



HST4-R Expansion anchor

Product Technical Datasheet
Steel-to-concrete
Update: June 24



HST4-R Expansion anchor

High-performance expansion anchor

Anchor version



HST4-R
(M8-M20)



HST4-R DN
(M10-M12)

Benefits

- High capacity anchor with ability to be used in reduced member thickness, small spacing and edge distances
- Suitable for uncracked and cracked concrete C20/25 to C50/60
- Highly reliable and safe anchor for structural seismic design with ETA C1/C2 assessment
- Longer embedment depth option to get higher resistance, closer distance to the edge or smaller spacing
- Full design flexibility with variable embedment depth and edge & spacing
- Faster and reliable installation thanks to approved non-cleaning and adaptive torquing tool
- Dome-nut variant available for more aesthetic application finish
- Product and length identification mark facilitates quality control and inspection



Base material



Concrete
(uncracked)



Concrete
(cracked)

Load conditions



Static/
quasi-static

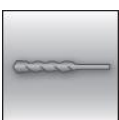


Seismic
C1/C2



Fire
resistance

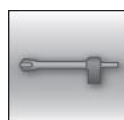
Drilling, cleaning, setting



Hammer
drilled holes
(with no
cleaning)



Diamond
drilled holes



Hollow
drill-bit drilling



Impact wrench
with adaptive
torque module



Variable
embedment
depth

Other information



PROFIS
Engineering
software



Steel to
concrete
Handbook



Linked Approvals/Certificates and Instructions for use

Approvals/certificates

Approval no	Application / loading condition	Authority / Laboratory	Date of issue
ETA-21/0878	Static and quasi-static / Seismic / Fire	CSTB, Marne-la-Vallée	28-02-2024
GS 6.1/22-065-3-r1	Fire data ZTV-ING Tunnel	MFPA, Leipzig	30-11-2023

Instructions for use

Anchor size	M8	M10	M12	M16	M20
HST4-R	IFU HST4-R M8	IFU HST4-R M10	IFU HST4-R M12	IFU HST4-R M16	IFU HST4-R M20
Filling set	IFU Filling set				

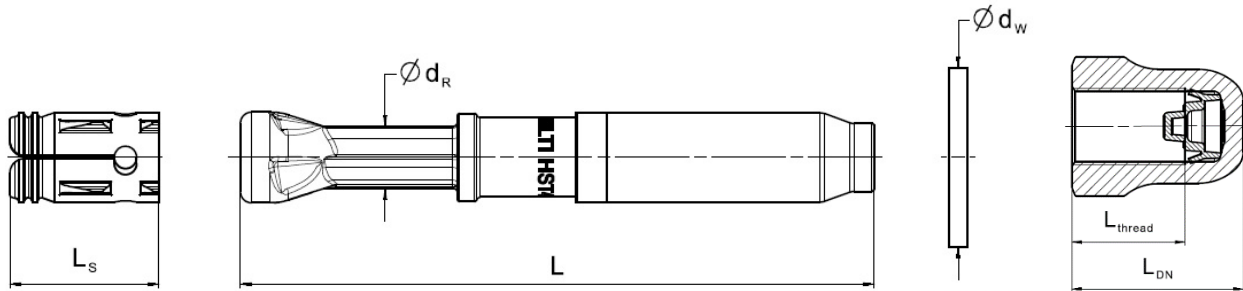
Link to Hilti Webpage

HST4-R	HST4-R DN	HST4-R BW
		

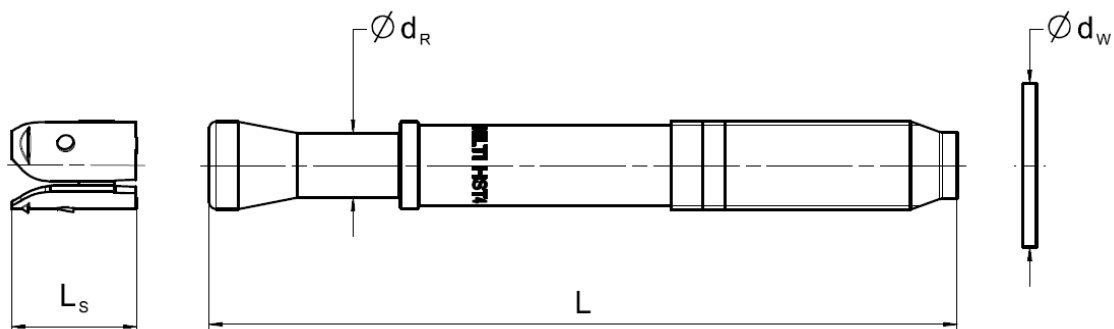
Fastener special dimensions

Anchor size		M8	M10	M12	M16	M20
Maximum length of anchor	L [mm]	115	180	200	260	200
Diameter of washer	d_w [mm]	15,57	19,48	23,48	29,48	36,38
Length of dome nut thread	$L_{threadmin}$ [mm]	-	16,8	17,8	-	-
Length of dome nut	L_{DNmin} [mm]	-	21,9	24,0	-	-

HST4-R (M8-M16)



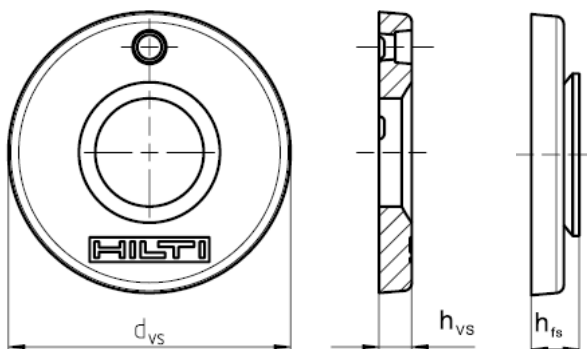
HST4-R (M20)



Hilti filling set :

Dimensions filling washer

Anchor size		M8	M10	M12	M16	M20
Diameter	d_{vs} [mm]	38	42	44	52	60
Height filling washer	h_{vs} [mm]	5	5	5	6	6
Height filling washer and spherical washer	h_{fs} [mm]	8	9	10	11	13



Static and quasi-static loading based on ETA-21/0878. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes and diamond cored holes (M8 to M20), hammer drilled holes with Hilti hollow drill bit (M10-M20)
- Recommended loads: With overall partial safety factor for action $\gamma = 1,4$.

Note: that according to the EAD 330232-01-0601 effective embedment depths smaller than 40 mm are allowed only for dry indoor applications in statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners.

For specific design cases refer to [PROFIS Engineering](#)

Design resistance

Anchor size	M8			M10			M12			M16			M20		
Effective anchorage depth h_{ef} [mm]	30	47	90	30	60	100	40	70	125	65	85	160	101	120	180
Uncracked concrete															
Tension N_{Rd} [kN]	5,4	10,6	12,7	6,2	17,6	21,3	9,6	22,2	30,7	19,8	29,7	40,0	33,3	33,3	33,3
Shear V_{Rd} [kN]	11,0	13,9	13,9	11,6	22,0	22,0	23,9	33,0	33,0	57,5	57,9	57,9	77,8	77,8	77,8
Cracked concrete															
Tension N_{Rd} [kN]	3,8	6,7	6,7	4,4	12,3	13,3	6,7	15,5	18,7	13,9	20,8	25,3	23,3	23,3	23,3
Shear V_{Rd} [kN]	7,7	13,9	13,9	8,1	22,0	22,0	16,8	33,0	33,0	40,3	41,7	57,9	74,6	77,8	77,8

Recommended loads

Anchor size	M8			M10			M12			M16			M20		
Effective anchorage depth h_{ef} [mm]	30	47	90	30	60	100	40	70	125	65	85	160	101	120	180
Uncracked concrete															
Tension N_{rec} [kN]	3,8	7,5	9,0	4,4	12,6	15,2	6,8	15,8	21,9	14,2	21,2	28,6	23,8	23,8	23,8
Shear V_{rec} [kN]	7,9	9,9	9,9	8,3	15,7	15,7	17,1	23,6	23,6	41,1	41,4	41,4	55,5	55,5	55,5
Cracked concrete															
Tension N_{rec} [kN]	2,7	4,8	4,8	3,1	8,8	9,5	4,8	11,1	13,3	9,9	14,9	18,1	16,6	16,7	16,7
Shear V_{rec} [kN]	5,5	9,9	9,9	5,8	15,7	15,7	12,0	23,6	23,6	29,8	41,4	41,4	53,3	55,5	55,5

The partial safety factors for action depend on the type of loading and shall be taken from national regulations

Seismic loading based on ETA-21/0878. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- $\alpha_{\text{gap}} = 1,0$ (using Hilti filling set) and $\alpha_{\text{gap}} = 0,5$ (without using Hilti filling set) accordingly
- Values valid for hammer drilled and diamond cored holes (M8 to M20), hammer drilled holes with Hilti hollow drill bit (M10-M20)

For specific design cases refer to [PROFIS Engineering](#).

Design resistance in case of seismic performance C2

Anchor size	M8		M10		M12			M16			M20		
Effective anchorage depth, h_{ef} [mm]	47	90	60	100	40	70	125	65	85	160	101	120	180
with and without Hilti filling set													
Tension $N_{\text{Rd,C2}}$ [kN]	3,0	3,3	8,4	8,5	5,7	13,2	14,7	11,8	17,7	24,5	19,8	23,3	23,3
with Hilti filling set ($\alpha_{\text{gap}} = 1,0$)													
Shear $V_{\text{Rd,C2}}$ [kN]	8,2	8,2	14,9	15,0	14,3	19,2	19,2	34,3	41,0	41,0	53,9	53,9	53,9
without Hilti filling set ($\alpha_{\text{gap}} = 0,5$)													
Shear $V_{\text{Rd,C2}}$ [kN]	4,1	4,1	7,5	7,5	7,1	9,6	9,6	17,1	20,5	20,5	19,8	19,8	19,8

Design resistance in case of seismic performance C1

Anchor size	M8		M10		M12			M16			M20		
Effective anchorage depth, h_{ef} [mm]	47	90	60	100	40	70	125	65	85	160	101	120	180
with and without Hilti filling set													
Tension $N_{\text{Rd,C1}}$ [kN]	6,2	6,2	10,5	12,7	5,7	13,2	16,3	11,8	17,7	24,7	19,8	23,3	23,3
with Hilti filling set ($\alpha_{\text{gap}} = 1,0$)													
Shear $V_{\text{Rd,C1}}$ [kN]	12,6	12,6	18,6	18,6	14,3	31,9	31,9	35,5	48,6	48,6	63,4	82,1	82,2
without Hilti filling set ($\alpha_{\text{gap}} = 0,5$)													
Shear $V_{\text{Rd,C1}}$ [kN]	6,3	6,3	9,3	9,3	7,1	16,0	16,0	17,7	24,3	24,3	22,7	22,7	22,7

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Values valid for hammer drilled and diamond cored holes (M8 to M20), hammer drilled holes with Hilti hollow drill bit (M10-M20)
- Partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1,0$

Note: that according to the EAD 330232-01-0601 effective embedment depths smaller than 40 mm are allowed only for dry indoor applications in statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners.

For specific design cases refer to [PROFIS Engineering](#).

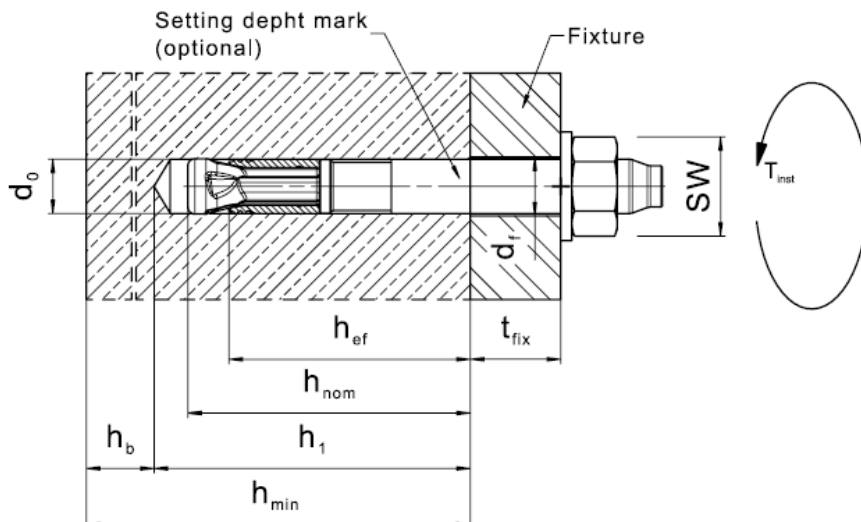
Design resistance in case of fire

Anchor size		M8			M10			M12			M16			M20		
Effective anchorage depth, h_{ef}	[mm]	30	47	90	30	60	100	40	70	125	65	85	160	101	120	180
Fire Exposure R30																
Tension	$N_{Rd,fi(30)}$ [kN]	0,8	2,2	2,2	1,0	3,5	3,5	2,0	5,2	5,2	6,8	9,5	9,5	9,1	9,1	9,1
Shear	$V_{Rd,fi(30)}$ [kN]	1,7	4,9	4,9	1,8	11,1	11,8	5,0	17,1	17,1	16,9	31,9	31,9	49,8	49,8	49,8
Fire Exposure R60																
Tension	$N_{Rd,fi(60)}$ [kN]	0,8	2,2	2,2	1,0	3,5	3,5	2,0	5,2	5,2	6,8	9,5	9,5	9,1	9,1	9,1
Shear	$V_{Rd,fi(60)}$ [kN]	1,7	3,6	3,6	1,8	8,4	8,4	4,4	12,2	12,2	12,6	22,8	22,8	35,5	35,5	35,5
Fire Exposure R90																
Tension	$N_{Rk,fi(90)}$ [kN]	0,8	2,2	2,2	1,0	3,5	3,5	2,0	5,2	5,2	6,8	9,5	9,5	9,1	9,1	9,1
Shear	$V_{Rk,fi(90)}$ [kN]	1,4	2,4	2,4	1,8	5,0	5,0	3,6	7,3	7,3	8,4	13,6	13,6	21,2	21,2	21,2
Fire Exposure R120																
Tension	$N_{Rd,fi(120)}$ [kN]	0,7	1,2	1,2	0,8	2,0	2,0	1,6	3,2	3,2	5,4	6,2	6,2	7,3	7,3	7,3
Shear	$V_{Rd,fi(120)}$ [kN]	1,2	1,7	1,7	1,5	3,3	3,3	3,2	4,8	4,8	6,2	9,0	9,0	14,1	14,1	14,1

Setting information

Setting details

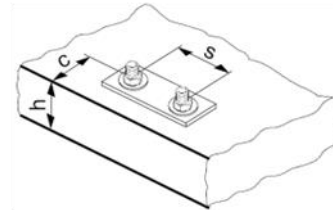
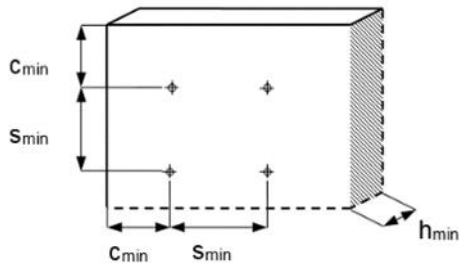
Anchor size		M8			M10			M12			M16			M20			
Nominal diameter of drill bit	d_o [mm]	8			10			12			16			20			
Maximum diameter of clearance hole in the fixture	d_f [mm]	9			12			14			18			22			
Torque moment	T_{inst} [Nm]	20			40			60			120			180			
Effective anchorage depth	h_{ef} [mm]	30	47	90	30	60	100	40	70	125	65	85	160	101	120	180	
Nominal embedment depth	h_{nom} [mm]	36	53	96	38	68	108	49	79	134	77	97	172	116	135	195	
Drill hole depth																	
Hammer drill	not cleaned	h_{1min} [mm]	56	73	116	58	88	128	69	99	154	97	117	192	136	155	215
			$h_{nom}+20$														
	cleaned	h_{1min} [mm]	39	56	99	42	72	112	53	83	138	83	103	178	124	143	203
Hollow drill	h_{1min} [mm]	$h_{nom}+3$			$h_{nom}+4$						$h_{nom}+6$			$h_{nom}+8$			
		-	-	-	42	72	112	53	83	138	83	103	178	124	143	203	
Diamond coring	h_{1min} [mm]	$h_{nom}+3$			$h_{nom}+4$						$h_{nom}+6$			$h_{nom}+8$			
		46	63	106	48	78	118	59	89	144	87	107	182	126	145	205	
Concrete thickness belowbore hole	h_{bmin} [mm]	21			27			32			34			36			
Minimum concrete thickness	h_{min} [mm]	max(80; 1,5 h_{ef} ; h_1+h_b)			max(80; 1,5 h_{ef} ; h_1+h_b)			max(100; 1,5 h_{ef} ; h_1+h_b)			max(120; 1,5 h_{ef} ; h_1+h_b)			max(160; 1,5 h_{ef} ; h_1+h_b)			
Fixture thicknesses																	
Thickness of Hilti filling set	h_{fs} [mm]	8			9			10			11			13			
Effective fixture thickness with Hilti filling set	$t_{fix,ef}$ [mm]	$t_{fix} - h_{fs}$															
Characteristic distances																	
Spacing for splitting failure and concrete cone failure	$S_{cr,sp}$ [mm]	122	200	143	173	304	218	199	306	224	381	515	368	384	456	684	
	$S_{cr,N}$ [mm]	90	141	270	90	180	300	120	210	375	195	255	480	303	360	540	
Edge distance for splitting failure and concrete cone failure	$C_{cr,sp}$ [mm]	61	100	72	86	152	109	99	153	112	190	258	184	192	228	342	
	$C_{cr,N}$ [mm]	45	71	135	45	90	150	60	105	188	98	128	240	152	180	270	



Minimum spacing s_{min} , edge distance c_{min} and required splitting area $A_{sp,req}$

We recommend checking your designs in Hilti's PROFIS Engineering software to verify the edge & spacing values. ETA-21/0878 provides formulae for the calculation of flexible edge & spacing for each anchor layout configuration depending on base material thickness.

Minimum spacing and edge distance values on the tables below are recommendations for specific anchor layout and base material dimensions.



Anchor size			M8					
Effective anchorage depth	h_{ef}	[mm]	30		47		90	
Drill hole cleaned			yes	no	yes	no	yes	no
Min. base material thickness	h_{min}	[mm]	80	80	80	100	135	140
Uncracked concrete								
Minimum spacing	s_{min}	[mm]	35	35	35	35	35	35
	for c_{min}	[mm]	70	70	70	55	45	45
Minimum edge distance	c_{min}	[mm]	40	40	40	40	40	40
	for s_{min}	[mm]	120	120	120	70	65	55
Cracked concrete								
Minimum spacing	s_{min}	[mm]	35	35	35	35	35	35
	for c_{min}	[mm]	50	50	50	50	40	40
Minimum edge distance	c_{min}	[mm]	40	40	40	40	40	40
	for s_{min}	[mm]	55	55	55	35	35	35

Anchor size			M10					
Effective anchorage depth	h_{ef}	[mm]	30		60		100	
Drill hole cleaned			yes	no	yes	no	yes	no
Min. base material thickness	h_{min}	[mm]	80	90	100	115	150	155
Uncracked concrete								
Minimum spacing	s_{min}	[mm]	40	40	40	40	40	40
	for c_{min}	[mm]	100	90	80	70	55	55
Minimum edge distance	c_{min}	[mm]	45	45	45	45	45	45
	for s_{min}	[mm]	205	170	140	105	100	90
Cracked concrete								
Minimum spacing	s_{min}	[mm]	40	40	40	40	40	40
	for c_{min}	[mm]	80	70	65	55	50	50
Minimum edge distance	c_{min}	[mm]	45	45	45	45	45	45
	for s_{min}	[mm]	145	115	90	60	55	50

Anchor size			M12					
Effective anchorage depth	h_{ef}	[mm]	40		70		125	
Drill hole cleaned			yes	no	yes	no	yes	no
Min. base material thickness	h_{min}	[mm]	100	105	115	135	190	190
Uncracked concrete								
Minimum spacing	s_{min}	[mm]	50	50	50	50	50	50
	for c_{min}	[mm]	125	120	105	90	70	70
Minimum edge distance	c_{min}	[mm]	55	55	55	55	55	55
	for s_{min}	[mm]	255	235	200	145	120	120
Cracked concrete								
Minimum spacing	s_{min}	[mm]	50	50	50	50	50	50
	for c_{min}	[mm]	95	90	80	65	60	60
Minimum edge distance	c_{min}	[mm]	55	55	55	55	55	55
	for s_{min}	[mm]	160	145	120	75	55	55

Anchor size			M16					
Effective anchorage depth	h_{ef}	[mm]	65		85		160	
Drill hole cleaned			yes	no	yes	no	yes	no
Min. base material thickness	h_{min}	[mm]	120	135	140	155	240	240
Uncracked concrete								
Minimum spacing	s_{min}	[mm]	65	65	65	65	65	65
	for c_{min}	[mm]	115	100	95	85	70	70
Minimum edge distance	c_{min}	[mm]	65	65	65	65	65	65
	for s_{min}	[mm]	210	165	150	120	80	80
Cracked concrete								
Minimum spacing	s_{min}	[mm]	65	65	65	65	65	65
	for c_{min}	[mm]	100	85	80	70	65	65
Minimum edge distance	c_{min}	[mm]	65	65	65	65	65	65
	for s_{min}	[mm]	160	120	110	80	65	65

Anchor size			M20					
Effective anchorage depth	h_{ef}	[mm]	101		120		180	
Drill hole cleaned			yes	no	yes	no	yes	no
Min. base material thickness	h_{min}	[mm]	160	175	180	195	270	270
Uncracked concrete								
Minimum spacing	s_{min}	[mm]	90	90	90	90	90	90
	for c_{min}	[mm]	140	125	120	110	90	90
Minimum edge distance	c_{min}	[mm]	80	80	80	80	80	80
	for s_{min}	[mm]	260	220	205	170	140	140
Cracked concrete								
Minimum spacing	s_{min}	[mm]	90	90	90	90	90	90
	for c_{min}	[mm]	100	90	85	80	80	80
Minimum edge distance	c_{min}	[mm]	80	80	80	80	80	80
	for s_{min}	[mm]	145	110	100	90	90	90