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NEXCAST™ CAST-IN ANCHOR CHANNEL

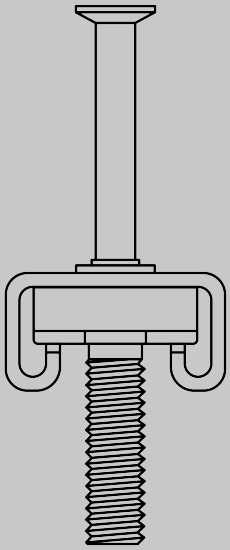
GALVANISED / 316 (A4) STAINLESS STEEL

CERTIFICATION | TDS

HDG 316

ETA-20/0698
9 October 2020

- HDG & Stainless Steel
- Cracked Concrete Certified
- 3D Loading Certified



Cold rolled
Toothed

ACT-G, ACT-S (HMPR-Z)

NCC Compliant AS 5216

This ETA document meets anchor testing and reporting requirements of AS 5216, essential for compliance with the NCC.

NCC COMPLIANT

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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-20/0698 of 2020/10/09

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:	HAZ HMPR-Z 41/22 anchor channel and HZS 41/22 channel bolts
Product family to which the above construction product belongs:	Anchor channels
Manufacturer:	HAZ Metal Deutschland GmbH Alfred-Zippe-Strasse 1 DE-97877 Wertheim Telephone: +49 9342 93590 www.haz.eu
Manufacturing plant:	HAZ Metal AS, Şehit Er Ali Çıracı Caddesi, No: 10, Akçay Sanayi Bölgesi TR-31200 İskenderun/Hatay
This European Technical Assessment contains:	21 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"
This version replaces:	-

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
The HAZ METAL anchor channels/channel bolt "HMPR-Z 41/22 and HZS" consists of a channel profile with two lips produced of carbon steel (HDG) or stainless steel (A4) and at least two metal anchors. The anchor channel, have serrated channel lips in combination with locking channel bolts with matching serration on the channel bolt head

A fixture is connected to the anchor channel by locking channel bolts with serrations on the channel bolt head (hammer head, M16 and M12, two materials each) with appropriate hexagon nuts and washers.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

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 B.

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 for tension under static and quasi-static loading	See Annex C1 to C3
Characteristic resistance for shear under static and quasi-static loading	See Annex C4 to C5
Characteristic resistance under combined static and quasi-static tension and shear loading	See Annex C6
Characteristic resistance under fatigue tension loading	No performance assessed
Displacements (static and quasi-static loading)	No performance assessed
Durability	See annex A3
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The anchor channels are made from steel classified as class A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364.
2.2.11 Resistance to fire	No performance assessed

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 HAZ Metal, anchor channels/channel bolt "HMPR-Z 41/22 and HZS" 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)

4.1 AVCP system

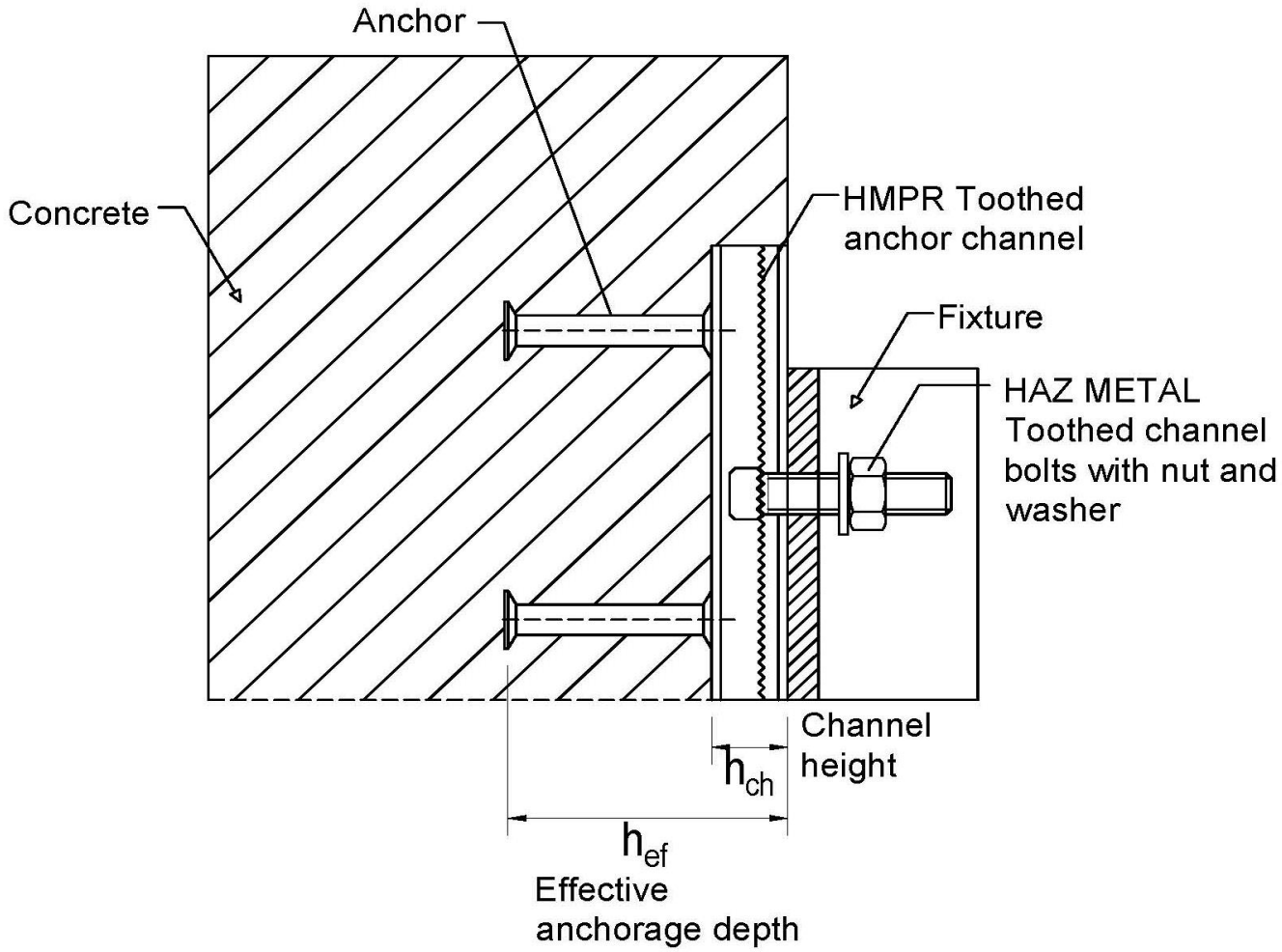
According to the decision 2000/273/EC of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance is system 1 (see Annex V to Regulation (EU) No 305/2011).

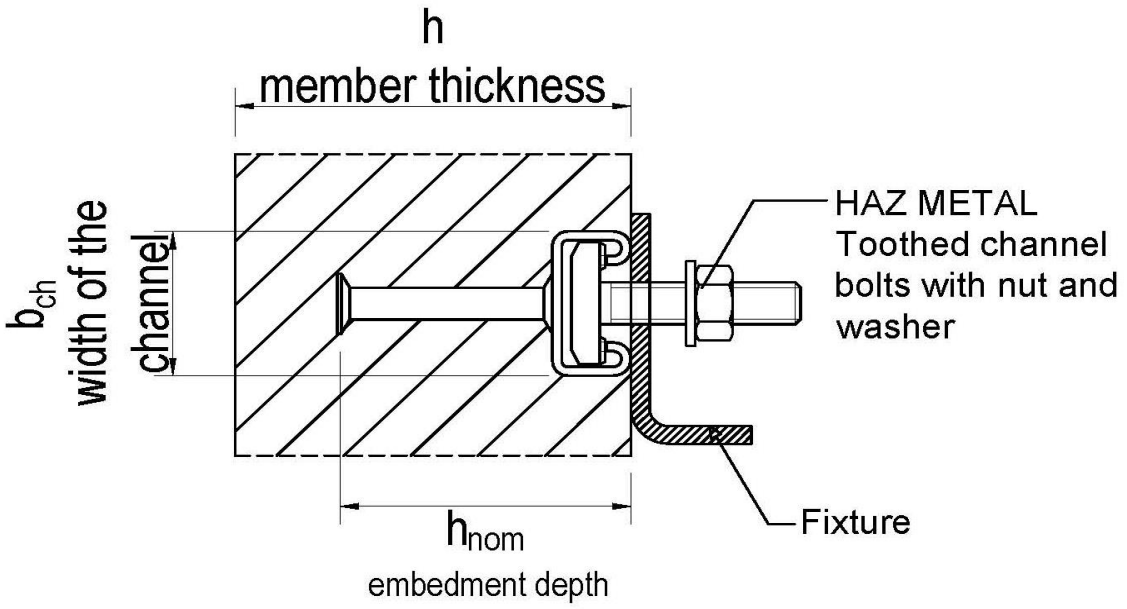
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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

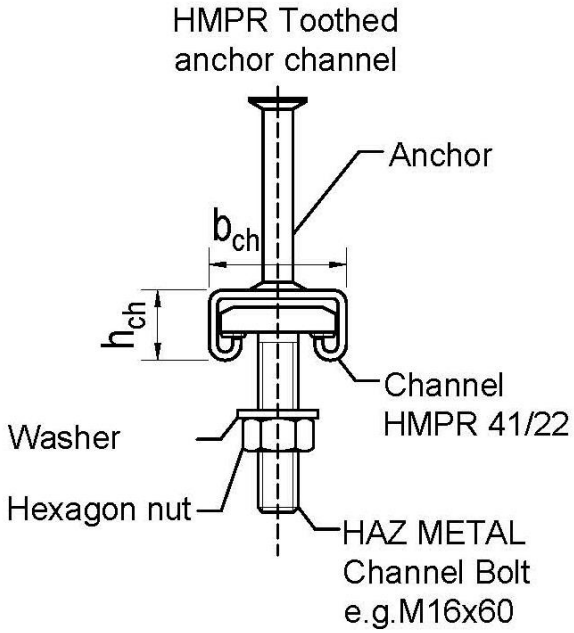
Issued in Copenhagen on 2020-10-09 by

Thomas Bruun
Managing Director, ETA-Danmark



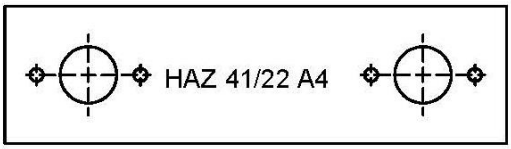


HAZ METAL – Anchor Channel HMPR	**Annex A1**
Product Description Installed condition	

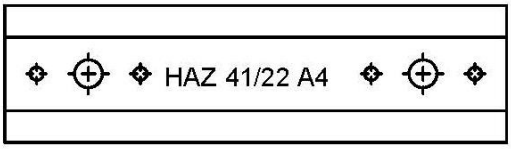


Legend
h_{ch} Channel height
b_{ch} Channel width
h_{ef} Effective embedment depth
n_{hom} Embedment depth

Marking of the HAZ - Anchor channel:
e.g. HAZ 41/22 - A4
HAZ = Identifying mark of the manufacturer
41/22 = Size
A4 = Material

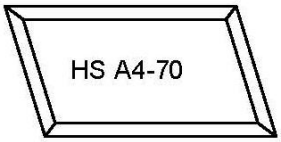


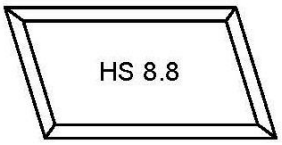
Marked on the back of the channel
or



Marked inside of the channel

Marking of the HAZ - Channel bolt:
e.g. HS - A4
HS = Identifying mark of the manufacturer
A4-70 = Material / Strength grade





Material / Strenght grade channel bolts:
8.8 = Strength grade 8.8
A4-70 = Stainless steel (1.4401 / 1.4404 / 1.4571) Grade - 70
L4-70 = Stainless steel (1.4362) Grade - 70
HC-70= Stainless steel (1.4529 / 1.4547) Grade - 70
F4-70 = Stainless steel (1.4462) Grade - 70

HAZ METAL – Anchor Channel HMPR	**Annex A2**
Product Description Marking and Materials	

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 1.0038/ 1.0044 EN 10025:2004 hot-dip galv.≥ 50 µm [3] Stainless steel 1.4301 EN 10088:2005	Steel 1.0038/ 1.0044 EN 10025:2004 hot-dip galv. ≥ 50 µm [3]	Stainless steel 1.4401/1.4404/ 1.4571/ 1.4362 EN 10088:2014	Stainless steel 1.4462 1)/ 1.4529/ 1.4547 EN 10088:2014
2	**Anchor**	Steel 1.0038/ 1.0214/ 1.0401, 1.1132/ 1.5525 EN 10263:2017 hot-dip galv.≥ 50 µm [3] Stainless steel 1.4301 EN 10088:2014	Steel 1.0038/ 1.0214/ 1.0401/ 1.1132/ 1.5525 EN 10263:2017 hot-dip galv. ≥ 50 µm [3]	Stainless steel 1.4401/ 1.4404/ 1.4571/ 1.4578/ 1.4362 EN 10088:2014	
3	**HAZ METAL Channel bolt thread and shaft EN ISO 4018:2011**	Steel, strength grade 8.8 EN ISO 898-1:2013 electroplated ≥ 5 µm [2]	Steel, strength grade 8.8 EN ISO 898-1:2013 hot-dip galv. ≥ 50 µm [3]	Stainless steel 1.4401/ 1.4404/ 1.4571/ 1.4362 EN ISO 3506-1:2009	Stainless steel 1.4462 [1]/ 1.4529/ 1.4547 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 [2]	Steel EN 10025:2004 hot-dip galv. ≥ 50 µm [3]	Stainless steel 1.4401/ 1.4404/ 1.4571 EN 10088:2014	Stainless steel 1.4462 [1]/ 1.4529/ 1.4547 EN 10088:2014
5	**Hexagonal nuts EN ISO 4032:2012**	Steel, strength grade 8 EN ISO 898-2:2012 electroplated ≥ 5 µm [2]	Steel, strength grade 8 EN ISO 898-2:2012 hot-dip galv. ≥ 50 µm [3]	Stainless steel 1.4401/ 1.4404/ 1.4571 EN ISO 3506-2:2009	Stainless steel 1.4462 [1]/ 1.4529/ 1.4547 EN ISO 3506-2:2009

1) 1.4462 not applicable for indoor swimming pools
2) Electroplated acc. EN ISO 4042:2018
3) Hot-dip galvanized on the basis of EN ISO 1461:2009, but coating thickness ≥ 50 µm

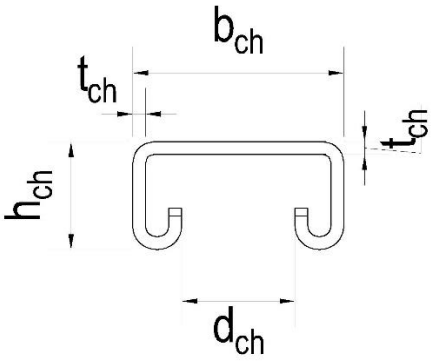


Table 2: Geometrical profile properties

Anchor channel	Material	Dimensions					
		b_{ch}	h_{ch}	t_{ch}	d_{ch}	f	I_y
		[mm]					[mm^4]
41/22	Steel	41.00	22.00	2.50	21.00	7.00	1,16
41/22	Stainless Steel	41.00	22.00	2.50	21.00	7.00	1,16

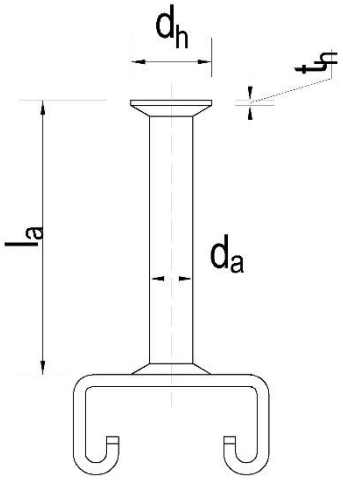


Table 3: Types of round anchors

Anchor channel	Material	Dimensions				
		d_a	d_h	t_h	l_a	A_h
		[mm]				
41/22	Steel	8.00	16.00	1.80	50.00	150,8
41/22	Stainless Steel	8.00	16.00	1.80	50.00	150,8

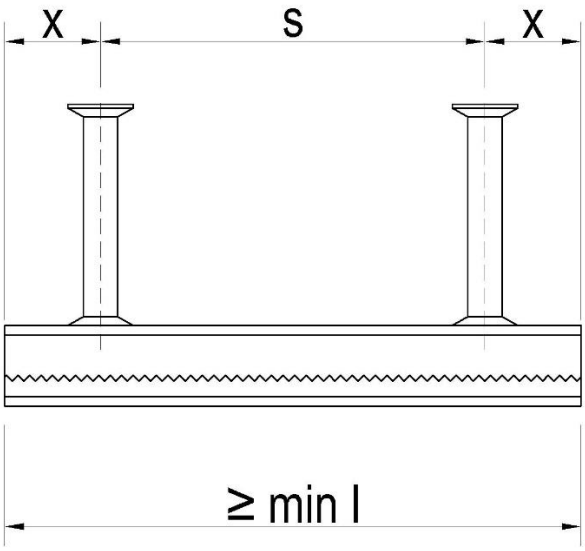


Table 4: Anchor Positioning

Anchor channel	Anchor spacing		End spacing	Min. channel length
	s_{min}	s_{max}	x	min l
	[mm]			
41/22	50	250	25	100

Hook-head channel bolt

Fig. 2

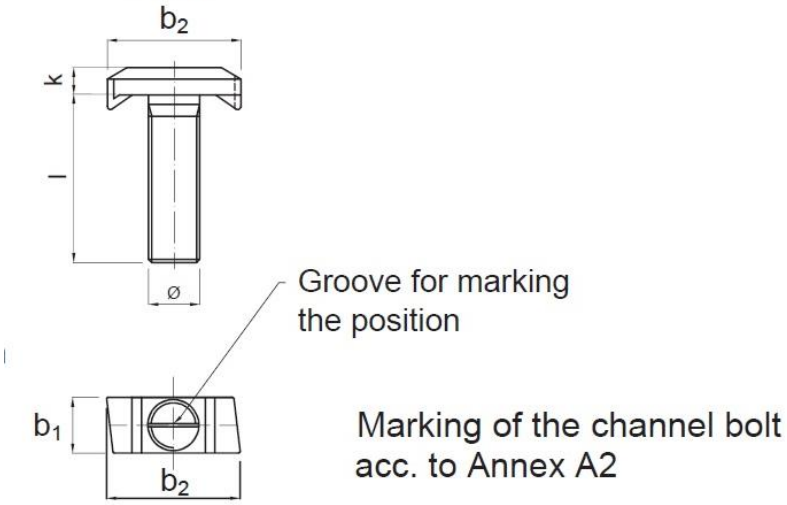


Table 5: Dimension of the HAZ METAL channel bolt

HS Channel bolt		**41/22 Steel**		**41/22 Stainless Steel**	
Anchor channel		**41/22**		**41/22**	
Ø	[mm]	12	16	12	16
b1	[mm]	14.00	19.50	14.00	19.50
b2	[mm]	35.00	34.50	35.00	34.50
k	[mm]	7.50	9.00	7.50	9.00
Length l	[mm]	20-300	30-300	20-300	30-300
Strength grade		8.8	8.8	70	70
fuk	[N/mm2]	800	800	700	700
fyk	[N/mm2]	640	640	450	450
Finish		Electroplated, hot-dip galvanized	Electroplated, hot-dip galvanized	-	-

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

Base materials:

- 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 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.
- 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 A4, 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 Annexes B4 to B5.
- 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 (groove according to Annex B4 and B5) rectangular to the channel axis.
- The setting torques given in Annex B5 shall be applied and shall not be exceeded.

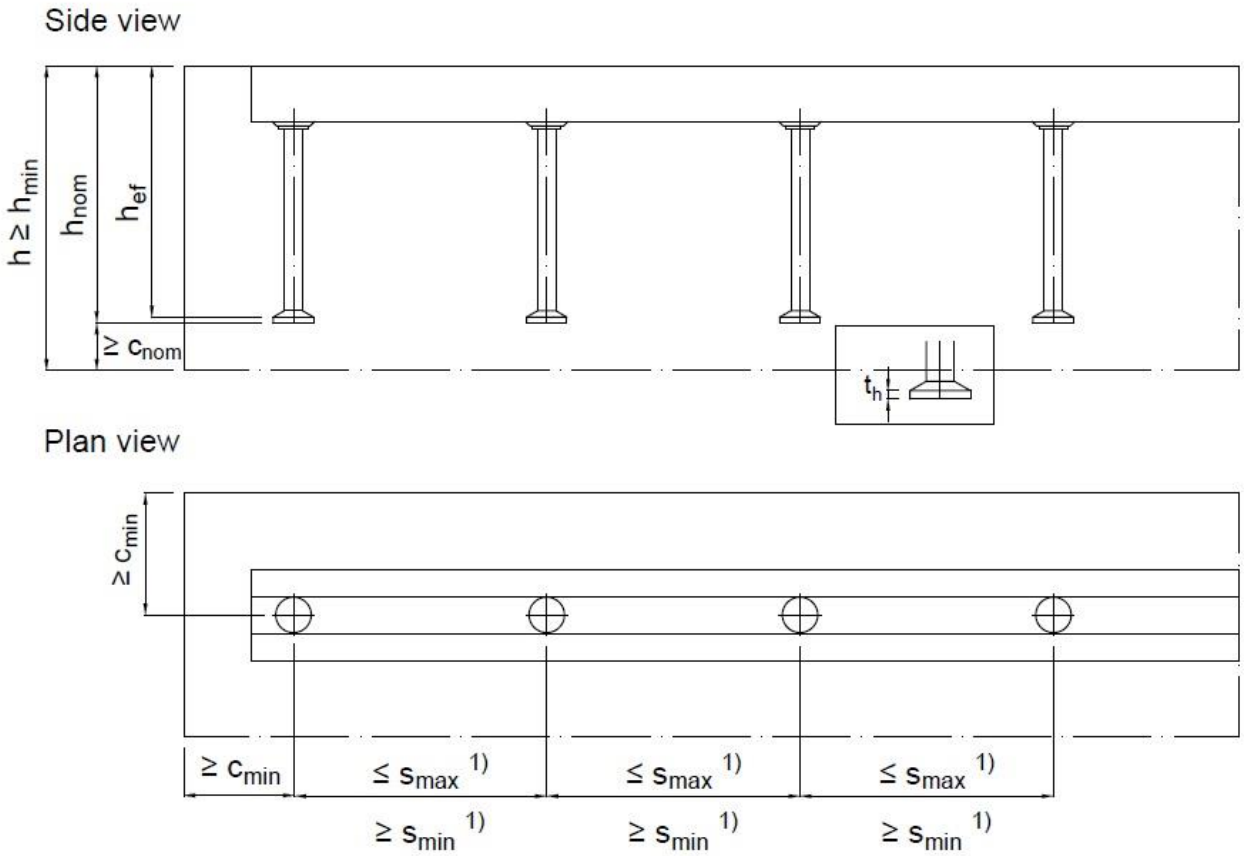


Table 6: Minimum effective embedment depth, edge distance and member thickness of the anchor channel

Anchor Channel			41/22
Min. effective embedment depth	min h_{ef}	[mm]	70
Min edge distance	c_{min}		50
Min. member thickness	h_{min} 2)		102

1) s_{min}, s_{max} acc. to Table 4, Annex A4
2) $h_{min} \geq l_a + h_{ch} + c_{nom}$; c_{nom} acc. to EN 1992-1-1:2004 + AC 2010

HAZ METAL – Anchor Channel HMPR	**Annex B2**
Product Description Installation parameters of anchor channels	

Table 7: Minimum spacing and installation torque of HAZ METAL – Channel bolts Type HS

Channel bolt for cold profiles	Channel bolt Ø	Min. spacing $S_{min,cbo}$ 3) of the channel bolts	Installation torque T_{Inst} 4)			
			General 1)		Steel-steel contact 2)	
			8.8	70	8.8	70
	[mm]	[mm]	[Nm]			
41/22	12	60	25	25	50	50
	16	80	40	40	120	80

1) Acc. to Annex B3, Fig 1
2) Acc. to Annex B3, Fig 2
3) See Annex C1, Fig 1
4) T_{inst} shall not be exceeded

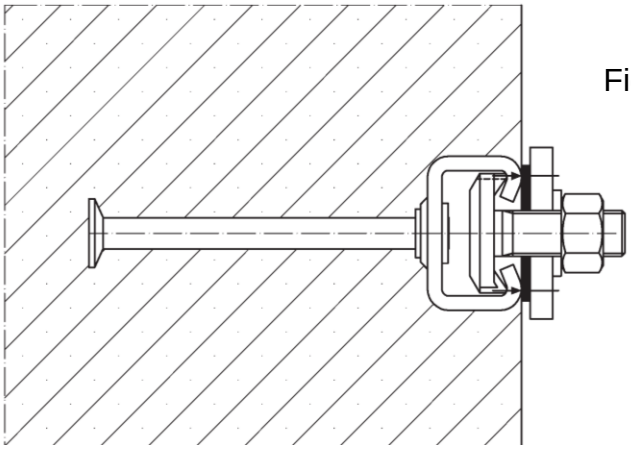


Fig.1

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.

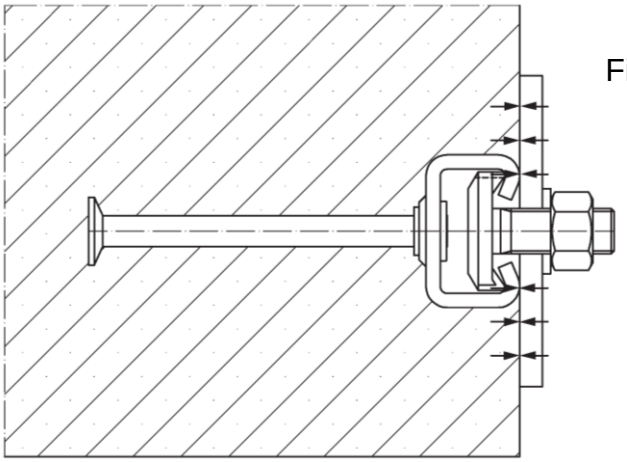


Fig.2

General:

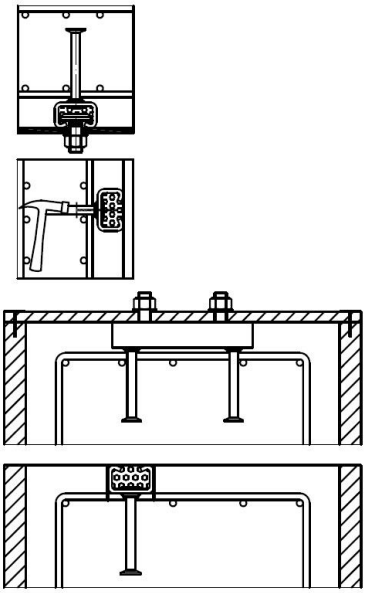
The fixture is in contact with the channel profile and the concrete surface.

The installation torques acc. Annex B5, Table 8 shall be applied and shall not be exceeded.

HAZ METAL – Anchor Channel HMPR	**Annex B3**
Intended Use Installation parameters of HAZ METAL – Channel bolt Type HS, Positions of the fixture	

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 HAZ METAL channel bolts and nuts, with rivets cramps or with magneting fixings.
or

b) Fixing to timber formwork

With nails through the pre-punched holes in the back of the channels and with staples.

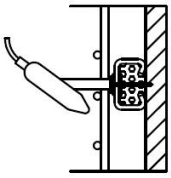
or

c) Fixing to anchor channels at the top

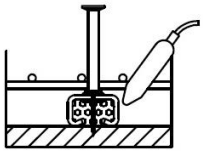
- To timber batten on the side formwork (e.g. with HAZ METAL channel bolts)
- Fixing from above directly to the reinforcement or to a mounting rebar, attach the channel by wire binding.

2. Pouring concrete and regular compacting of concrete

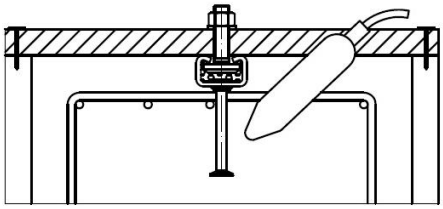
Compact the concrete properly around the channel and the anchors.



a) Sidefaces to the formwork stands



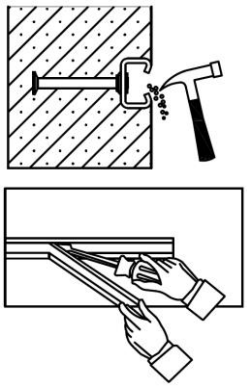
b) in soffits



c) into top surfaces of concrete up

3. Removing of the channel infill

Clean the channel on the outside after removing the formwork



a) Foam infill

With a hammer or a hook

or

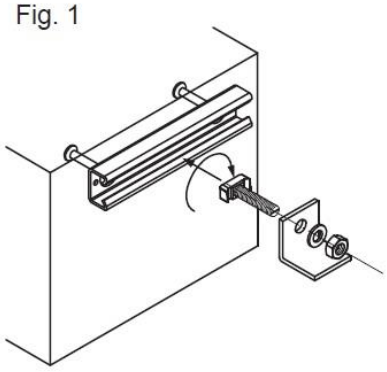
b) PE – foam infill

By hand or with help of a screwdriver in one piece

HAZ METAL – Anchor Channel HMPR	**Annex B4**
Intended Use Installation instructions for HAZ METAL anchor channels	

4. Fastening the HAZ METAL channel bolt to the anchor channel

Fig. 1



b) Setting torques (General)

1. Insert the HAZ METAL channel bolt into the channel slot at any point along the channel length (Fig.1)
2. Turn the channel bolt 90° clockwise and the head of the screw locks into position (Fig.1)
3. Use the washer under nut (Fig.1)
4. Check the correct fit of the screw. The groove on the shank end of the channel bolt must be perpendicular to the longitudinal axis.
5. Tighten the nuts to the installation torque according to Table 8 (Fig.2). The installation torque must not be exceeded.

Fig. 2

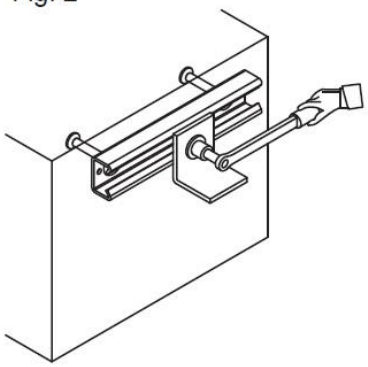
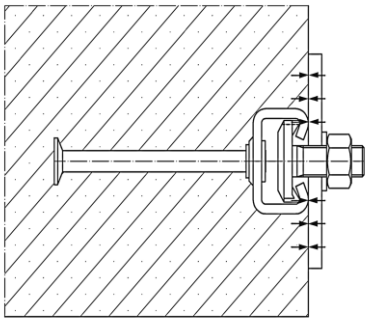


Table 8: Installation torques (General) for HAZ METAL channel bolts Type HS

Table 8	Anchor channel	T_{inst} [Nm]	
		M12	M16
8.8	**41/22**	25	40
70	**41/22**	25	40

a) Installation torques (Steel-Steel Contact)

1. Use washers between the channel and the fixture to create a defined contact.
2. Tighten the nuts to the installation torque according to Table 9



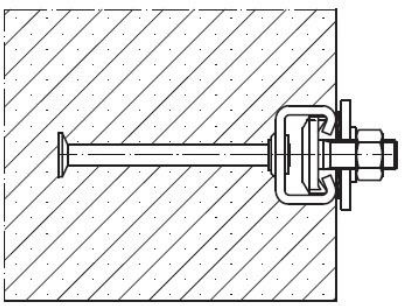


Table 9: Installation torques (Steel-Steel contact) for HAZ METAL channel bolts Type HS

Table 9	Anchor channel	T_{inst} [Nm]	
		M12	M16
8.8	**41/22**	50	120
70	**41/22**	50	80

Table 10: 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	41/22	25,1	1,71	13,1	1,80	82	13,1	1,80
Stainless Steel	41/22	30,1	1,42	21,2		82	21,2	

1) In absence of other regulations

2) $s_{min,cbo}$ acc. to Table 7 Annex B3

Fig 1

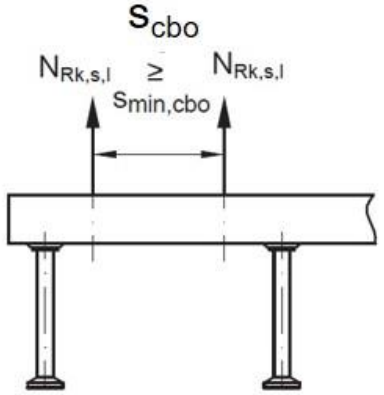


Table 11: Characteristic flexure resistance of channel under tension load

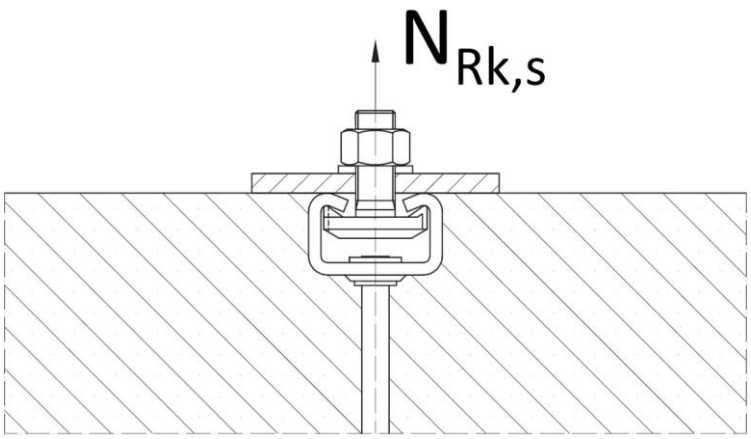
Anchor Channel				41/22
Characteristic flexure resistance of the channel	$M_{Rk,s,flex}$	[Nm]	Steel	484
			Stainless Steel	344
Partial safety factor	$\gamma_{Ms,flex}$ [1]			1.15

1) In absence of other regulations

Table 12: Characteristic resistance under tension load – Steel failure channel bolts

Anchor Channel				41/22
Characteristic resistance	$N_{Rk,s}$	[kN]	M12 8.8	67,4
			M16 8.8	77,9
			M12 70	59,0
			M16 70	109,9
Partial safety factor	γ_{Ms} 1)		8.8	1,50
			70	1,87

1) In absence of other regulations



Channel under tension load

Table 13: Characteristic resistances under tension load – Concrete failure under tension load

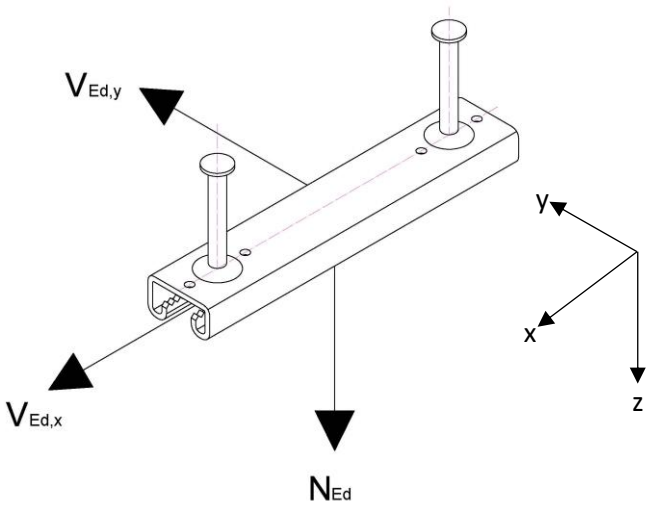
Anchor channel				Steel and Stainless Steel
				41/22
Pull out failure				
Charac. resistance in cracked concrete C20/25		$N_{Rk,p}$ [kN]		22,6
Charac. resistance in uncracked concrete C20/25				31,6
Increasing factor of $N_{Rk,p}$	C25/30	Ψ_c [-]		1.25
	C30/37			1.50
	C35/45			1.75
	C40/50			2.00
	C45/55			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	$k_{cr,N}$		7,74
	Uncracked concrete	$k_{ucr,N}$		11,05
Partial safety factor		γ_{Mc} 1)		1.5
Concrete splitting failure				
Characteristic edge distance		$c_{cr,sp}$	[mm]	210,6
Characteristic spacing		$s_{cr,sp}$		421,2
Partial safety factor		$\gamma_{Msp} = \gamma_{Mc}$ 1)		1.5

1) In absence of other national regulations

Table 14: Characteristic resistances under shear load

Anchor channel		Steel failure					Concrete failure				
		Failure of anchor, connection between anchor-channel or channel lips				Local flexure of channel lips	Pry-out failure		Concrete edge failure		
		$V_{Rk,s,a,x}$ / $V_{Rk,s,a,y}$	$V_{Rk,s,c,x}$ / $V_{Rk,s,c,y}$	$V^0_{Rk,s,l}$	γ_{Ms} 1)	$s_{l,v}$	k_8 2)	γ_{Mc} 1)	$k_{cr,V}$ 3)	$k_{ucr,V}$ 3)	γ_{Mc} 1)
		(kN)	(kN)	(kN)	(-)	(mm)	(-)	(-)	(-)	(-)	(-)
Steel	41/22	15,0	7,8	13,1	$\gamma_{Ms,l}$ = 1.8	82	2,0	γ_{Mc} = 1.5	4,5	6,3	γ_{Mc} = 1.5
		13,1	13,1								
Stainless Steel	41/22	18,1	12,7	21,2		82	2,0		4,5	6,3	
		21,2	21,2								

1) In absent of other national regulations
2) In case of supplementary reinforcement, the factor k8 should multiplied with 0.75
3) $k_{cr,V}$ for cracked concrete, $k_{ucr,V}$ for uncracked concrete



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)

HAZ METAL – Anchor Channel HMPR

Performances
Characteristic resistances under shear load

Annex C4

Table 15.1: Characteristic resistances under shear load – Steel failure channel bolts

Steel failure, channel bolts				41/22
Characteristic resistance	$V_{Rk,s}$	[kN]	M12 8.8	33,7
			M16 8.8	62,8
			M12 70	35,4
			M16 70	65,9
Partial safety factor	γ_{Ms} 1)		8.8	1.25
			70	1.56

1) In absence of other national regulations

Table 15.2: Characteristic resistances under shear load – Steel failure channel bolts

Steel failure, channel bolts				41/22
Characteristic resistance	$M^0_{Rk,s}$ 2)	[kN]	M12 8.8	104,6
			M16 8.8	265,9
			M12 70	91,6
			M16 70	232,6
Partial safety factor	γ_{Ms} 1)		8.8	1.25
			70	1.56

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 10

   $N_{Rk,s}$ acc. to Annex C2, Table 12

   a acc. to Annex C6, Table 15.3

Table 15.3: Internal lever arm between tension and compression force

Internal lever arm of channel bolts		41/22
a [mm]	M12 8.8	21,5
	M16 8.8	23,5
	M12 70	21,5
	M16 70	23,5

Table 16: Characteristic resistances under combined tension and shear load

Anchor channel		41/22
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 (VRd,s,a; VRd,s,c) are limited to min (NRd,s,a; NRd,s,c)