HAC-C-P HOT-ROLLED ANCHOR CHANNELS

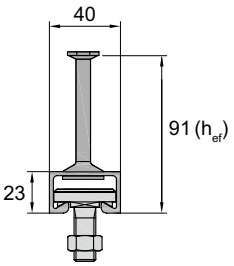
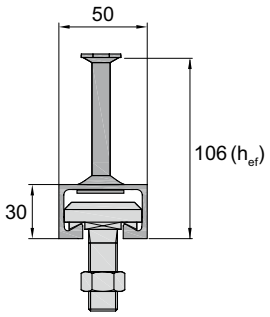
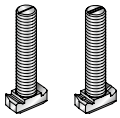
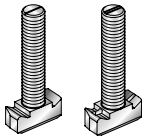
Technical Datasheet
November 2020, Version 2.0

SELECTOR FOR HAC-C-P HOT-ROLLED ANCHOR CHANNELS

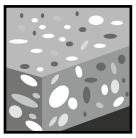
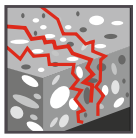
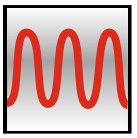
Type		HAC-C-P hot-rolled anchor channels			
		HAC-C-P 40/22		HAC-C-P 50/30	
					
Channel bolt type		HBC-40/22	HBC-40/22-N	HBC-50/30	HBC-50/30-N
Channel bolt size		M12 - M16	M16	M12-M20	M16-M20
Base material	Cracked concrete	■	■	■	■
	Uncracked concrete	■	■	■	■
	NWC concrete	■	■	■	■
	LWC concrete	◪	◪	◪	◪
	Reinforced/unreinforced	■	■	■	■
Technical data	European Technical Assessment (ETA)	■	■	■	■
	Static 2D	■	■	■	■
	Static 3D (only HDG)	–	■	–	■
	Seismic	–	–	–	–
	Fatigue (only HDG)	■	–	■	–
	Fire	■	■	■	■
Specification	Hot-dip galvanized (HDG)	■	■	■	■
	Stainless steel A4	■	■	■	■
	Tear-out band	✔	✔	✔	✔
	End caps	✔	✔	✔	✔
PROFIS Anchor Channel software		✔			

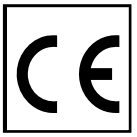
■ ETA approved ◪ Internal tests

PRODUCT OVERVIEW

HAC-C-P hot-rolled anchor channels	
HAC-C-P 40/22	**HAC-C-P 50/30**
	
	
HBC-40/22 and HBC-40/22-N	HBC-50/30 and HBC-50/30-N

Units = mm

Base material		Load conditions				
						
Concrete (uncracked)	Concrete (cracked)	Static/ quasi-static	Static 2D loading	Static 3D loading	Fatigue	Fire resistance

Other Information			
			
European Technical Assessment (ETA)	CE conformity	PROFIS Anchor Channel software	Corrosion resistance

Approvals & Hilti technical data

Description	Issuing Authority	Approval No.
European Technical Assessment (ETA) covering 2D, 3D static, fatigue and fire loads	DIBt Berlin	ETA-17/0336

PRODUCT FEATURES

HAC-C-P hot-rolled anchor channel

Nomenclature of HAC-C-P hot-rolled anchor channels

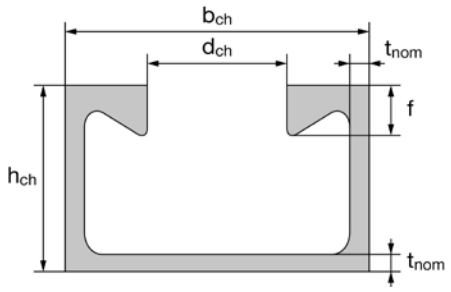
❶ Hilti anchor channel C-shape	❷ Profile type and size	❸ Anchor channel length [mm]	❹ Material finish
HAC-C-P (P = Premium)	40/22	300	F (HDG) or A4 (stainless steel)

Examples: ❶ Channel type ❷ Profile type/size ❸ Length ❹ Material finish

HAC-C-P 40/22 300 F

Dimensions of hot-rolled channel profile

Anchor channel	b_{ch}	h_{ch}	t_{nom}	d_{ch}	f	I_y
	[mm]					[mm⁴]
HAC-C-P 40/22	40.1	23.0	2.7	18.0	6.0	21504
HAC-C-P 50/30	49.6	30.0	3.2	22.5	8.1	57781

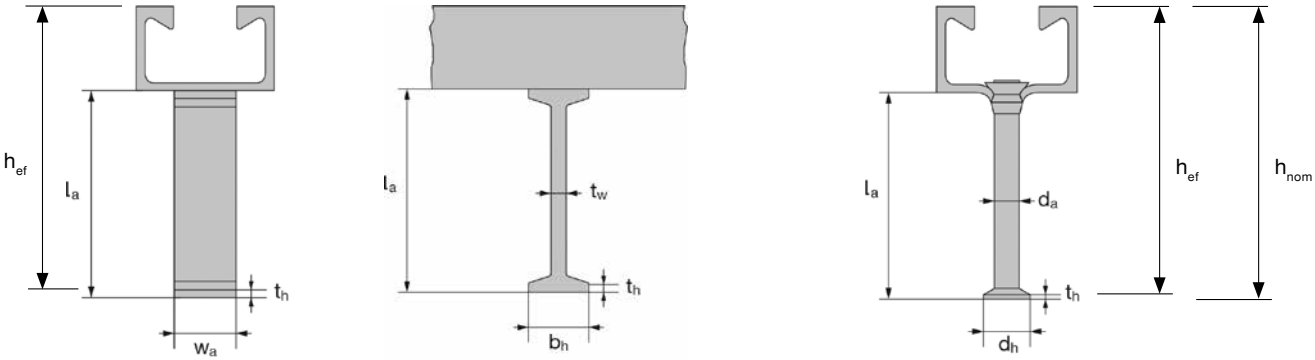


Dimensions of anchor (welded I-anchor or round anchor)

Anchor channel	I-anchor[1]						Round anchor				
	min l_a	t_w	b_h	t_h	w_A	A_h	min l_a	d_a	d_h	t_h	A_h
	[mm]					[mm²]	[mm]				[mm²]
HAC-C-P 40/22	125.0	6.0	25.0	5.0	20.0	380	70.0	10.0	21.5	2.2	285
HAC-C-P 50/30	125.0	6.0	25.0	5.0	25.0	475	78.0	11.0	26.0	2.5	436

[1] Available on request. Not on stock.

Types of anchors



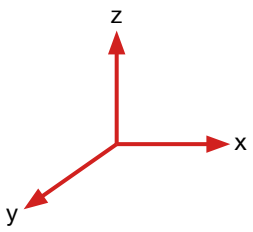
Welded I-anchor

Round anchor

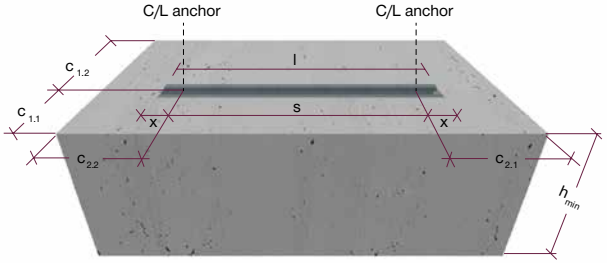
Installation parameters for anchor channels

HAC-C-P			40/22	50/30
Minimum effective embedment depth	$h_{ef,min}$	[mm]	91	106
Nominal embedment depth[2]	h_{nom}		93.2	108.5
Minimum spacing	s_{min}		50	
Maximum spacing	s_{max}		250	
End spacing	x		25 [1]	
Minimum channel length	l_{min}		100	
Minimum edge distance (c_{11}, $c_{1,2}$ & c_{21}, c_{22})	c_{min}		50	75
Minimum thickness of concrete member	h_{min}		100	120

[1] The end spacing may be increased from 25 to 35 mm
[2] The nominal embedment depth may vary slightly. Please contact Hilti for further information.



X- Longitudinal shear-V_x
Y- Perpendicular shear-V_y
Z - Tension- N



Material of anchor channels and channel bolts

Component	Carbon steel			Stainless steel
	Mechanical properties	Coating		Mechanical properties
1	2a	2b	2c	3
Channel profile	1.0038, 1.0044, 1.0045 according to EN 10025: 2005 1.0976, 1.0979 according to EN 10149: 2013	Hot-dip galvanized ≥ 50 µm according to EN ISO 10684: 2004/AC: 2009		1.4362, 1.4401 1.4404, 1.4571, 1.4578 according to EN 10088: 2005
Anchor	1.0038, 1.0213, 1.0214 according to EN 10025: 2005 1.5523, 1.5535 according to EN 10263: 2002-02	-	Hot-dip galvanized ≥ 50 µm according to EN ISO 10684: 2004/AC: 2009	1.4362, 1.4401 1.4404, 1.4571, 1.4578 according to EN 10088: 2005 [3]
Channel bolt	Steel grade 4.6 and 8.8 according to EN ISO 898-1: 2013	Electroplated according to EN ISO 4042: 1999	Hot dip galvanized ≥ 50 µm according to EN ISO 10684: 2004/ AC: 2009	Grade 50 or 70 according to EN ISO 3506: 2009
Plain washer [1] according to ISO 7089: 2000 and ISO 7093-1: 2000	Hardness class A ≥ 200 HV	Electroplated according to EN ISO 4042: 1999	Hot dip galvanized ≥ 50 µm according to EN ISO 10684: 2004/ AC: 2009	1.4401, 1.4404 1.4571, 1.4578 according to EN 10088: 2005
Hexagonal nut according to ISO 4032: 2012 or DIN 934: 1987-10 [2]	Property class 5 or 8 according to EN ISO 898-2: 2012	Electroplated according to EN ISO 4042: 1999	Hot dip galvanized ≥ 50 µm according to EN ISO 10684: 2004/ AC: 2009	Property class 50, 70 or 80 according to EN ISO 3506: 2009

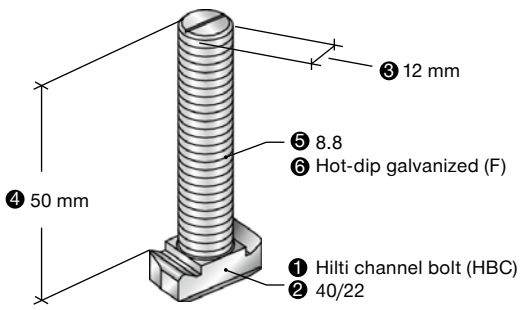
[1] In scope of delivery only for notched bolts
[2] Hexagonal nuts according to DIN 934: 1987-10 for channel bolts made from carbon steel (4.6) and stainless steel
[3] Anchors made of carbon steel according column 2a may also be used if they are welded and their concrete cover is more than 50 mm and the tempering colors are removed

Nomenclature of Hilti HBC channel bolts

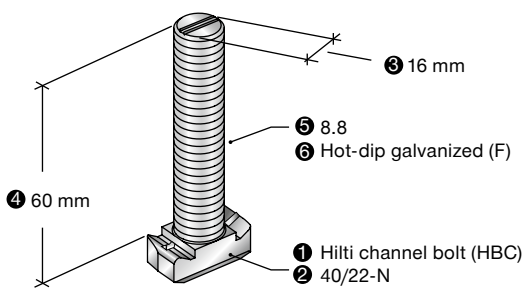
❶ Hilti channel bolt	❷ Bolt type	❸ Diameter	❹ Bolt length [mm]	❺ Steel grade	❻ Finish or material
HBC	40/22	M12	50	8.8 or A4-70	F (HDG) or A4 (stainless steel)
HBC	40/22-N	M16	60	8.8	F (HDG)

Examples: ❶ Channel bolt ❷ Bolt type ❸ Diameter ❹ Bolt length ❺ Steel grade ❻ Finish or material

HBC-40/22 M12x50 8.8F (standard bolt)



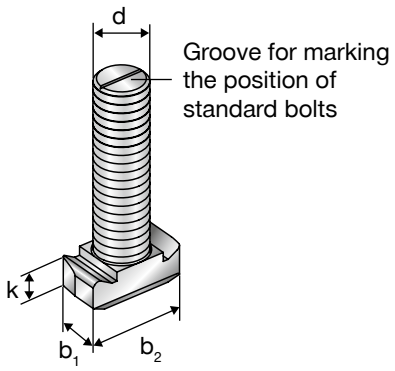
HBC-40/22-N M16x60 8.8F (notched bolt)



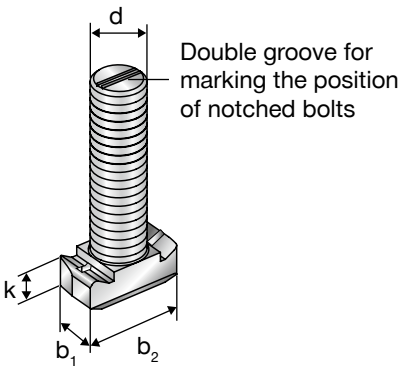
Dimensions of channel bolts

Anchor channel	Channel bolt type	Dimensions			
		b_1	b_2	k	d
		[mm]			
HAC-C-P 40/22	HBC-40/22	14.0	33.0	10.5	10
				11.5	12
		17.0			16
	HBC-40/22-N	17.0	33.0	11.5	16
HAC-C-P 50/30	HBC-50/30	17.0	42.0	14.5	12
				15.5	16
		21.0			20
	HBC-50/30-N	21.0	42.0	15.5	16
					20

Channel bolts



HBC-40/22, HBC-50/30

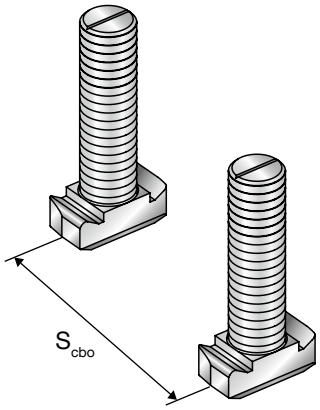


HBC-40/22-N, HBC-50/30-N

Minimum spacing for channel bolts

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

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



Channel bolts steel grade and corrosion class

Channel bolt	Carbon steel [1]		Stainless steel [1]	
Steel grade	4.6	8.8	A4-50	A4-70
f_{uk} [N/mm²]	400	800 / 830 [2]	500	700
f_{yk} [N/mm²]	240	640 / 660 [2]	210	450
Corrosion class	G [3] F [4]		R [5]	

[1] Material properties according to table on page 59
[2] Material properties according to EN ISO 898-1: 2013
[3] Electroplated
[4] Hot-dip galvanized
[5] Stainless steel

STEEL FAILURE MODES – STATIC RESISTANCE UNDER TENSION AND PERPENDICULAR SHEAR

Static/
quasi-static

Resistance values under tension loads - steel failure

HAC-C-P anchor channel			40/22	50/30
Steel failure: Anchor				
	Characteristic resistance	$N_{Rk,s,a}$ [kN]	40.0	57.0
	Design resistance	$N_{Rd,s,a}$ [kN]	22.2	31.7
Steel failure: Connection between anchor and channel				
	Characteristic resistance	$N_{Rk,s,c}$ [kN]	39.6	50.6
	Design resistance	$N_{Rd,s,c}$ [kN]	22.0	28.1
Steel failure: Local flexure of channel lips				
	Characteristic or design spacing of the channel bolts	$s_{l,N}$ [mm]	79	98
	Characteristic resistance	$N^0_{Rk,s,l}$ [kN]	47.9	50.5
	Design resistance	$N^0_{Rd,s,l}$ [kN]	26.6	28.1

Resistance values under tension load - steel failure

HAC-C-P anchor channel			40/22	50/30
Steel failure: Failure by flexure of channel				
	Characteristic flexural resistance	$M_{Rk,s,flex}$ [Nm]	1704	3448
	Design flexural resistance	$M_{Rd,s,flex}$ [Nm]	1482	2998

Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

Displacements under tension load

HAC-C-P anchor channel		40/22	50/30
Tension load	N [kN]	15.3	25.8
Short-term displacement [1]	δ_{N0} [mm]	1.1	1.4
Long-term displacement [1]	$\delta_{N\infty}$ [mm]	2.2	2.8

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

Static/
quasi-static

Resistance values under perpendicular and longitudinal shear load - steel failure

HAC-C-P anchor channel			40/22	50/30
Steel failure: Anchor				
	Characteristic resistance	$V_{Rk,s,a,y}$ [kN]	58.1	100.0
		$V_{Rk,s,a,x}$ [kN]	24.0	34.2
	Design resistance	$V_{Rd,s,a,y}$ [kN]	38.7	66.7
		$V_{Rd,s,a,x}$ [kN]	16.0	22.8
Steel failure: Connection between anchor and channel				
	Characteristic resistance	$V_{Rk,s,c,y}$ [kN]	58.1	100.0
		$V_{Rk,s,c,x}$ [kN]	23.8	30.4
	Design resistance	$V_{Rd,s,c,y}$ [kN]	32.3	55.6
		$V_{Rd,s,c,x}$ [kN]	13.2	16.9
Steel failure: Local flexure of channel lips under perpendicular shear				
	Characteristic or design spacing of channel bolts	$s_{l,V}$ [mm]	80	99
	Characteristic resistance	$V^0_{Rk,s,l,y}$ [kN]	55.0	91.7
	Design resistance	$V^0_{Rd,s,l,y}$ [kN]	30.6	50.9

Resistance values under perpendicular shear load in direction of the logitudinal axis of the channel- steel failure of hot-rolled anchor channel

Anchor channel			HAC-C-P 40/22	HAC-C-P 50/30
Steel failure: Connection between channel lips and channel bolt				
Characteristic resistance	$V^0_{Rk,s,l,x}$ [kN]	HBC-40/22-N M16 8.8F	12,5	-
		HBC-50/30-N M16 8.8F	-	8.3
		HBC-50/30-N M20 8.8F		8.3
Installation factor	γ_{inst}	[-]	1.4	1.0
Design resistance	$V^0_{Rd,s,l,x}$ [kN]	HBC-40/22-N M16 8.8F	5.0	-
		HBC-50/30-N M16 8.8F	-	4.6
		HBC-50/30-N M20 8.8F	-	4.6

Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

Static/
quasi-static

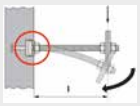
Resistance values under tension and shear load – steel failure of channel bolts

Channel bolt diameter					M10	M12	M16	M20
Steel failure								
	Characteristic resistance	$N_{Rk,s}$ [kN]	HBC-40/22	4.6	23.2	-	-	-
				8.8	-	67.4	125.6	-
				A4-70	20.5	59.0	91.0	-
			HBC-40/22-N	8.8	-	-	125.6	-
			HBC-50/30	4.6	-	-	-	-
				8.8	-	67.4	125.6	147.1
				A4-70	-	59.0	109.9	121.2
			HBC-50/30-N	8.8	-	-	125.6	186.6
	Design resistance	$N_{Rd,s}$ [kN]	HBC-40/22	4.6	11.6	-	-	-
				8.8	-	44.9	83.7	-
				A4-70	10.9	31.6	48.7	-
			HBC-40/22-N	8.8	-	-	83.7	124.4
			HBC-50/30	4.6	-	-	-	-
				8.8	-	44.9	83.7	98.1
				A4-70	-	31.6	58.8	64.8
			HBC-50/30-N	8.8	-	-	83.7	124.4
	Characteristic resistance	$V_{Rk,s}$ [kN]	HBC-40/22	4.6	13.9	-	-	-
				8.8	23.2	33.7	62.8	-
				A4-70	24.4	35.4	65.9	-
			HBC-40/22-N	8.8	-	-	62.8	-
			HBC-50/30	4.6	-	-	-	-
				8.8	-	33.7	62.8	101.7
				A4-70	-	35.4	65.9	102.9
			HBC-50/30-N	8.8	-	-	62.8	101.7
	Design resistance	$V_{Rd,s}$ [kN]	HBC-40/22	4.6	8.3	-	-	-
				8.8	18.6	26.9	50.2	-
				A4-70	15.6	22.7	42.2	-
			HBC-40/22-N	8.8	-	-	50.2	-
			HBC-50/30	4.6	-	-	-	-
				8.8	-	26.9	50.2	81.4
				A4-70	-	22.7	42.2	65.9
			HBC-50/30-N	8.8	-	-	50.2	81.3

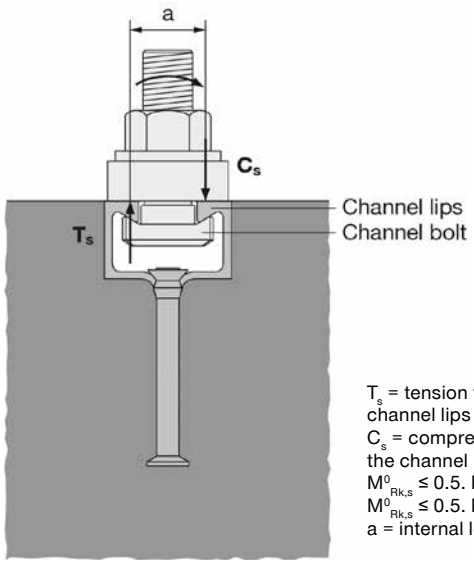
Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

Static/
quasi-static

Resistance values under shear load with lever arm – steel failure of channel bolts

Channel bolt					M10	M12	M16	M20
Steel failure								
	Characteristic flexural resistance	$M^0_{Rk,s}$ [Nm]	HBC-40/22(-N) HBC-50/30(-N)	4.6	29.9[1)]	-	-	-
				8.8	59.8	104.8	266.4	538.7
				A4-70	52.3	91.7	233.1	454.4
	Design flexural resistance	$M^0_{Rd,s}$ [Nm]	HBC-40/22(-N) HBC-50/30(-N)	4.6	17.9[1)]	-	-	-
				8.8	47.8	83.8	213.1	430.9
				A4-70	33.5	58.8	149.4	291.3
	Internal lever arm	a [mm]	HBC-40/22(-N)	40/22	24.3	25.7	27.3	-
			HBC-50/30(-N)	50/30	-	29.9	31.7	33.9

[1)]Not applicable for HBC-50/30



T_s = tension force acting on the channel lips
C_s = compression force acting on the channel lips
$M^0_{Rk,s} \leq 0.5 . N_{Rk,s,l} . a$
$M^0_{Rk,s} \leq 0.5 . N_{Rk,s,} . a$
a = internal lever arm

Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

Displacements under perpendicular shear

HAC-C-P anchor channel		40/22	50/30
Shear load	V_y [kN]	29.0	39.7
Short-term displacement [1)]	$\delta_{V0,y}$ [mm]	2.0	2.7
Long-term displacement [1)]	$\delta_{V\infty,y}$ [mm]	3.5	4.0
Shear load	V_x [kN]	5.2	3.3
Short-term displacement [1)]	$\delta_{V0,x}$ [mm]	0.1	0.1
Long-term displacement [1)]	$\delta_{V\infty,x}$ [mm]	0.2	0.2

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

CONCRETE FAILURE MODES – STATIC RESISTANCE UNDER TENSION AND PERPENDICULAR SHEAR

Static/
quasi-static

Resistance values under tension load – concrete failure

HAC-C-P anchor channel				40/22		50/30	
Type of anchor (I-Anchor or R-Round Anchor)				**I**	**R**	**I**	**R**
Concrete failure: Pullout failure							
	Characteristic resistance in cracked concrete C12/15		$N_{Rk,p}$ [kN]	34.2	25.6	42.8	39.2
	Characteristic resistance in uncracked concrete C12/15			47.9	35.8	59.9	54.9
	Design resistance in cracked concrete C12/15		$N_{Rd,p}$ [kN]	22.8	17.1	28.5	26.1
	Design resistance in uncracked concrete C12/15			31.9	23.9	39.9	36.6
	Amplification factor for other concrete grades		Ψc	$\Psi_c = \frac{f_{c,specified}}{12MPa}$			
Concrete failure: Concrete cone failure							
	Product factor k_1 for characteristic resistance	cracked concrete	$k_{cr,N}$	8.0		8.2	
		uncracked concrete	$k_{ucr,N}$	11.5		11.7	
Concrete failure: Splitting							
	Characteristic edge distance		$c_{cr,sp}$ [mm]	273		318	
	Characteristic spacing		$s_{cr,sp}$ [mm]	$2.0 \cdot c_{cr,sp}$			

Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

Resistance values under shear load – concrete failure

HAC-C-P anchor channel				40/22	50/30
Concrete failure: Pry out failure					
	Product factor		k_8	2.0	
Concrete failure: Concrete edge failure					
	Product factor k_{12} for characteristic resistance	cracked concrete	$k_{cr,V}$	7.5	
		uncracked concrete	$k_{ucr,V}$	10.5	

Note: combined effects of loads (tension and shear) must be verified additionally. We recommend using Hilti Profis anchor channel software

STEEL FAILURE - COMBINED LOADING

Static/
quasi-static

Resistance values under combined tension and shear load

HAC-C-P anchor channel		40/22	50/30
Steel failure: Local flexure of channel lips and flexure of channel			
Product factor	k_{13}	1.0[1]	
Steel failure: Anchor and connection between anchor and channel			
Product factor	k_{14}	1.0[2]	
Concrete failure (Product factor)			
Without supplematery reinforcement		1.5	
With supplematery reinforcement		1.0	

[1] k_{13} can be taken as 2.0 if $V_{Rd,s,l}$ is limited to $N_{Rd,s,l}$
[2] k_{14} can be taken as 2.0 if max($V_{Rd,s,a}$; $V_{Rd,s,c}$) is limited to min($N_{Rd,s,a}$; $N_{Rd,s,c}$)
Note: We recommend to use Hilti Profis Anchor channel software

FIRE RESISTANCE

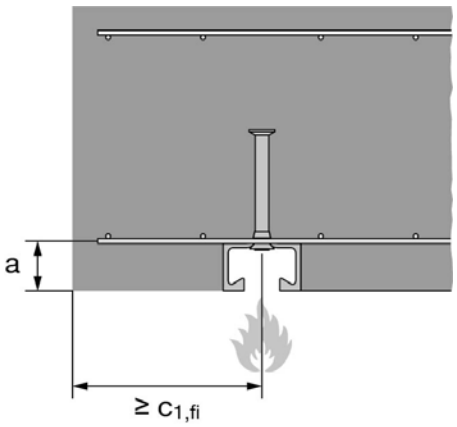
Fire
resistance

Resistance values under tension and shear load – fire exposure

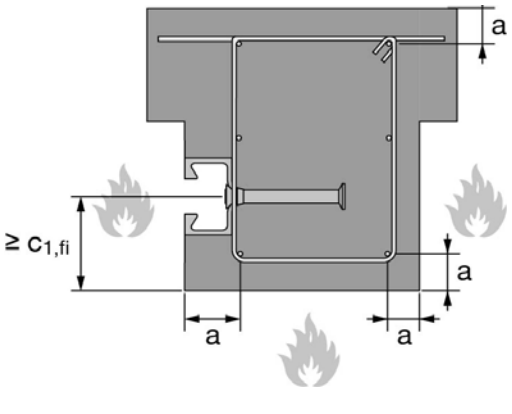
Channel bolt diameter					M10	M12	≥ M16
Steel failure: Anchor, connection between anchor and channel, local flexure of channel lip							
Characteristic and design resistance in cracked concrete C20/25	HAC-C-P 40/22	R60	$N_{Rk,s,fi}$ = $V_{Rk,s,fi}$ or $N_{Rd,s,fi}$ = $V_{Rd,s,fi}$	[kN]	1.7	3.5	
		R90			1.2	2.2	
		R120			0.9	1.5	
	HAC-C-P 50/30	R60			-	3.8	3.9
		R90				2.5	2.9
		R120				1.9	2.4

Minimum axis distance of reinforcement

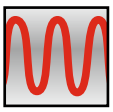
HAC-C-P anchor channel			40/22	50/30
Min axis distance	R60	a [mm]	35	50
	R90		45	
	R120		55	



Fire exposure from one side only
$c_{1,fi}$ = 2 x h_{ef}



Fire exposure from more than one side
$c_{1,fi}$ = max (2 x h_{ef} ; 300mm)



Fatigue

Combination of anchor channels and channel bolts under fatigue tension load

Anchor channel			Channel bolt			
Channel profile	Anchor type	Corrosion protection	Channel bolt	Diameter	Steel grade	Corrosion protection
HAC-C-P 40/22	R	F	HBC-40/22	M12	8.8	G F
				M16		
HAC-C-P 50/30			HBC-50/30	M16		
				M20		

Resistance values under fatigue tension load – steel failure after n load cycles without static preload (N_{Ed} = 0) (Design method I according to EOTA TR 050)

Anchor channel		HAC-C-P 40/22	HAC-C-P 50/30
Steel failure	n	$\Delta N_{Rk,s,0,n}$ [kN]	
Characteristic resistance under fatigue tension load after n load cycles without static preload (N_{Ed} = 0)	$\leq 10^4$	16.4	20.9
	$\leq 10^5$	7.7	9.0
	$\leq 10^6$	3.2	4.2
	$\leq 2 \cdot 10^6$	2.6	3.7
	$\leq 5 \cdot 10^6$	2.2	3.4
	$\leq 10^8$	2.0	3.3
	$> 10^8$	1.8	3.2

Reduction factor $\eta_{c,fat}$ of characteristic fatigue resistance - concrete failure after n load cycles without static preload (N_{Ed} = 0) (Design method I according to EOTA TR 050)

Anchor channel		HAC-C-P 40/22	HAC-C-P 50/30
Pull-out and concrete cone failure	n	$\eta_{c,fat}$ [-]	
Reduction factor after n load cycles without static preload (N_{Ed} = 0) for: $\Delta N_{Rk,p,0,n} = \eta_{c,fat} \cdot N_{Rk,p}$ $\Delta N_{Rk,c,0,n} = \eta_{c,fat} \cdot N_{Rk,c}$ with $N_{Rk,p}$ calculated according to page 12 and $N_{Rk,c}$ calculated according to EOTA TR047, March 2018 or EN 1992-4: 2018	$\leq 10^4$	0.736	
	$\leq 10^5$	0.665	
	$\leq 10^6$	0.600	
	$\leq 2 \cdot 10^6$	0.582	
	$\leq 5 \cdot 10^6$	0.559	
	$\leq 6 \cdot 10^7$	0.500	
	$> 6 \cdot 10^7$	0.500	

Resistance values under fatigue tension load – steel failure with n → ∞ load cycles without static preload (N_{Ed} = 0) (Design method II according to EOTA TR 050)

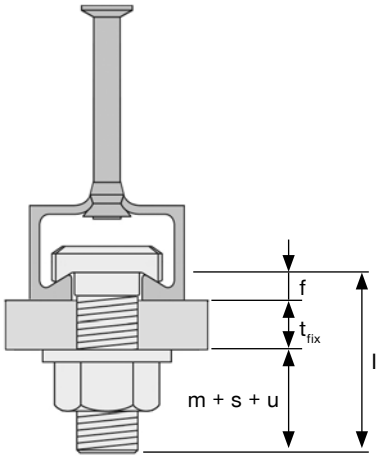
Fatigue

Anchor channel	HAC-C-P 40/22	HAC-C-P 50/30
Steel failure	$\Delta N_{Rk,s,0}$, ∞ [kN]	
Characteristic fatigue limit resistance (n → ∞) without static preload (N_{Ed} = 0)	1.8	3.2

Reduction factor $\eta_{c,fat}$ of characteristic fatigue limit resistance - concrete failure with n → ∞ load cycles without static preload (N_{Ed} = 0) (Design method II according to EOTA TR 050)

Anchor channel	HAC-C-P 40/22	HAC-C-P 50/30	HAC-C 52/34
Pull-out and concrete cone failure	$\eta_{c,fat}$ [-]		
Reduction factor for fatigue limit resistance (n → ∞) without static preload (N_{Ed} = 0) for: $\Delta N_{Rk,p,0,n} = \eta_{c,fat} \cdot N_{Rk,p}$ $\Delta N_{Rk,c,0,n} = \eta_{c,fat} \cdot N_{Rk,c}$ with $N_{Rk,p}$ calculated according to page 12 and $N_{Rk,c}$ calculated according to EOTA TR047, March 2018 or EN 1992-4: 2018	0.5		

Determination of required T-Bolt length



Required T-Bolt length $l_{req} = t_{fix} + f + (m+s+u)$

Anchor channel	Height of channel lip (f)	T-Bolt type	m+s+u [mm]			
[-]	[mm]	[-]	M10	M12	M16	M20
HAC-C-P 40/22	6	HBC-40/20	13.9	17.3	21.8	-
HAC-C-P 40/22	6	HBC-40/22-N	-	-	21.8	-
HAC-C-P 50/30	8	HBC-50/30	-	17.3	21.8	27.0
HAC-C-P 50/30	8	HBC-50/30-N	-	-	21.8	27.0

l = nominal length of channel bolt
t_{fix} = fastenable thickness (Thickness of the attached part)
f = height of channel lip
m = thickness of the nut (ISO 4032)
s = thickness of the washer
u = channel bolt projection

Note: Round the bolt length to the nearest standard channel bolt

INSTALLATION INSTRUCTIONS

Installation instructions for HAC-C-P hot-rolled anchor channels

1) Correct selection of anchor channel in accordance with the design specification.

2) If cutting of the anchor channel is necessary, cut the channel and leave an end spacing.

x = 25 or 35 mm for round or welded anchors with profile:
HAC-C-P 40/22
HAC-C-P 50/30

Minimum two anchors per channel!

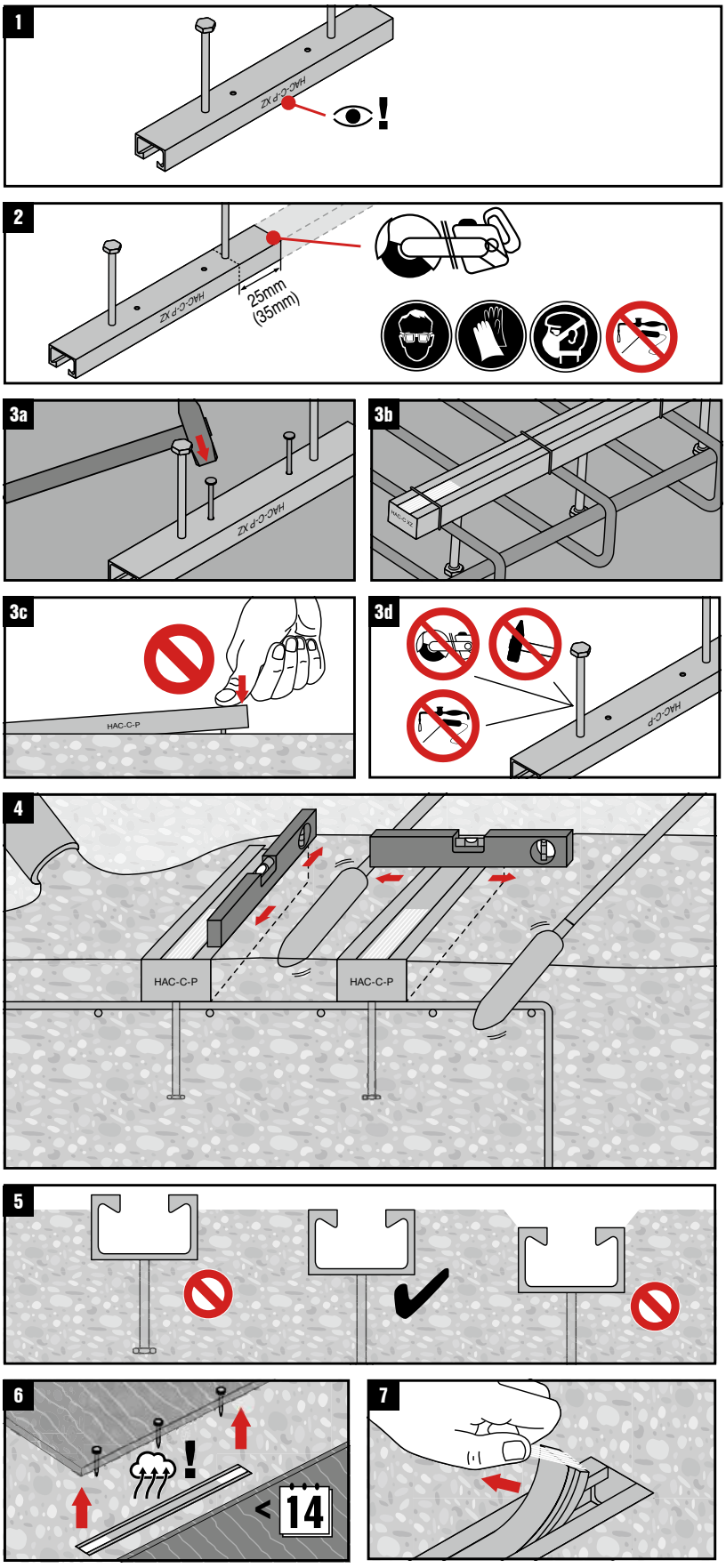
3) Position the anchor channel such that the channel lips will be flush with the surface of the concrete. Secure anchor channels to formwork (3a) or adjoining reinforcing steel (3b) with nails, staples, rivets, or wire ties as appropriate. Supports and attachments shall be adequate helping to ensure that anchor channels remain in position during concrete placement. Anchor channels shall not be pushed into fresh concrete (3c). Anchors shall not be bent, cut or otherwise modified (3d).

4) Anchor channels shall be protected from intrusion of concrete and slurry into the channel during concrete placement. Place and consolidate concrete around anchor channels to mitigate voids.

Make sure that channels are leveled with the concrete surface.

5) Installed anchor channels must be flush with the concrete surface.

6) and 7) Remove the foam filler after hardening of concrete and striking the formwork.



Installation instructions for HBC channel bolts

1) Select Hilti channel bolt type HBC in accordance with the design specification.

2) Place the channel bolt in the channel and lock the channel bolt in the channel by turning it 90 degrees.

3) Verify alignment of the bolt with the groove.

4) Verify that the channel bolt is not located outside of that part of the channel bounded by the outermost anchors.

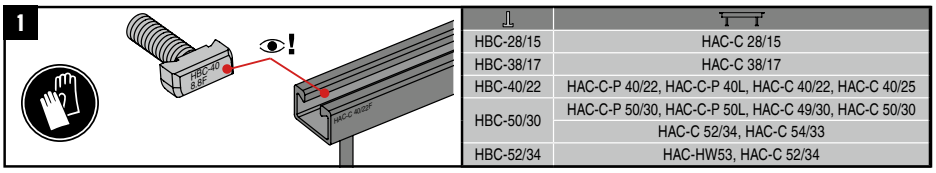
5) Do not cut channel bolts.

6) Install the fixture distinguishing between installation type A and installation type B.

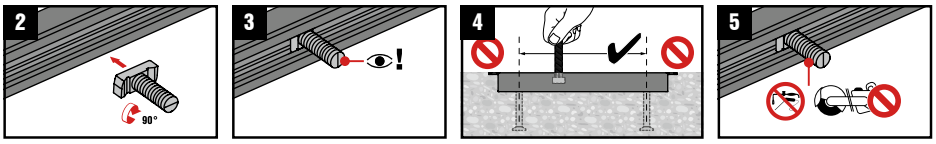
- For installation type A the fixture is in contact with the concrete surface and the channel profile.
- For installation type B the fixture is not in contact with the concrete surface. The fixture is fastened to the anchor channel by a suitable steel element e.g. square plate washer is used helping to avoid introducing forces into the concrete during application of the installation torque T_{inst}. The steel element shall have sufficient stiffness to avoid deformation of the channel lips

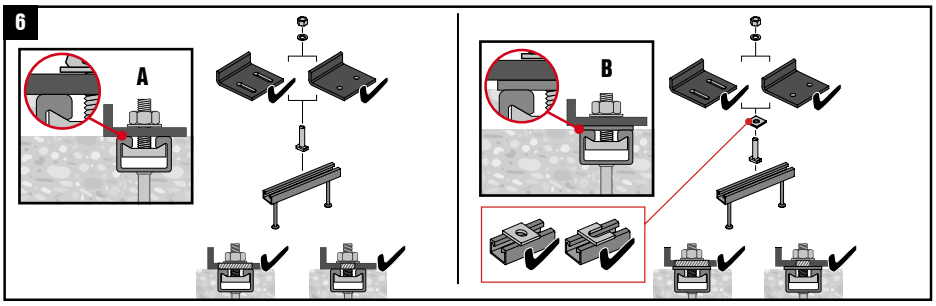
7) Apply the installation torque T_{inst} to the channel bolt with a calibrated torque wrench. Do not exceed the value T_{inst} distinguishing between installation type A and installation type B.

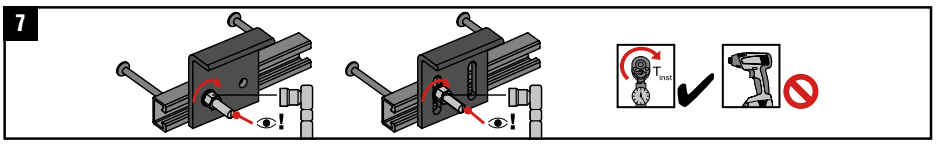
Select the correct installation torque T_{inst} according to material, channel type, channel bolt diameter, and installation type.



HBC-28/15	HAC-C 28/15
HBC-38/17	HAC-C 38/17
HBC-40/22	HAC-C-P 40/22, HAC-C-P 40L, HAC-C 40/22, HAC-C 40/25
HBC-50/30	HAC-C-P 50/30, HAC-C-P 50L, HAC-C 49/30, HAC-C 50/30 HAC-C 52/34, HAC-C 54/33
HBC-52/34	HAC-HW53, HAC-C 52/34







Channel bolt		T_{inst} [Nm]				
		A	B			
		4.6, 8.8, A4-50, A4-70	4.6	8.8	A4-50	A4-70
HBC-28/15	M8	7	–	20	7	15
	M10	10		40	–	30
	M12	13		60		50
HBC-38/17	M10	15	13	15		22
	M12	25	–	45		50
	M16	40		100		90
HBC-40/22	M10	15	13	15		22
	M12	25	–	45		50
	M16	30		100		90
HBC-50/30	M12	25		45		50
	M16	55		100		130
	M20	55		360		250
HBC-52/34	M20	55		360		–

[1] T_{inst} must not be exdeeded

Installation instructions for HBC-N channel bolts

1) Select Hilti channel bolt type HBC in accordance with the design specification.

2) Place the channel bolt in the channel and lock the channel bolt in the channel by turning it 90 degrees.

3) Verify alignment of the bolt with the groove.

4) Verify that the channel bolt is not located outside of that part of the channel bounded by the outermost anchors.

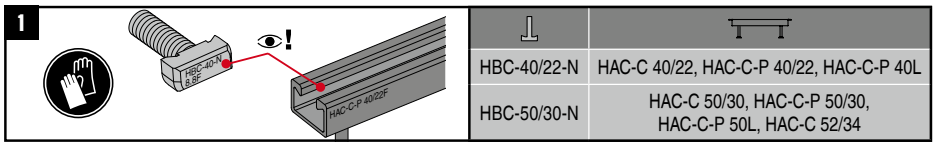
5) Do not cut channel bolts.

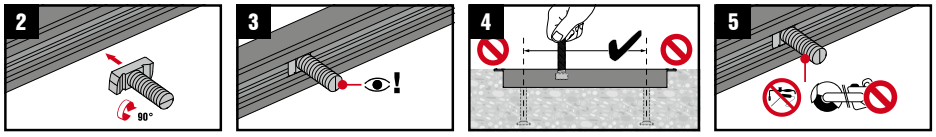
6) Install the fixture distinguishing between installation type A and installation type B.

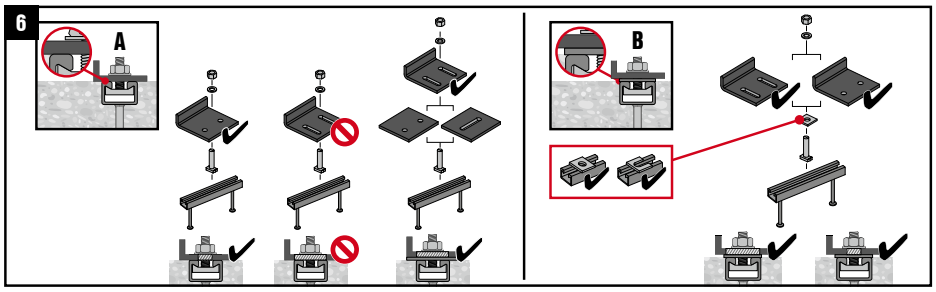
- For installation type A the fixture is in contact with the concrete surface and the channel profile.
- For installation type B the fixture is not in contact with the concrete surface. The fixture is fastened to the anchor channel by suitable steel element e.g. square plate washer is used helping to avoid introducing forces into the concrete during application of the installation torque T_{inst}. The steel element shall have sufficient stiffness helping to avoid deformation of the channel lips

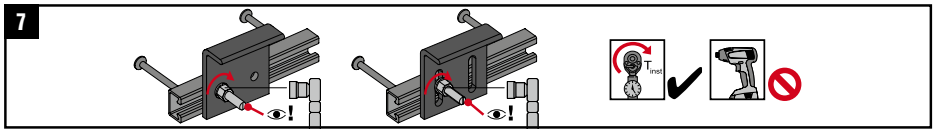
7) Apply the installation torque T_{inst} to the channel bolt with a calibrated torque wrench. Do not exceed the value T_{inst} distinguishing between installation type A and installation type B.

Select the correct installation torque T_{inst} according to material, channel type, channel bolt diameter, and installation type.









Anchor Channel	Channel Bolt	T_{inst} [Nm]	
		A	B
		8.8	8.8
HAC-C-P 40/22	HBC-40/22-N M16	160	160
HAC-C-P 40L			
HAC-C 40/22		60	160
HAC-C-P 50/30	HBC-50/30-N M16	185	185
HAC-C-P 50L			
HAC-C 50/30			
HAC-C 52/34			
HAC-C-P 50/30	HBC-50/30-N M20	320	320
HAC-C-P 50L			
HAC-C 50/30			
HAC-C 52/34			

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