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European Technical Assessment ETA 22/0217 of 16/06/2022

GENERAL PART

Trade name of the construction product	**GP SEISMIC**
Product family to which the construction product belongs	**PAC 33: FIXINGS** **Kit for connection of precast concrete façade elements to concrete structure based on 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:	**20 pages, including 10 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 332699-00-0601 – Kit for connection of precast concrete façade elements to concrete structure based on anchor channels**

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SPECIFIC PARTS

1 TECHNICAL DESCRIPTION OF THE PRODUCT

The GP SEISMIC, made of anchor channels (GP seismic complete of sliding nut), consists of two anchor channels, each of them embedded in the precast element (panel and beam/column), a toothed steel plate and bolt allowing the regulation of the system during the assembly phase. The two nuts, pre-inserted in the anchor channels, can slide and allow the relative displacements between the panel and the main structure, both in horizontal and vertical direction.

The product description, with reference to its components, is given in Annex A.

2 SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° 332699-00-0601 (hereinafter EAD)

The GP SEISMIC, made of anchor channels (GP seismic complete of sliding nut), is intended to be used in commercial and industrial precast concrete buildings for the connection of both vertical and horizontal precast concrete cladding panels to beams and columns, respectively.

Concerning product packaging, transport and storage it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport and storage, as he considers necessary in order to reach the declared performances.
The information about installation is provided with the technical documentation from the Manufacturer and it is assumed that the product will be installed according to it or (in absence of such instructions) according to the usual practice of the building professionals.

The specifications and conditions given by the manufacturer are summarized in Annex B.

The performances assessed in this European Technical Assessment, according to the applicable EAD, are based on an assumed intended working life of at least 50 years, provided that the conditions for packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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

The tests for performance assessment of GP SEISMIC joint, made of anchor channels (GP seismic complete of sliding nut), were carried out in compliance with EAD 332699-00-0601 according to the test methods reported herein, as well for what concerns sampling, conditioning and testing provisions.
The numbering (#) in the following tables corresponds to the numbering of Table 2.1.1 and 2.1.2 of EAD 332699-00-0601.

3.1 MECHANICAL RESISTANCE AND STABILITY (BWR 1)

3.1.1 Anchor channel (EAD, Table 2.1.1)

#	Essential characteristic	Performance
Characteristic resistance under static and quasi-static tension loading		
1	Resistance to steel failure of anchors	See Annex C1/1; Table C1
2	Resistance to steel failure of the connection between anchors and channel	No Performance Assessed
3	Resistance to steel failure of channel lips and subsequently pull-out of channel bolt	No Performance Assessed
4	Resistance to steel failure of channel bolt	No Performance Assessed
5	Resistance to steel failure by exceeding the bending strength of the channel	No Performance Assessed
6	Maximum installation torque moment to avoid damage during installation	No Performance Assessed
7	Resistance to pull-out failure of the anchor	See Annex C1/2; Table C2
8	Resistance to concrete cone failure	See Annex C1/2; Table C2
9	Minimum edge distances, spacing and member thickness to avoid concrete splitting during installation	No Performance Assessed
10	Characteristic edge distance and spacing to avoid splitting of concrete under load	See Annex C1/2; Table C2
11	Resistance to blowout failure - bearing area of anchor head	See Annex A5; Table A6
Characteristic resistance under static and quasi-static shear loading		
12	Resistance to steel failure of anchor bolt under shear loading without lever arm	See Annex C2/1; Table C3
13	Resistance to steel failure by bending of the channel bolt under shear load with lever arm	No Performance Assessed
14	Resistance to steel failure of channel lips, steel failure of connection between anchor and channel or steel failure of anchor (shear load in transverse direction)	See Annex C2/2; Table C4
15	Resistance to steel failure of connection between channel lips and channel bolt (shear load in longitudinal channel axis)	No Performance Assessed
16	Factor for sensitivity to installation	No Performance Assessed
17	Resistance to steel failure of the anchor	See Annex C2/2; Table C5
18	Resistance to steel failure of connection between anchor and channel	No Performance Assessed
19	Resistance to concrete pry-out failure	See Annex C2/2; Table C6

20	Resistance to concrete edge failure	See Annex C2/2; Table C6
Characteristic resistance under combined static and quasi-static tension and shear loading		
21	Resistance to steel failure of the anchor channel	See Annex C2/3; Table C7
Characteristic resistance under fatigue tension loading		
22	Fatigue resistance to steel failure of the whole system (continuous or tri-linear function)	No Performance Assessed
23	Fatigue limit resistance to steel failure of the whole system	No Performance Assessed
24	Fatigue resistance to concrete related failure (exponential function)	No Performance Assessed
25	Fatigue limit resistance to concrete related failure	No Performance Assessed
26	Displacements	No Performance Assessed

3.1.2 Kit for connection of precast concrete façade elements to concrete structures based on anchor channels (EAD, Table 2.1.2)

#	Essential characteristic	Performance
Mechanical resistance to cyclic quasi-static actions		
1	Shear strength after cyclic loads	See Annex C3/1; Table C8
2	In-plane behaviour	See Annex C3/1; Table C9
3	Out-of-plane behaviour	See Annex C3/1; Table C10
Mechanical resistance to cyclic dynamic actions		
4	Mechanical resistance to cyclic dynamic actions	See Annex C3/2; Table C11-Table C12

3.2 SAFETY IN CASE OF FIRE (BWR 2)

3.2.1 Anchor channel (EAD, Table 2.1.1)

#	Essential characteristic	Performance
28	Reaction to fire	Class A1
29	Resistance to fire	No Performance Assessed

3.3 Aspect of durability linked with the Basic Work Requirements

3.3.1 Anchor channel (EAD, Table 2.1.1)

#	Essential characteristic	Performance
27	Durability	No Performance Assessed

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. 332699-00-0601 the applicable European legal act is: **Decision 2001/596/EC**.
The AVCP system to be applied is: **1**

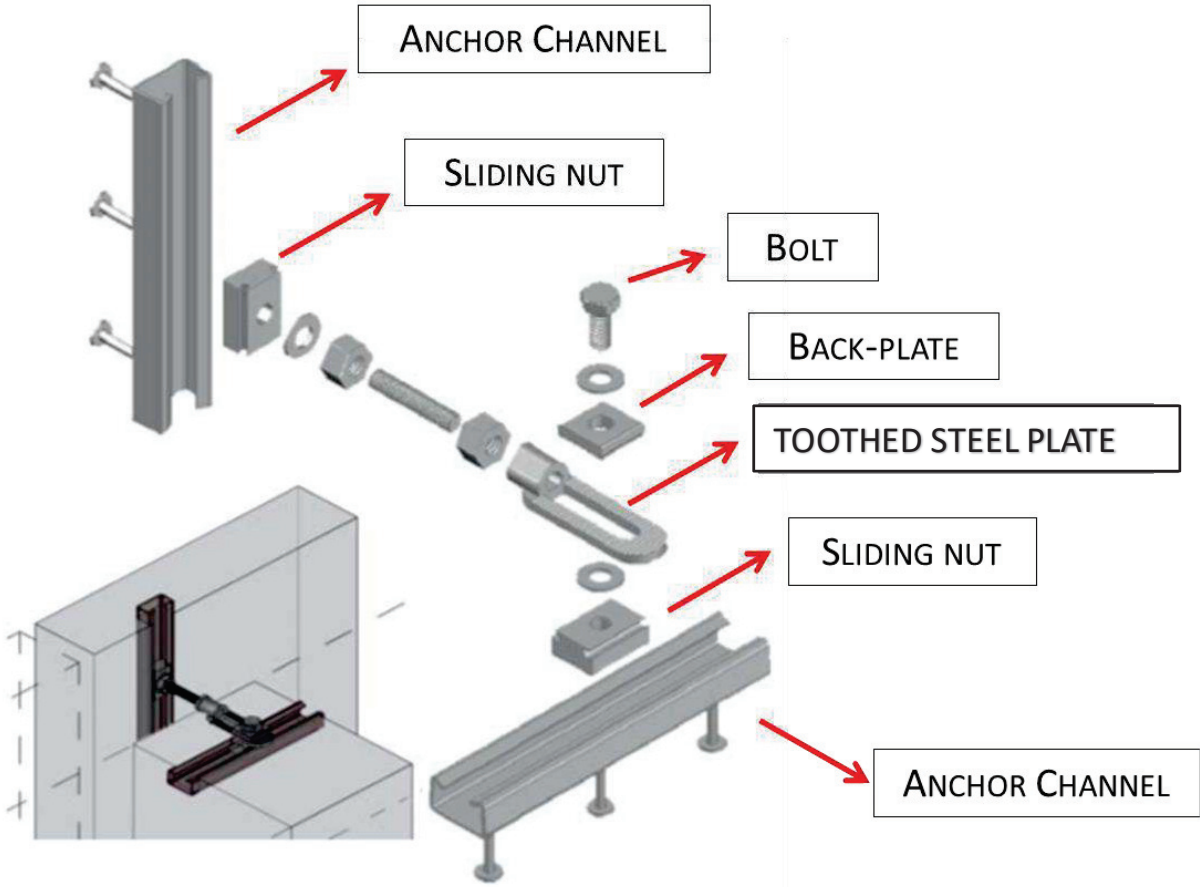
5 TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN EAD 332699-00-0601

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 16/06/2022
by ITC – CNR

Professor Antonio Occhiuzzi
Director of ITC-CNR

GP seismic: overall view



GP SEISMIC	Annex A1 of ETA N° 22/0217
Product Description – Overall view of the product	

Table A1: Components' material

GP 40/2310	
Channel profile	Steel S235JR (1.0038) [EN 10025] hot-dip galvanized with sendzimir 16 to 20 µm f_{yk} = 235 N/mm^2 f_{uk} = 360 N/mm^2
Anchor	Steel CB10FF (1.0214) [EN 10263] f_{yk} = 420 N/mm^2 f_{uk} = 480 N/mm^2 electroplated ≥ 9 µm
Bolt (acc. to EN ISO 4018)	Carbon steel Steel grade 8.8 [EN ISO 898-1] electroplated ≥ 5 µm
Sliding Nut	Steel S235JR (1.0038) [EN 10025] f_{yk} = 235 N/mm^2 f_{uk} = 360 N/mm^2 electroplated ≥ 12 µm
Toothed steel plate	Steel S235JR (1.0038) [EN 10025] f_{yk} = 235 N/mm^2 f_{uk} = 360 N/mm^2 electroplated ≥ 12 µm
Back plate	Steel S235JR (1.0038) [EN 10025] f_{yk} = 235 N/mm^2 f_{uk} = 360 N/mm^2 electroplated ≥ 12 µm
Washer (acc. to EN ISO 7089 and EN ISO 7093-1, production class A, 200 HV)	Carbon Steel [EN 10025] electroplated ≥ 5 µm
Exagonal nut (acc. to EN ISO 4032)	Carbon Steel Strength grade 8/10 [EN 20898-2] electroplated ≥ 5 µm

GP SEISMIC	**Annex A2** **of ETA N° 22/0217**
Product Description – Material	

Channel Profile

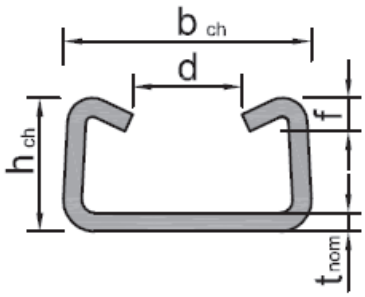


Table A2: Channel profile geometry

Channel profile	b_{ch}	h_{ch}	t_{nom}	d	f	I_y
	[mm]					[mm^3]
GP 40/2310	40	22	3	18	5,5	14616

Anchor Channel

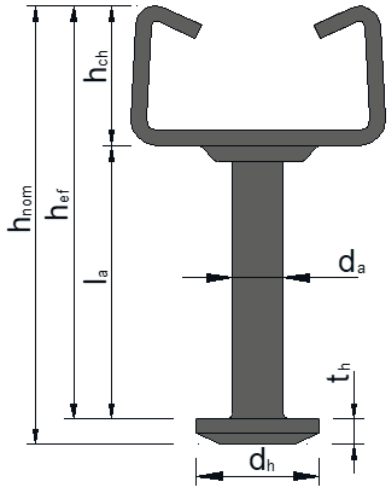


Table A3: Anchor channel geometry

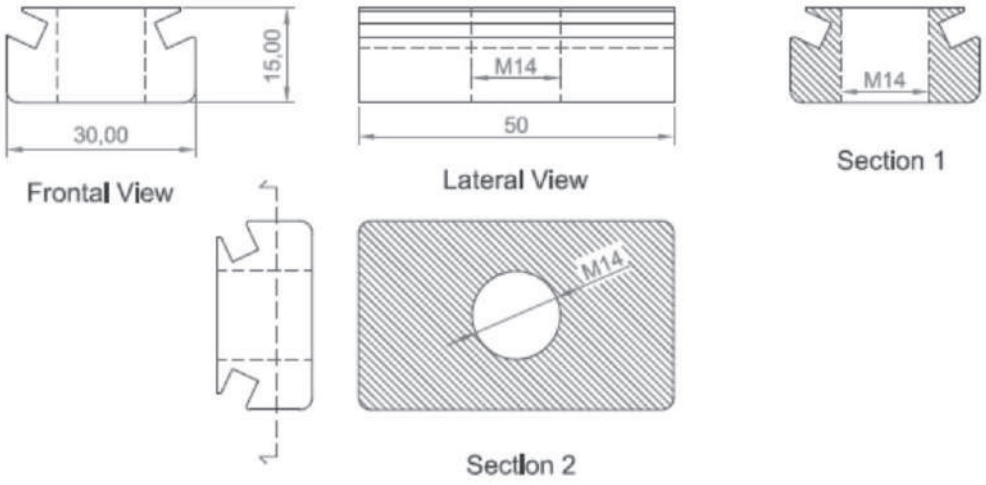
Anchor channel	h_{nom}	h_{ef}	d_a	d_h	min l_a	t_h	A_h
	[mm]						[mm^2]
GP 40/2310	81,5	76,5	10	24	56	5	373,8

GP SEISMIC

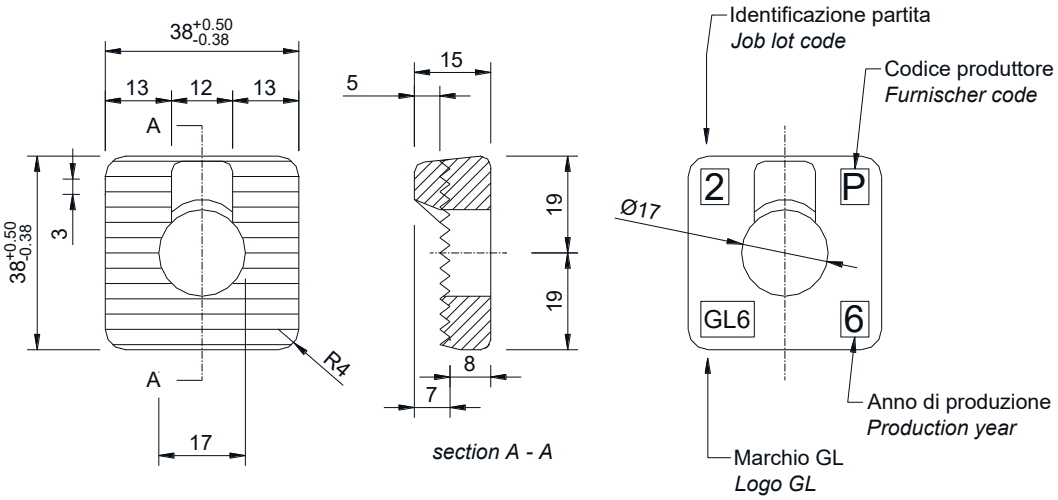
Product Description – Channel profile and anchor dimensions

Annex A3
of ETA N° 22/0217

Sliding Nut

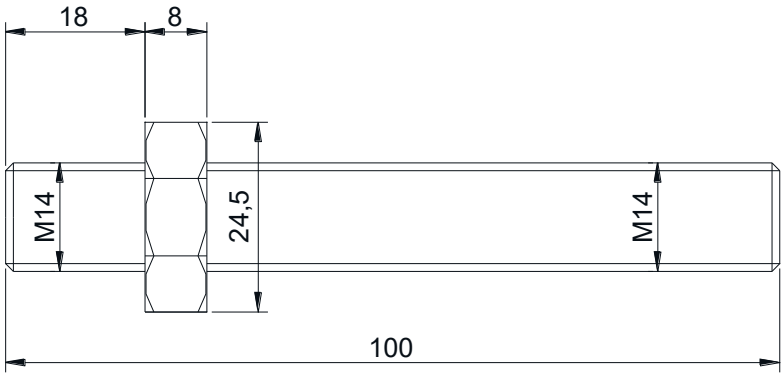


Back plate

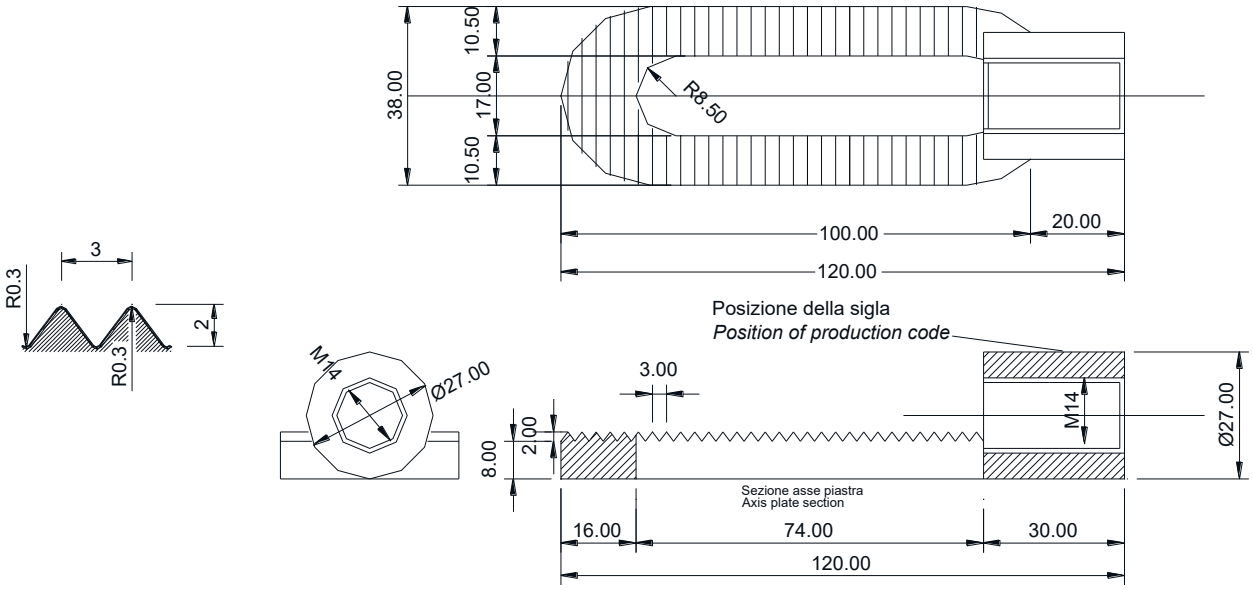


GP SEISMIC	Annex A4 of ETA N° 22/0217
Product Description – Sliding nut and back plate dimensions	

Bolt



Toothed steel plate



GP SEISMIC	Annex A5 of ETA N° 22/0217
Product Description – Bolt and Toothed steel plate dimensions	

SPECIFICATION OF INTENDED USE

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

- Static and quasi-static loads in tension and shear longitudinal and 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 206:2013.
- Strength classes C12/15 to C90/105 according to EN 206:2013.
- 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-A5.
- 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-A5.

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 INSTRUCTIONS

- 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.
- 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.
- Do not change or replace the sliding nut with other accessories.
- Orientate the channel bolt rectangular to the channel axis.

GP SEISMIC	**Annex B1** **of ETA N° 22/0217**
Intended Use – Specifications and Installation instructions	

GL LOCATELLI
Sistemi di ancoraggio

MANUALE D'USO

USER MANUAL

Installazione in cantiere

Installazione nel cassero dei profili di ancoraggio GP e HGP

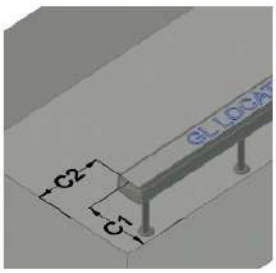
Installation in the building yard

Installation in the formwork of GP and HGP anchor channels

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

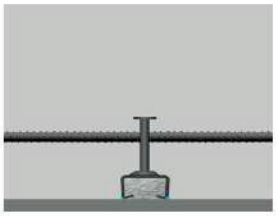
Respecting the minimum distances C1 and C2

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	GPK2	GP1	GL1
C1,C2	100	75	50	50	50	50	50	50



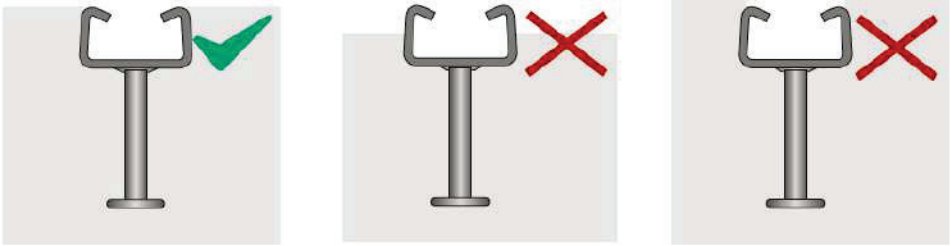
Fissare il profilo affinchè rimanga in posizione durante il getto, a scelta: legare alle armature, incollare con silicone, inchiodare al cassero di legno

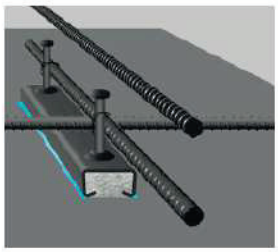
Fixing the profile in order to have it in position during the concrete pouring, choosing between: binding it to the reinforcement, glue it with silicone or nail it the wooden formwork



Eseguire il getto in calcestruzzo e compattare vibrando.

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





GP SEISMIC

Intended Use – Installation instructions

Annex B2/1
of ETA N° 22/0217

GL LOCATELLI
Sistemi di ancoraggio

Installazione dell'ancoraggio

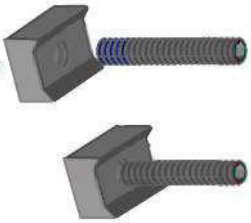
Anchorage installation

Rimuovere il riempimento di schiuma dal profilo

Remove the foam filling from the channel

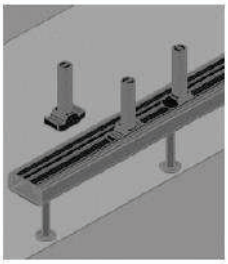
HGP - avvitare il grano M16x60 nel connettore all'interno del profilo. Il grano è completamente avvitato quando il filetto BLU non è più visibile.
Eseguire l'ancoraggio con dadi e rondelle piane rispettado la coppia di chiusura M16.

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.



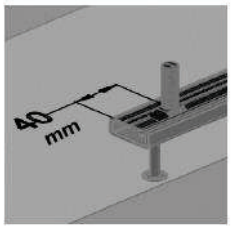
GP - inserire la vite testa ad ancora nel profilo e ruotare la vite di 90° in senso orario in modo che la testa si ancori alle estremità del profilo.

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 then 40 mm from the lateral edge of the GP. anchor channel
Carry out the fixing with nuts and flat washers respecting the torque.



GP SEISMIC

Intended Use – Installation instructions

Annex B2/2
of ETA N° 22/0217

Table C1: Characteristic resistance under static and quasi-static tension loading – steel failure

Anchor channel			GP seismic 40/2310
Steel failure - Anchor			
Characteristic resistance	$N_{Rk,s,a}$	[kN]	37,7
Partial safety factor	γ_{Ms} 2)	[-]	1,4
Steel failure - Connection channel/anchor			
Characteristic resistance	$N_{Rk,s,c}$	[kN]	- (1)
Partial safety factor	$\gamma_{Ms,ca}$ 2)	[-]	- (1)
Steel failure - Channel lips			
Axial spacing	$s_{l,N}$	[mm]	- (1)
Characteristic resistance	$N^0_{Rk,s,l}$	[kN]	- (1)
Partial safety factor	$\gamma_{Ms,l}$ 2)	[-]	- (1)

(1) No Performance Assessed
(2) In absence of other national regulations

GP SEISMIC	Annex C1/1 of ETA N° 22/0217
Performances – Characteristic resistance under static and quasi static tension loading	

Table C2: Characteristic resistance under static and quasi-static tension loading – concrete failure

Anchor channel				GP seismic 40/2310
Concrete pull-out failure				
Characteristic resistance in cracked concrete C12/15		$N_{Rk,p}$	[kN]	33,6
Characteristic resistance in uncracked concrete C12/15		$N_{Rk,p}$	[kN]	47,1
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		$\gamma_{Mp} = \gamma_{Mc}$	[-]	1,5
Concrete cone failure $N_{Rk,c}$				
α_{ch}				0,880
Product factor k_1	Cracked concrete	$k_{cr,N}$	[-]	7,8
	Uncracked concrete	$k_{ucr,N}$	[-]	11,2
Partial safety factor		γ_{Mc}	[-]	1,5
Concrete splitting failure				
Characteristic edge distance		$c_{cr,sp}$	[mm]	229,5
Characteristic spacing		$s_{cr,sp}$	[mm]	459
Partial safety factor		γ_{Msp}	[-]	1,5

GP SEISMIC	Annex C1/2 of ETA N° 22/0217
Performances – Characteristic resistance under static and quasi static tension loading	

Table C3: Characteristic resistance under static and quasi static shear loading in transverse direction – steel failure –bolt

Bolt				M14
Steel failure				
Characteristic resistance	$V_{Rk,s}$	[kN]	8.8	61,60
Characteristic flexure resistance	$M^0_{Rk,s}$	[Nm]	8.8	-[1)]
Partial safety factor	γ_{Ms}[2)]	[-]	8.8	1,25

1) No performance assessed

2) In absence of other national regulations

GP SEISMIC	**Annex C2/1** **of ETA N° 22/0217**
Performances – Characteristic resistance under static and quasi-static shear loading	

Table C4: Characteristic resistance under static and quasi static shear loading in transverse direction –steel failure anchor channel

Anchor channel			GP 40/2310
Steel failure - Anchor			
Characteristic resistance	$V_{Rk,s,a,y}$	[kN]	52,36
Partial safety factor	$\gamma_{Ms,a}$ [1)]	[-]	1,14
Steel failure - Connection channel/anchor			
Characteristic resistance	$V_{Rk,s,c,y}$	[kN]	52,36
Partial safety factor	$\gamma_{Ms,ca}$ [1)]	[-]	1,8
Steel failure - Channel lips			
Axial spacing	$s_{l,V}$	[mm]	80
Characteristic resistance	$V^0_{Rk,s,l,y}$	[kN]	52,36
Partial safety factor	$\gamma_{Ms,l}$ [1)]	[-]	1,8

1) In absence of other national regulations

Table C5: Characteristic resistance under static and quasi static shear loading in longitudinal channel axis – steel failure

Anchor channel			GP 40/2310
Steel failure - channel lips/channel bolt			
Characteristic resistance	$V_{Rk,s,l,x}$	[kN]	- [1)]
Installation factor	γ_{inst}	[-]	- [1)]
Steel failure - anchor			
Characteristic resistance	$V_{Rk,s,a,x}$	[kN]	18,8
Steel failure - Connection channel/anchor			
Characteristic resistance	$V_{Rk,s,c,x}$	[kN]	- [1)]

1) No performance assessed

Table C6: Characteristic resistance under static and quasi static shear loading – concrete failure

Anchor Channel			GP 40/2310
Pry out failure			
Product factor	k_8	[-]	2,0
Partial safety factor	γ_{Mc} [1)]	[-]	1,5
Concrete edge failure			
Product factor K_{12}	$k_{cr,v}$	[-]	4,5
	$k_{ucr,v}$	[-]	6,3
Partial safety factor	γ_{Mc} [1)]	[-]	1,5

1) In absence of other national regulations

GP SEISMIC	Annex C2/2 of ETA N° 22/0217
Performances – Characteristic resistance under static and quasi-static shear loading	

Table C7: Characteristic resistance under combined tension and shear load

Anchor channel			**GP 40/2310**
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}	[-]	1,0

GP SEISMIC	**Annex C2/3** **of ETA N° 22/0217**
Performances – Characteristic resistance under static and quasi-static shear loading	

Table C8: Mechanical resistance to cyclic quasi-static actions - shear strength after cyclic loads

GP SEISMIC	$V_{res,k}$
	[kN]
GP40/2310	41,68

Table C9: Mechanical resistance to cyclic quasi-static actions – in plane behaviour

GP SEISMIC	In-plane displacements and forces	
GP40/2310	$(\Delta^{+}_{s,IP}, \boldsymbol{F}_{\Delta^{+}_{s,IP}})$	$(\Delta^{-}_{s,IP}, \boldsymbol{F}_{\Delta^{-}_{s,IP}})$
	[%, kN]	[%, kN]
DS1	(<1%, 1,2 kN)	(<1%, 2,5 kN)
DS2	(1%, 1,2 kN)	(1%, 2,5 kN)
DS3	(>1%, 1,2 kN)	(>1%, 2,5 kN)

Table C10: Mechanical resistance to cyclic quasi-static actions – out-of- plane behaviour

GP SEISMIC	Out-of-plane displacements and forces	
GP40/2310	$(\Delta^{+}_{s,OOP}, \boldsymbol{F}_{\Delta^{+}_{s,OOP}})$	$(\Delta^{-}_{s,OOP},, \boldsymbol{F}_{\Delta^{-}_{s,OOP}})$
	[%, kN]	[%, kN]
DS1	(<1%, 0,5 kN)	(<1%, 0,5 kN)
DS2	(1%, 0,5 kN)	(1%, 0,5 kN)
DS3	(>1%, 0,5 kN)	(>1%, 0,5 kN)

GP SEISMIC	**Annex C3/1** **of ETA N° 22/0217**
Performances – Mechanical resistance to seismic loads	

Table C11: Mechanical resistance to cyclic dynamic actions – in-plane behaviour

GP SEISMIC	In-plane forces and displacements			
GP40/2310	$(F^{+}_{d,IP}, \Delta_{F^{+}_{d,IP}})$	$(F^{-}_{d,IP}, \Delta_{F^{-}_{d,IP}})$	$(\Delta^{+}_{d,IP}, F_{\Delta^{+}_{d,IP}})$	$(\Delta^{-}_{d,IP}, F_{\Delta^{-}_{d,IP}})$
	[kN, %]	[kN, %]	[%, kN]	[%, kN]
DS1	-[1)]	-[1)]	-[1)]	-[1)]
DS2	-[1)]	-[1)]	-[1)]	-[1)]
DS3	(16,88 kN, 0,3%)	(14,88 kN, 0,04%)	(1%, 2,08 kN)	(0,6%, 2,79 kN)

1) Not observed (not achieved) damage state during the test

Table C12: Mechanical resistance to cyclic dynamic actions – out-of-plane behaviour

GP SEISMIC	Out-of-plane forces and displacements			
GP40/2310	$(F^{+}_{d,OOP}, \Delta_{F^{+}_{d,OOP}})$	$(F^{-}_{d,OOP}, \Delta_{F^{-}_{d,OOP}})$	$(\Delta^{+}_{d,OOP}, F_{\Delta^{+}_{d,OOP}})$	$(\Delta^{-}_{d,OOP}, F_{\Delta^{-}_{d,OOP}})$
	[kN, %]	[kN, %]	[%, kN]	[%, kN]
DS1	-[1)]	-[1)]	-[1)]	-[1)]
DS2	-[1)]	-[1)]	-[1)]	-[1)]
DS3	(28,18 kN, 0,02%)	(25,25 kN, 0,04%)	(0,9%, 5,85 kN)	(0,8%, 14,88 kN)

1) Not observed (not achieved) damage state during the test

GP SEISMIC	**Annex C3/2 of ETA N° 22/0217**
Performances – Mechanical resistance to seismic loads	