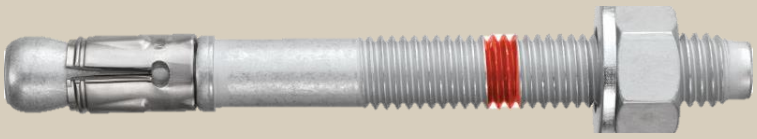
HST-3
EXPANSION ANCHOR

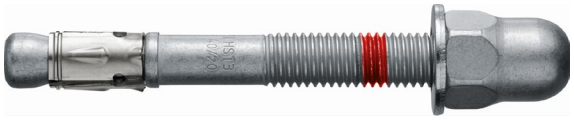
Technical Datasheet

Update: Nov-23



HST3 Expansion anchor

Ultimate-performance expansion anchor for cracked concrete and seismic

Anchor version		Benefits
	HST3 HST3-R (M8-M24)	- Ultimate resistance for reduced member thickness, short spacing and edge distances - Suitable for non-cracked and cracked concrete C 12/15 to C 80/95* - 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 torqueing tool. - Dome-nut version is available with adaptive tool qualification - Product and length identification mark facilitates quality control and inspection
	HST3 DN HST3-R DN (M8-M16)	
	HST3 BW HST3-R BW (M8-M24)	

Base material

Concrete (non-cracked)

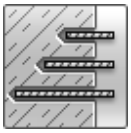
Concrete (cracked)

Load conditions

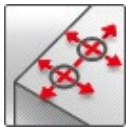
Static/ quasi-static

Seismic ETA-C1/C2

Fire resistance

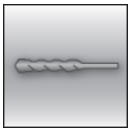


Variable embedment depth



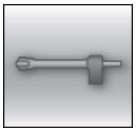
Small edge distance and spacing

Installation conditions

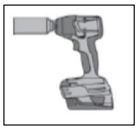


Hammer drilled holes (with no cleaning)

Diamond drilled holes



Hollow drill-bit drilling



Impact wrench with adaptative torque module

Other information

European Technical Assessment

CE conformity

PROFIS Engineering design software

Corrosion resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment [a)]	DIBt, Berlin	ETA-98/0001 / 2023-07-20
Fire test report	DIBt, Berlin	ETA-98/0001 / 2023-07-20
IAPMO Report	Uniform Evaluation Service	578 / 03.13.2023 (revised)
Certificate of compliance	FM	003053697 / 2016-01-25
Shock approval M10 - M24	BABS, Spiez Laboratory	BZS D 08-602 / 2019-01-29

a) All data given in this section according to ETA-98/0001, issue 2023-07-20.

* ETA ETA-98/0001 covers the concrete strength class between C20/25 and C 50/60. Strength classes out of this invertal are covered by Hilti Technical Data

Static and quasi-static loading (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cyl}$ = 20 N/mm² (EN 1992-4 design)

Effective anchorage depth for static

Anchor size				M8	M10		M12		M16		M20	M24
Approved variable embedment depth range [a]	$h_{ef,min}$ - $h_{ef,max}$	[mm]		47-90	40-100		50-125		65-160		101-180	125
Effective anchorage depth [b]	h_{ef}	[mm]		47	40	60	50	70	65	85	101	125

a) Variable embedmbent depth approved by ETA-98/0001 of 2021-05-04;
b) Standard embedment depth used for calculations of values below. For other embedment depths PROFIS Engineering can be used

Characteristic resistance

Anchor size				M8	M10		M12		M16		M20	M24
Non-cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rk}	[kN]	12,0	12,4	22,0	17,4	25,0	25,8	38,6	49,9	60,0
	HST3-R (-BW, -DN)			12,0	12,4	22,0	17,4	25,0	25,8	38,6	49,9	60,0
Shear	HST3 (-BW, -DN)	V_{Rk}	[kN]	13,8	21,9	23,6	34,0	35,4	54,5	55,3	83,9	94,0
	HST3-R (-BW, -DN)			15,7	25,6	25,3	31,1	36,7	48,6	63,6	97,2	115,0
Cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rk}	[kN]	8,0	8,7	15,0	12,2	20,0	18,0	27,0	35,0	40,0
	HST3-R (-BW, -DN)			8,5	8,7	15,0	12,2	20,0	18,0	27,0	35,0	40,0
Shear	HST3 (-BW, -DN)	V_{Rk}	[kN]	13,8	21,9	23,6	33,8	35,4	54,5	55,3	83,9	94,0
	HST3-R (-BW, -DN)			15,7	23,3	25,3	31,1	36,7	48,6	63,6	97,2	115,0

Design resistance

Anchor size				M8	M10		M12		M16		M20	M24
Non-cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rd}	[kN]	8,0	8,3	14,7	11,6	16,7	17,2	25,7	33,3	40,0
	HST3-R (-BW, -DN)			8,0	8,3	14,7	11,6	16,7	17,2	25,7	33,3	40,0
Shear	HST3 (-BW, -DN)	V_{Rd}	[kN]	11,0	17,5	18,9	27,2	28,3	43,6	44,2	67,1	62,7
	HST3-R (-BW, -DN)			12,6	20,5	20,2	24,9	29,4	38,9	50,9	77,8	88,5
Cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rd}	[kN]	5,3	5,8	10,0	8,1	13,3	12,0	18,0	23,3	26,7
	HST3-R (-BW, -DN)			5,7	5,8	10,0	8,1	13,3	12,0	18,0	23,3	26,7
Shear	HST3 (-BW, -DN)	V_{Rd}	[kN]	11,0	15,5	18,9	22,6	28,3	41,0	44,2	67,1	62,7
	HST3-R (-BW, -DN)			12,6	15,5	20,2	22,6	29,4	38,9	50,9	74,6	80,2

Recommended loads[a)]

Anchor size				M8	M10		M12		M16		M20	M24
Non-cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rec}	[kN]	5,7	5,9	10,5	8,3	11,9	12,3	18,4	23,8	28,6
	HST3-R (-BW, -DN)			5,7	5,9	10,5	8,3	11,9	12,3	18,4	23,8	28,6
Shear	HST3 (-BW, -DN)	V_{Rec}	[kN]	7,9	12,5	13,5	19,4	20,2	31,1	31,6	47,9	44,8
	HST3-R (-BW, -DN)			9,0	14,6	14,5	17,8	21,0	27,8	36,3	55,5	63,2
Cracked concrete												
Tension	HST3 (-BW, -DN)	N_{Rec}	[kN]	3,8	4,1	7,1	5,8	9,5	8,6	12,9	16,6	19,0
	HST3-R (-BW, -DN)			4,0	4,1	7,1	5,8	9,5	8,6	12,9	16,6	19,0
Shear	HST3 (-BW, -DN)	V_{Rec}	[kN]	7,9	11,1	13,5	16,1	20,2	29,3	31,6	47,9	44,8
	HST3-R (-BW, -DN)			9,0	11,1	14,5	16,1	21,0	27,8	36,3	53,3	57,3

a) With overall partial safety factor for action γ = 1,4, The partial safety factors for action depend on the type of loading and shall be taken from national regulations

Seismic loading (for a single anchor)

All data in this section applies to:
- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cyl}$ = 20 N/mm² (EN 1992-4 design)
- α_{gap} = 1,0 (using Hilti seismic filling set)

Effective anchorage depth for seismic C2 and C1

Anchor size			M8	M10	M12	M16	M20	M24
Approved variable embedment depth range [a)]	$h_{ef,min}$ - $h_{ef,max}$	[mm]	47-90	60-100	70-125	85-160	101-180	-
Effective anchorage depth [b)]	h_{ef}	[mm]	47	60	70	85	101	-

a) Variable embedmbent depth approved by ETA-98/0001 of 2021-05-04;
b) Standard embedment depth used for calculations of values below. For other embedment depths PROFIS Engineering can be used

Characteristic resistance in case of seismic performance C2 (with Hilti filling set)

Anchor size				M8	M10	M12	M16	M20	M24
Tension	HST3 (-BW, -DN)	$N_{Rk,\ seis}$	[kN]	3,0	10,4	17,1	22,9	29,7	-
	HST3-R (-BW, -DN)			3,4	10,4	17,1	22,9	29,7	-
Shear	HST3 (-BW, -DN)	$V_{Rk,seis}$	[kN]	9,9	19,0	28,6	48,5	84,3	-
	HST3-R (-BW, -DN)			9,9	17,2	27,6	42,5	67,4	-

Design resistance in case of seismic performance C2 (with Hilti filling set)

Anchor size				M8	M10	M12	M16	M20	M24
Tension	HST3 (-BW, -DN)	$N_{Rk,\ seis}$	[kN]	2,0	6,9	11,4	15,3	19,8	-
	HST3-R (-BW, -DN)			2,3	6,9	11,4	15,3	19,8	-
Shear	HST3 (-BW, -DN)	$V_{Rk,seis}$	[kN]	7,9	15,2	22,9	38,8	63,4	-
	HST3-R (-BW, -DN)			7,9	13,8	22,1	34,0	53,9	-

Characteristic resistance in case of seismic performance C1 (with Hilti filling set)

Anchor size				M8	M10	M12	M16	M20	M24
Tension	HST3 (-BW, -DN)	$N_{Rk,\,seis}$	[kN]	8,0	13,6	17,1	22,9	29,7	-
	HST3-R (-BW, -DN)			8,5	13,6	17,1	22,9	29,7	-
Shear	HST3 (-BW, -DN)	$V_{Rk,seis}$	[kN]	16,6	25,8	39,0	60,9	95,1	-
	HST3-R (-BW, -DN)			19,5	28,4	44,3	70,2	95,1	-

Design resistance in case of seismic performance C1

Anchor size				M8	M10	M12	M16	M20	M24
Tension	HST3 (-BW, -DN)	$N_{Rd,\,seis}$	[kN]	5,3	9,1	11,4	15,3	19,8	-
	HST3-R (-BW, -DN)			5,7	9,1	11,4	15,3	19,8	-
Shear	HST3 (-BW, -DN)	$V_{Rd,seis}$	[kN]	13,3	20,6	31,2	48,7	63,4	-
	HST3-R (-BW, -DN)			15,6	22,7	31,8	52,1	63,4	-

Fire resistance

All data in this section applies to:
- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cyl}$ = 20 N/mm² (EN 1992-4 design)
- Hilti technical data for concrete strength class C55/67 to C80/95: for a structural element that fullfills the requirements according to DIN EN 1992-1-2 the fire resistance of C20/25 could be assumed.
- partial safety factor for resistance under fire exposure $\gamma_{M,fi}$=1,0 (in absence of other national regulations)

Effective anchorage depth for static

Anchor size			M8	M10		M12		M16		M20	M24
Approved variable embedment depth range [a]	$h_{ef,min}$ - $h_{ef,max}$	[mm]	47-90	40-59	60-100	50-69	70-125	65-84	85-160	101-180	125
Effective anchorage depth [b]	h_{ef}	[mm]	47	40	60	50	70	65	85	101	125

a) Variable embedmbent depth approved by ETA-98/0001 of 2021-05-04;
b) Standard embedment depth used for calculations of values below. For other embedment depths PROFIS Engineering can be used

Characteristic resistance

Anchor size				M8	M10		M12		M16		M20	M24
Fire Exposure R30												
Tension	HST3 (-BW, -DN)	$N_{Rk,fi}$	[kN]	0,9	1,5	2,4	2,3	5,0	4,4	7,1	9,1	12,6
	HST3-R (-BW, -DN)			1,9	1,8	3,0	3,2	5,0	4,7	7,1	9,1	12,6
Shear	HST3 (-BW, -DN)	$V_{Rk,fi}$	[kN]	0,9	1,5	2,4	2,3	5,2	4,4	9,7	15,2	21,9
	HST3-R (-BW, -DN)			4,9	4,7	11,8	8,9	17,1	16,9	31,9	37,0	62,8
Fire Exposure R120												
Tension	HST3 (-BW, -DN)	$N_{Rk,fi}$	[kN]	0,6	0,8	0,9	0,8	1,3	1,5	2,4	3,8	5,4
	HST3-R (-BW, -DN)			1,5	1,5	2,4	2,5	4,0	3,8	5,6	7,3	10,1
Shear	HST3 (-BW, -DN)	$V_{Rk,fi}$	[kN]	0,6	0,8	0,9	0,8	1,3	1,5	2,4	3,8	5,4
	HST3-R (-BW, -DN)			1,7	2,0	3,3	3,3	4,8	6,2	9,0	14,1	20,3

Design resistance

Anchor size				M8	M10		M12		M16		M20	M24
Fire Exposure R30												
Tension	HST3 (-BW, -DN)	$N_{Rd,fi}$	[kN]	0,9	1,5	2,4	2,3	5,0	4,4	7,1	9,1	12,6
	HST3-R (-BW, -DN)			1,9	1,8	3,0	3,2	5,0	4,7	7,1	9,1	12,6
Shear	HST3 (-BW, -DN)	$V_{Rd,fi}$	[kN]	0,9	1,5	2,4	2,3	5,2	4,4	9,7	15,2	21,9
	HST3-R (-BW, -DN)			4,9	4,7	11,8	8,9	17,1	16,9	31,9	37,0	62,8
Fire Exposure R120												
Tension	HST3 (-BW, -DN)	$N_{Rd,fi}$	[kN]	0,6	0,8	0,9	0,8	1,3	1,5	2,4	3,8	5,4
	HST3-R (-BW, -DN)			1,5	1,5	2,4	2,5	4,0	3,8	5,6	7,3	10,1
Shear	HST3 (-BW, -DN)	$V_{Rd,fi}$	[kN]	0,6	0,8	0,9	0,8	1,3	1,5	2,4	3,8	5,4
	HST3-R (-BW, -DN)			1,7	2,0	3,3	3,3	4,8	6,2	9,0	14,1	20,3

For more information about diffrent failure modes and fire resistance times please see the full ETA-98/0001 report

Materials

Mechanical properties

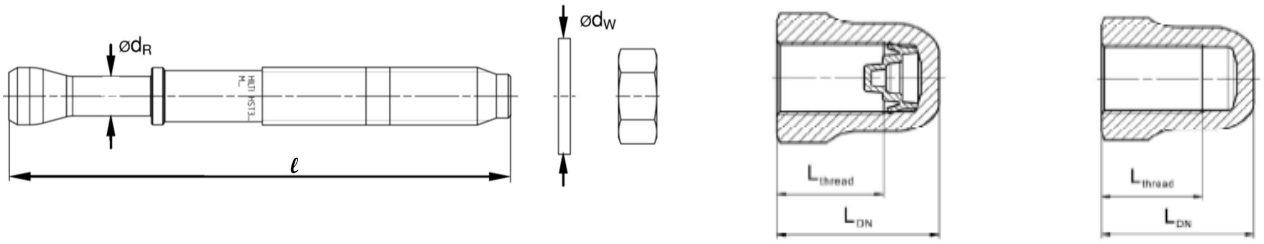
Anchor size				M8	M10	M12	M16	M20	M24
Nominal tensile strength	HST3 (-BW, -DN)	$f_{uk,thread}$	[N/mm²]	800	800	800	720	700	530
	HST3-R (-BW, -DN)			720	710	710	650	650	650
Yield strength	HST3 (-BW, -DN)	$f_{yk,thread}$	[N/mm²]	640	640	640	576	560	450
	HST3-R (-BW, -DN)			576	568	568	520	520	500
Stressed cross-section		A_s	[mm²]	36,6	58,0	84,3	157	245	353
Moment of resistance		W	[mm³]	31,2	62,3	109	277	541	935
Characteristic bending resistance	HST3 (-BW, -DN)	$M^0_{Rk,s}$	[Nm]	30	60	105	240	457	595
	HST3-R (-BW, -DN)			27	53	93	216	425	730

Material quality

Part		Material
Expansion sleeve	HST3 (-BW, -DN)	M10, M16: Galvanized or Stainless steel M8, M12, M20, M24: Stainless steel
	HST3-R (-BW, -DN)	Stainless steel A4
Bolt	HST3 (-BW, -DN)	Carbon steel, galvanized, coated (transparent)
	HST3-R (-BW, -DN)	Stainless steel A4, cone coated (transparent)
Washer	HST3 (-BW, -DN)	Galvanized
	HST3-R (-BW, -DN)	Stainless steel A4
Hexagon nut	HST3 (-BW)	Strength class 8
	HST3-R (-BW)	Stainless steel A4, coated
Dome nut	HST3 DN	Galvanized
	HST3-R DN	Stainless steel A4, coated

Anchor dimensions

Anchor size			M8	M10	M12	M16	M20	M24
Maximum length of anchor	$\ell_{max} \leq$	[mm]	260	280	350	475	450	500
Shaft diameter at the cone	d_R	[mm]	5,60	6,94	8,22	11,00	14,62	17,4
Length of expansion sleeve	ℓ_s	[mm]	13,6	16,0	20,0	25,0	28,3	36,0
Diameter of washer	$d_w \geq$	[mm]	15,57	19,48	23,48	29,48	36,38	43,38
Length of dome nut thread	$L_{thread} \geq$	[mm]	13,3	16,8	17,8	22,3	-	-
Length of dome nut	$L_{DN} \geq$	[mm]	18,1	21,9	24,0	29,5	-	-

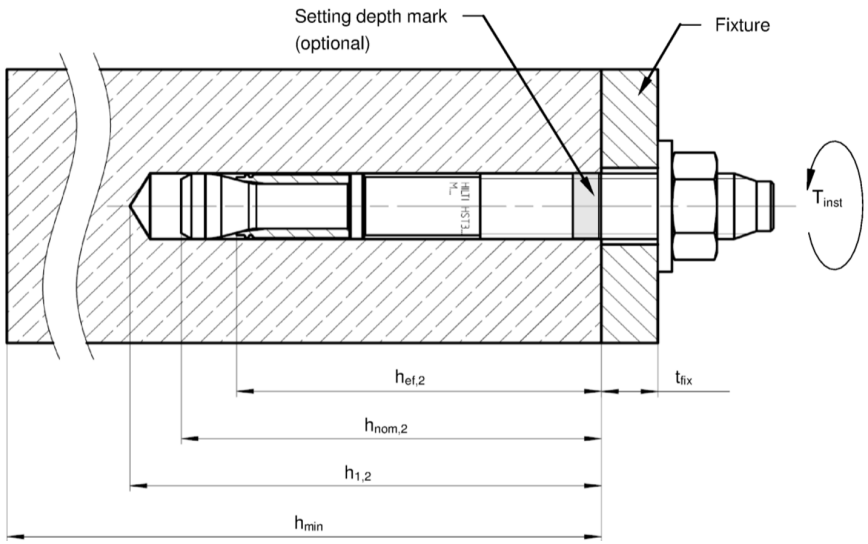


Setting information

Setting details

Anchor size			M8	M10	M12	M16	M20	M24
Nominal diameter of drill bit	d_o	[mm]	8	10	12	16	20	24
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	12,5	16,5	20,55	24,55
Effective embedment depth	$h_{ef,1}$	[mm]	-	40-59	50-69	65-84	-	-
	$h_{ef,2}$	[mm]	47-90	60-100	70-125	85-160	101-180	125
Drill hole depth[1) 3)]	$h_{1,1} \geq$	[mm]	-	h_{ef}+13	h_{ef}+18	h_{ef}+21	-	-
	$h_{1,2} \geq$	[mm]	h_{ef}+12	h_{ef}+13	h_{ef}+18	h_{ef}+21	h_{ef}+23	151
Nominal embedment depth	$h_{nom,1}$	[mm]	-	h_{ef}+8	h_{ef}+10	h_{ef}+13	-	-
	$h_{nom,2}$	[mm]	h_{ef}+7	h_{ef}+8	h_{ef}+10	h_{ef}+13	h_{ef}+15	143
Maximum diameter of clearance hole in the fixture[2)]	d_f	[mm]	9	12	14	18	22	26
Torque moment	T_{inst}	[Nm]	20	45	60	110	180	300
Maximum thickness of fixture	$t_{fix,max}$	[mm]	195	220	270	370	310	330
Width across	SW	[mm]	13	17	19	24	30	36

1) In case of diamond drilling +5 mm for M8 to M10 and +2 mm for M12 to M24.
2) For the design of bigger clearance holes in the fixture see EN 1992-4:2018.
3) In case of hammer drilling with non-cleaned boreholes + 12 mm for M8 to M20.



Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24
Rotary hammer	TE2(-A) – TE30(-A)				TE40 – TE80	
Diamond coring tool	DD-30W, DD-EC1					
Torqueing tool	Hilti SIW 4AT-22 with SI-AT-22 [1]				-	
	-	Hilti SIW 6AT-22 with SI-AT-22 [1]				
Setting tool	HS-SC				-	
Hollow drill bit	-		TE-CD, TE-YD			
Other tools	hammer, torque wrench, blow out pump					

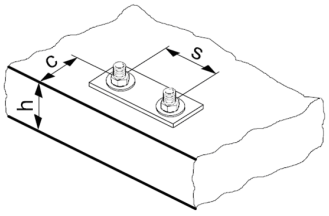
1) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used

Setting parameters of HST3 (-BW, -DN) / HST3-R (-BW, -DN) for M8 and M10*

Anchor Size			M8			M10			
Concrete class			C20/25 to C50/60[a] C55/67 to C80/95[b]		C12/15[b] C16/20[b]	C20/25 to C50/60[a]	C20/25 to C50/60[a] C55/67 to C80/95[b]		C12/15[b] C16/20[b]
Effective anchorage depth	h_{ef}	[mm]	47		47	40	60		60
Minimum base material thickness	h_{min}	[mm]	80	100	100	80	100	120	120
Minimum spacing in non-cracked concrete	s_{min}	[mm]	35	35	35	50	40	40	70
	for c ≥	[mm]	70	55	65	65	90	75	90
Minimum spacing in cracked concrete	s_{min}	[mm]	35	35	35	40	40	40	45
	for c ≥	[mm]	55	40	55	50	70	55	85
Minimum edge distance in non-cracked concrete	c_{min}	[mm]	45	40	50	50	60	50	80
	for s ≥	[mm]	110	80	80	95	130	110	120
Minimum edge distance in cracked concrete	c_{min}	[mm]	40	40	40	45	50	45	70
	for s ≥	[mm]	70	35	75	55	90	65	120
Critical spacing for splitting failure and concrete cone failure	$s_{cr,sp}$	[mm]	141		188	168	180		240
	$s_{cr,N}$	[mm]	141		141	120	180		180
Critical edge distance for splitting failure and concrete cone failure	$c_{cr,sp}$	[mm]	71		94	84	90		120
	$c_{cr,N}$	[mm]	71		71	60	90		90

a) Data covered by ETA-98/0001 issue 2023-07-20.
b) Data covered by Hilti Technical Data

* ETA-98/0001 provides flexible edge & spacing values for each anchor layout configuration depending on base material thickness. Minimum spacing and edge distance values on the table are recommendations for specific anchor layout and base material dimensions. We kindly ask you to check your designs on PROFIS Engineering software to verify the edge & spacing values.

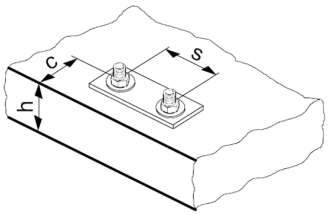


Setting parameters of HST3 (-BW, -DN) / HST3-R (-BW, -DN) for M12 and M16*

Anchor Size			M12				M16			
Concrete class			C20/25 to C50/60[a]	C20/25 to C50/60[a] C55/67 to C80/95[b]		C12/15[b] C16/20[b]	C20/25 to C50/60[a]	C20/25 to C50/60[a] C55/67 to C80/95[b]		C12/15[b] C16/20[b]
Effective anchorage	h_{ef}	[mm]	50	70		70	65	85		85
Minimum base material	h_{min}	[mm]	100	120	140	140	120	140	160	160
Minimum spacing in non-cracked concrete	s_{min}	[mm]	55	50	60	110	75	80	65	90
	for c	[mm]	85	110	85	140	100	115	100	145
Minimum spacing in cracked concrete	s_{min}	[mm]	50	50	50	80	65	80	65	70
	for c ≥	[mm]	65	80	65	120	75	80	75	125
Minimum edge distance in non-cracked concrete	c_{min}	[mm]	60	75	60	90	65	80	70	110
	for s ≥	[mm]	130	145	135	190	175	180	160	170
Minimum edge distance in cracked concrete	c_{min}	[mm]	55	60	55	80	65	65	65	90
	for s ≥	[mm]	75	100	75	170	85	125	85	165
Critical spacing for splitting failure and concrete cone failure	$s_{cr,sp}$	[mm]	180	210		280	208	255		340
	$s_{cr,N}$	[mm]	150	210		210	195	255		255
Critical edge distance for splitting failure and concrete cone failure	$c_{cr,sp}$	[mm]	90	105		140	104	128		170
	$c_{cr,N}$	[mm]	75	105		105	98	128		128

a) Data covered by ETA-98/0001 issue 2023-07-20.
b) Data covered by Hilti Technical Data

* ETA-98/0001 provides flexible edge & spacing values for each anchor layout configuration depending on base material thickness. Minimum spacing and edge distance values on the table are recommendations for specific anchor layout and base material dimensions. We kindly ask you to check your designs on PROFIS Engineering software to verify the edge & spacing values.



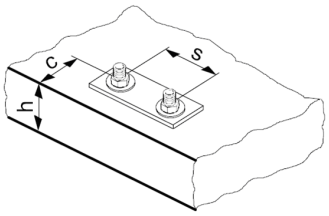
Setting parameters of HST3(-BW) / HST3-R(-BW) for M20 and M24*

Anchor Size				M20			M24	
Concrete class				C20/25 to C50/60[a] C55/67 to C80/95[b]		C12/15[b] C16/20[b]	C20/25 to C50/60[a] C55/67 to C80/95[b]	C12/15[b] C16/20[b]
Effective anchorage		h_{ef}	[mm]	101		101	125	125
Minimum base material		h_{min}	[mm]	160	200	200	250	250
Minimum spacing in non-cracked concrete	HST3	s_{min}	[mm]	120	90	90	125	180
	HST3-BW	for c ≥	[mm]	130	105	165	255	375
	HST3-R	s_{min}	[mm]	120	90	90	125	180
	HST3-R-BW	for c ≥	[mm]	130	105	165	205	375
Minimum spacing in cracked concrete	HST3	s_{min}	[mm]	90	90	90	125	140
	HST3-BW	for c ≥	[mm]	100	80	165	180	325
	HST3-	s_{min}	[mm]	90	90	90	125	140
	HST3-R-BW	for c ≥	[mm]	100	80	140	130	325
Min. edge distance in non-cracked concrete	HST3	c_{min}	[mm]	110	80	90	170	260
	HST3-BW	for s ≥	[mm]	170	160	140	295	400
	HST3-R	c_{min}	[mm]	110	80	120	150	260
	HST3-R-BW	for s ≥	[mm]	170	160	270	235	400
Min. edge distance in cracked concrete	HST3	c_{min}	[mm]	90	80	100	125	230
	HST3-BW	for s ≥	[mm]	115	90	240	240	295
	HST3-R	c_{min}	[mm]	90	80	100	125	230
	HST3-R-BW	for s ≥	[mm]	115	90	240	140	295
Critical spacing for splitting failure and concrete cone failure		$s_{cr,sp}$	[mm]	384		404	375	500
		$s_{cr,N}$	[mm]	303		303	375	375
Critical spacing for splitting failure and concrete cone failure		$c_{cr,sp}$	[mm]	192		202	188	250
		$c_{cr,N}$	[mm]	152		152	188	188

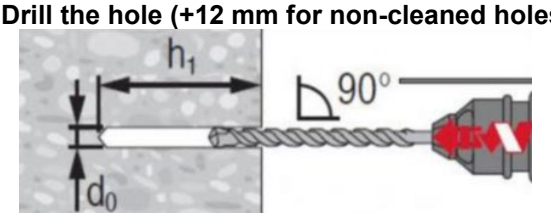
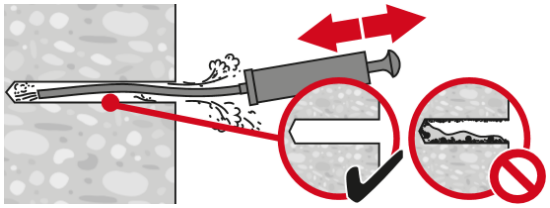
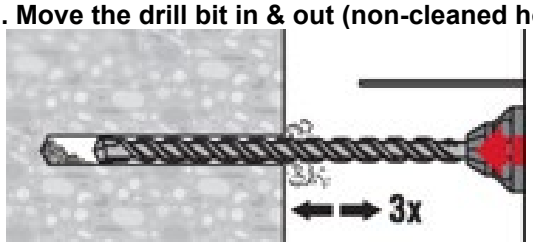
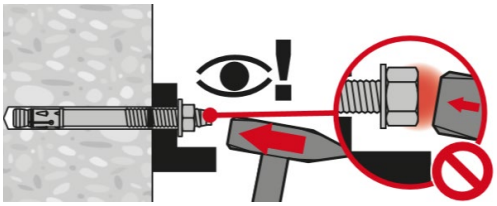
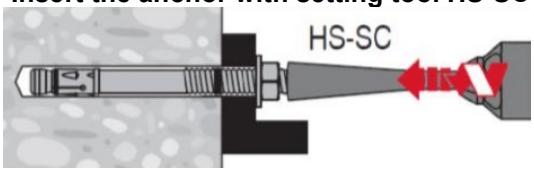
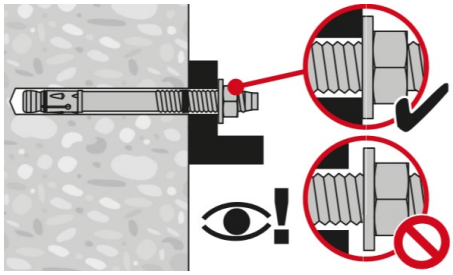
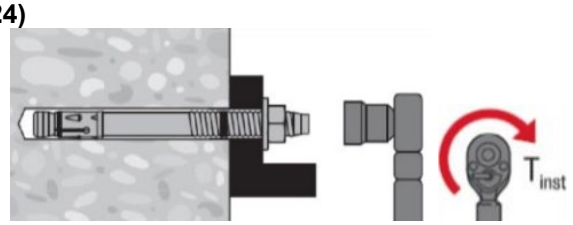
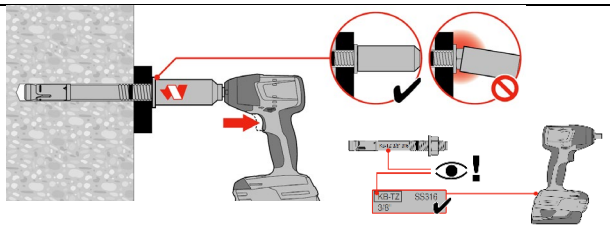
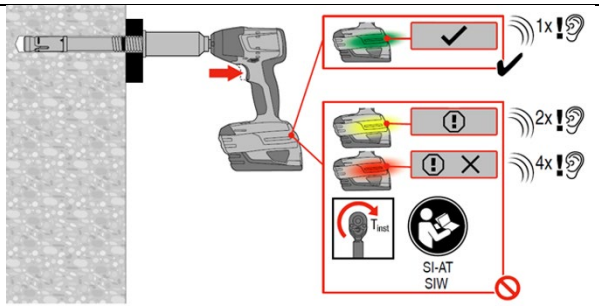
a) Data covered by ETA-98/0001 issue 2023-07-20.
b) Data covered by Hilti Technical Data

For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

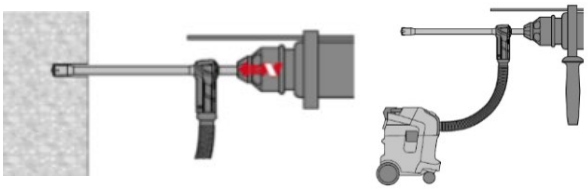
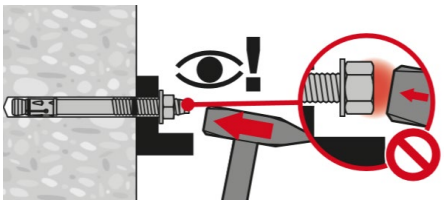
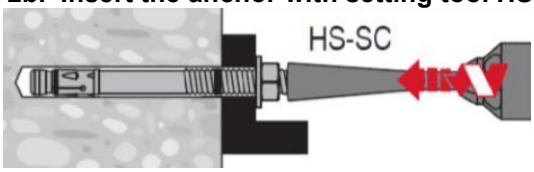
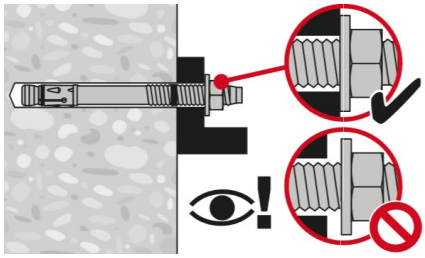
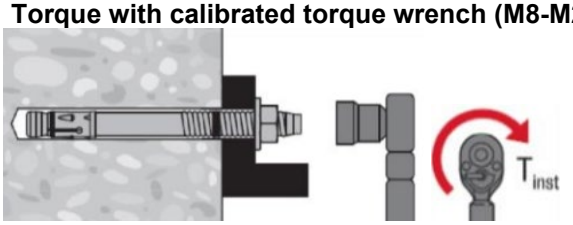
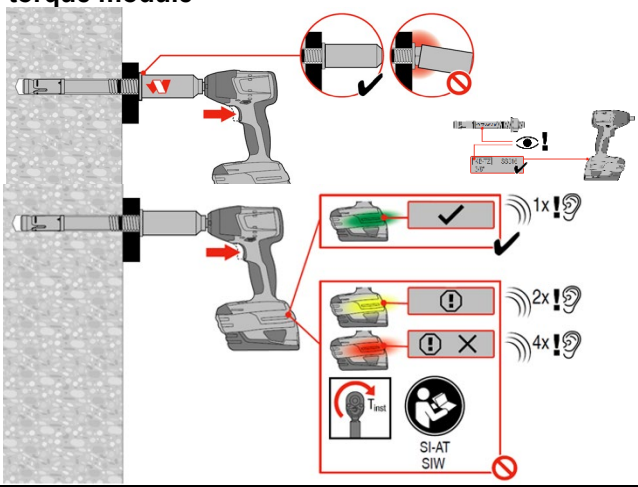
* ETA-98/0001 provides flexible edge & spacing values for each anchor layout configuration with M20 depending on base material thickness. Minimum spacing and edge distance values on the table are recommendations for specific anchor layout and base material dimensions. We kindly ask you to check your designs on PROFIS Engineering software to verify the edge & spacing values.



Setting instructions
***For detailed information on installation see instruction for use given with the package of the product**

Setting instruction for HST3 (-BW, -DN) / HST3-R (-BW, -DN) [a)]	
Hammer drilling (M8, M10, M12, M16, M20, M24)	
1. Drill the hole (+12 mm for non-cleaned holes) 	**2a. Clean the hole** 
2bi. Move the drill bit in & out (non-cleaned hole) 	**2bii. Check** 
3a. Insert the anchor with hammer 	**3b. Insert the anchor with setting tool HS-SC** 
4. Check 	**5a. Torque with calibrated torque wrench (M8-M24)** 
5b. Torque with impact wrench with Adaptative torque module [b)]	
	

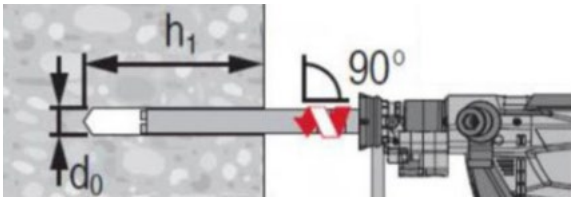
a) HST3 DN covers the diameter range between M8 and M16;
b) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 6AT-22 with SI-AT-22 for sizes M10-M24 or SIW 4AT-22 with SI-AT-22 for size M8-M16)

Hollow Drill Bit (M16, M20, M24), no cleaning is required even without buffer [a]	
1. Drill the hole with the Hollow drill bit 	**2a. Insert the anchor with hammer** 
2b. Insert the anchor with setting tool HS-SC 	**3. Check** 
5a. Torque with calibrated torque wrench (M8-M24) 	**5b. Torque with impact wrench with Adaptative torque module [b]** 

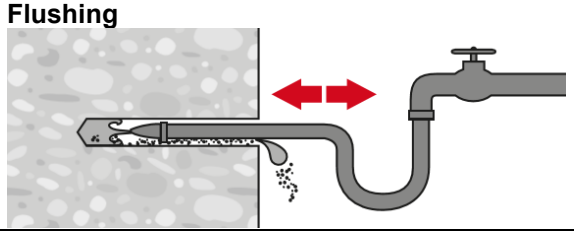
a) HST3 DN covers the diameter range between M8 and M16;
b) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 6AT-22 with SI-AT-22 for sizes M10-M24 or SIW 4AT-22 with SI-AT-22 for size M8-M16)

Diamond coring (M8, M10, M12, M16, M20, M24) [a)]

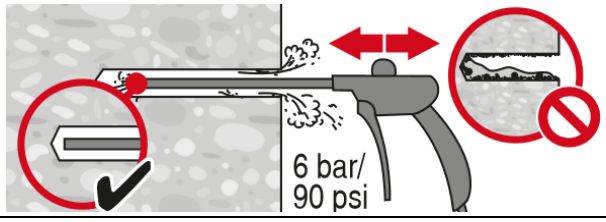
1. Core the hole



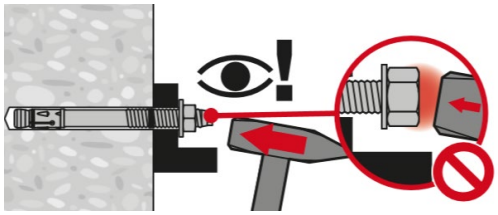
2. Flushing



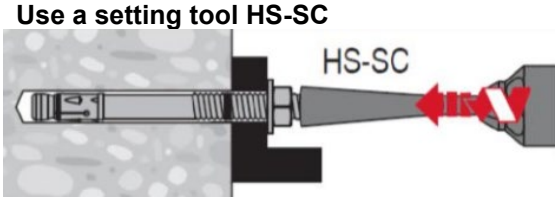
3. Clean the hole



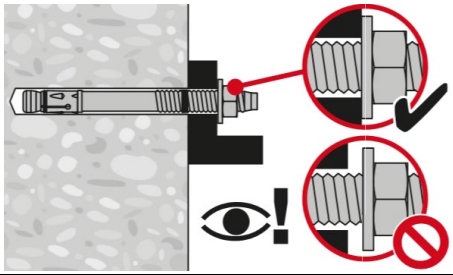
4a. Insert the anchor with hammer



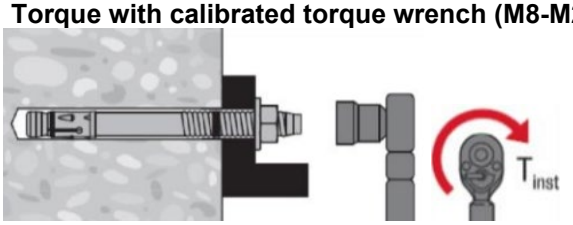
4b. Use a setting tool HS-SC



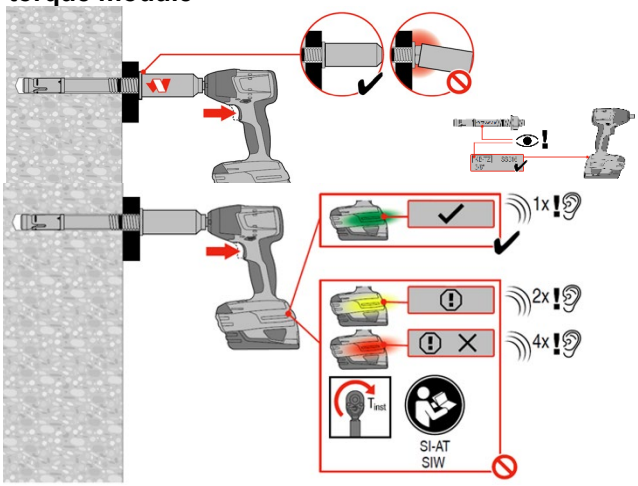
5. Check



6a. Torque with calibrated torque wrench (M8-M24)



5b. Torque with impact wrench with Adaptative torque module [b)]



a) HST3 DN covers the diameter range between M8 and M16;
b) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 6AT-22 with SI-AT-22 for sizes M10-M24 or SIW 4AT-22 with SI-AT-22 for size M8-M16)