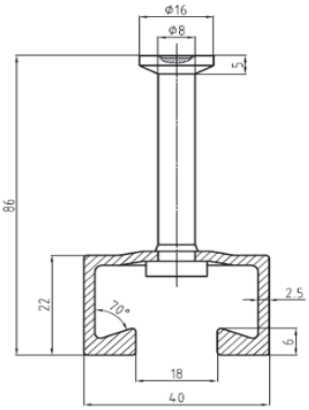
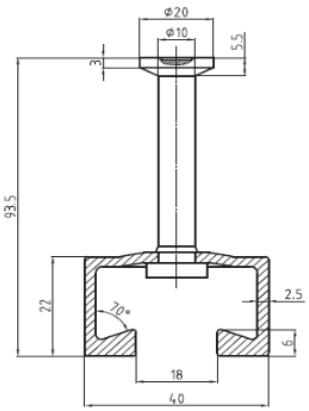
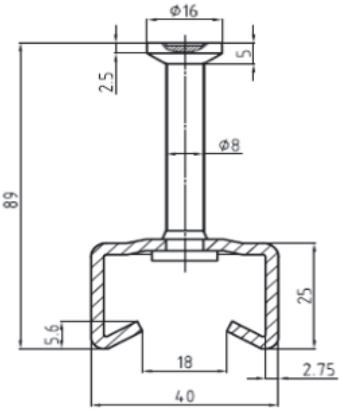


atc4022



atc4022P



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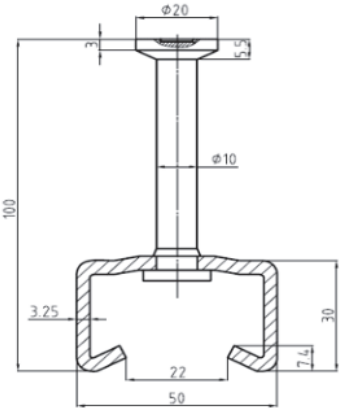

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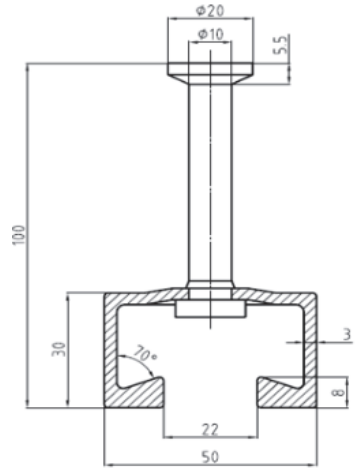
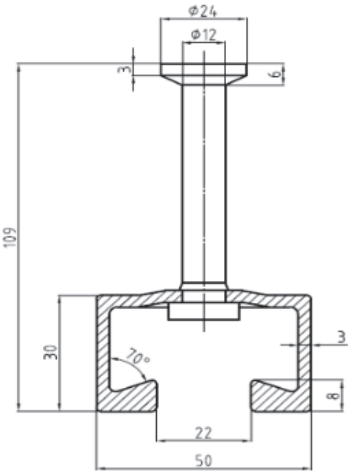


atc5030



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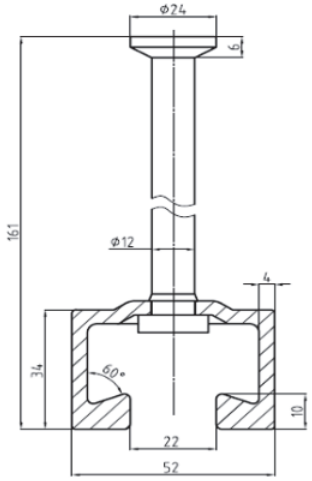
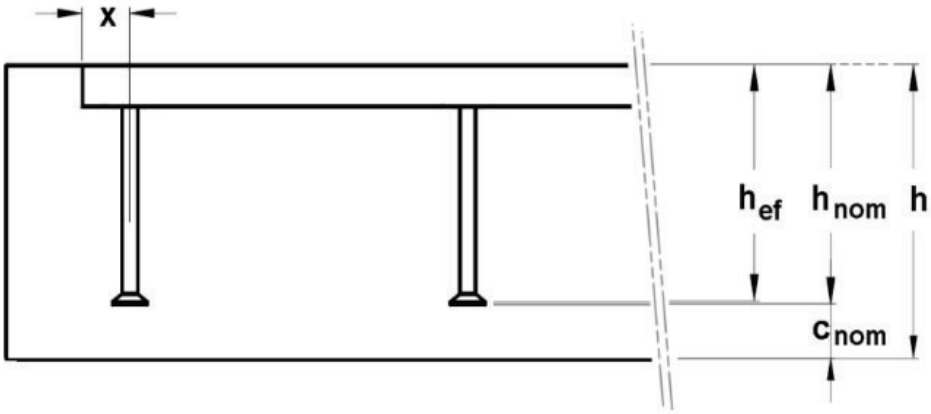


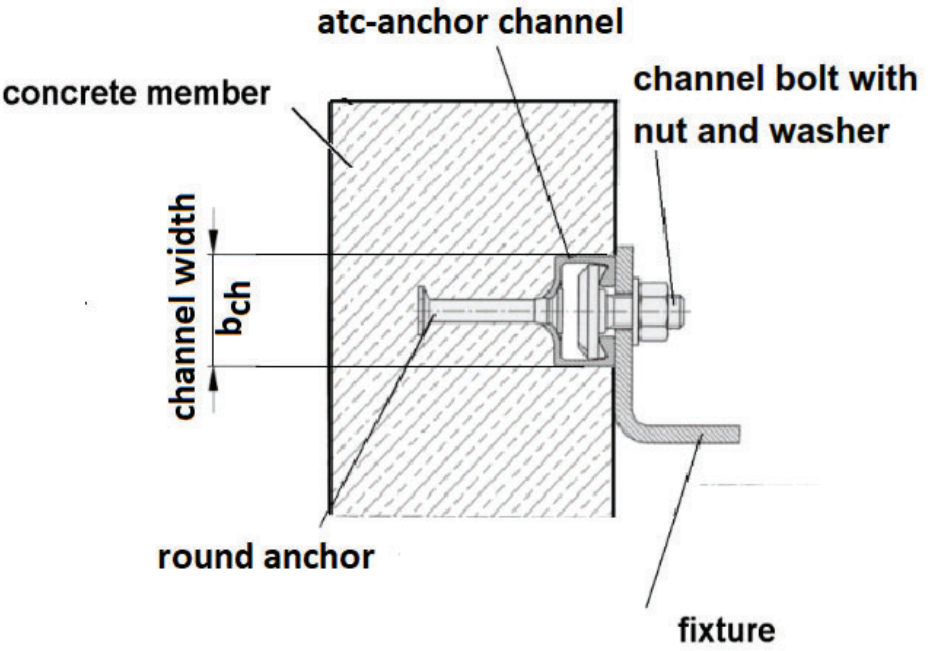
atc5234

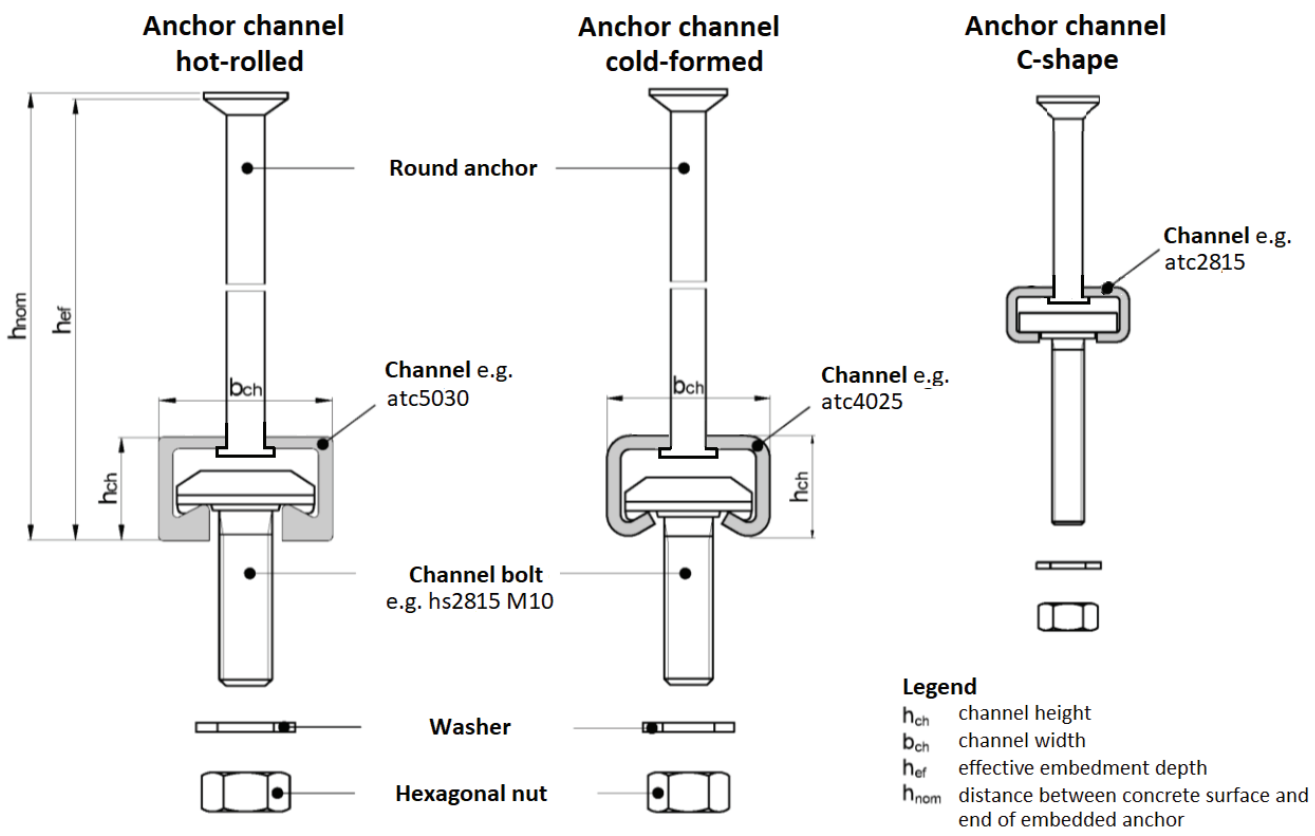
ancotech GmbH – atc-anchor channel

Product Description
Anchor channels covered by this ETA

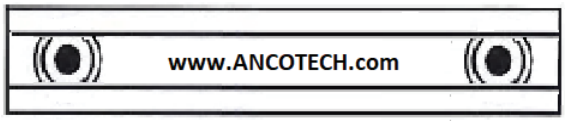
Annex A1


x
h_{ef}
h_{nom}
h
c_{nom}


atc-anchor channel
concrete member
channel bolt with
nut and washer
channel width
b_{ch}
round anchor
fixture



Marking of atc-anchor channels at channel back



Material:

Steel:
Channel: 1.0036 / 1.0507
Anchor: 1.7027

Stainless steel:
Channel: 1.4401 / 1.4404
Anchor: 1.4401 / 1.4404

Marking of atc-channel bolts at channel bolt head

Strength classes of channel bolts:

Steel: 4.6, 8.8

Stainless steel: A4-50, A4-70

ancotech GmbH – atc-anchor channel	
Product Description Marking and Materials	Annex A3

Table 1: Materials and intended use

1	2	3	4	5	6
Item No	**Specification**	**Intended use**			
		Dry internal conditions	**Internal conditions with usual humidity**	**Medium corrosion exposure**	**High corrosion exposure**
		Structures subject to dry internal conditions (e.g. accommodations, bureaus, schools, hospitals, shops, exceptional internal conditions with usual humidity acc. column 4)	Structures subject to internal conditions with usual humidity (e.g. kitchen, bath and laundry in residential buildings, exceptional permanently damp conditions and application under water)	Structures subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions, if no particular aggressive conditions (e.g. permanent, alternating immersion in seawater etc. acc. column 6) exist.	Structures subject to exposure in particular aggressive conditions (e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools) or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)
		Materials			
1	**Channel Profile**	Steel 1.0036/ 1.0507 EN 10025:2004 hot-dip galv.≥ 50 µm[3)] Stainless steel 1.4301 EN 10088:2005	Steel 1.0036/ 1.0507 EN 10025:2004 hot-dip galv. ≥ 50 µm[3)]	Stainless steel 1.4401/1.4404 EN 10088:2014	Stainless steel 1.4401/1.4404 EN 10088:2014
2	**Anchor**	Steel 1.7027 EN 10263:2017 hot-dip galv.≥ 50 µm[2)] Stainless steel 1.4301 EN 10088:2014	Steel 1.7027 EN 10263:2017 hot-dip galv. ≥ 50 µm[2)]	Stainless steel 1.4401/1.4404 EN 10088:2014	
3	**Channel bolt thread and shaft EN ISO 4018:2011**	Steel, strength grade 8.8 EN ISO 898-1:2013 electroplated ≥ 5 µm[1)]	Steel, strength grade 8.8 EN ISO 898-1:2013 hot-dip galv. ≥ 50 µm[2)]	Stainless steel 1.4401/1.4404 EN ISO 3506-1:2009	Stainless steel 1.4401/1.4404 EN ISO 3506-1:2009
4	**Washer, EN ISO 7089:2000, EN ISO 7093-1:2000 production class A, 200HV**	Steel EN 10025:2004 electroplated ≥ 5 µm[1)]	Steel EN 10025:2004 hot-dip galv. ≥ 50 µm[2)]	Stainless steel 1.4401/1.4404 EN 10088:2014	Stainless steel 1.4401/1.4404 EN 10088:2014
5	**Hexagonal nuts EN ISO 4032:2012**	Steel, strength grade 8 EN ISO 898-2:2012 electroplated ≥ 5 µm[1)]	Steel, strength grade 8 EN ISO 898-2:2012 hot-dip galv. ≥ 50 µm[2)]	Stainless steel 1.4401/ 1.4404 EN ISO 3506-2:2009	Stainless steel 1.4401/1.4404 EN ISO 3506-2:2009

1) Electroplated acc. EN ISO 4042:2018
2) Hot-dip galvanized on the basis of EN ISO 1461:2009, but coating thickness ≥ 50 µm

ancotech GmbH – atc-anchor channel

Product Description
Materials and intended use

Annex A4

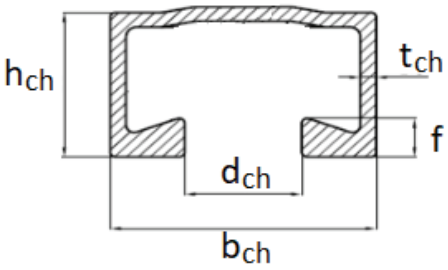


Table 2: Geometrical profile properties

Anchor channel	Dimensions					
	b_{ch}	h_{ch}	t_{ch}	d_{ch}	f	I_y
	[mm]					[mm^4]
atc2815	28	15.25	2.3	12	2.3	4060
atc3817	38	17.5	3	18	3	8547
atc4022	40	22	2.5	18	6	20029
atc4022P	40	22	2.5	18	6	20029
atc4025	40	25	2.75	18	5.6	20570
atc4930	50	30	3.25	22	7.4	39683
atc5030	50	30	3	22	8	41827
atc5030P	50	30	3	22	8	41827
atc5234	52	34	4	22	10	72079

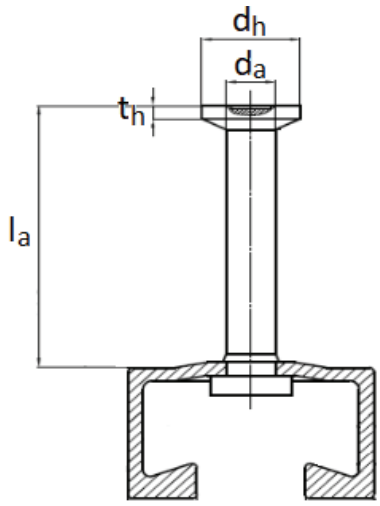


Table 3: Types of round anchors

Anchor channel	Dimensions				
	d_a	d_h	t_h	l_a	A_h
	[mm]				
atc2815	6	12	2	50	84.8
atc3817	8	16	2.5	81	150.8
atc4022	8	16	2.5	86	150.8
atc4022P	10	20	3	93.5	235.6
atc4025	8	16	2.5	89	150.8
atc4930	10	20	3	100	235.6
atc5030	10	20	3	100	235.6
atc5030P	12	24	3	109	339.3
atc5234	12	24	3	161	339.3

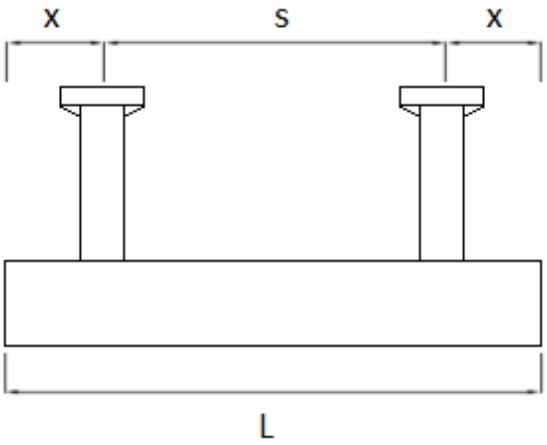


Table 4: Anchor Positioning

Anchor channel	Anchor spacing		End spacing	Min. channel length
	s_{min}	s_{max}	x	min l
	[mm]			
atc2815	50	200	25	100
atc3817	50	200	25	100
atc4022	100	250	25	150
atc4022P				
atc4025				
atc4930				
atc5030				
atc5030P	100	250	35	150
atc5234				

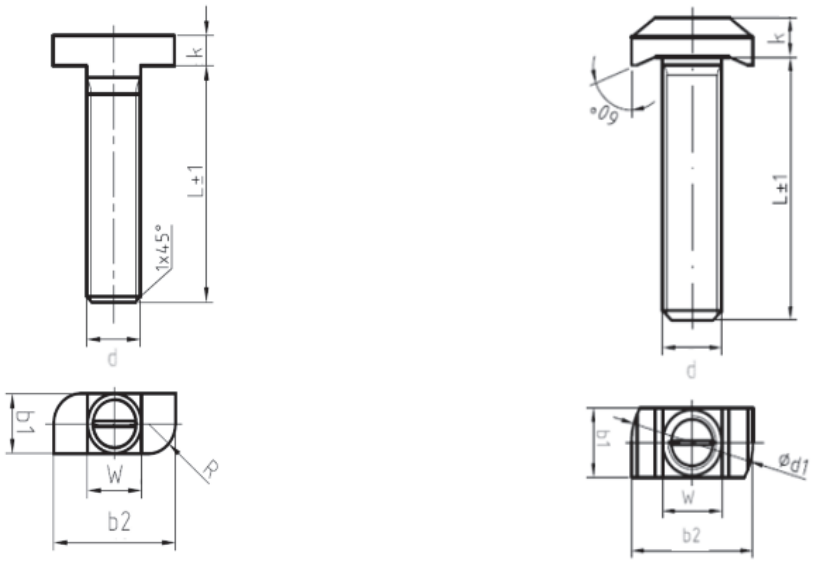


Table 5: Dimension of the channel bolts

Channel bolt			hs2815				hs3817			hs4022			hs5030			
Anchor channel			M6	M8	M10	M12	M10	M12	M16	M10	M12	M16	M10	M12	M16	M20
Ø		[mm]	6	8	10	12	10	12	16	10	12	16	10	12	16	20
b1		[mm]	10.1	10.1	10.1	10.8	13	13	16.4	14	14	17.2	13	13	17	21
b2		[mm]	22.7	22.7	22.7	22.7	30.7	30.7	30.7	32.5	32.5	32.5	41	41	41	41
k		[mm]	4	4	5.7	5.7	6	7.2	7.2	7	7	8.7	10	10	11	12.3
Length l		[mm]	15 - 60	20 - 150	15 - 200	20 - 200	20 - 175	20 - 200	20 - 200	20 - 150	20 - 250	30 - 300	25 - 50	30 - 200	30 - 300	35 - 300
4.6	f_{uk}	[N/mm²]	400													
	f_{yk}	[N/mm²]	240													
8.8	f_{uk}	[N/mm²]	800													
	f_{yk}	[N/mm²]	640													
A4-50	f_{uk}	[N/mm²]	500													
	f_{yk}	[N/mm²]	210													
A4-70	f_{uk}	[N/mm²]	700													
	f_{yk}	[N/mm²]	450													

Specifications of intended use

Anchor channel and channel bolts subject to:

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

Substrate:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000
- Strength classes C20/25 to C90/105 according to EN 206-1:2000
- Cracked or uncracked concrete

Use conditions (Environmental conditions):

- Structures subject to environmental conditions acc. Annex A3

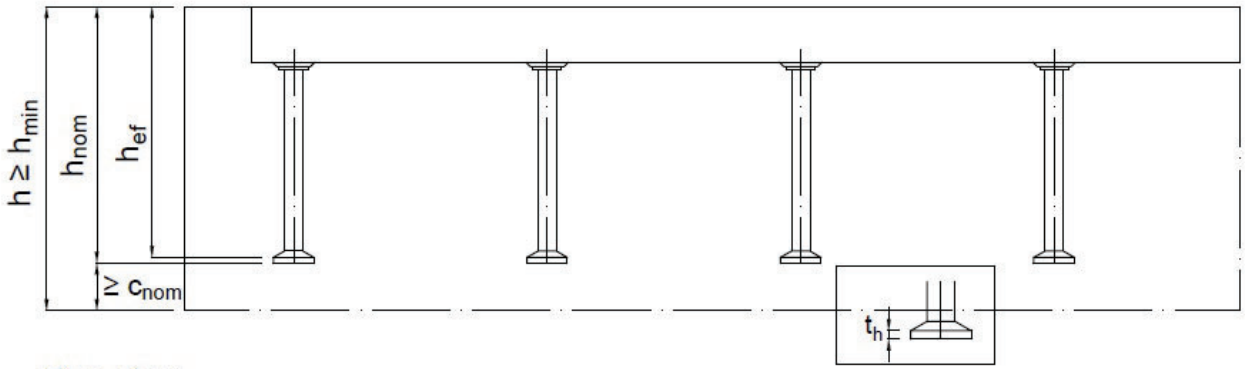
Design:

- Anchor channel 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 the supports)
- For static and quasi-static loading as well as fire exposure the anchor channels are designed in accordance with EOTA TR 047 "Calculation Method for the performance of Anchor Channels", March 2018 or EN 1992-4:2018.
- For fatigue loading the anchor channels are designed in accordance with EOTA TR 050 "Calculation Method for the Performance of Anchor channels under Fatigue Loading", November 2015.
- 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 the channel components.
- Cutting of anchor channels is allowed only if pieces according Annex A5, Table 4 are generated including end spacing and minimum channel length and only to be used in dry internal conditions.
- Installation in accordance with the manufacturer's specifications given in Annex B4.
- The anchor channels are fixed on the formwork or reinforcement 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 are 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 bolts rectangular to the channel axis.
- The setting torques given in Annex B3 shall be applied and shall not be exceeded.

Side view



Plan view

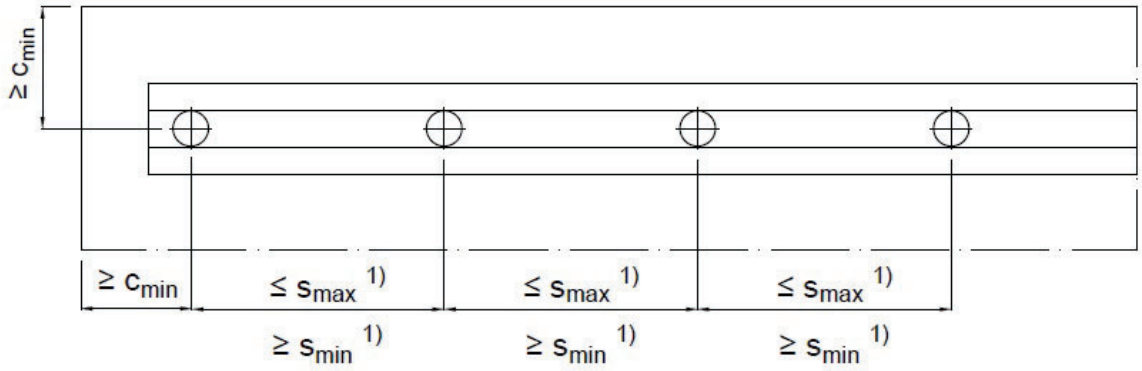


Table 6: Minimum effective embedment depth, edge distance and member thickness of the anchor channel

Anchor Channel			atc 2815	atc 3817	atc 4022	atc 4022P	atc 4025	atc 4930	atc 5030	atc 5030P	atc 5234
Min. effective embedment depth	min h_{ef}	[mm]	48	78.5	83.5	90.5	86.5	97	97	106	158
Min edge distance	c_{min}		40	50	50	50	50	75	75	75	100
Min. member thickness	h_{min} 2)		80	111	116	123.5	120	130	130	139	191

1) s_{min}, s_{max} acc. to Table 4, Annex A5
2) $h_{min} \geq l_a + h_{ch} + c_{nom}$; c_{nom} acc. to EN 1992-1-1:2004 + AC 2010

ancotech GmbH – atc-anchor channel	
Intended use Installation parameters of anchor channels	Annex B2

Table 7: Minimum spacing and installation torque of Channel bolts – General[1]

Channel bolt Ø [mm]	Installation torque $T_{Inst,g}$[2]								
	atc 2815	atc 3817	atc 4022	atc 4022P	atc 4025	atc 4930	atc 5030	atc 5030P	atc 5234
6	3								
8	8								
10	13	15	15	15	15	15	15	15	15
12	15	25	25	25	25	25	25	25	25
16		40	45	45	45	60	60	60	60
20						75	75	75	120

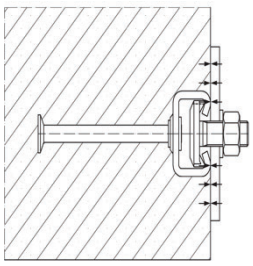
1) Acc. to Annex B3, Fig 1
2) $T_{inst,g}$ shall not be exceeded

Table 8: Minimum spacing and installation torque of Channel bolts – Steel-Steel-Contact[1]

Channel bolt Ø	Installation torque $T_{Inst,s}$[2]			
	4.6	A4-50	A4-70	8.8
[mm]	[Nm]			
6	3	8		
8	8	8	15	20
10	15	15	30	40
12	25	25	50	70
16	65	60	130	180
20	130	120	250	360

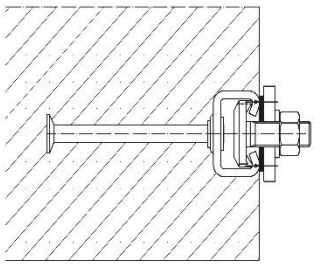
1) Acc. to Annex B3, Fig 2
2) $T_{inst,s}$ shall not be exceeded

Fig. 1



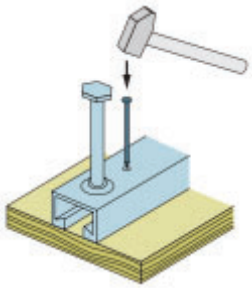
General:
The fixture is in contact with the channel profile and the concrete surface.
The installation torques acc. Annex B5, Table 8 shall be applied and shall not be exceeded.

Fig. 2



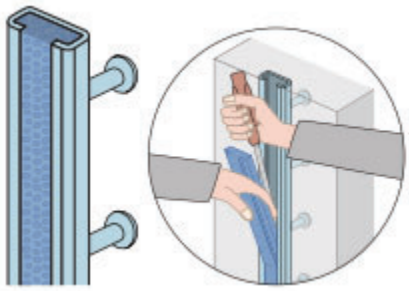
Steel – Steel Contact:
The fixture is fastened to the anchor channel by suitable steel part (e.g. washer). Fixture is in contact with the channel profile only.
The installation torques Annex B5, Table 9 shall be applied and shall not be exceeded.

1. Fixing anchor channel



The ATC-anchor channel is fixed with nails attached to the wooden formwork. For fixing the ATC-anchor channels on a steel formwork, the Hammer-head channel bolts with a nut can be used.

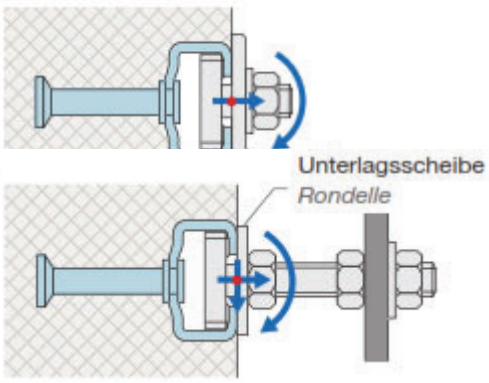
2. Removing of the channel infill



To prevent concrete from penetrating the ATC anchor channels, all profiles are supplied with a foam filling.

The filling can be easily removed with a suitable tool after concreting.

3. Fastening the channel bolt to the ATC-anchor channel



a) Setting torques (General)

The hammer-head channel bolt is inserted into the rail and turned 90°. The channel bolt head must rest on both lips of the anchor channel. The screw is then

b) Installation torques (Steel-Steel Contact)

When installing at a distance, a washer must always be installed to absorb the tensile and transverse forces.

Table 9: Characteristic resistances under tension load – Steel failure channel

Anchor Channel		Steel failure anchor		Connection anchor/channel		Local flexure of channel lips [2]		
		$N_{Rk,s,a}$ (kN)	γ_{Ms} [1]	$N_{Rk,s,c}$ (kN)	$\gamma_{Ms,c}$ [1]	$s_{l,N}$ (mm)	$N^0_{Rk,s,l}$ (kN)	$\gamma_{Ms,l}$ [1]
Steel	atc2815	12.2	1.80	10.0	1.80	56	10.0	1.80
	atc3817	21.6		20.4		76	20.4	
	atc4022	24.6		15.1		80	15.1	
	atc4022P	38.5		26.7		80	26.7	
	atc4025	21.6		22.2		80	22.2	
	atc4930	33.8		33.5		98	33.5	
	atc5030	38.5		33.4		100	33.4	
	atc5030P	55.4		32.2		100	32.2	
	atc5234	55.4		40.0		104	40.0	
Stainless Steel	atc2815	16.7		12.3		56	12.3	
	atc3817	29.7		32.6		76	32.6	
	atc4022	29.7		29.4		80	29.4	
	atc4022P	46.3		33.7		80	33.7	
	atc4025	29.7		31.0		80	31.0	
	atc4930	46.3		43.6		98	43.6	
	atc5030	46.3		49.2		100	49.2	
	atc5030P	66.7		47.2		100	47.2	
	atc5234	66.7		72.5		104	72.5	

1) In absence of other regulations

Table 10: Characteristic flexure resistance of channel under tension load

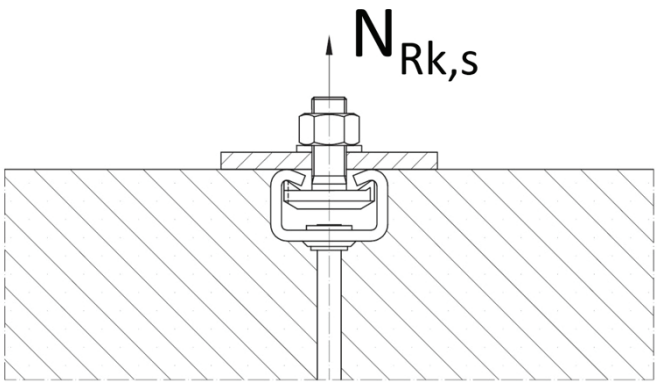
Anchor Channel				Stainless Steel	Steel
Characteristic flexure resistance of the channel	$M_{Rk,s,flex}$	[Nm]	atc2815	324	317
			atc3817	593	580
			atc4022	1580	1406
			atc4022P	1580	1406
			atc4025	1071	1099
			atc4930	1708	1673
			atc5030	3184	2830
			atc5030P	3184	2830
			atc5234	3373	3373
Partial safety factor	$\gamma_{Ms,flex}$ [1]			1.15	

1) In absence of other regulations

Table 11: Characteristic resistance under tension load – Steel failure channel bolts

Anchor Channel				4.6	A4-50	A4-70	8.8
Characteristic resistance	$N_{Rk,s}$ [kN]	hs2815	M6	8.0	10.0	14.0	16.0
			M8	14.6	18.3	25.6	29.2
			M10	16.2	29.0	40.6	46.4
			M12	18.1	35.7	49.9	51.2
		hs3817	M10	23.2	29.0	40.6	46.4
			M12	33.7	42.1	59.0	67.4
			M16	45.9	101.5	101.9	68.8
		hs4022	M10	23.2	29.0	40.6	46.4
			M12	33.7	42.1	59.0	67.4
			M16	43.1	99.6	89.2	80.6
		hs5030	M10	23.2	29.0	40.6	46.4
			M12	33.7	42.1	59.0	67.4
			M16	62.8	78.5	109.9	125.6
			M20	75.8	137.3	150.0	132.7
Partial safety factor	γ_{Ms} 1)		[-]	2.00	2.86	1.87	1.50

1) In absence of other regulations



Channel under tension load

Table 12: Characteristic resistances under tension load – Concrete failure under tension load

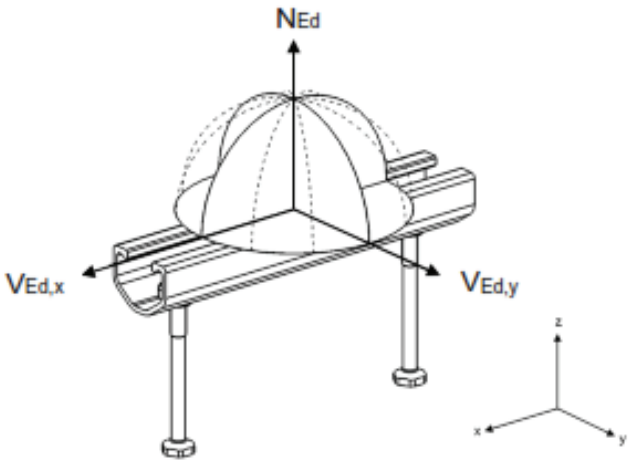
Anchor channel			atc 2815	atc 3817	atc 4022	atc 4022P	atc 4025	atc 4930	atc 5030	atc 5030P	atc 5234
Pull out failure											
Charac. resistance in cracked concrete C20/25		$N_{Rk,p}$ [kN]	12.7	22.6	22.6	22.6	35.3	22.6	35.3	50.9	50.9
Charac. resistance in uncracked concrete C20/25			17.8	31.7	31.7	31.7	49.5	31.7	49.5	71.3	71.3
Increasing factor of $N_{Rk,p}$	C25/30	Ψ_c [-]	1.25								
	C30/37		1.50								
	C35/45		1.75								
	C40/50		2.00								
	C45/55		2.25								
	C50/60		2.50								
	C55/67		2.75								
	≥ C60/75		3.00								
Partial safety factor		$\gamma_{Mp} = \gamma_{Mc}$ 1)	1.50								
Concrete cone failure											
Product factor	Cracked concrete	$k_{cr,N}$	4.5								
	Uncracked concrete	$k_{ucr,N}$	6.3								
Partial safety factor		γ_{Mc} 1)	1.50								
Concrete splitting failure											
Characteristic edge distance		$c_{cr,sp}$ [mm]	144	235.5	250.5	271.5	259.5	291	291	318	474
Characteristic spacing		$s_{cr,sp}$ [mm]	96	157	167	181	173	194	194	212	316
Partial safety factor		$\gamma_{Msp} = \gamma_{Mc}$ 1)	1.50								

1) In absence of other national regulations

Table 13: Characteristic resistances under shear load

Anchor Channel		Steel failure anchor		Connection anchor/channel		Local flexure of channel lips		
		$V_{Rk,s,a,x}$ (kN)	γ_{Ms} 1)	$V_{Rk,s,c}$ (kN)	$\gamma_{Ms,c}$ 1)	$s_{l,V}$ (mm)	$V^0_{Rk,s,l,y}$ (kN)	$\gamma_{Ms,l}$ 1)
Steel	atc2815	7.3	1.50	6.0	1.80	56	16.0	1.80
	atc3817	13.0		12.2		76	27.1	
	atc4022	14.8		9.0		80	46.2	
	atc4022P	14.8		16.0		80	40.5	
	atc4025	20.3		13.3		80	43.1	
	atc4930	13.0		20.1		98	50.9	
	atc5030	23.1		20.0		100	73.8	
	atc5030P	33.3		19.3		100	78.7	
	atc5234	33.3		24.0		104	90.5	
Stainless Steel	atc2815	10.0		7.3		56	20.8	
	atc3817	17.8		19.5		76	29.0	
	atc4022	17.8		17.6		80	58.5	
	atc4022P	17.8		20.2		80	44.0	
	atc4025	27.8		18.6		80	50.3	
	atc4930	17.8		26.1		98	79.0	
	atc5030	27.8		29.5		100	92.2	
	atc5030P	40.0		28.3		100	65.5	
	atc5234	40.0		43.5		104	76.8	

1) In absence of other regulations



Tension load:
z-direction (in direction of anchor)

Shear load:
y-direction (perpendicular to longitudinal axis of channel)

Shear load:
x-direction (in longitudinal channel axis)

Table 15: Characteristic resistances under shear load – Steel failure channel bolts

Anchor Channel				4.6	A4-50	A4-70	8.8
Characteristic resistance	$V_{Rk,s}$ [kN]	hs2815	M6	4.8	6.0	8.4	8.0
			M8	8.8	11.0	15.4	14.6
			M10	13.9	17.4	24.4	23.2
			M12	20.2	25.3	35.4	33.7
		hs3817	M10	13.9	17.4	24.4	23.2
			M12	20.2	25.3	35.4	33.7
			M16	37.7	47.1	65.9	62.8
		hs4022	M10	13.9	17.4	24.4	23.2
			M12	20.2	25.3	35.4	33.7
			M16	37.7	47.1	65.9	62.8
		hs5030	M10	13.9	17.4	24.4	23.2
			M12	20.2	25.3	35.4	33.7
			M16	37.7	47.1	65.9	62.8
			M20	58.8	73.5	102.9	98.0
Partial safety factor	γ_{Ms} 1)		[-]	1.67	2.38	1.56	1.25

1) In absence of other national regulations

Table 16: Characteristic resistances under shear load – Steel failure channel bolts

Anchor Channel			4.6	A4-50	A4-70	8.8
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	M6	6.5	8.1	11.4	13.0
		M8	14.9	18.7	26.2	29.9
		M10	29.9	37.3	52.3	59.8
		M12	52.4	65.5	91.6	98.0
		M16	133.2	166.5	233.1	266.4
		M20	259.6	324.5	454.3	519.2
Partial safety factor	γ_{Ms} 1)	[-]	1.67	2.38	1.56	1.25

1) In absence of other national regulations
2) The characteristic flexure acc. to Table 15.2 is limited as follows:

$M^0_{Rk,s} \leq 0{,}5 \cdot N^0_{Rk,s,l} \cdot a$
$M^0_{Rk,s} \leq 0{,}5 \cdot N_{Rk,s} \cdot a$
$N^0_{Rk,s,l}$ acc. to Annex C1, Table 9
$N_{Rk,s}$ acc. to Annex C2, Table 11
a acc. to Annex C6, Table 17

Table 17: Internal lever arm between tension and compression force

Internal lever arm of channel bolts	hs2815				hs3817			hs4022			hs5030			
	M6	M8	M10	M12	M10	M12	M16	M10	M12	M16	M10	M12	M16	M20
a [mm]	15.6	16.9	18.2	19.6	22.9	24.2	26.2	23.5	24.8	26.8	27.7	29.0	31.0	33.3

Table 18: Characteristic resistances under combined tension and shear load

atc-anchor channels		
k13	Steel	1,0
k14		1,0
k13	Stainless Steel	1,0
k14		1,0

1) k_{13} can be taken as 2,0 if $V_{Rd,s,l}$ limited to $N_{Rd,s,l}$
2) k_{14} can be taken as 2,0 if max ($V_{Rd,s,a}$; $V_{Rd,s,c}$) are limited to min ($N_{Rd,s,a}$; $N_{Rd,s,c}$)