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European Organisation for
Technical Assessment
Organisation Européenne
pour l'évaluation technique

European Technical Assessment ETA 17/0869 of 10/09/2019

GENERAL PART

Trade name of the construction product

**GL LOCATELLI anchor channels (GP) with
channel bolts (V) and smart anchor channels
(HGP)**

Product family to which the construction
product belongs

**PAC 33: FIXINGS.
Anchor channels**

Manufacturer

**GL Locatelli S.r.l
Via Dante Alighieri, 66 - 22078 Turate (CO)
Italy**

Manufacturing plant

**GL Locatelli S.r.l
Via Dante Alighieri, 66 - 22078 Turate (CO)
Italy**

This European Technical Assessment
contains:

**27 pages, including 24 annexes which form
an integral part of this assessment**

This European Technical Assessment is
issued in accordance with Regulation (EU)
n° 305/2011, on the basis of

EAD 330008-02-0601 – Anchor Channels

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SPECIFIC PART

1. TECHNICAL DESCRIPTION OF THE PRODUCT

GP40/223 – HGP40/223 – GP50/30 – HGP50/30 – GP54/33 – HGP54/33 anchor channels consist of C-shaped channel of cold-formed steel, and at least two steel anchors non-detachably fixed on the profile back. The anchor channel is embedded surface-flush in the concrete. GL Locatelli channel bolt (hook-head) with the appropriate hexagon nuts and washers will be inserted in the channel.

HGP smart anchor channel is composed of GP channel with HGP channel nuts pre-installed into the channel and HGP threaded rod.

The product description is given in Annex A. The material values, dimensions and tolerances of the components indicated in the annexes shall correspond to the values laid down in the technical documentation¹.

2. SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° 330008-02-0601

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.

¹ *The technical documentation comprises all information of the holder of this ETA necessary for the production, installation and maintenance of the anchor channels; these are in particular the structural analysis, design drawings and the manufacturer's installation instructions. The part to be treated confidentially is deposited in ITC-CNR and, as far as this is relevant to the tasks of the approved bodies involved in the procedure of attestation of conformity, shall be handed over to the approved body.*

3. PERFORMANCE OF THE PRODUCT AND REFERENCES TO THE METHODS USED FOR ITS ASSESSMENT

3.1 MECHANICAL RESISTANCE AND STABILITY (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension under static and quasi-static loading	See Annex C1-C3
Characteristic resistance for shear under static and quasi-static loading	See Annex C4-C6
Characteristic resistance for tension under fatigue loading	See Annex C9-C10
Displacements	See Annex C3 and C6

3.2 SAFETY IN CASE OF FIRE (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C7-C8

4. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

In accordance with the European Assessment Document EAD No. 330008-02-0601 the applicable European legal act is: Decision 2000/273/EC.

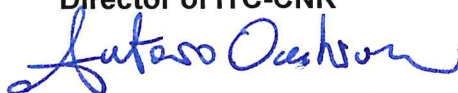
The System to be applied is: 1.

5. TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN EAD 330008-02-0601

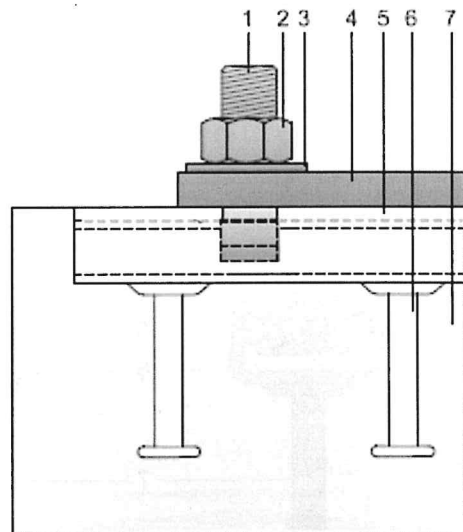
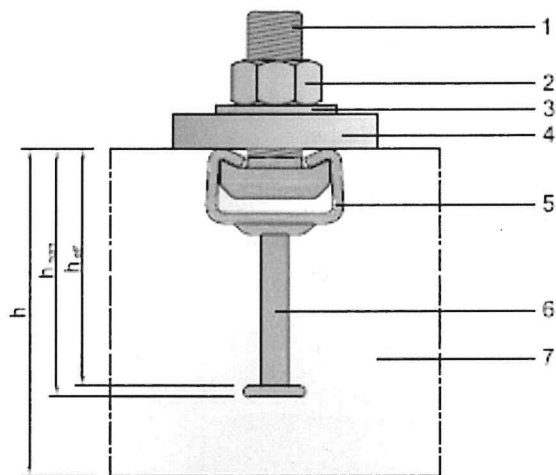
Technical details necessary for the implementation of the AVCP system are laid down in the Control Plan deposited at ITC-CNR.

Issued in San Giuliano Milanese, Italy on 10/09/2019
by ITC – CNR

Prof. Antonio Occhiuzzi
Director of ITC-CNR

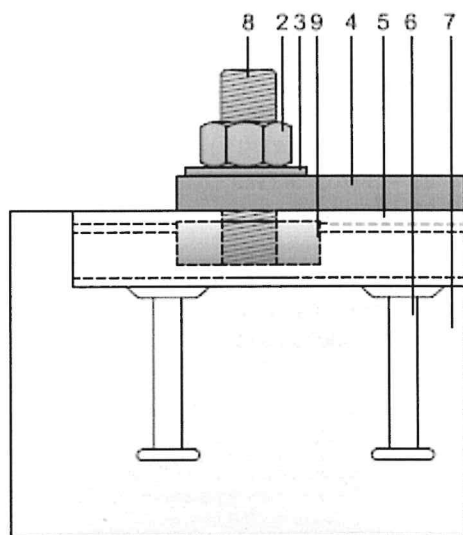
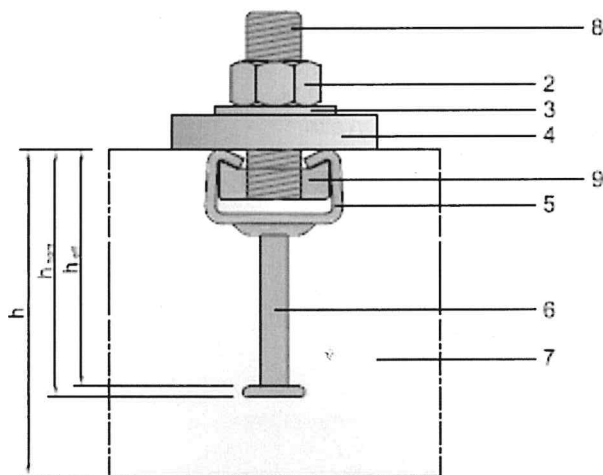


GP Anchor Channel



- 1 Channel Bolt
- 2 Hexagonal Nut
- 3 Washer
- 4 Fixture
- 5 Channel profile
- 6 Anchor
- 7 Concrete Member
- 8 HGP Threaded rod
- 9 HGP Channel Nut (pre-installed)

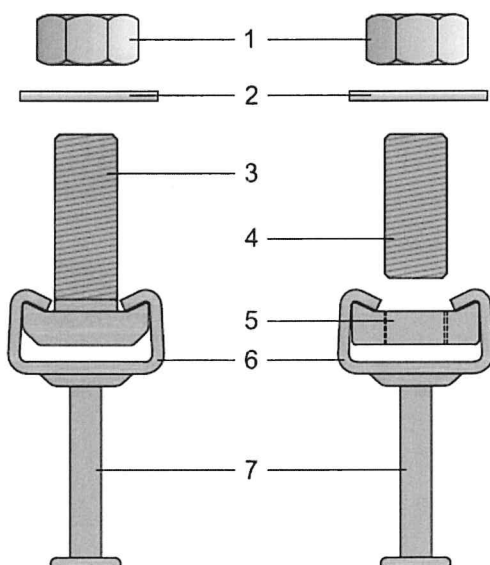
HGP Smart Anchor Channel



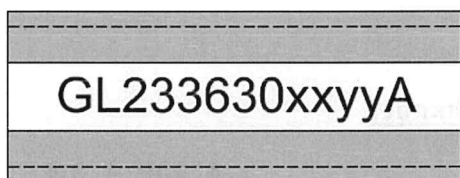
GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Installed Condition

Annex A1
of ETA N° 17/0869

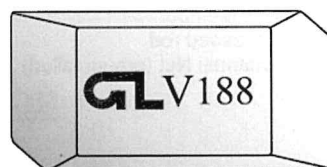


- 1 Hexagonal Nut
- 2 Washer
- 3 Channel Bolt
- 4 HGP Threaded rod
- 5 HGP Channel Nut (pre-installed)
- 6 Channel Profile
- 7 Anchor



Marking of the GL Locatelli anchor channel

GL = GL LOCATELLI
 23 = Size of anchor channel
 36 = Material
 30 = Thickness
 xx= Week of production
 yy = Year of production
 A = Production site



Marking of the GL Locatelli channel bolt

GL = GL LOCATELLI
 V = Production site
 1 = Job lot code
 88 = Steel grade

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Product and Marking

Annex A2
of ETA N° 17/0869

Table A1: Materials for anchor channels

	GP40/223 – HGP40/223				GP50/30 – HGP50/30		GP54/33 – HGP54/33	
	Steel S235JR (1.0038) [EN 10025]	Steel S235JR (1.0038) [EN 10025]	Steel S235JR (1.0038) [EN 10025]	Steel S420MC (1.0980) [EN 10149-2]	Steel S420MC (1.0980) [EN 10149-2]	Steel S420MC (1.0980) [EN 10149-2]	Steel S235JR (1.0038) [EN 10025]	Steel S235JR (1.0038) [EN 10025]
Channel profile	electroplated 19 to 21 μm $f_{yk} = 235 \text{ N/mm}^2$ $f_{uk} = 360 \text{ N/mm}^2$	hot-dip galvanized $\geq 55 \mu\text{m}$ $f_{yk} = 235 \text{ N/mm}^2$ $f_{uk} = 360 \text{ N/mm}^2$	hot-dip galvanized with sendzimir 16 to 20 μm $f_{yk} = 235 \text{ N/mm}^2$ $f_{uk} = 360 \text{ N/mm}^2$	electroplated 19 to 21 μm $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	hot-dip galvanized $\geq 55 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	hot-dip galvanized with sendzimir 16 to 20 μm $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	hot-dip galvanized $\geq 55 \mu\text{m}$ $f_{yk} = 235 \text{ N/mm}^2$ $f_{uk} = 360 \text{ N/mm}^2$	electroplated 19 to 21 μm $f_{yk} = 235 \text{ N/mm}^2$ $f_{uk} = 360 \text{ N/mm}^2$
Anchor	Steel CB10FF (1.0214) [EN 10263] electroplated $\geq 9 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel CB10FF (1.0214) [EN 10263] hot-dip galvanized $\geq 55 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel CB10FF (1.0214) [EN 10263] electroplated $\geq 9 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel CB10FF (1.0214) [EN 10263] electroplated $\geq 9 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel CB10FF (1.0214) [EN 10263] hot-dip galvan. $\geq 55 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel CB10FF (1.0214) [EN 10263] electroplated $\geq 9 \mu\text{m}$ $f_{yk} = 420 \text{ N/mm}^2$ $f_{uk} = 480 \text{ N/mm}^2$	Steel St 52-3 (1.0570) [EN 10027-2] hot-dip galvanized $\geq 55 \mu\text{m}$ $f_{yk} = 355 \text{ N/mm}^2$ $f_{uk} = 520 \text{ N/mm}^2$	Steel St 52-3 (1.0570) [EN 10027-2] electroplated $\geq 9 \mu\text{m}$ $f_{yk} = 355 \text{ N/mm}^2$ $f_{uk} = 520 \text{ N/mm}^2$

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Material

Annex A3
of ETA N° 17/0869

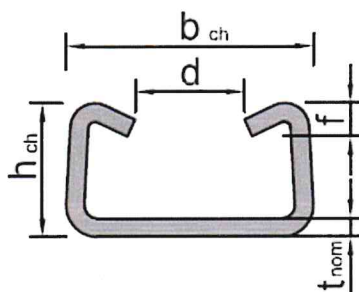
Table A2: Materials for channel bolts and smart channel bolts

Channel	GP40/223 - GP50/30 - GP54/33		HGP40/223 - HGP50/30 - HGP54/33	
Product	Channel Bolt		Smart Channel Bolt	
Channel Bolt (V40/22 –V50/300) (acc. to EN ISO 4018)	Carbon steel Steel grade 4.6/8.8 [EN ISO 898-1] electroplated ≥ 12 µm	Carbon steel Steel grade 4.6/8.8 [EN ISO 898-1] hot-dip galvan. ≥ 40 µm	-	-
HGP Channel Nut (ADHZ40 – ADHZ50 – ADHZ54)	-	-	Carbon Steel S275JR [EN 10025] electroplated 19 to 21 µm	Carbon Steel S275JR [EN 10025] hot-dip galvan. ≥ 55 µm
HGP Threaded Rod	-	-	Carbon Steel Steel grade 4.6/8.8 [EN ISO 898-1] electroplated ≥ 12 µm	Carbon Steel Steel grade 4.6/8.8 [EN ISO 898-1] hot-dip galvan. ≥ 40 µm
Washer (acc. to EN ISO 7089 and EN ISO 7093-1, production class A, 200 HV)	Carbon Steel [EN 10025] electroplated ≥ 5 µm	Carbon Steel [EN 10025] hot-dip galvan. ≥ 40 µm	Carbon Steel [EN 10025] electroplated ≥ 5 µm	Carbon Steel [EN 10025] hot-dip galvan. ≥ 40 µm
Hexagonal nut (acc. to EN ISO 4032)	Carbon Steel Strength grade 5/8 [EN 20898-2] electroplated ≥ 5 µm	Carbon Steel Strength grade 5/8 [EN 20898-2] hot-dip galvan. ≥ 40 µm	Carbon Steel Strength grade 5/8 [EN 20898-2] electroplated ≥ 5 µm	Carbon Steel Strength grade 5/8 [EN 20898-2] hot-dip galvan. ≥ 40 µm

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Material

Annex A4
of ETA N° 17/0869



Marking of the channel according to Annex A2

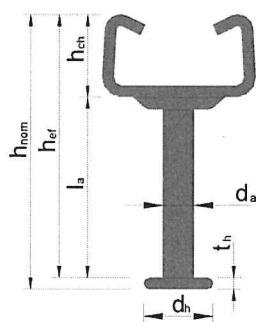
Table A3: Geometry

Anchor channel	b_{ch}	h_{ch}	t_{nom}	d	f	I_y
	[mm]					[mm ³]
GP40/223 HGP40/223	40.8	22	3	18	5.50	14616
GP50/30 HGP50/30	50	28.5	3	22	6.50	40198
GP54/33 HGP54/33	55	34	5	22	8.80	83800

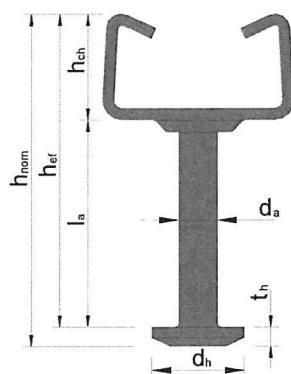
GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Profile Dimensions

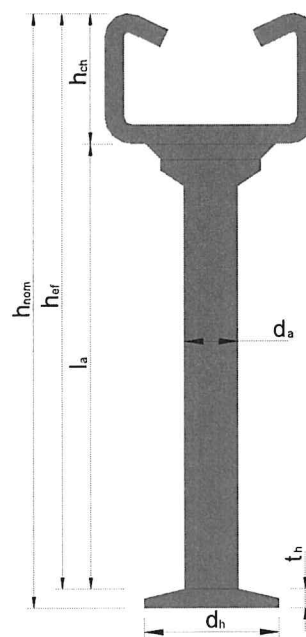
Annex A5
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**GP40/223
HGP40/223**



**GP50/30
HGP50/30**



**GP54/33
HGP54/33**

Table A4: Anchor dimensions

Anchor channel	h_{nom}	h_{ef}
	[mm]	
GP40/223 HGP40/223	72	69.0
GP50/30 HGP50/30	87	81.5
HGP54/33	154	150.0

Table A5: Round anchor dimensions

Round anchor	d_a	d_h	$\min l_a$	t_h	A_h
	[mm]				[mm ²]
GP40/223 HGP40/223	8	18	47	3.0	204.2
GP50/30 HGP50/30	10	24	53	5.5	373.8
GP54/33 HGP54/33	14	35	116	4.0	808.2

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Anchor Dimensions

**Annex A6
of ETA N° 17/0869**

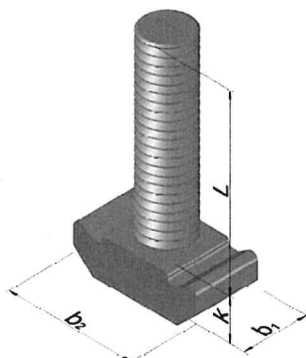


Table A6: Dimensions for channel bolt

Anchor channel	Channel bolt	b ₁	b ₂	k	Ø
		[mm]			
GP40/223	V40/22	16.5	32.1	11	10
					12
					14
					16
GP50/30	V50/300	20.5	41.5	15	10
					12
					14
					16
GP54/33	V50/300	20.5	41.5	15	20
					10
					12
					14

Table A7: Channel bolt steel strength grade

Grade	Carbon Steel	
	4.6	8.8
f _{uk} [MPa]	400	800
f _{yk} [MPa]	240	640
Finishing coat	Zinc plated - HDG	

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – Channel Bolt Dimensions and Steel Grade

Annex A7
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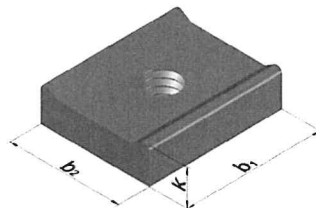


Table A8: Dimensions for HGP Channel Nut

Anchor channel	Channel Nut	b ₁	b ₂	k	Ø
		[mm]			
HGP40/223	ADHZ40	50	32.1	13.0	12-14-16
HGP50/30	ADHZ50	50	40.5	13.9	16
HGP54/33	ADHZ54	50	42.5	19.9	16

Table A9: HGP Channel Nut strength grade

	Carbon Steel	
Grade	S275JR	
f _{uk} [MPa]	410	
f _{yk} [MPa]	275	
Finishing coat	Electroplated	HDG

Table A10: HGP Threaded Rod steel strength grade

	Carbon Steel	
Grade	4.6	8.8
f _{uk} [MPa]	400	800
f _{yk} [MPa]	240	640
Finishing coat	Zinc plated - HDG	

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Product Description – HGP Connector Dimensions and Steel Grade

Annex A8
of ETA N° 17/0869

Specification of intended use

Anchor channels and channel bolts/ smart channel bolts subject to:

- Static and quasi-static loads in tension and shear perpendicular to the longitudinal axis of the channel;
- Fatigue loading;
- Fire exposure only for concrete class C20/25 to C50/60.

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 non-cracked concrete.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (e.g. accommodations, bureaus, schools, hospitals, shops, exceptional internal conditions with usual humidity) : anchor channels and channel bolts according to Annex A3-A4.
- 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: anchor channels and channel bolts according to Annex A3-A4.

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 bolts are indicated on the design drawings (e.g. position of the anchor channel relative to the reinforcement or to 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" and according to EN 1992-4.
- For fatigue loading the anchor channel is designed in accordance with EOTA TR 050 "Calculation Method for the Performance of Anchor Channels" and according to EN 1992-4.
- The characteristic resistances are calculated with the minimum effective embedment depth.

Installation:

- Anchor channel installation is carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on 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 according to Annex B2, Table B1 are generated including end spacing and minimum channel length and only to be use in dry internal conditions.
- Anchor channel installation in accordance with the manufacturer's specifications and the design drawings.
- The anchor channels are fixed on the framework, 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 A4 and provided separately by the user.
- Size and spacing of channel bolts corresponding to the design drawings.
- Orientate the channel bolt rectangular to the channel axis.
- The required installation torques given in Annex B3 must be applied and must not be exceeded.

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Intended Use – Specifications

**Annex B1
of ETA N° 17/0869**

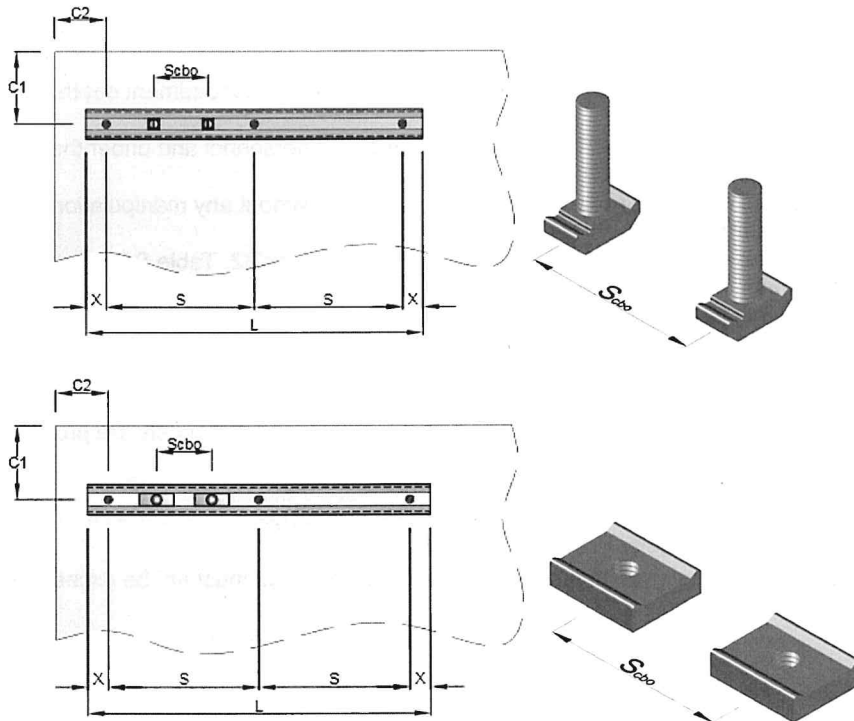
Table B1: Installation parameters for anchor channels

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Minimum spacing	S_{min}	[mm]	95	90	120
Maximum spacing	S_{max}		250		
End spacing	X		27,5	30	40
Minimum channel length	l_{min}		150		
Minimum edge distance	C_{min}		50	75	100
Minimum thickness of concrete member	h_{min}		102	117	183
Minimum effective embedment depth	$h_{ef,min}$		69	81.5	150

Table B2: Minimum spacing for channel bolt

Channel bolt			M8	M10	M12	M14	M16	M20
Minimum spacing between channel bolts	$S_{cbo,min}$	[mm]	40	50	60	70	80	100

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



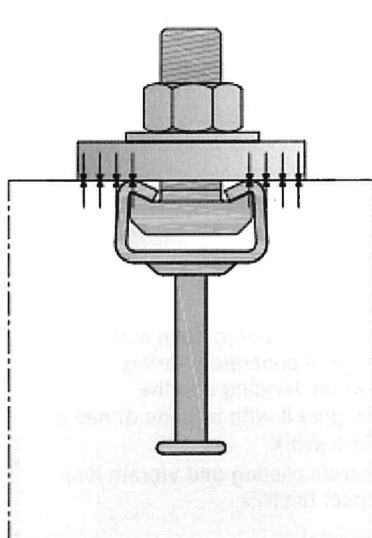
GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Intended Use – Installation parameters for channel bolts

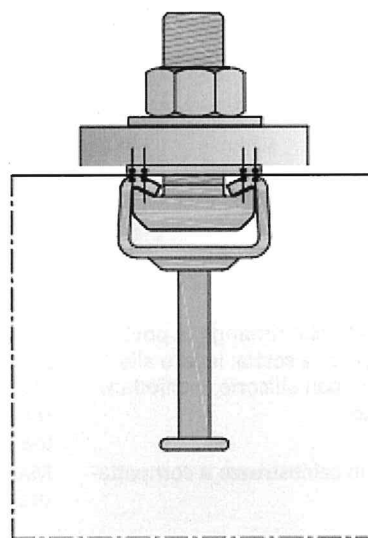
Annex B2
of ETA N° 17/0869

Table B1: Required installation torque T_{inst}

Channel Bolt		T_{inst} [Nm]					
		General			Steel to steel contact		
		GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33	GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
M10	4.6, 8.8	15	15	15	15	15	15
M12	4.6, 8.8	25	25	25	25	25	25
M14	4.6, 8.8	35	35	35	35	35	35
M16	4.6, 8.8	35	60	60	45	60	60
M20	4.6, 8.8	-	60	100	-	75	120



a)



b)

- a) General:** The fixture is in contact with the channel profile and the concrete surface
- b) 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.

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Intended Use – Installation parameters for channel bolts

Annex B3
of ETA N° 17/0869

Installazione in cantiere

Installazione nel cassero dei profili di ancoraggio GP e HGP

Posizionare il profilo di ancoraggio nel cassero rispettando le distanze minime C1 e C2

Installation in the building yard

Installation in the formwork of GP and HGP anchor channels

Respecting the minimum distances C1 and C2

Distanza minima dai bordi- mm - Minimum edge distance

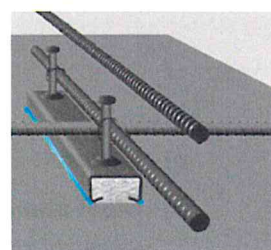
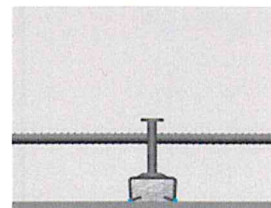
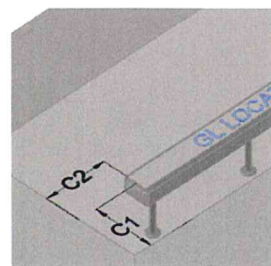
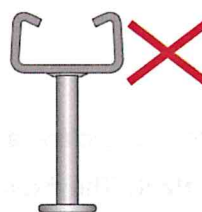
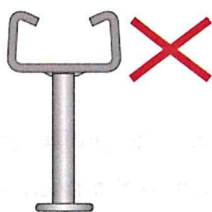
Profilo Channel	HGP54/33	HGP50/30	HGP40/223					
	GP54/33	GP50/30	GP40/223	GP40/221	GP38/17	GP2	GP1	GL1
C1,C2	100	75	50	50	50	50	50	50

Fissare il profilo affinché rimanga in posizione durante il getto, a scelta: legare alle armature, incollare con silicone, inchiodare al cassero di legno

Eseguire il getto in calcestruzzo e compattare vibrando.

Fixing the profile in order to have it in position during the concrete pouring, choosing between: binding it to the reinforcement, glue it with silicone or nail it the wooden formwork

Make the concrete casting and vibrate it in order to compact the mix.



GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Intended Use – Installation instructions for anchor channels

Annex B4
of ETA N° 17/0869

Installazione dell'ancoraggio

Rimuovere il riempimento di schiuma dal profilo

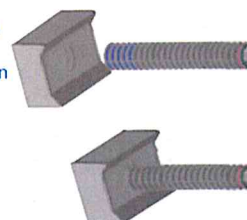
Anchorage installation

Remove the foam filling from the channel



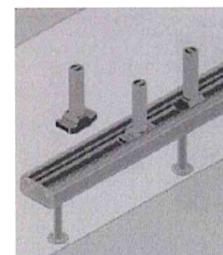
HGP - avvitare il grano M16x60 nel connettore all'interno del profilo. Il grano è completamente avvitato quando il filetto BLU non è più visibile. Eseguire l'ancoraggio con dadi e rondelle piane rispettando la coppia di chiusura M16.

HGP - screw the M16x60 socket into the link inside the profile. The sockets are completely screwed when the BLUE thread will disappear. Carry out the fixing with nut and flat washers respecting the M16 torque hammer-head.



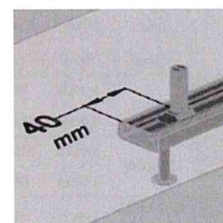
GP - inserire la vite testa ad ancora nel profilo e ruotare la vite di 90° in senso orario in modo che la testa si ancori alle estremità del profilo.

GP - insert the channel bolt into the channel slot and rotate the channel bolt of 90° clockwise in a way that the head anchor itself to the edges of the profile.



Verificare il corretto posizionamento della vite ad ancora. La scanalatura presente sotto al gambo della vite deve essere perpendicolare all'asse longitudinale del profilo. Installare le viti a una distanza superiore a 40 mm dall'estremità laterale del profilo GP. Eseguire l'ancoraggio con dadi e rondelle piane rispettando la coppia di chiusura.

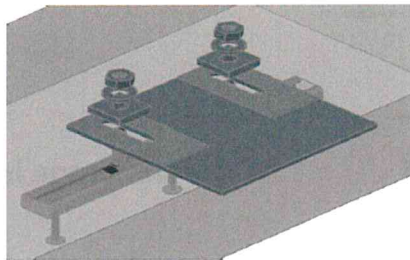
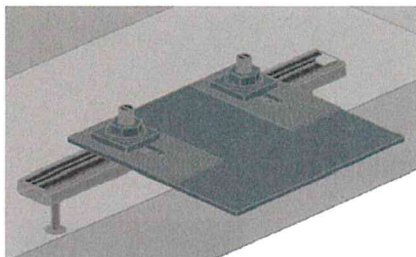
Check the correct positioning of the GL Locatelli hammer-head channel bolt. The groove on the shank end of the channel bolt must be perpendicular to the channel longitudinal axis. Install the channel bolts at a distance higher than 40 mm from the lateral edge of the GP anchor channel. Carry out the fixing with nuts and flat washers respecting the torque.



GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

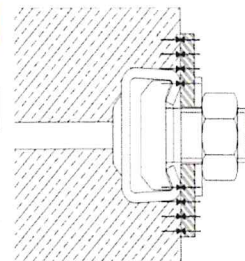
Intended Use – Installation instructions for V bolts and HGP bolts

Annex B5
of ETA N° 17/0869



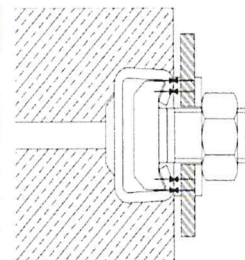
Coppia di serraggio (cls-acciaio) - Tinst Nm - Recommended torque (concrete-steel)

Profilo Channel	HGP54/33	GP54/33	HGP50/30	GP50/30	HGP40/223	GP40/223	GP40/221	GP38/17	GPK2	GP1	GL1
Vite Screw	HGP	V50/300	HGP	V50/30	HGP	V40/22	V40/22	V38/17	VM4	VM3	VM3
M 8	-	-	-	-	-	-	-	-	15	-	-
M 10	-	15	-	15	-	15	15	15	15	15	15
M 12	-	25	-	25	-	25	25	25	25	25	25
M 14	-	35	-	35	-	35	35	35	-	-	-
M 16	60	60	60	60	60	35	35	35	-	-	-
M 20	-	100	-	60	-	-	-	-	-	-	-



Coppia di serraggio (acciaio-acciaio) - Tinst Nm - Recommended torque (steel-steel)

Profilo Channel	HGP54/33	GP54/33	HGP50/30	GP50/30	HGP40/223	GP40/223	GP40/221	GP38/17	GPK2	GP1	GL1
Vite Screw	HGP	V50/300	HGP	V50/30	HGP	V40/22	V40/22	V38/17	VM4	VM3	VM3
M 8	-	-	-	-	-	-	-	-	15	-	-
M 10	-	15	-	15	-	15	15	15	15	15	15
M 12	-	25	-	25	-	25	25	25	25	25	25
M 14	-	35	-	35	-	35	35	35	-	-	-
M 16	60	60	60	60	60	45	45	45	-	-	-
M 20	-	120	-	75	-	-	-	-	-	-	-



Profili di ancoraggio - Anchor channel

Tipo	Acciaio	Norma UNI	Zincatura Sendzimir	Zincatura a caldo
Type	Steel	Norm	Sendzimir galvanized	Hot dip galvanized
Profilo	GP54/33	1.0038	EN 10025	≥ 55 µm
Chiodo	GP54/33	1.0570	EN 10027-2	≥ 55 µm
Profilo	GP50/30	1.0990	EN 10149-2	≥ 55 µm
Chiodo	GP50/30	1.0214	EN 10263	≥ 55 µm
Profilo	GP40/223	1.0038	EN 10025	da 19 a 21 µm
Chiodo	GP38/17	1.0214	EN 10263	da 19 a 21 µm
Profilo	GP1	1.0038	EN 10025	da 19 a 21 µm
GL1				≥ 55 µm

Accessori - Accessories

	Acciaio	Norma UNI	Zincatura Elettrolitica	Zincatura a caldo
	Steel	Norm	Electrolytic galvanized	Hot dip galvanized
Viti spec GL e barra fil. EN ISO 4018	grado 4.6 e 8.8	EN ISO 898-1	≥ 12 µm	≥ 40 µm
Rondelle EN ISO 7089 e EN ISO 7093-1 classe a 200HV	acciaio	EN 10025	≥ 5 µm	≥ 40 µm
Viti T. Esagonale EN ISO 4042		EN 20898-2	≥ 5 µm	≥ 40 µm

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Intended Use – Installation instructions for V bolts and HGP bolts

Annex B6
of ETA N° 17/0869

Table C1: Characteristic resistance under tension loads – steel failure

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33	HGP54/33
Steel failure - Anchor						
Characteristic resistance	N _{Rk,s,a}	[kN]	24,1	37,7	80	80
Partial safety factor	γ _{Ms} ¹⁾	[-]	1,4	1,4	1,8	1,8
Steel failure - Connection channel/anchor						
Characteristic resistance	N _{Rk,s,c}	[kN]	20,4	31,1	57,7	76,8
Partial safety factor	γ _{Ms,ca} ¹⁾	[-]	1,8			
Steel failure - Channel lips						
Axial spacing	S _{I,N}	[mm]	81,6	100	110	110
Characteristic resistance	N ⁰ _{Rk,s,l}	[kN]	20,4	31,1	57,7	76,8
Partial safety factor	γ _{Ms,l} ¹⁾	[-]	1,8			

1) In absence of other national regulations

Table C2: Characteristic flexure resistance of channel

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Steel failure – Failure by flexure of channel					
Characteristic flexural resistance of channel	$M_{Rk,s,flex}$	[Nm]	1270	2299	3256
Partial safety factor	$\gamma_{Ms,flex}^{1)}$	[-]	1,15		

1) In absence of other national regulations

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

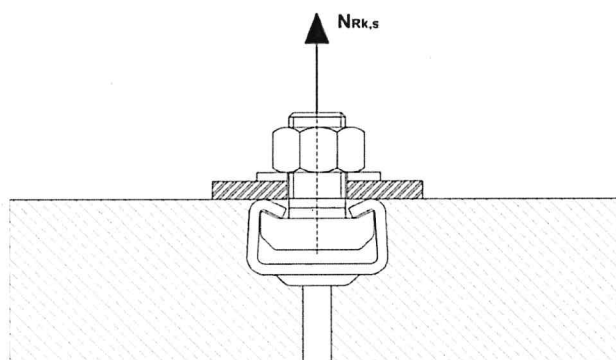
Performances – Characteristic resistances of anchor channel under tension load

Annex C1
of ETA N° 17/0869

Table C3: Characteristic values for tension loads – steel failure – channel bolts

Channel bolt					M10	M12	M14	M16	M20
Steel failure									
Characteristic resistance	N _{Rk,s}	[kN]	V40/22	4.6	23,2	33,7	46,0	62,8	-
				8.8	46,4	67,4	92,0	125,6	-
			V50/300	4.6	23,2	33,7	46,0	62,8	98,0
				8.8	46,4	67,4	92,0	125,6	196,0
			HGP Thread. Rod + ADHZ40	4.6	-	33,7	46,0	56,7	-
				8.8	-	56.7	56.7	56,7	-
			HGP Thread. Rod + ADHZ50	4.6	-	-	-	56,7	-
				8.8	-	-	-	56,7	-
			HGP Thread. Rod + ADHZ54	4.6	-	-	-	62,8	-
				8.8	-	-	-	103,6	-
Partial safety factor	γ _{Ms} ¹⁾	[-]	4.6	2,0					
			8.8	1,5					

1) In absence of other national regulations



GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channel under tension load

Annex C2
of ETA N° 17/0869

Table C4: Characteristic resistance under tension loads – concrete failure

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33	
Concrete pullout failure						
Characteristic resistance in cracked concrete C12/15		N _{Rk,p}	[kN]	18,4	33,6	72,7
Characteristic resistance in uncracked concrete C12/15		N _{Rk,p}	[kN]	25,7	47,1	101,8
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		
Partial safety factor		γ _{Mp} = γ _{Mc}		1,5		
Concrete cone failure N _{Rk,c}						
α _{ch}			0,866	0,888	0,973	
Product factor k ₁	Cracked concrete	k _{cr,N}	7,7	7,9	8,7	
	Uncracked concrete	k _{ucr,N}	11,0	11,3	12,4	
Partial safety factor		γ _{Mc}		1,5		
Concrete splitting failure						
Characteristic edge distance		c _{cr,sp}	[mm]	207	245	450
Characteristic spacing		s _{cr,sp}	[mm]	414	490	900

Table C5: Characteristic resistance under tension loads – displacements

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Tension load	N	[kN]	9,5	11,1	20,4
Short time displacement	δ_{N0}	[mm]	0,3	0,2	0,2
Long time displacement	$\delta_{N\infty}$	[mm]	0,6	0,4	0,4

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

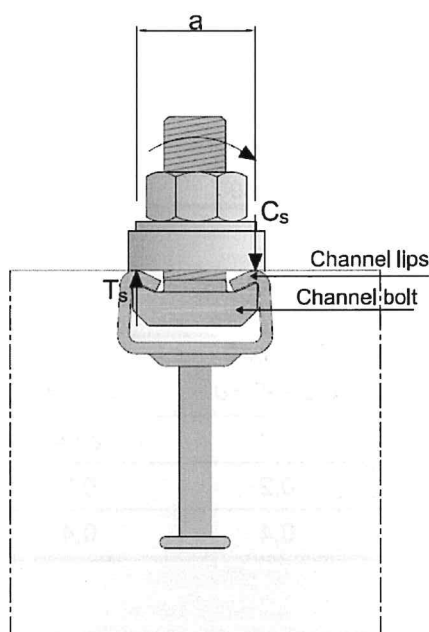
Performances – Characteristic values
for tension loads. Concrete failure and displacements

Annex C3
of ETA N° 17/0869

Table C6: Characteristic values for shear loads – steel failure – channel bolt

Channel bolt					M10	M12	M14	M16	M20
Steel failure									
Characteristic resistance	V _{Rk,s}	[kN]	V40/22, V50/300	4.6	13,92	20,22	27,60	37,68	58,8
				8.8	23,20	33,70	46,00	62,70	97,90
			HGP Thread. Rod	4.6	-	20,22	27,60	37,68	-
				8.8	-	33,70	46,00	62,70	-
Characteristic flexure resistance	M ⁰ _{Rk,s⁽²⁾}	[Nm]	V40/22, V50/300	4.6	29,9	52,4	83,5	133,2	259,6
				8.8	59,8	104,8	167,0	266,4	519,3
			HGP Thread. Rod	4.6	-	52,4	83,5	133,2	-
				8.8	-	104,8	167,0	266,4	-
Partial safety factor	γ _{Ms} ¹⁾	[-]	4.6	1,67					
			8.8	1,25					
Internal lever arm	a	[mm]	V40/22	4.6, 8.8	23	25	26	27	-
			V50/300	4.6, 8.8	28	29	30	31	34
			ADHZ40	4.6, 8.8	-	25	26	27	-
			ADHZ50	4.6, 8.8	-	-	-	31	-
			ADHZ54	4.6, 8.8	-	-	-	32	-

¹⁾ In absence of other national regulations



²⁾ The characteristic flexure resistance according to Table C6 shall be limited in design to:

$$M^0_{Rk,s} \leq 0,5 N_{Rk,s,l} \cdot a \quad (N_{Rk,s,l} \text{ according to Table C1})$$

$$M^0_{Rk,s} \leq 0,5 N_{Rk,s} \cdot a \quad (N_{Rk,s} \text{ according to Table C3})$$

with a reported in Table C6.

T_s tension force acting on the channel lips

C_s compression force acting on the channel lips

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channels under shear load

Annex C4
of ETA N° 17/0869

Table C7: Characteristic values for shear loads – steel failure

Anchor channel			GP 40/223	HGP 40/223	GP 50/30	HGP 50/30	GP 54/33	HGP 54/33
Steel failure - Anchor								
Characteristic resistance	V _{Rk,s,a}	[kN]	20,4	41,3	31,1	71,6	57,7	76,8
Partial safety factor	γ _{Ms,a} ¹⁾	[-]	1,14				1,46	
Steel failure - Connection channel/anchor								
Characteristic resistance	V _{Rk,s,c}	[kN]	20,4	41,3	31,1	71,6	57,7	76,8
Partial safety factor	γ _{Ms,ca} ¹⁾	[-]	1,8					
Steel failure - Channel lips								
Axial spacing	S _{l,v}	[mm]	81,6		100		110	
Characteristic resistance	V ⁰ _{Rk,s,l}	[kN]	20,4	41,3	31,1	71,6	57,7	76,8
Partial safety factor	γ _{Ms,l} ¹⁾	[-]	1,8					

1) In absence of other national regulations

Table C8: Characteristic values for shear loads – concrete failure

Anchor Channel		GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Pry out failure				
Product factor	k_8	2,0		
Partial safety factor	$\gamma_{Mc}^{1)}$	1,5		
Concrete edge failure				
Product factor K_{12}	$k_{cr,v}$	4,5		
	$k_{ucr,v}$	6,3		
Partial safety factor	$\gamma_{Mc}^{1)}$	1,5		

1) In absence of other national regulations

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channels under shear load

**Annex C5
of ETA N° 17/0869**

Table C9: Characteristic resistance under shear loads – displacements

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Shear load	V	[kN]	9,5	11,1	20,4
Short time displacement	δ_{V0}	[mm]	0,3	0,2	0,2
Long time displacement	$\delta_{V\infty}$	[mm]	0,5	0,3	0,3

Table C10: Characteristic resistance under combined tension and shear load

Anchor channel			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Steel failure – Flexure of channel lips and of channel					
Product factor	k ₁₃	[-]	1,0		
Steel failure – Anchor and Connection anchor/channel					
Product factor	k ₁₄	[-]	1 n		

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channels under shear load

**Annex C6
of ETA N° 17/0869**

Table C11: Characteristic resistance under fire exposure – concrete cone failure

Anchor channel				GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Concrete cone failure						
Characteristic resistance under fire exposure in concrete C20/25 to C50/60	$R_{k,c,fi}$	[kN]	R90	6,8	10,6	53,6
			R120	5,5	8,5	42,9

Table C12: Characteristic resistance under fire exposure – pull-out failure

Anchor channel				GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Pull-out failure						
Characteristic resistance under fire exposure in concrete C20/25 to C50/60	$N_{Rk,p,fi}$	[kN]	R90	7,6	14,0	30,3
			R120	6,1	11,2	24,2

Table C13: Characteristic shear resistance under fire exposure – concrete pry-out failure

PROFILE			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Concrete pry-out failure					
$V_{Rk,cp,fi}$	[kN]	R90	13,6	21,2	107,2
		R120	10,9	16,9	85,8

Table C14: Characteristic shear resistance under fire exposure – concrete edge failure

PROFILE			GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33
Concrete edge failure					
$R_{k,c,fi}$	[kN]	R90	0,9	1,6	2,3
		R120	0,7	1,3	1,9

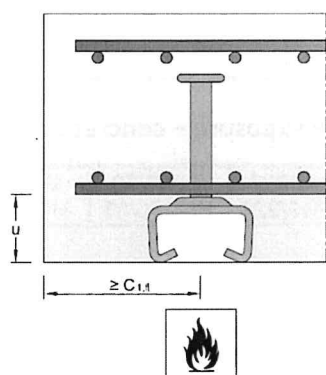
GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channels under fire exposure

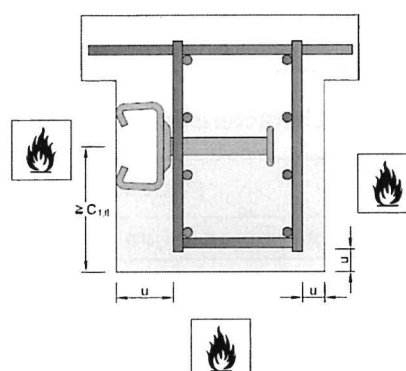
Annex C7
of ETA N° 17/0869

Table C15: Characteristic values for tension and shear loads under fire exposure

Anchor channel		GP40/223 HGP40/223	GP50/30 HGP50/30	GP54/33 HGP54/33	
Channel bolts ≥ [mm]		M16	M16	M16	
Steel failure: Anchor, Connection channel/anchor, Local flexure of channel lips					
Characteristic resistance	R90	NPA			
	R120				
Concrete cone failure					
Characteristic edge distance	C _{cr,N,fi}	[mm]	138	163	300
	C _{min,fi}		300	300	300
Characteristic spacing	S _{cr,N,fi}	[mm]	276	326	600
	S _{min,fi}		95	90	120



Fire exposure from one side only



Fire exposure from more than one side

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances of anchor channels under fire exposure

Annex C8
of ETA N° 17/0869

Table C16: Characteristic resistance under fatigue tension load – steel failure with n load cycles without static preload ($N_{ED}=0$) (design method A1 according to EAD 330008-02-0601)

Anchor channel		HGP50/30
Steel failure	n	$\Delta N_{Rk,s,0,n}$ [kN]
Characteristic resistance under fatigue tension load without static preload	$\leq 10^4$	17,95
	$\leq 5 \cdot 10^4$	10,75
	$\leq 10^5$	8,35
	$\leq 5 \cdot 10^5$	4,56
	$\leq 10^6$	3,60
	$\leq 3 \cdot 10^6$	2,69
	$\leq 6 \cdot 10^6$	2,38
	$< 10^7$	2,24

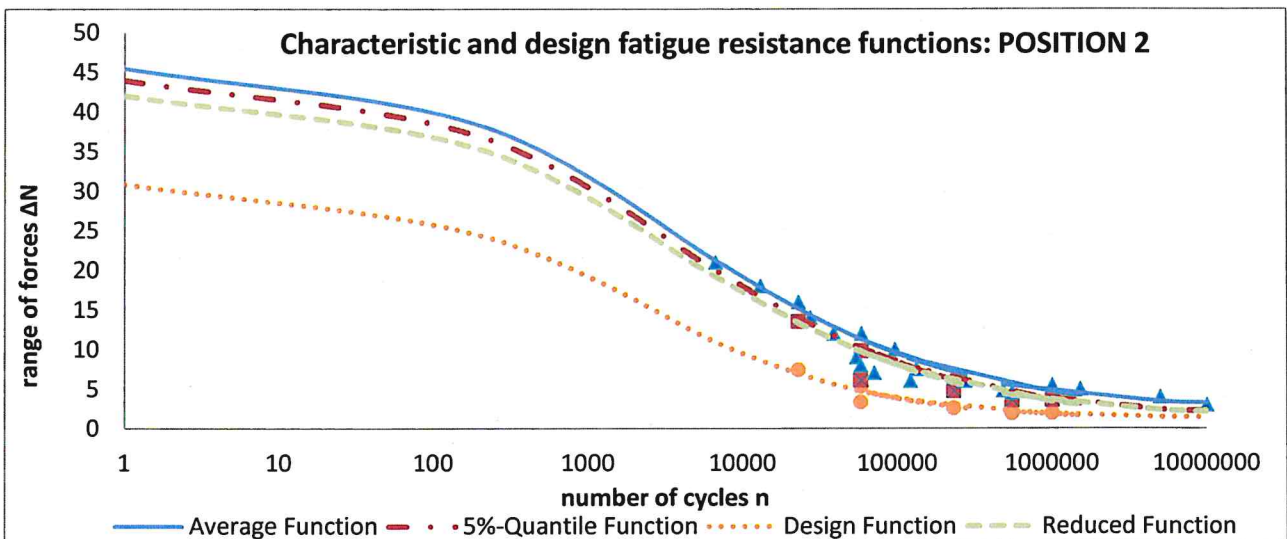


Table C17: Characteristic resistance under fatigue tension load – pullout failure with n load cycles without static preload ($N_{ED}=0$) (design method A1 according to EAD 330008-02-0601)

Anchor channel		HGP50/30
Pullout failure	n	$\Delta N_{Rk,p,0,n}$ [kN]
Characteristic resistance under fatigue tension load in cracked concrete C12/15 without static preload	$\leq 10^4$	24,73
	$\leq 5 \cdot 10^4$	23,03
	$\leq 10^5$	22,33
	$\leq 5 \cdot 10^5$	20,79
	$\leq 10^6$	20,16
	$\leq 3 \cdot 10^6$	19,20
	$\leq 6 \cdot 10^6$	18,62
	$< 10^7$	18,20

GL LOCATELLI anchor channels (GP) with channel bolts (V) and smart anchor channels (HGP)

Performances – Characteristic resistances under fatigue cyclic tension load

Annex C9
of ETA N° 17/0869

**Table C18: Reduction factor with n load cycles without static preload ($N_{ED}=0$)
(design method A1 according to EAD 330008-02-0601)**

Anchor channel		HGP50/30
Concrete cone failure	n	$\eta_{k,c,fat}$ [-]
Reduction factor for $\Delta N_{Rk,c,0;n} = \eta_{k,c,fat} N_{Rk,c}$ with $N_{Rk,c}$ calculated according to EOTA TR047	$\leq 10^4$	0,736
	$\leq 5 \cdot 10^4$	0,685
	$\leq 10^5$	0,665
	$\leq 5 \cdot 10^5$	0,619
	$\leq 10^6$	0,600
	$\leq 3 \cdot 10^6$	0,571
	$\leq 6 \cdot 10^6$	0,554
	$< 10^7$	0,542

Table C19: Characteristic resistance under fatigue tension load with $n \rightarrow \infty$ load cycles without static preload ($N_{ED}=0$) (design method A1 according to EAD 330008-02-0601) – Steel failure

Anchor channel		HGP50/30
Steel failure		
$\Delta N_{Rk,s,0,\infty}$	[kN]	2,24

Table C20: Characteristic resistance under fatigue tension load with $n \rightarrow \infty$ load cycles without static preload ($N_{ED}=0$) (design method A1 according to EAD 330008-02-0601) – Concrete failure

Anchor channel		HGP50/30
Concrete cone and pullout failure		$\eta_{k,c,fat}$
$\Delta N_{Rk,c,0,\infty} = \eta_{k,c,fat} N_{Rk,c}$	[-]	0,5
$\Delta N_{Rk,p,0,\infty} = \eta_{k,c,fat} N_{Rk,p}$		

**GL LOCATELLI anchor channels (GP) with channel bolts (V) and
smart anchor channels (HGP)**

Performances – Characteristic resistances under fatigue cyclic
tension load

**Annex C10
of ETA N° 17/0869**