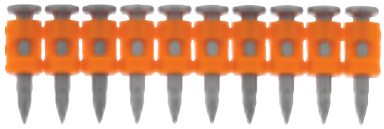
PULSA HC6

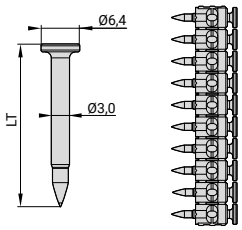


ETA - 22/0439
Category 2b
ETA - 23/0508
Category 4

High performance pins for steel, hard & pre-stressed concrete

CHARACTERISTICS





MATERIAL

- Orange collated strip
- Shank in carbon steel:
  Hardness ≥ 56 HRc
  Electrogalvanised,
  min. zinc coating 10 µm

PULSA HC6 PINS

RANGE	Length (mm) LT	Code 500 pcs BOX
HC6-15	15	057550
HC6-17	17	057551
HC6-22	22	057552
HC6-27	27	057553
HC6-32	32	057554
HC6-50	50	057701
HC6-57	57	057702
HC6-65	65	057703

PULSA GAS TOOLS

PULSA P27 (95 joules)



PULSA P40P+ (100 joules)



PULSA P65 (100 joules)

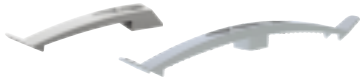


PULSA METAL ACCESSORIES

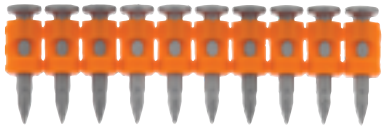
RANGE	DESCRIPTION	CODE	MATERIAL	FIRE RESISTANCE (1)
P-CLIP	Metal clip for fixing conduits			
	P-CLIP D.16 P-CLIP D.20 P-CLIP D.25	016988 016990 016993	Galvanised metal sheet DX51	Test report Ref. GS 6.1/22-002-1
TRH-CLIP	Metal clip to hang threaded rod (M6 & M8), chains or suspension cables (2)			
	TRH-CLIP	011430	Galvanised metal sheet DC01 Ep.1,5 mm	Test report ref. CSTB 05-158/A
METAL CABLE TIE	Right angled steel clip for installation of suspended light duty components			
	MCC-0	155721	Galvanised metal sheet S250GD	Test report Ref. GS 6.1/22-002-1
PERFORATED STRIP	Perforated metal strip for fixing conduits to the floor			
	12 x 0,8 - 10 m 17 x 0,8 - 10 m	056562 056561	Galvanised metal sheet DC01 Ep. 0,8 mm	Test report Ref. GS 6.1/22-002-1

(1) Tested in accordance with EAD 330232-01-0601 and ISO 834 fire standards.
(2) Not suitable for fixing suspended ceilings

PULSA PLASTIC ACCESSORIES

RANGE	DESCRIPTION	CODE	MATERIAL	INCANDESCENT WIRE TEST ISO CEI 695-2	INSTALLATION / WORKING TEMPERATURES
CLIPELEC	All purpose base plate for use with cable ties up to 9 mm wide for fixing conduit & cable ; Allogene free ; UV protected (black version)				
	CLIPELEC Black CLIPELEC Grey	011203 053881	Polypropylen copolymer	750°	-5°C + 35°C -30°C +55°C
MULTICLIP	Multi-purpose data & cable clip for the fast installation of specialised & standard cables using soft VELCRO™ style straps & plastic cable ties				
	Ø mini 16 Ø maxi 32	565843	Polypropylen	650°C	-5°C + 35°C -30°C +55°C
TIE-CLIP	Base plate with cable tie for fixing conduit & cable				
	Ø mini 16 Ø maxi 32	565844	Polyamid 6.6	650°C	-5°C +35°C -40°C +70°C
E-CLIP	For fast installation of RNC and rigid conduit				
	E-CLIP D.16 E-CLIP D.20 E-CLIP D.25 E-CLIP D.32	567214 565032 565033 565034	Polypropylen	650°C	-5°C + 35°C -30°C +55°C
P-CLIP	Single and double plastic base for fixing flexible water/electricity pipes				
	P-CLIP 16 P-CLIP 20 P-CLIP 25 P-CLIP 16 x 16 P-CLIP 20 x 20	567206 565082 567208 567209 565086	Polypropylen	650°C	-5°C + 35°C -30°C +60°C
CABLE BOW	Single and double bows for fixing cables to ceilings				
	S - 8 cables 3 x 1,5 D - 16 cables 3 x 1,5	565915 565916	Polyamid 6 Light grey colour	650°C	-5°C + 35°C -20°C +70°C
	S - 8 cables 3 x 1,5 FIRE D - 16 cables 3 x 1,5 FIRE	565917 565918	Polyamid 6 - GW960 Dark grey colour	960°C	

PULSA HC6



PIN SELECTION GUIDE

FIXING METAL TRACKS FOR DRYWALLERS		CONCRETE BASE MATERIAL	HC6-15	HC6-17	HC6-22	HC6-27	HC6-32	HC6-50	HC6-57	HC6-65
METAL TRACKS on floors, walls and ceilings 	Spacing between partition studs: 600 mm	C20/25	◆	◆	◆	◆				
		C30/37 to C50/60	◆	◆	◆					
		Pre-stressed slab / Hollow concrete slab (1)	◆	◆						
METAL TRACKS through insulation, on ceiling 	Spacing between partition studs: 600 mm Insulation thickness: 45 mm max.	C20/25						◆	◆	◆
		C30/37 to C50/60						◆	◆	
		Pre-stressed slab / Hollow concrete slab (1)						◆		

FIXING ACCESSORIES FOR ELECTRICIANS		CONCRETE BASE MATERIAL	HC6-15	HC6-17	HC6-22	HC6-27	HC6-32	HC6-50	HC6-57	HC6-65
 	Metal clip TRH-CLIP Clip MCC-O Perforated metal strip	C20/25	◆	◆	◆	◆				
		C30/37 to C50/60	◆	◆	◆					
		Pre-stressed slab / Hollow concrete slab (1)	◆	◆						
 	CLIPELEC TIE-CLIP P-CLIP MULTICLIP ECLIP Cable bow	C20/25				◆	◆			
		C30/37 to C50/60				◆	◆			
		Pre-stressed slab / Hollow concrete slab (1)				◆				

FIXING WOOD		CONCRETE BASE MATERIAL	HC6-15	HC6-17	HC6-22	HC6-27	HC6-32	HC6-50	HC6-57	HC6-65
WOOD STRUCTURES on floors and ceilings 	Thickness of part to be fixed: 10 - 20 mm	C20/25				◆	◆			
		C30/37 to C50/60				◆	◆			
		Pre-stressed slab / Hollow concrete slab (1)				◆	◆			
	Thickness of part to be fixed: 25 - 45 mm	C20/25						◆	◆	◆
		C30/37 to C50/60						◆	◆	◆
		Pre-stressed slab / Hollow concrete slab (1)						◆	◆	◆

VARIOUS FIXINGS		STEEL BASE MATERIAL	HC6-15	HC6-17	HC6-22	HC6-27	HC6-32	HC6-50	HC6-57	HC6-65
Various fixings on steel	Thickness of part to be fixed: LT - 7 mm max.	f_{uk} = 410-450 N/mm²	◆	◆						

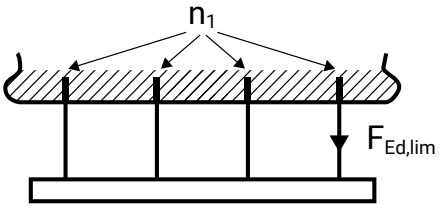
(1) Maximum embedment value to be respected to avoid damaging the prestressing reinforcement. The substrates used must comply the following embedment of the underlying concrete element pre-stressing rods: embedment greater than 17 mm in pre-stressed slabs, and 25 mm in hollow concrete slabs.

PERFORMANCES FOR NON STRUCTURAL APPLICATIONS

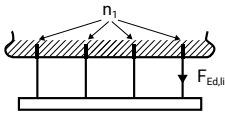
Design principle :

- **Non-structural applications**
- **Redundant systems with aligned fixing points ≥ n_1**

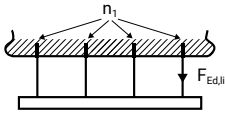
The principle of redundant systems allows the redistribution of loads in case of excessive slip or failure of one fastener to neighbouring fasteners: $n_1 \cdot F_{Rd} \geq F_{Ed}$



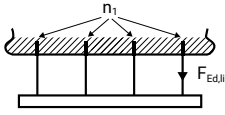
NON CRACKED CONCRETE

REDUNDANT SYSTEMS		EMBEDMENT DEPTH [mm]	CHARACTERISTIC / DESIGN RESISTANCES [kN]		ACTIONS at ULS (Ultimate Limit State) F_{Rd} [kN]			
 ▪ $n_1 \geq 4$; $F_{Ed,lim} \leq 0,6$ kN ▪ $n_1 \cdot F_{Rd} \geq F_{Ed}$		h_{nom}	F_{Rk}	F_{Rd}	$n_1 = 3$	$n_1 = 4$	$n_1 = 5$	$n_1 = 6$
Pre-stressed slab / Hollow concrete slab (1)	Non cracked concrete C20/25 to C50/60	10 - 12 mm	0,34	0,23	0,68	0,91	1,13	1,36
		13 - 17 mm	0,66	0,44	1,32	1,76	2,20	2,64
		18 - 19 mm	1,19	0,79	2,38	3,17	3,97	4,76
		20 mm	1,41	0,94	2,82	3,76	4,70	5,64

CRACKED CONCRETE

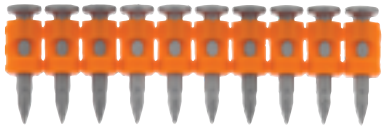
REDUNDANT SYSTEMS ETA 22/0439 (Category 2b)		EMBEDMENT DEPTH [mm]	CHARACTERISTIC / DESIGN RESISTANCES [kN]		ACTIONS at ULS (Ultimate Limit State) F_{Rd} [kN]		
 ▪ $n_1 \geq 6$; $F_{Ed,lim} \leq 0,3$ kN ▪ $n_1 \cdot F_{Rd} \geq F_{Ed}$		h_{nom}	F_{Rk}	F_{Rd}	$n_1 = 6$	$n_1 = 8$	$n_1 = 10$
Pre-stressed slab / Hollow concrete slab (1)	Cracked concrete C20/25 to C50/60	15 - 17 mm	0,05	0,033	0,20	0,27	0,33

STEEL

REDUNDANT SYSTEMS		EMBEDMENT DEPTH [mm]	CHARACTERISTIC / DESIGN RESISTANCES [kN]		ACTIONS at ULS (Ultimate Limit State) F_{Rd} [kN]		
 ▪ $n_1 \geq 3$; $F_{Ed,lim} \leq 2$ kN ▪ $n_1 \cdot F_{Rd} \geq F_{Ed}$		h_{nom}	F_{Rk}	F_{Rd}	$n_1 = 3$	$n_1 = 4$	$n_1 = 5$
Steel base material	f_{uk} = 350-500 N/mm² Max. grade ST52/S355	6,5 mm	2,60	1,73	5,20	6,93	8,67
		7,5 mm	2,90	1,93	5,80	7,73	9,67
		8,5 mm	3,20	2,13	6,40	8,53	10,67

(1) Maximum embedment value to be respected to avoid damaging the prestressing reinforcement. The substrates used must comply the following embedment of the underlying concrete element pre-stressing rods: embedment greater than 17 mm in pre-stressed slabs, and 25 mm in hollow concrete slabs.

PULSA HC6



PERFORMANCE FOR FIXING TRACKS FOR PLASTERBOARD PARTITIONS

Design principle:

Cracked concrete, performances according to category 4.

A minimum of 5 aligned fixing points is required to guarantee the safety of the system. The principle of redundant systems allows the redistribution of loads in case of excessive slip or failure of one fastener to neighbouring fasteners: $n_1 \cdot V_{Rd} \geq V_{Ed}$

Shear force applied to plasterboard partition tracks:

$V_{Ed} = H \cdot S$

with H : Horizontal action acting on the rail kN/ml for spacing between partition studs of 0,6 m.
$H = \gamma_F \times 0,3 \times W_a \times H_t / (1000 \times 0,6) / 2$
S : Spacing between fixings [m]
H_t : Partition height [m]
W_a : Partition weight [kg/m²]

$V_{Ed,lim}$: Design shear resistance per fixing point below which it is not necessary to check the rigidity of the system.

The design principle of dimensioning tracks for plasterboard partitions is defined in ETA 23/0508 for the HC6 pins, in accordance with EAD 330083-03-0601 category 4. HC6-17 pins are approved for cracked concrete, comply with DTU 25.41 revised in 2022, and can be used on the underside of slabs.

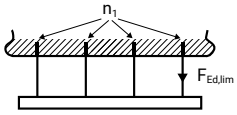
FIXING TRACKS FOR PLASTERBOARD PARTITIONS ETA 23/0508 (Category 4) - $n_1 \geq 5$; $V_{Ed,lim} \leq 0,6$ kN - $V_{Ed} = H \cdot s$		EMBEDMENT DEPTH	CHARACTERISTIC / DESIGN RESISTANCES		SPACING BETWEEN PINS DEPENDING ON PARTITION WEIGHT W_a AND PARTITION HEIGHT H_t		
		[mm]	[kN]		W_a = 10 kg/m²	W_a = 12 kg/m²	W_a = 15 kg/m²
		h_{nom}	V_{Rk}	V_{Rd}	H_t = 2,0 m	H_t = 2,0 m	H_t = 3,0 m
Pre-stressed slab / Hollow concrete slab (1)	Cracked concrete C20/25 to C50/60	13 mm	0,56	0,37	50 cm	40 cm	20 cm

FIXING TRACKS FOR PLASTERBOARD PARTITIONS Test report GS 6.1/22-0026-1 ETA 23/0508 (Category 4) - Rail thickness: 0,6 mm - Configuration: 3 pins /ml - $F_{Rd,fi} = F_{Rk,fi} / \gamma_{M,fi}$ with $\gamma_{M,fi} = 1$		EMBEDMENT DEPTH	CHARACTERISTIC RESISTANCE UNDER FIRE EXPOSURE [kN]			
		[mm]	30 minutes	60 minutes	90 minutes	120 minutes
		h_{nom}	$F_{Rk,fi,30}$	$F_{Rk,fi,60}$	$F_{Rk,fi,90}$	$F_{Rk,fi,120}$
Concrete	Cracked concrete C20/25 to C50/60	13 mm	0,268	0,200	0,130	0,095

PERFORMANCE FOR LIGHT CABLE TRAY FIXINGS

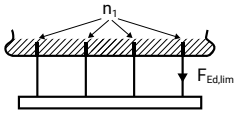
Density of fixing points:

- **Horizontal cable tray:** **0,40 m for non-reinforced cables**
  0,75 m for reinforced cables
- **Vertical cable tray:** **1,00 m for all cable types**

LIGHT-WEIGHT CABLE TRAY FIXINGS Technical approval CSTB no. 3.1/22-1062	BASE MATERIAL Concrete Pre-stressed slab / Hollow concrete slab (1)	EMBEDMENT DEPTH [mm] h_{nom}	DESIGN RESISTANCES PIN & ACCESSORY SYSTEM [kN]	ACTIONS at ULS (Ultimate Limit State) PER EACH METER LENGTH F_{Ed}/ml [kN]		
 - $n_1 \geq 10$ - $F_{Ed,lim} \leq 0,1$ kN/ml			$F_{Rd,syst}$	S = 0,40 m	S = 0,75 m	S = 1,00 m
METAL P-CLIP D.16 to D.25	Cracked concrete C20/25 to C50/60	12 - 15 (1) mm	0,15	0,37	0,20	0,15
CLIPELEC						
MULTICLIP						
TIE-CLIP	Cracked concrete C20/25 to C50/60	12 - 15 (1) mm	0,035	0,087	0,045	0,035
E-CLIP						
P-CLIP SINGLE						
P-CLIP DOUBLE						
SINGLE CABLE BOW						
DOUBLE CABLE BOW						

(1) Maximum embedment value to be respected to avoid damaging the prestressing reinforcement. The substrates used must comply the following embedment of the underlying concrete element pre-stressing rods: embedment greater than 17 mm in pre-stressed slabs, and 25 mm in hollow concrete slabs.

SECURING CEILING LIGHTS

LIGHT FIXINGS, SECURING CEILING LIGHTS	BASE MATERIAL Concrete Pre-stressed slab / Hollow concrete slab (1)	EMBEDMENT DEPTH [mm] h_{nom}	DESIGN RESISTANCES PIN & ACCESSORY SYSTEM [kN] $F_{Rd,syst}$
 - $n_1 \geq 10$ - $F_{Ed,lim} \leq 0,1$ kN/ml			
MCC-O	Cracked concrete C20/25 to C50/60	12 - 15 (1) mm	0,30
TRH-CLIP			

(1) Maximum embedment value to be respected to avoid damaging the prestressing reinforcement. The substrates used must comply the following embedment of the underlying concrete element pre-stressing rods: embedment greater than 17 mm in pre-stressed slabs, and 25 mm in hollow concrete slabs.

FIRE PERFORMANCE FOR LIGHT FIXINGS, SECURING CEILING LIGHTS

LIGHT-WEIGHT CABLE TRAY FIXINGS Test report GS 6.1/22-0026-1 Test report ref. CSTB 05-158/A		EMBEDMENT DEPTH	CHARACTERISTIC RESISTANCE UNDER FIRE EXPOSURE [kN]			
- $F_{Rd,fi} = F_{Rk,fi} / \gamma_{M,fi}$ with $\gamma_{M,fi} = 1$		[mm] h_{nom}	30 minutes $F_{Rk,fi,30}$	60 minutes $F_{Rk,fi,60}$	90 minutes $F_{Rk,fi,90}$	120 minutes $F_{Rk,fi,120}$
METAL P-CLIP D.16 to D.25	Cracked concrete C20/25 to C50/60	12 - 15 mm	0,020	0,017	0,013	0,012
MCC-O			0,102	0,087	0,073	0,065
TRH-CLIP			0,250	0,130	0,020	-