

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-16/0560**  
**of 17 July 2017**

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

Deutsches Institut für Bautechnik

Edilmatic anchor channels and channel bolts

Anchor channels

EDILMATIC srl  
Via Gonzaga 11  
46020 PEGOGNAGA  
ITALIEN

EDILMATIC srl  
Via Gonzaga 11  
46020 PEGOGNAGA  
ITALIEN

19 pages including 3 annexes which form an integral part  
of this assessment

European Assessment Document (EAD)  
330008-02-0601

**European Technical Assessment**

**ETA-16/0560**

English translation prepared by DIBt

**Page 2 of 19 | 17 July 2017**

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**Specific Part****1 Technical description of the product**

The Edilmatic anchor channels with channel bolts is a system consisting of C-shaped channel profile 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. Edilmatic 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 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 resistances under static and quasi-static loads and displacements	See Annex C1 to C3

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

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1

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

In accordance with EAD No. 330008-02-0601, 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**

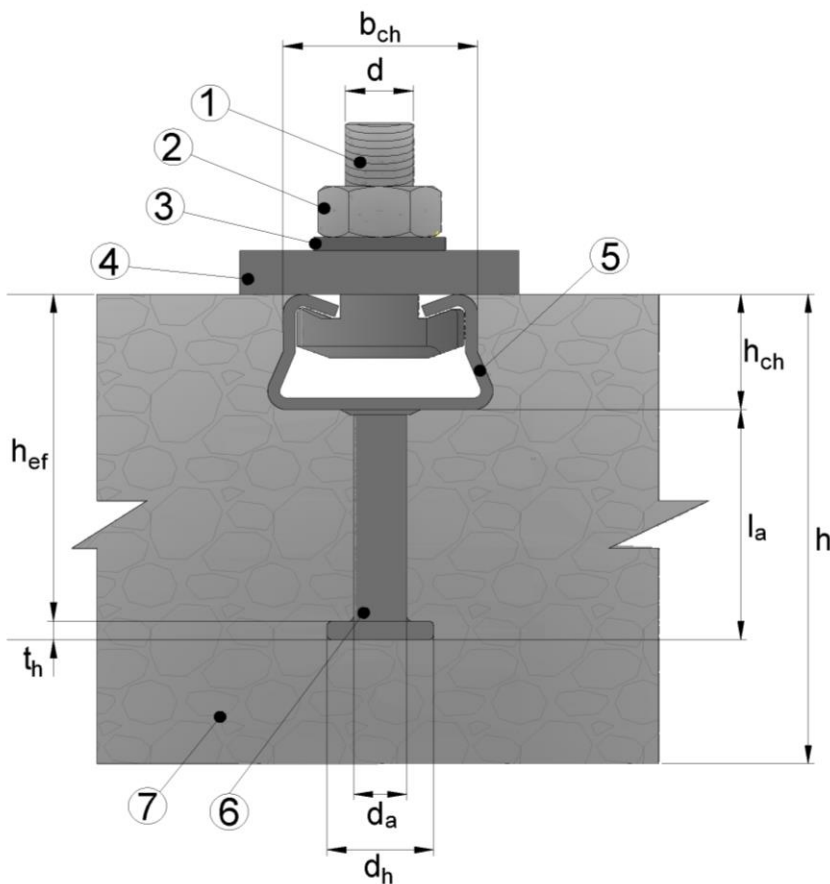
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 17 July 2017 by Deutsches Institut für Bautechnik

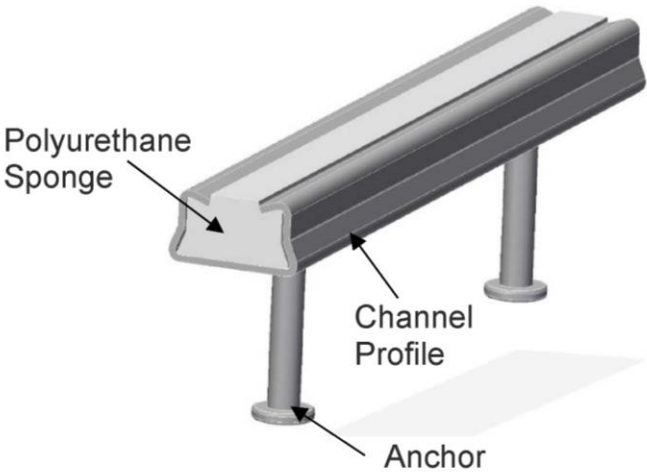
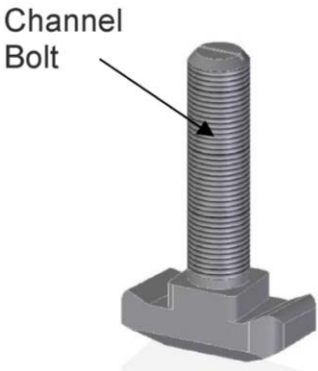
BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Lange

Product and installation condition



- Key
- 1 Channel Bolt
  - 2 Hexagonal nut
  - 3 Washer
  - 4 Fixture
  - 5 Channel Profile
  - 6 Anchor
  - 7 Concrete member

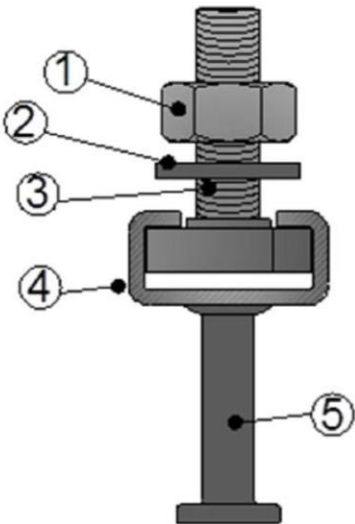


Edilmatic anchor channels with channel bolts

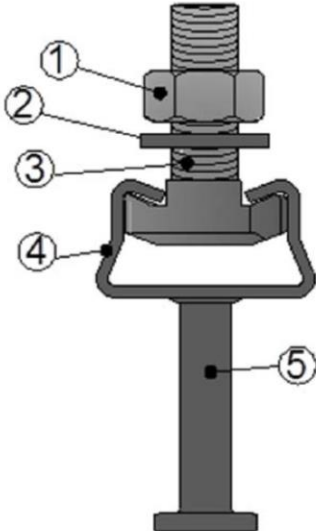
Product description  
Installed condition

Annex A1

Anchor channel types



Anchor channel type  
GF and GI  
with channel bolt type  
TMG1 and TMG2



Anchor channel type  
GD, GE and GM  
with channel bolt type  
TAG1 and TAG2

- Key
- 1 Hexagon nut
  - 2 Washer
  - 3 Channel Bolt
  - 4 Channel Profile
  - 5 Anchor

Edilmatic anchor channels with channel bolts

Product description  
Anchor channel types

Annex A2

### Marking of the Edilmatic anchor channel:

E-X

E = Identifying mark of the manufacturer (Edilmatic)  
X = Size of Anchor Channel



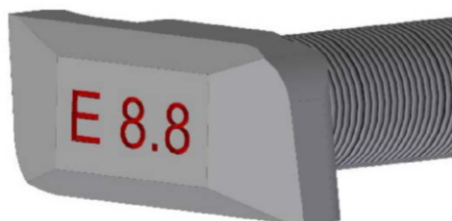
(e.g. E-GD)

E = EDILMATIC  
GD = Anchor channel size GD

### Marking of the Edilmatic channel bolt:

E-X

E = Identifying mark of the manufacturer (Edilmatic)  
X = Steel grade



(e.g. E-8.8)

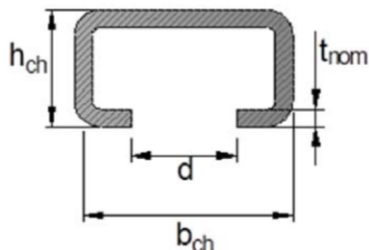
E = EDILMATIC  
8.8 = Steel grade

**Edilmatic anchor channels with channel bolts**

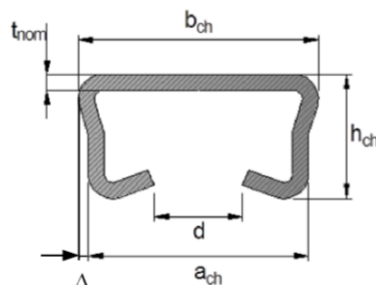
**Product description**  
Marking of channel and channel bolt

**Annex A3**

## Channel profiles



Anchor channel type  
GF and GI



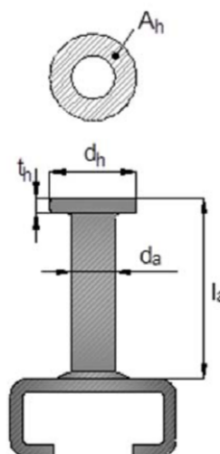
Anchor channel type  
GD, GE and GM

**Table A1: Dimensions of channel profile**

Anchor Channel	a <sub>ch</sub>	b <sub>ch</sub>	Δ	h <sub>ch</sub>	t <sub>nom</sub>	d	I <sub>y</sub>
	[mm]						[mm <sup>4</sup> ]
GF	---	28,0	-	15,0	2,3	12,2	3776
GI	---	38,0	-	17,0	3,0	17,5	9080
GD	40,5	46,0	2,75	25,0	2,5	17,5	21055
GE	52,0	56,0	2	30,5	3,3	21,5	48251
GM	52,0	56,0	2	31,0	4,0	21,5	59279

**Table A2: Dimensions of anchor**

Anchor Channel	d <sub>a</sub>	d <sub>h</sub>	t <sub>h</sub>	min I <sub>a</sub>
	[mm]			
GF	6,0	12,0	2,5	34,1
GI	11,0	21,0	4,0	45,0
GD	11,0	21,0	4,0	47,0
GE	13,5	25,0	5,0	64,0
GM	13,0	25,5	5,0	98,5



## Edilmatic anchor channels with channel bolts

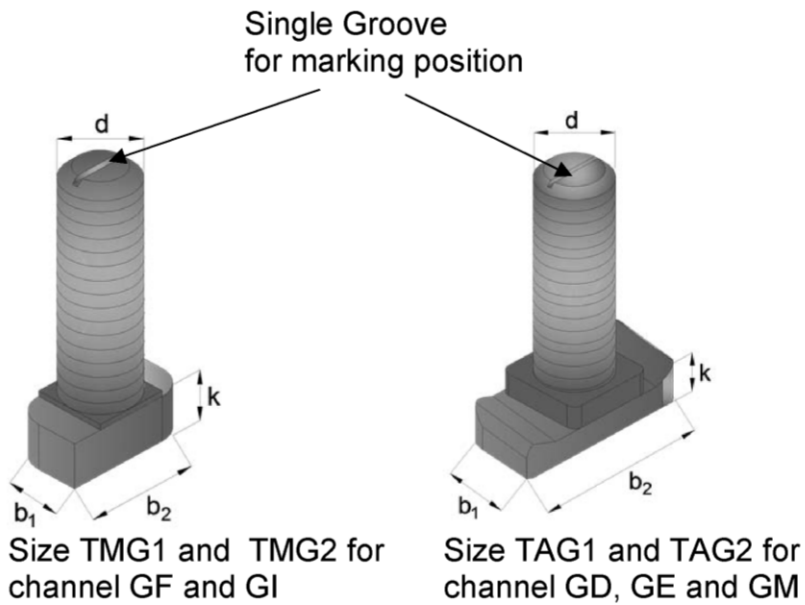
### Product description

Dimensions of channel profiles and anchors

## Annex A4



## Channel bolts



**Table A3: Dimensions of channel bolts**

Anchor channel	Channel bolt Type	Dimensions			
		b <sub>1</sub>	b <sub>2</sub>	k	d
		[mm]			
GF	TMG1	12,0	22,0	7,5	12
GI	TMG2	16,0	30,0	7,5	12
GD	TAG1	16,0	36,0	8,5	12
					14
					16
GE	TAG2	20,0	46,0	9,5	16
GM					

**Edilmatic anchor channels with channel bolts**

**Product description**  
Dimensions of channel bolts

**Annex A5**

**Table A4: Materials**

Specification	Intended use	
	1	2
	Dry internal conditions	Internal conditions with usual humidity
	Anchor channels may only be used in structures subject to dry internal conditions (e.g. accommodations, bureaus, schools, hospitals, shops, exceptional internal conditions with usual humidity acc. column 2)	Anchor channels may also be used in structures subject to internal conditions with usual humidity (e.g. kitchen, bath and laundry in residential buildings, exceptional permanent damp conditions and application under water)
Materials		
Channel profile	<b>Material:</b> S235 JR EN 10346: 2015 <b>Material Number:</b> 1.0244 <b>Coating:</b> Hot dip galvanized (with Sendzimir method) <b>Thickness:</b> $19\mu\text{m} < t < 21\mu\text{m}$	<b>Material:</b> S235 JR EN 10025: 2005 <b>Material Number:</b> 1.0038 <b>Coating:</b> Hot dip galvanized (on the basis of EN ISO 1461: 2009) <b>Thickness:</b> $t \geq 50\mu\text{m}$
Anchor	<b>Material:</b> S235 JR EN 10263-3: 2002 <b>Material Number:</b> 1.1152 <b>Coating:</b> electroplated (on the basis of EN ISO 4042: 1999) <b>Thickness:</b> $t \geq 5\mu\text{m}$	<b>Material:</b> S235 JR EN 10263-3: 2015 <b>Material Number:</b> 1.1152 <b>Coating:</b> Hot dip galvanized (on the basis of EN ISO 1461: 2009) <b>Thickness:</b> $t \geq 50\mu\text{m}$
EDILMATIC Channel bolt	<b>Material:</b> Steel strength grade 8.8 (according to EN ISO 898-1: 2013) <b>Coating:</b> electroplated (on the basis of EN ISO 4042: 1999) <b>Thickness:</b> $t \geq 5\mu\text{m}$	<b>Material:</b> Steel strength grade 8.8 (according to EN ISO 898-1: 2013) <b>Coating:</b> Hot dip galvanized (on the basis of EN ISO 10684: 2004 + AC 2009) <b>Thickness:</b> $t \geq 50\mu\text{m}$
Washer EN 7089	<b>Material:</b> Steel acc. to EN 10025: 2005 <b>Coating:</b> electroplated (on the basis of EN ISO 4042: 1999) <b>Thickness:</b> $t \geq 5\mu\text{m}$	<b>Material:</b> Steel According to EN 10025: 2005 <b>Coating:</b> Hot dip galvanized (on the basis of EN ISO 10684: 2004 + AC 2009)) <b>Thickness:</b> $t \geq 50\mu\text{m}$
Hexagonal nut EN 4032	<b>Material:</b> Steel According to EN 898-2: 2012 <b>Coating:</b> electroplated (on the basis of EN ISO 4042: 1999) <b>Thickness:</b> $t \geq 5\mu\text{m}$	<b>Material:</b> Steel According to EN 898-2: 2012 <b>Coating:</b> Hot dip galvanized (on the basis of EN ISO 10684 2004 + AC 2009)) <b>Thickness:</b> $t \geq 50\mu\text{m}$

**Edilmatic anchor channels with channel bolts**

**Product description**  
Materials and intended use

**Annex A6**

## Specification of intended use

### Anchor channels and channel bolts subject to:

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

### Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C12/15 to C90/105 according to EN 206-1:2000.
- Cracked or uncracked concrete.

### Use conditions (Environmental conditions)

- Structures subject to dry internal conditions (e.g. accommodations, bureaus, schools, hospitals, shos, exceptional internal conditions with usual humidity), (anchor channels and channel bolts acc. to Annex A6, Table A4, column 1 and 2).
- Structures subject to internal conditions with usual humidity (e.g. kitchen, batch and laundry in residential buildings, exceptional permanent damp conditions and application under water), (anchor channels and channel bolts acc. to Annex A6, Table A4, column 2).

### Design:

- Anchor channels are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor channel and channel bolt are indicated on the design drawings (e.g. position of the anchor channel relative to reinforcement or to supports, etc.).
- 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" or EN 1992-4: 2016.

### Installation:

- The installation of anchor channels is carried out by appropriately qualified personnel under the supervision of the person responsible for the technical matters on site.
- Use of the anchor channels only as supplied by the manufacturer – without any manipulations, repositioning or exchanging of channel components.
- Installation in accordance with the manufacturer's specifications 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 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 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 A3, Table B3 must be applied and must not be exceeded.

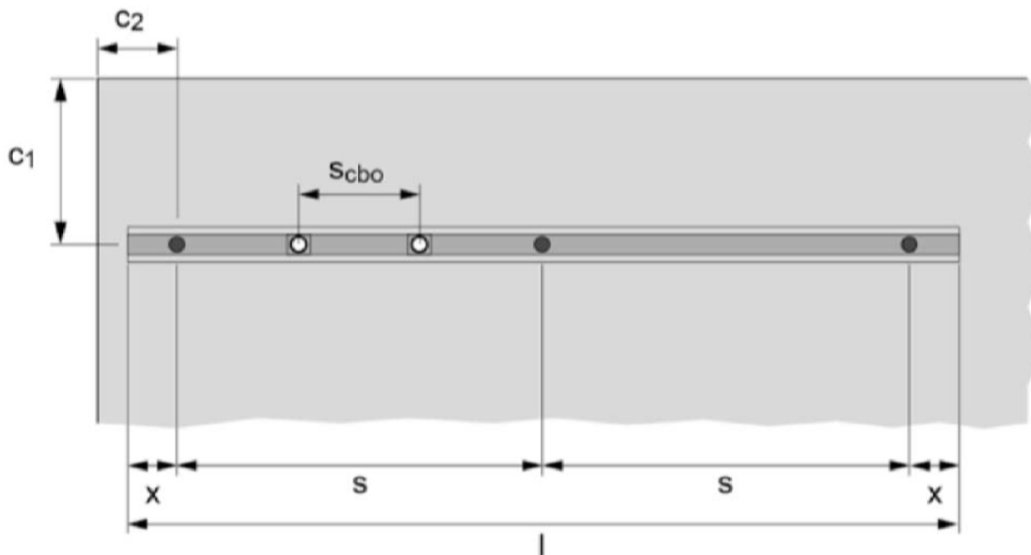
## Edilmatic anchor channels with channel bolts

### Intended Use Specifications and Installation

## Annex B1

**Table B1: Installation parameters for anchor channels**

Anchor channel			GF	GI	GD	GE	GM
Effective embedment depth	$h_{ef}$	[mm]	46,5	59,0	69,0	91,0	126,0
Minimum spacing	$s_{min}$	[mm]	100	100	100	100	100
Maximum spacing	$s_{max}$	[mm]	200	200	200	200	200
End spacing	x	[mm]	50	50	50	50	50
Minimum channel length	$l_{min}$	[mm]	200	200	200	200	200
Minimum edge distance	$c_{min,1}$	[mm]	60	60	100	100	100
	$c_{min,2}$	[mm]	40	40	80	80	100
Minimum thickness of concrete member	$h_{min}$	[mm]	100	100	150	150	200



**Edilmatic anchor channels with channel bolts**

**Intended Use**  
Installation parameters for anchor channels

**Annex B2**

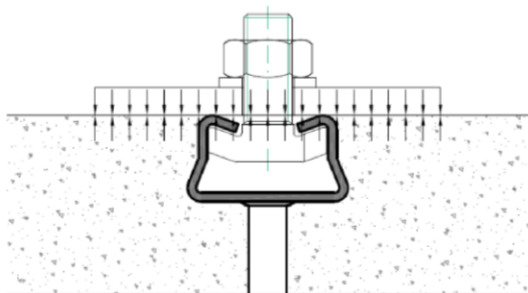
**Table B2: Minimum spacing for channel bolts**

Channel bolt			M12	M14	M16
Minimum spacing between channel bolts	$s_{cbo,min}$	[mm]	60	70	80

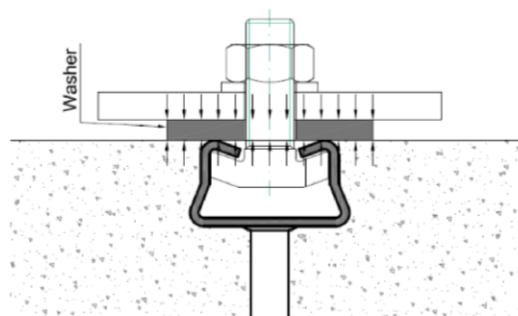
$s_{cbo}$  = center to center spacing between channel bolts ( $s_{cbo,min} = 5d$ )

**Table B3: Required installation torque  $T_{inst}$  (general application and steel-steel contact)**

Anchor channel			GF	GI	GD			GE	GM
Bolt size			M12	M12	M12	M14	M16	M16	M16
Installation torque	$T_{inst}$	[Nm]	15	16	30	40	40	60	60



**General:** The fixture is in contact with the channel profile and the concrete surface



**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.

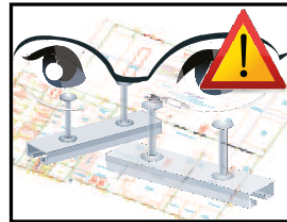
**Edilmatic anchor channels with channel bolts**

**Intended Use**  
Installation instructions for anchor channels (part 1)

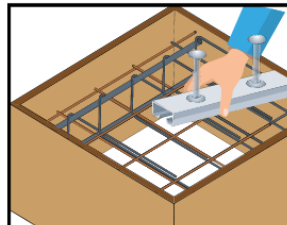
**Annex B3**



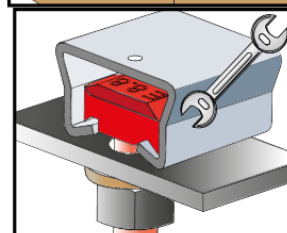
**1 Selection of anchor channel, in accordance to the planning document**



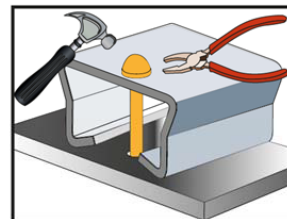
**2 Placing channel into formwork**



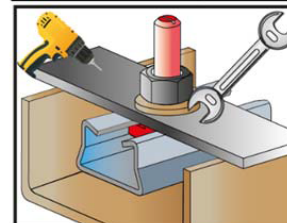
**2a) Steel formwork: Fixing with Edilmatic channel bolts through the form**



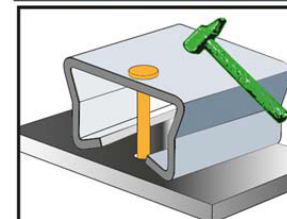
**2b) Steel formwork: Fixing with rivets using the prefabricated holes in the back of the anchor channel**



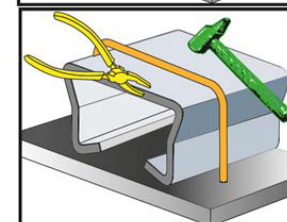
**2c) Top surface of concrete: Fixing by using auxiliary construction or fixing from above directly to the reinforcement**



**2d) Wood formwork: Fixing with nails using the prefabricated holes in the back of the anchor channel**



**2e) Wood formwork: Fixing with staples**



**Edilmatic anchor channels with channel bolts**

**Intended Use**  
Installation instructions for anchor channels (part 1)

**Annex B4**

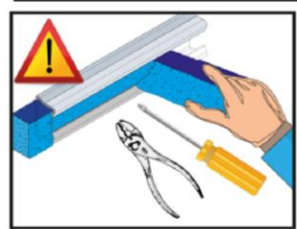
**3 Cast in and compact the concrete and wait hardening of concrete**



**4 Striking the formwork:** Removing of the steel or wood formwork



**5 Removing the foam filler**



**6 Installation of the anchor channel is finished**



**Edilmatic anchor channels with channel bolts**

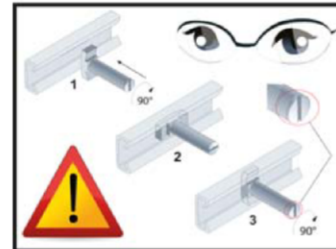
**Intended Use**  
Installation instructions for anchor channels (part 2)

**Annex B5**

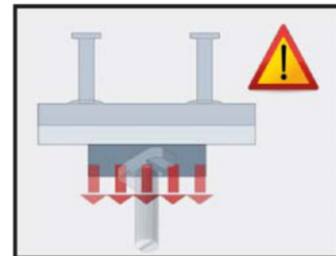
**1 Selection of the EDILMATIC channel bolt in accordance to the planning document.**



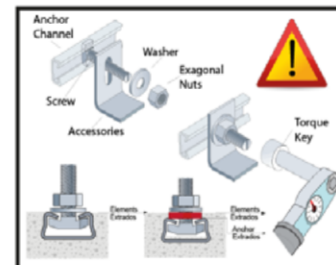
**2 Insert the channel bolt into the channel.**  
After 90° turn clockwise the channel bolt locks into the channel.  
(Check of the position of the bolt by notch!!!)



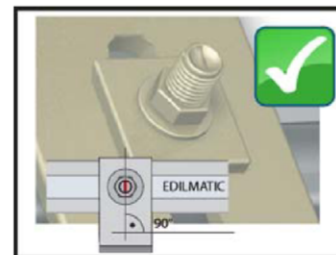
**4 Positioning of the channel bolt.**  
At the channel ends a minimum clearance must be maintained, which corresponds with the overhang beyond the last anchor.  
 $T_{inst}$  must not be exceeded.



**5 Tighten the hexagonal nut to the setting torque in accordance with technical prescriptions.**



**6 After fixing the nuts check the correct position of the bolt.**  
If the notch is not perpendicular to the channel length axis, the channel bolt must be released completely, inserted and tightened again.



**Installation of the channel bolt is finished.**

**Edilmatic anchor channels with channel bolts**

**Intended Use**  
Installation instructions for anchor channels (part 3)

**Annex B6**



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

Anchor channel				GF	GI	GD	GE	GM
<b>Steel failure, anchor</b>								
Characteristic resistance	$N_{Rk,s,a}$	[kN]		11,3	38,0	38,0	57,3	53,1
Partial safety factor	$\gamma_{Ms}$					2,0		
<b>Steel failure, connection anchor/channel</b>								
Characteristic resistance	$N_{Rk,s,c}$	[kN]		8,8	27,0	19,2	31,5	47,8
Partial safety factor	$\gamma_{Ms,ca}$					1,8		
<b>Steel failure, channel lips</b>								
Characteristic spacing of channel bolt for $N_{Rk,s,l}$	$s_{l,N}$	[mm]		56	76	92	112	112
Characteristic resistance	$N_{Rk,s,l}^0$	[kN]		8,8	27,0	19,2	31,5	47,8
Partial safety factor	$\gamma_{Ms,l}$					1,8		
<b>Steel failure, bending moment</b>								
Characteristic resistance	$M_{Rk,s,flex}$	[Nm]		159	288	507	938	1152
Partial safety factor	$\gamma_{Ms,flex}$					1,15		

1) In absence of other national regulations.

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

Anchor channel				GF	GI	GD	GE	GM
<b>Pullout</b>								
Characteristic resistance in cracked concrete	C12/15	$N_{Rk,p}$	[kN]	7,6	22,6	22,6	31,3	34,0
Increasing factor of $N_{Rk,p}$	C20/25	$\psi_c$	[-]			1,67		
	C25/30					2,08		
	C30/37					2,50		
	C35/45					2,92		
	C40/50					3,33		
	C45/55					3,75		
	C50/60					4,17		
	C55/67					4,58		
	≥ C60/75					5,00		
Factor for uncracked concrete		$\psi_{ucr,N}$	[-]			1,4		
Partial safety factor		$\gamma_{Mp} = \gamma_{Mc}$	[-]			1,5		
<b>Concrete cone failure</b>								
Product factor cracked concrete		$k_{cr,N}$	[-]	7,3	7,5	7,7	8,0	8,4
Product factor uncracked concrete		$k_{ucr,N}$	[-]	10,4	10,7	11,0	11,5	12,0
characteristic edge distance		$c_{cr,N}$	[mm]	115	140	159	195	238
characteristic anchor spacing		$s_{cr,N}$	[mm]	229	280	318	390	476
Partial safety factor		$\gamma_{Mc}$				1,5		
<b>Splitting</b>								
		$c_{cr,sp}$	[-]			3,0 $h_{ef}$		
Partial safety factor		$\gamma_{M,sp} = \gamma_{Mc}$	[-]			1,5		

1) In absence of other national regulations.

## Edilmatic anchor channels with channel bolts

### Performance

Characteristic resistances of anchor channels under tension load

## Annex C1

**Table C3: Characteristic resistances under tension load – steel failure of anchor channel and concrete failure**

Anchor channel				GF	GI	GD	GE	GM
<b>Steel failure, failure of anchor</b>								
Characteristic resistance	$V_{Rk,s,a}$	[kN]		11,3	38,0	38,0	57,3	53,1
Partial safety factor	$\gamma_{Ms,1}$	[-]				1,67		
<b>Steel failure, failure of connection between anchor and channel</b>								
Characteristic resistance	$V_{Rk,s,c}$	[kN]		8,8	27,0	19,2	31,5	47,8
Partial safety factor	$\gamma_{Ms,c,1}$	[-]				1,8		
<b>Steel failure, local failure by flexure of channel lips</b>								
Characteristic spacing of channel bolts for $V_{Rk,s,l}$	$s_{l,v}$	[mm]		56	76	92	112	112
Characteristic resistance	$V_{Rk,s,l}$	[kN]		8,8	27,0	19,2	31,5	47,8
Partial safety factor	$\gamma_{Ms,l,1}$	[-]				1,8		
<b>Concrete pry-out</b>								
Product factor	$k_8$	[kN]		1,0	1,0	2,0	2,0	2,0
Partial safety factor	$\gamma_{Mc}$					1,5		
<b>Concrete edge failure</b>								
Product factors	cracked concrete	$k_{cr,v}$	[-]			4,5		
	uncracked concrete	$k_{ucr,v}$	[-]			6,3		
Partial safety factor	$\gamma_{Mc}$	[-]				1,5		

1) In absence of other national regulations.

**Table C4: Characteristic resistances under combined tension and shear load**

Anchor channel				GF	GI	GD	GE	GM
<b>Steel failure, local failure by flexure of channel lips and failure by flexure of channel</b>								
Product factor	$k_{13}$	[-]				1,0		
<b>Steel failure, failure of anchor and connection between anchor and channel</b>								
Product factor	$k_{14}$	[-]				1,0		

#### Edilmatic anchor channels with channel bolts

#### Performance

Characteristic resistances of anchor channels under shear load  
Characteristic resistance under combined tension and shear load

#### Annex C2

**Table C5: Characteristic resistances under tension load – steel failure of Edilmatic channel bolts**

Channel bolt			M12	M14	M16
Characteristic resistance	$N_{Rk,s}$	[kN]	56,0	59,5	63,7
Partial safety factor	$\gamma_{Ms}$	[-]	1,5		

**Table C6: Characteristic resistances under shear load – steel failure of Edilmatic channel bolts**

Channel bolt			M12	M14	M16
Characteristic resistance	$V_{Rk,s}$	[kN]	33,7	46,0	62,8
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	82,4	167,0	267,0
Partial safety factor	$\gamma_{Ms}$	[-]	1,25		

**Table C7: Displacements under tension load**

Anchor channel			GF	GI	GD	GE	GM
Tension load	N	[kN]	3,5	10,7	7,7	12,1	20,0
Short time displacement	$\delta_{N0}$	[mm]	0,6	0,8	0,7	1,0	1,3
Long time displacement	$\delta_{N\infty}$	[mm]	1,2	1,6	1,4	2,0	2,6

**Table C8: Displacements under shear load**

Anchor channel			GF	GI	GD	GE	GM
Shear load	V	[kN]	3,5	10,7	7,7	12,1	20,0
Short time displacement	$\delta_{V0}$	[mm]	0,9	1,2	1,1	1,5	2,0
Long time displacement	$\delta_{V\infty}$	[mm]	1,4	1,8	1,7	2,3	3,0

**Edilmatic anchor channels with channel bolts**

**Performance**

Characteristic resistances of channel bolts under tension and shear loads  
Displacements under tension and shear loads

**Annex C3**