Centre Scientifique et Technique du Bâtiment

84 avenue Jean Jaurès
CHAMPS-SUR-MARNE
F-77447 Marne-la-Vallée Cedex 2
Tél. : (33) 01 64 68 82 82
Fax : (33) 01 60 05 70 37

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European Technical Assessment

ETA-19/0385 of 15/12/2023

English translation prepared by CSTB - Original version in French language

General Part

Nom commercial du kit *Trade name of the kit*	Rails insert KIN LONG *KIN LONG anchor channels*
Famille de produit *Product family*	Anchor channel *Rails insert*
Titulaire *Manufacturer*	Guangdong Kin Long Hardware Products Co.,Ltd. No.3, Jian Lang Rd., Tangxia Town, Dongguan City, Guangdong Province China
Usine de fabrication *Manufacturing plants*	Guangdong Kin Long Hardware Products Co.,Ltd. No.3, Jian Lang Rd., Tangxia Town, Dongguan City, Guangdong Province China
Cette evaluation contient *This Assessment contains*	19 pages incluant 16 pages d'annexes qui font partie intégrante de cette évaluation *19 pages including 16 pages of annexes which form an integral part of this assessment*
Base de l'ETE *Basis of ETA*	DEE 330008-03-0601 (Mai 2018) *EAD 330008-03-0601 (May 2018)*
Cette versio remplace *This version replaces*	ETE-19/0385 du 10/06/2020 ETA-19/0385 of 10*/06/2020*

Specific Part

1 Technical description of the product

The Kin Long anchor channels (RX, RXY, RCG) with channel bolts (CA/TA) is a system consisting of U-shaped channel profile made of carbon steel and at least two metal anchors non-detachably fixed to the channel back and channel bolts.

The anchor channel is embedded surface-flush in the concrete. Kin Long channel bolts 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

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 resistances under static and quasi static load and displacement	See Annexes C1 to C5
Characteristic resistances under fatigue cyclic load	No performance assessed

3.2 Safety in case of fire (BWR 2)

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

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European technical approval, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For Basic requirement Safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.8 General aspects relating to fitness for use

Durability and Serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

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

In accordance with EAD 330008-03-0601 (May 2018), 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 Assessment and verification of constancy of performance (AVCP) system are laid down in the control plan deposited at Centre Scientifique et Technique du Bâtiment.

The control plan including confidential informations, it is not included in the published part of this ETA.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of fire stopping and sealing products for issuing the certificate of conformity CE based on the control plan.

The Notified Body shall visit the factory at least twice a year for surveillance of the manufacturer.

The original French version is signed by

Anca Cronopol

Head of the Structure, Masonry, Partition Division

Product and installation condition

Figure A1: RCG 50-26 anchor channel

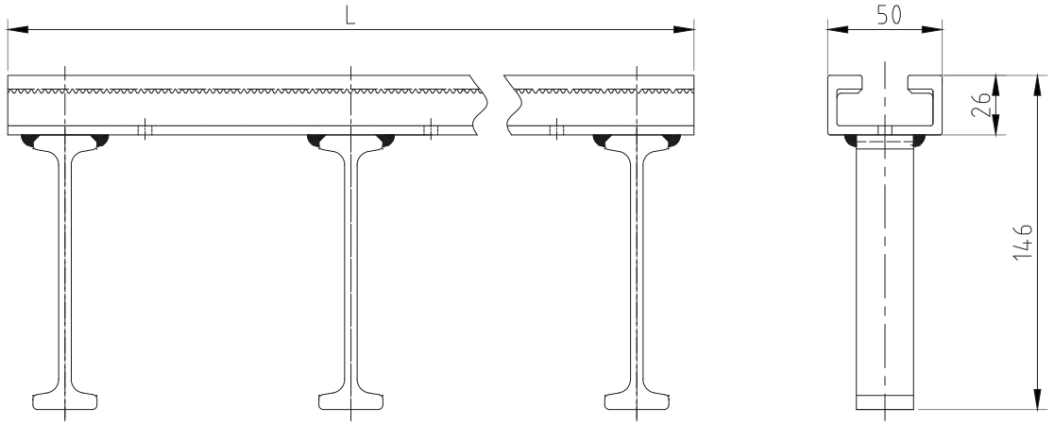


Figure A2: RX 50-26 anchor channel

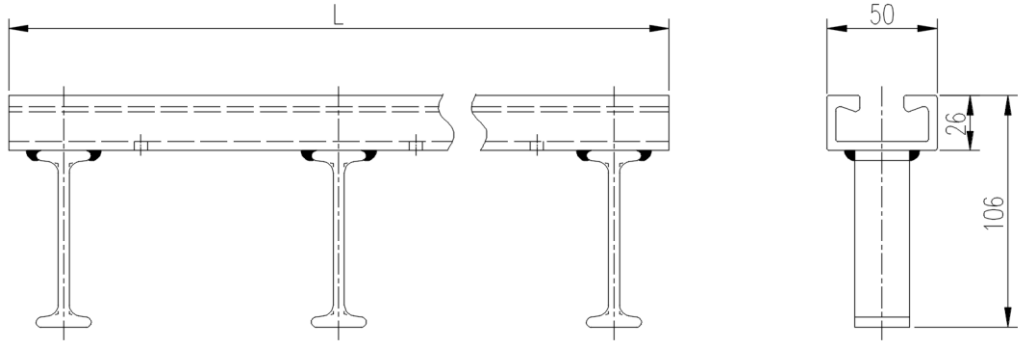


Figure A3: RX 52-34 anchor channel

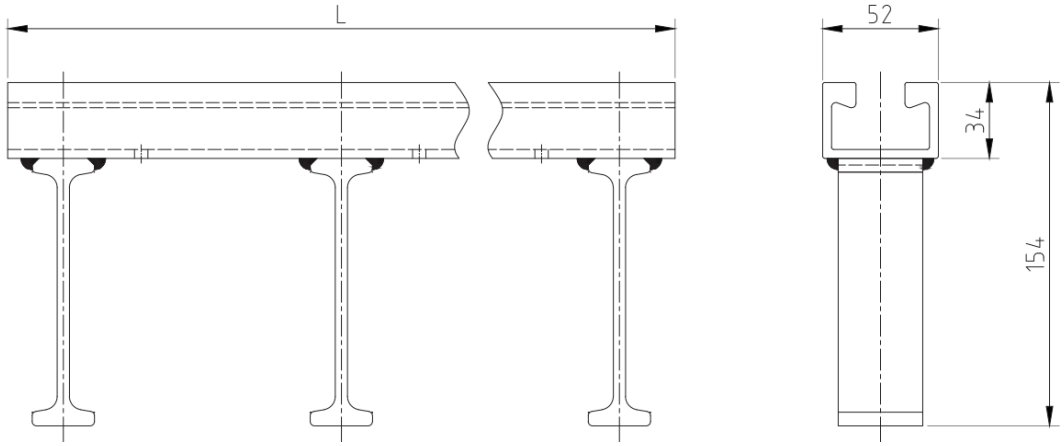


Figure A4: RXY 50-26 anchor channel

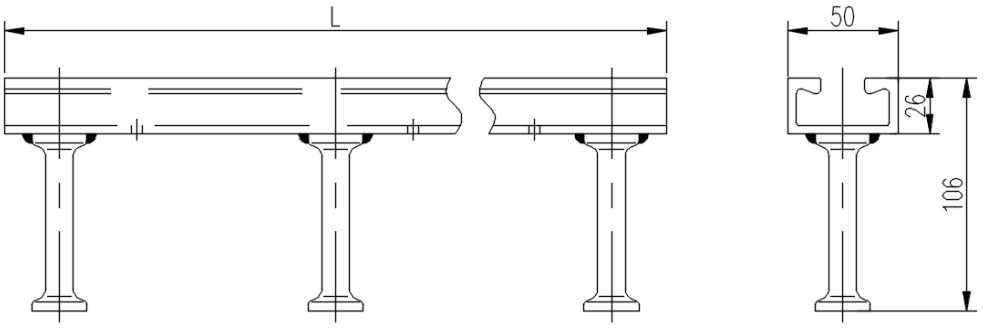
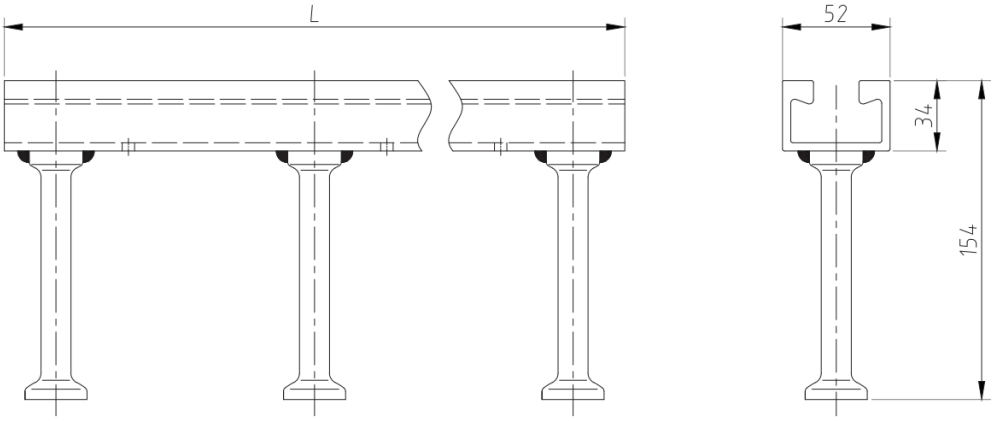


Figure A5: RXY 52-34 anchor channel



Kin Long anchor channels with channel bolts

Product Description
Installed condition

Annex A1

Figure A6: Channel anchor bolt TA-M12, TA-M16, TA-M20

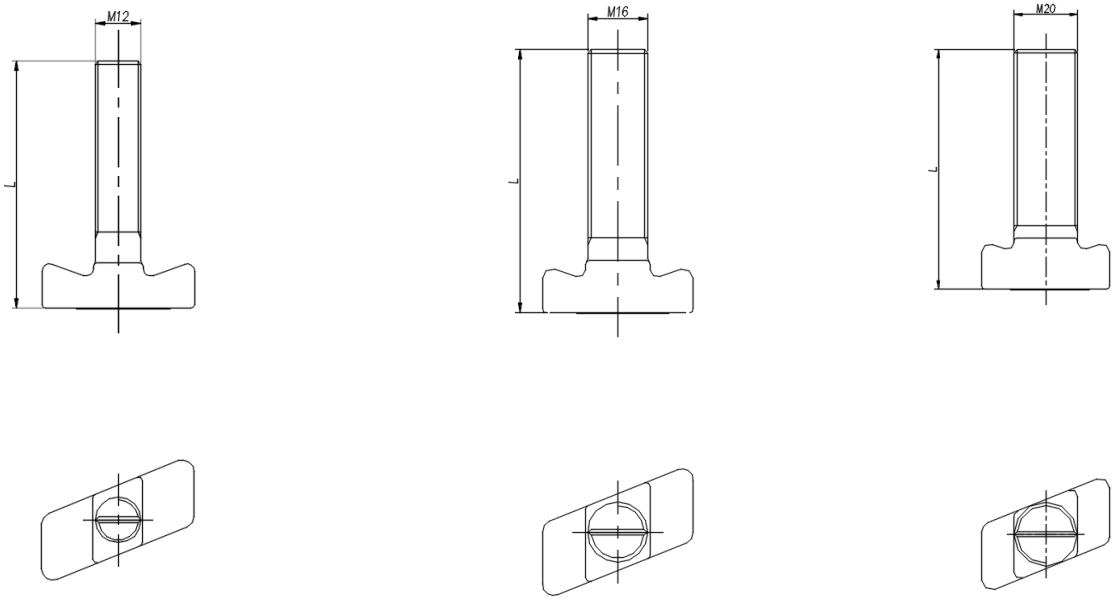
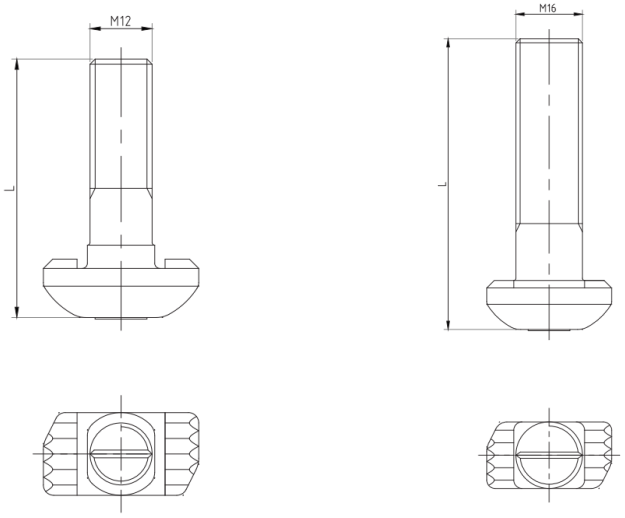
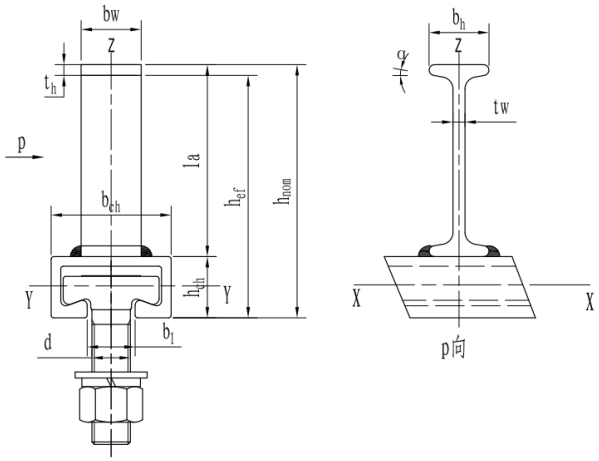


Figure A7: Serrated channel anchor bolt CA-M12, CA-M16

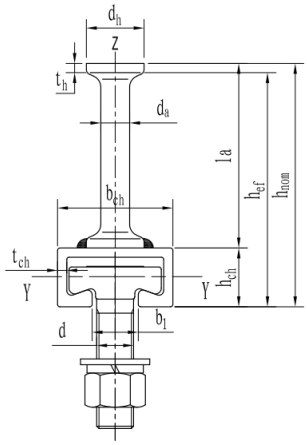


Kin Long anchor channels with channel bolts	
Product Description Installed condition	**Annex A2**

Anchor channel types



Anchor channel with I-anchor welded to the back:
RCG 50-26, RX 50-26, RX 52-34



Anchor channel with round anchor:
RXY 50-26, RXY 52-34

Table A1: Dimensions and materials of channel profile

Channel profile	Dimensions						Material	f_{uk}	f_{yk}	$W_{pl,y,nom}$	I_y
	b_{ch}	h_{ch}	t_{ch}	d_{ch}	f	h_{nom}					
	[mm]							[N/mm²]	[N/mm²]	[mm³]	[mm⁴]
RCG 50-26	50	26	4,0	20	6,0	145	Carbon steel	420	235	4480	45145
RX 50-26	50	26	4,0	20	5,0	106		420	235	4497	45219
RXY 50-26	50	26	4,0	20	5,0	106		420	235	4497	45219
RX 52-34	52	34	4,2	22	9,0	154		420	235	7760	101128
RXY 52-34	52	34	4,2	22	9,0	154		420	235	7760	101128

Table A2: Dimensions and materials of I-anchor

Anchor type	Channel profile	Web thickness	Head thickness	Anchor breadth	Anchor width	Cross section of the anchor	Load bearing area	Material	
		t_w	t_h	b_w	b_h	A_s	A_h	f_{uk}	f_{yk}
		[mm]	[mm]	[mm]	[mm]	[mm²]	[mm²]	[N/mm²]	[N/mm²]
I-anchor	RCG 50-26	5,0	6,0	25	25	125	500	420	235
	RX 50-26	5,0	4,5	25	25	125	500		
	RX 52-34	5,0	6,0	38	25	190	760		

Table A3: Dimensions and materials of round anchor

Anchor type	Channel profile	Shaft diameter	Head diameter	Head thickness	Cross section of the anchor	Load bearing area	Material	
		d_a	d_h	t_h	A_s	A_h	f_{uk}	f_{yk}
		[mm]	[mm]	[mm]	[mm²]	[mm²]	[N/mm²]	[N/mm²]
Round	RXY 50-26	12,5	25	4	122,7	368,16	420	235
	RXY 52-34	14,5	30	5	165,1	541,73	420	235

Channel bolts

Table A4: Dimensions of channel bolt

Anchor channel	Channel bolt	b_1 [mm]	b_2 [mm]	k [mm]	d [mm]
RCG 50-26	CA-M12	19	40	11,3	12
	CA-M16	19	40	12,3	16
RX 50-26 RXY 50-26	TA-M12	17	40	11,7	12
	TA-M16	19	40	11,7	16
RX 52-34 RXY 52-34	TA-M16	19	40	11,7	16
	TA-M20	20	40	14,2	20

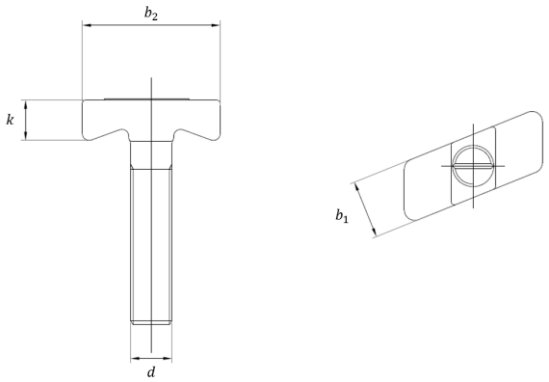


Table A5: Steel grade and corrosion protection

Channel bolt	Carbon steel[1)]
Steel grade	8.8
f_{uk} [N/mm²]	800/830[2)]
f_{yk} [N/mm²]	640/660[2)]
Corrosion protection	Zinc alloy co-penetration ≥ 50 µm

[1)] Material properties according to Annex A5.
[2)] For M20 bolts.

Table A6: Materials

Component	Carbon steel	
	Material properties	**Coating**
Channel Profile	Carbon steel according to EN 10025:2004	Zinc alloy co-penetration ≥ 50 μm According to EN ISO 10684:2004 or EN ISO 1461:2009
Anchor	Carbon steel	Zinc alloy co-penetration ≥ 50 μm According to EN ISO 10684 or EN ISO 1461
Channel bolt	Steel grade 8.8 according to EN ISO 898-1:2013	Zinc alloy co-penetration ≥ 50 μm According to EN ISO 10684 or EN ISO 1461
Plain washer	According to EN ISO 7089:2000 or EN ISO 7093-1:2000 production class A, 200HV	Zinc alloy co-penetration ≥ 50 μm
Hexagonal nut	According to EN ISO 4032:2012 or DIN 934: 1987-10 or EN ISO 7093-1: 2000 Steel class 8 According to EN ISO 898-2:2012	Zinc alloy co-penetration ≥ 50 μm

Specifications of intended use

Anchor channels and channel bolts subject to

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

Base material

- Reinforced or unreinforced normal weight concrete according to EN 206+A2:2021.
- Strength classes C12/15 to C90/105 according to EN 206+A2:2021.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions)

- Structures subject to dry internal conditions
- Structures subject to internal conditions with usual humidity.

Design

- Anchorages 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 is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- For static and quasi-static loading the anchor channels are designed in accordance with EN 1992-4:2018 and EOTA TR 047 "Design for anchor channels in addition to EN 1992-4", May 2021.
- The characteristic resistances are calculated with the minimum embedment depths.

Installation

- Anchor installation of anchor channels is carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor channel only as supplied by the manufacturer – without any manipulations, repositioning or exchanging of channel components.
- Cutting of anchor channels is allowed only if pieces are generated including end spacing and minimum channel length and only to be used in dry conditions.
- Installation in accordance with the installation instructions given in Annex B4 to B5.
- The anchor channels are fixed on the formwork, reinforcement or auxiliary construction such that no movement of the channel will occur during the time of taying the reinforcement and of placing and compacting the concrete.
- The concrete under the head of the anchor is properly compacted. The channels are protected from penetration of concrete into the internal space of the channels.
- Orientating the channel bolt rectangular to the channel axis.
- The required installation torques given in Annex B3 must be applied and must not be exceeded.

Table B1: Installation parameters for anchor channel

Profile type	Material	Min embedment depth	Min slab thickness	End spacing	Min channel length	Characteristic edge distance	Spacing	
		$h_{ef,min}$	h_{min} [1)]	x	$l_{min} = min(s + 2x)$	c_{min}	s_{min}	s_{max}
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
RCG 50-26	CS	140,0	176	25	200	75	150	250
RX 50-26		101,5	136	25	200	125	150	250
RXY 50-26		102,0	136	25	200	125	150	250
RX 52-34		148,0	184	25	200	100	150	250
RXY 52-34		149,0	184	25	200	100	150	250

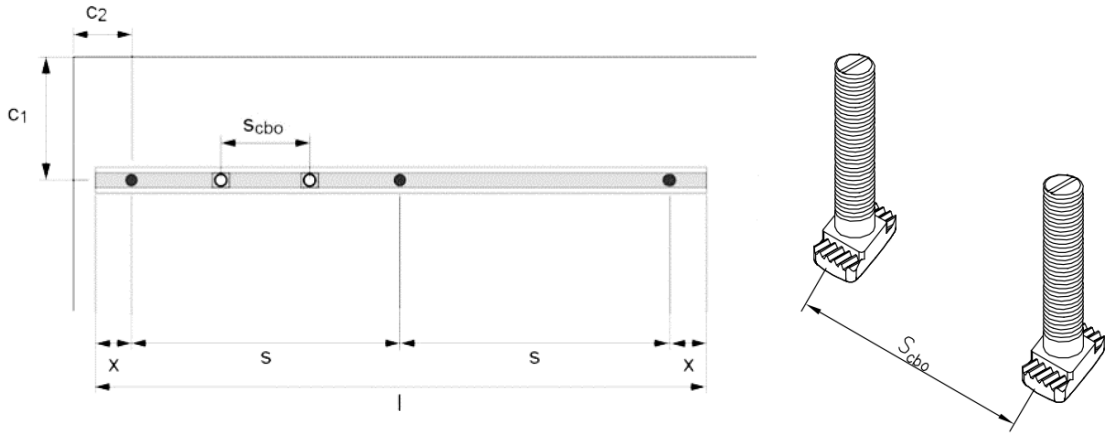


Table B2: Minimum spacing for channel bolts

Channel bolt			CA-M12	CA-M16	TA M-12	TA-M16	TA-M20
Min. spacing between channel bolts	$s_{cbo,min}$	[mm]	60	80	60	80	100

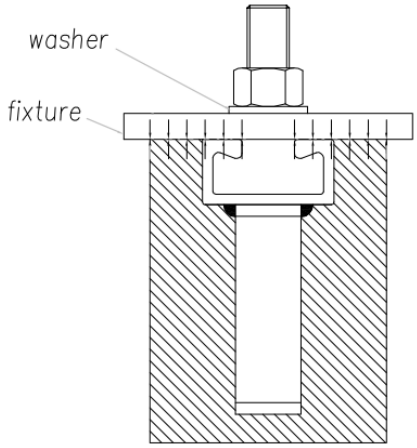
Kin Long anchor channels with channel bolts

Intended use
Installation instructions

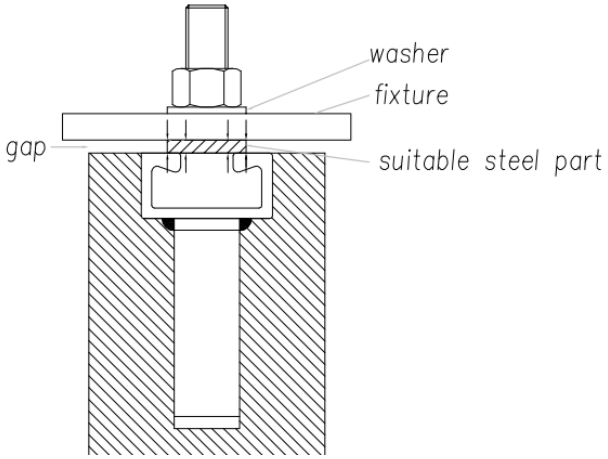
Annex B2

Table B3: Required installation torque T_{inst} for general and steel-steel contact [Nm]

Channel bolt	T_{inst}
	[Nm]
CA-M12	55
CA-M16	75
TA-M12	55
TA-M16	135
TA-M20	170



General: the fixture is fastened to the concrete or to the anchor channel respectively fastened to concrete and anchor channel by torquening with $T_{inst,g}$

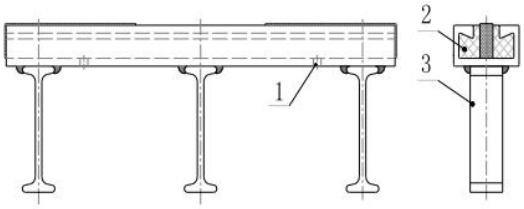


Steel-to-steel contact: the fixture is fastened to the anchor channel by suitable steel part (e.g., washer) by torquening with $T_{inst,s} \geq T_{inst,g}$

Installation instruction

KIN LONG
For Better Living

Installation Instructions for Anchor channel



1、Location hole　2、Filler Strip　3、Anchor channel

1、Product Function：

Being a kind of construction hardware component with high load capacity and easy installation, Anchor channel is embedded in the concrete to hold affiliated construction components by matched T-bolt.

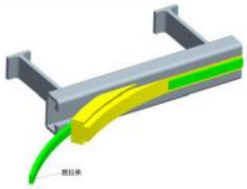
2、Installation Steps：

Step 1: Fixing The Template/Fixed to plate

Fix the Anchor channel on the plate before casting into the concrete. According to the material of plate, there are mainly these ways to fix the Anchor channel as shown below:

Step 2: Remove the filler strip

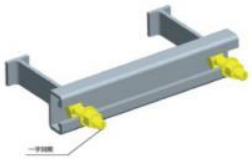
After the concrete formed, remove the plate, then remove the filler strip by hand or proper tools like screwdriver.



Step 3: Install the T- bolt.

1）Make the lenghwise bottom plate of T-shape bolt parrallel to the lengthwise direction ofthe steel channel, and put it into the channel. Rotate the bolt, making the length direction of the T bolt plate parallel to slot length direction.

2）Turn the T- bolt 90 degrees, pull tightly when the cut on the butt of bolt gets vertical to the channels's lenghwise direction, and make both parts tightly grip each other, Then put the connectors, fasten the screw nuts.



3、Notes：

1）Avoid collision when unloading, to prevent the anti-corrosion coating from scratching

2）When fixing the Anchor channel, make sure the plane of notch fits well with the plate and if the slot is filled by strip. If not filled, concrete grout will enter into the slot when casting, making the T-bolt can't work normally.

3）If dirt is adhered to the surface during construction, forbid to clean it by metals items, to avoid the damage on anti-corrosion coating on the surface.

4）After removing the plate, if there is remnant concrete on the surface, please use proper tools to tap lightly to remove it, then using a wet cloth to clean, forbid to clean by metals items, to avoid the damage on anti-corrosion coating on the surface.

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

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Steel failure: Anchor							
Characteristic resistance	$N_{Rk,s,a}$	[kN]	52,5	52,5	79,8	51,5	69,4
Partial safety factor	γ_{Ms} [1)]	[-]	1,9				
Steel failure: Connection between anchor and channel							
Characteristic resistance	$N_{Rk,s,c}$	[kN]	39,88	37,97	56,65	45,72	51,7
Partial safety factor	$\gamma_{Ms,ca}$ [1)]	[-]	1,8				
Steel failure: Local flexure of channel lips							
Characteristic resistance	$N^0_{Rk,s,l}$	[kN]	46,6	45,5	74,0	45,5	74,0
Partial safety factor	$\gamma_{Ms,l}$ [1)]	[-]	1,8				

[1)] In absence of other national regulation.

Table C2: Characteristic flextural resistance of channel under tension load

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Steel failure: Bending of channel							
Characteristic bending resistance of channel	$M_{Rk,s,flex}$	[Nm]	2103	2113	2883	2113	2883
Partial safety factor	$\gamma_{Ms,flex}$ [1)]	[-]	1,15				

[1)] In absence of other national regulation.

Table C3: Characteristic resistances under tension load – concrete failure

Anchor channel				**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Pullout failure								
Characteristic resistance in cracked concrete C12/15		$N_{Rk,p}$	[kN]	45	45	68,4	33,1	48,7
Characteristic resistance in uncracked concrete C12/15		$N_{Rk,p}$	[kN]	63	63	95,7	46,3	68,2
Amplification factor of $N_{Rk,p}$	C16/20	ψ_c	[-]	1,33				
	C20/25			1,67				
	C25/30			2,08				
	C30/37			2,50				
	C35/45			2,92				
	C40/50			3,33				
	C45/55			3,75				
	C50/60			4,17				
	C55/67			4,58				
	≥ C60/75			5,00				
Partial safety factor		$\gamma_{Mp} = \gamma_{Mc}$	[-]	1,5				
Concrete cone failure								
Product factor k_1	cracked concrete	$k_{cr,N}$	[mm]	8,57	8,17	8,64	8,17	8,65
	uncracked concrete	$k_{ucr,N}$	[-]	12,23	11,65	12,33	11,66	12,34
Partial safety factor		γ_{Mc} [1)]	[-]	1,5				
Splitting								
Characteristic edge distance		$c_{cr,sp}$	[mm]	420,0	304,5	444,0	306,0	447,0
Partial safety factor		$\gamma_{Mp} = \gamma_{Mc}$	[-]	1,5				

[1)] In absence or of other national regulation.

Table C4: Displacements under tension load

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Tension load	N	[kN]	7,62	7,85	10,63	8,08	10,63
Short time displacement	δ_{N0}	[mm]	0,20	0,03	0,10	0,03	0,11
Long time displacement	$\delta_{N\infty}$	[mm]	0,40	0,05	0,21	0,06	0,21

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

Table C5: Characteristic resistances under shear load – steel failure of anchor channel

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Steel failure: Anchor							
Characteristic resistance	$V_{Rk,s,a,y}$	[kN]	49	44	83	40	86
Partial safety factor	γ_{Ms} [1)]	[-]	1,6				
Steel failure: Connection between anchor and channel							
Characteristic resistance	$V_{Rk,s,c,y}$	[kN]	49	44	83	40	86
Partial safety factor	$\gamma_{Ms,ca}$ [1)]	[-]	1,8				
Steel failure: Local failure by flexure of channel lips							
Characteristic resistance	$V_{Rk,s,l,y}$	[mm]	49	44	88	40	83
Partial safety factor	$\gamma_{Ms,l}$ [1)]	[-]	1,8				

[1)] In absence or of other national regulation.

Table C6: Characteristic resistances under shear load – concrete failure

Anchor channel				**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Pry out failure								
Product factor		k_8	[-]	2,0				
Partial safety factor		γ_{Mc} [1)]	[-]	1,5				
Concrete edge failure								
Product factor	cracked concrete	$k_{cr,V}$	[-]	7,5				
	uncracked concrete	$k_{ucr,V}$		10,5				
Partial safety factor		γ_{Mc} [1)]	[-]	1,5				

[1)] In absence or of other national regulation.

Table C7: Displacements under shear load

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Shear load	V_y	[kN]	13,33	11,97	22,59	10,88	23,40
Short time displacement	$\delta_{V0,y}$	[mm]	2,31	3,27	4,63	4,19	4,46
Long time displacement	$\delta_{V\infty,y}$	[mm]	4,63	6,55	9,26	8,39	8,92

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

Table C8: Characteristic resistances under combined tension and shear load

Anchor channel			**RCG 50-26**	**RX 50-26**	**RX 52-34**	**RXY 50-26**	**RXY 52-34**
Steel failure: Local failure by bending of channel lips and failure by bending of channel							
Product factor	k_{13}	[-]	1,0[1)]				
Steel failure: Failure of anchor and connection between anchor and channel							
Partial safety factor	k_{14}	[-]	1,0[2)]				

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

Table C9: Characteristic resistances under combined tension and shear load – Steel failure of channel bolts

Channel bolt			**CA-M12**	**CA-M16**	**TA-M12**	**TA-M16**	**TA-M20**
Characteristic tension resistance	$N_{Rk,s}$	[kN]	67,4	124,6	67,4	125,6	196,0
Partial safety factor	γ_{Ms} [1)]	[-]	1,5				
Characteristic shear resistance	$V_{Rk,s}$	[kN]	33,7	62,8	33,7	62,8	98,0
Partial safety factor	γ_{Ms} [1)]	[-]	1,25				

[1)] In absence or of other national regulation.

Table C10: Characteristic resistances under shear load with lever arm - shear failure of channel bolts

Channel bolt			**CA-M12**	**CA-M16**	**TA-M12**	**TA-M16**	**TA-M20**
Characteristic flexure resistance	$M^0_{Rk,s}$	[Nm]	104,8	193,8	104,8	193,8	538,7
Partial safety factor	γ_{Ms} [1)]	[-]	1,6				

[1)] In absence or of other national regulation.