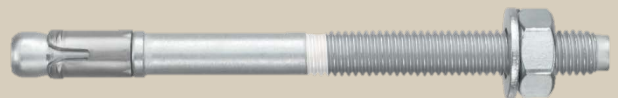




HST-2 EXPANSION ANCHOR

Technical Datasheet

Update: Nov-23



HST2 Expansion anchor

Everyday standard expansion anchor for cracked concrete

Anchor version



HST2
HST2-R
(M8-M16)

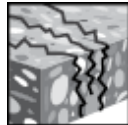
Benefits

- Optimized expansion cone and wedge design combined with special steel and coatings.
- Suitable for non-cracked and cracked concrete
- Product and length identification mark facilitates quality control and inspection

Base material



Concrete
(non-cracked)



Concrete
(cracked)

Load conditions



Static/
quasi-static

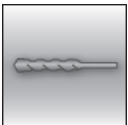


Fire
resistance



Seismic
ETA-C1, C2

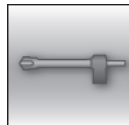
Installation conditions



Hammer
drilled holes



Diamond
drilled holes



Hollow drill-
bit drilling



Impact wrench
with adaptative
torque module

Other information



European
Technical
Assessment



CE
conformity



PROFIS
Engineering
design
software



FM
approved

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment ^{a)}	DIBt, Berlin	ETA-15/0435 / 2022-11-16
Fire test report	DIBt, Berlin	ETA-15/0435 / 2022-11-16

a) All data given in this section according to ETA-15/0435, issue 2022-11-16

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, $f_{ck,cube} = 25 \text{ N/mm}^2$

Effective anchorage depth for static

Anchor size			M8	M10	M12	M16
Effective anchorage depth	h_{ef}	[mm]	47	60	70	82

Characteristic resistance

Anchor size			M8	M10	M12	M16	
Non-cracked concrete							
Tension	HST2	N_{Rk}	[kN]	9,0	16,0	20,0	35,0
	HST2-R			9,0	16,0	20,0	35,0
Shear	HST2	V_{Rk}	[kN]	11,4	21,6	31,4	55,3
	HST2-R			15,7	25,3	36,7	63,6
Cracked concrete							
Tension	HST2	N_{Rk}	[kN]	5,0	9,0	12,0	20,0
	HST2-R			5,0	9,0	12,0	25,0
Shear	HST2	V_{Rk}	[kN]	11,4	21,6	31,4	55,3
	HST2-R			15,7	25,3	36,7	63,6

Design resistance

Anchor size			M8	M10	M12	M16	
Non-cracked concrete							
Tension	HST2	N_{Rd}	[kN]	6,0	10,7	13,3	23,3
	HST2-R			6,0	10,7	13,3	23,3
Shear	HST2	V_{Rd}	[kN]	9,1	17,3	25,1	44,2
	HST2-R			12,6	20,2	29,4	50,9
Cracked concrete							
Tension	HST2	N_{Rd}	[kN]	3,3	6,0	8,0	13,3
	HST2-R			3,3	6,0	8,0	16,7
Shear	HST2	V_{Rd}	[kN]	9,1	17,3	25,1	42,6
	HST2-R			12,6	20,2	29,4	42,6

Recommended loads ^{a)}

Anchor size			M8	M10	M12	M16	
Non-cracked concrete							
Tension	HST2	N_{rec}	[kN]	4,3	7,6	9,5	16,7
	HST2-R			4,3	7,6	9,5	16,7
Shear	HST2	V_{rec}	[kN]	6,5	12,3	17,9	31,6
	HST2-R			9,0	14,5	21,0	36,3
Cracked concrete							
Tension	HST2	N_{rec}	[kN]	2,4	4,3	5,7	9,5
	HST2-R			2,4	4,3	5,7	11,9
Shear	HST2	V_{rec}	[kN]	6,5	12,3	17,9	30,4
	HST2-R			9,0	14,5	21,0	30,4

a) With overall partial safety factor for action $\gamma = 1,4$, 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, $f_{ck,cube} = 25 \text{ N/mm}^2$
- $\alpha_{gap} = 1,0$ (using Hilti seismic filling set)

Effective anchorage depth for seismic

Anchor size		M10	M12	M16
Effective anchorage depth	h_{ef} [mm]	60	70	82

Characteristic resistance in case of seismic performance C2

Anchor size			M10	M12	M16
Tension	HST2	$N_{Rk,seis}$ [kN]	3,3	10,0	12,8
Shear	HST2	$V_{Rk,seis}$ [kN]	16,0	24,2	41,3

Design resistance in case of seismic performance C2

Anchor size			M10	M12	M16
Tension	HST2	$N_{Rd,seis}$ [kN]	2,2	6,7	8,5
Shear	HST2	$V_{Rd,seis}$ [kN]	12,8	19,4	33,0

Characteristic resistance in case of seismic performance C1

Anchor size			M10	M12	M16
Tension	HST2	$N_{Rk,seis}$ [kN]	8,0	10,7	18,0
Shear	HST2	$V_{Rk,seis}$ [kN]	16,0	27,0	41,3

Design resistance in case of seismic performance C1

Anchor size			M10	M12	M16
Tension	HST2	$N_{Rd,seis}$ [kN]	5,3	7,1	12,0
Shear	HST2	$V_{Rd,seis}$ [kN]	12,8	21,6	33,0

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, $f_{ck,cube} = 25 \text{ N/mm}^2$
- 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 fire

Anchor size		M8	M10	M12	M16
Effective anchorage depth	h_{ef} [mm]	47	60	70	82

Characteristic resistance

Anchor size		M8	M10	M12	M16	
Fire Exposure R30						
Tension	HST2	$N_{Rk,fi}$ [kN]	0,9	2,3	3,0	5,0
	HST2-R		0,9	2,3	3,0	5,0
Shear	HST2	$V_{Rk,fi}$ [kN]	0,9	2,5	5,0	9,0
	HST2-R		0,9	2,5	5,0	9,0
Fire Exposure R120						
Tension	HST2	$N_{Rk,fi}$ [kN]	0,5	0,7	1,0	2,0
	HST2-R		0,5	0,7	1,0	2,0
Shear	HST2	$V_{Rk,fi}$ [kN]	0,5	0,7	1,0	2,0
	HST2-R		0,5	0,7	1,0	2,0

Design resistance

Anchor size		M8	M10	M12	M16	
Fire Exposure R30						
Tension	HST2	$N_{Rd,fi}$ [kN]	0,9	2,3	3,0	5,0
	HST2-R		0,9	2,3	3,0	5,0
Shear	HST2	$V_{Rd,fi}$ [kN]	0,9	2,5	5,0	9,0
	HST2-R		0,9	2,5	5,0	9,0
Fire Exposure R120						
Tension	HST2	$N_{Rd,fi}$ [kN]	0,5	0,7	1,0	2,0
	HST2-R		0,5	0,7	1,0	2,0
Shear	HST2	$V_{Rd,fi}$ [kN]	0,5	0,7	1,0	2,0
	HST2-R		0,5	0,7	1,0	2,0

Materials

Mechanical properties

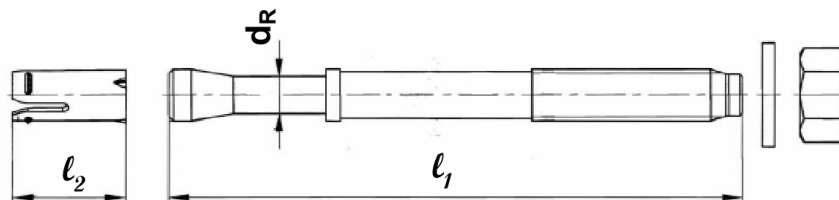
Anchor size			M8	M10	M12	M16
Nominal tensile strength	HST2	$f_{uk,thread}$ [N/mm ²]	660	730	710	720
	HST2-R		720	710	710	650
Yield strength	HST2	$f_{yk,thread}$ [N/mm ²]	528	584	568	576
	HST2-R		576	568	568	520
Stressed cross-section		A_s [mm ²]	36,6	58,0	84,3	157
Moment of resistance		W [mm ³]	31,2	62,3	109	277
Characteristic bending resistance	HST2	$M^{0}_{Rk,s}$ [Nm]	25	55	93	240
	HST2-R		27	53	93	216

Material quality

Part		Material
Expansion sleeve	HST2	Stainless steel A2
	HST2-R	Stainless steel A4
Bolt	HST2	Carbon steel, galvanized
	HST2-R	Stainless steel A4 or Duplex A4
Washer	HST2	Carbon steel, galvanized
	HST2-R	Stainless steel A4
Hexagon nut	HST2	Carbon steel, galvanized
	HST2-R	Stainless steel A4

Anchor dimensions

Anchor size			M8	M10	M12	M16
Minimum thickness of fixture	$t_{fix,min}$	[mm]	2	2	2	2
Maximum thickness of fixture	$t_{fix,max}$	[mm]	195	200	200	235
Shaft diameter at the cone	d_R	[mm]	5,5	7,2	8,5	11,6
Minimum length of anchor	$l_{1,min} \geq$	[mm]	75	90	105	140
Maximum length of anchor	$l_{1,max} \leq$	[mm]	260	280	295	350
Length of expansion sleeve	l_2	[mm]	14,8	18,2	22,7	24,3

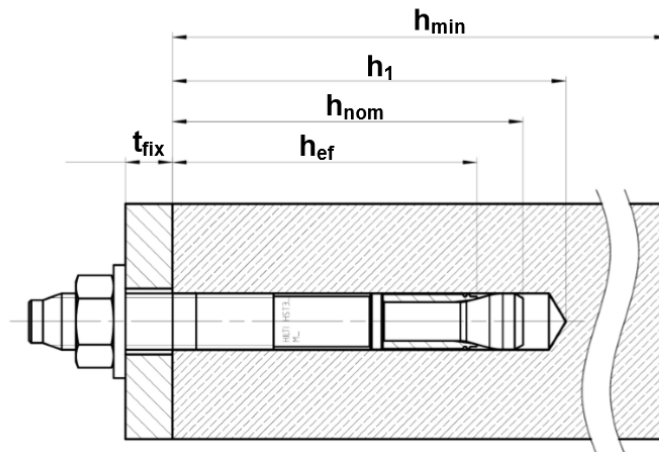


Setting information

Setting details

Anchor size		M8	M10	M12	M16
Nominal diameter of drill bit	d_o [mm]	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8,45	10,45	12,50	16,50
Effective embedment depth	h_{ef} [mm]	47	60	70	82
Nominal embedment depth	h_{nom} [mm]	55	69	80	95
Drill hole depth ¹⁾	$h_{1,1} \geq$ [mm]	60	74	88	103
	$h_{1,2} \geq$ [mm]	65	79	90	105
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14	18
Torque moment	T_{inst} [Nm]	20	45	60	110
Width across	SW [mm]	13	17	19	24

1) $h_{1,1}$ valid for hammer drilled holes and $h_{1,2}$ valid for diamond drilled holes.



Installation equipment

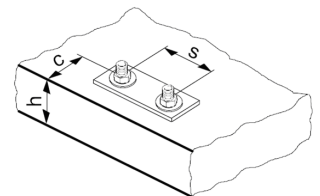
Anchor size	M8	M10	M12	M16
Rotary hammer	TE2 – TE16			
Diamond coring tool	DD – 30W, DD – EC1			
Torqueing tool	Hilti SIW 4AT A22 – SI-AT-22 ¹⁾			-
Hollow drill bit	-	-	TE – CD, TE – YD	
Other tools	hammer, torque wrench, blow out pump			

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

Setting parameters

Anchor Size		M8		M10		M12		M16		
Effective anchorage depth	h_{ef} [mm]	47		60		70		82		
Minimum base material thickness	h_{min} [mm]	$h_{min,1}$	$h_{min,2}$	$h_{min,1}$	$h_{min,2}$	$h_{min,1}$	$h_{min,2}$	$h_{min,1}$	$h_{min,2}$	
		100	80	120	100	140	120	160	140	
Minimum spacing in non-cracked concrete	HST2	s_{min} [mm]	60	60	55	55	60	60	70	80
		for $c \geq$ [mm]	50	75	80	115	85	100	110	140
	HST2-R	s_{min} [mm]	60	60	55	55	60	60	70	80
		for $c \geq$ [mm]	60	75	70	115	80	100	110	140
Minimum spacing in cracked concrete	HST2	s_{min} [mm]	40	50	55	55	60	60	70	80
		for $c \geq$ [mm]	50	60	70	110	75	100	100	140
	HST2-R	s_{min} [mm]	40	50	55	55	60	60	70	80
		for $c \geq$ [mm]	50	60	65	110	75	100	100	140
Minimum edge distance in non-cracked concrete	HST2	c_{min} [mm]	50	70	55	70	55	70	85	80
		for $s \geq$ [mm]	60	80	115	110	145	130	150	180
	HST2-R	c_{min} [mm]	60	70	50	70	55	70	70	80
		for $c \geq$ [mm]	60	80	115	110	145	130	160	180
Minimum edge distance in cracked concrete	HST2	c_{min} [mm]	45	55	55	70	55	70	70	80
		for $s \geq$ [mm]	50	60	90	100	120	130	150	180
	HST2-R	c_{min} [mm]	45	55	50	70	55	70	60	80
		for $c \geq$ [mm]	50	60	90	100	110	130	160	180
Critical spacing for splitting failure and concrete cone failure	$s_{cr,sp}$ [mm]	141		180		210		246		
	$s_{cr,N}$ [mm]									
Critical spacing for splitting failure and concrete cone failure	$c_{cr,sp}$ [mm]	71		90		105		123		
	$c_{cr,N}$ [mm]									

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



Setting instructions

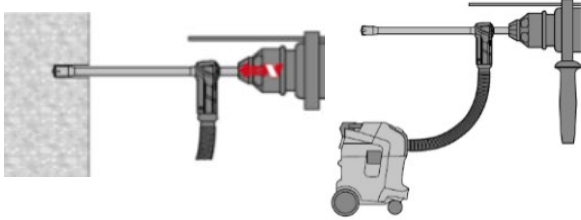
*For detailed information on installation see instruction for use given with the package of the product

Setting instruction	
Hammer drilling	
<p>1. Drill the hole</p>	<p>2. Clean the hole</p>
<p>3a. Insert the anchor with hammer</p>	<p>3a. Insert the anchor with setting tool HS-SC (M8-M16)</p>
<p>4. Check</p>	<p>5a. Torque with calibrated torque wrench (M8-M16)</p>
<p>5b. Torque with impact wrench with Adaptive torque module (M8-M12) ^{a)}</p>	

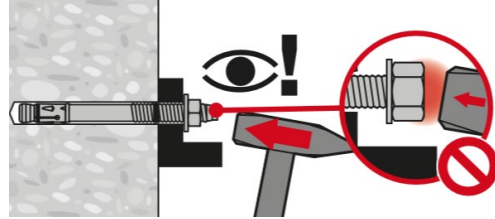
a) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 4AT-22 with SI-AT-22 for sizes M8-M12)

Hollow Drill Bit, no cleaning required

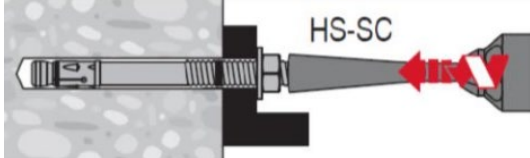
1. Drill the hole with the Hollow drill bit



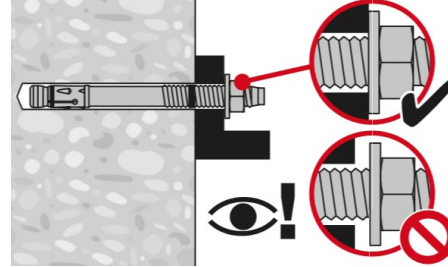
2a. Insert the anchor with hammer



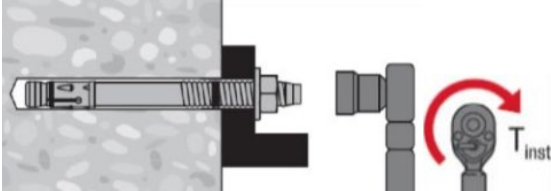
2a. Insert the anchor with setting tool HS-SC



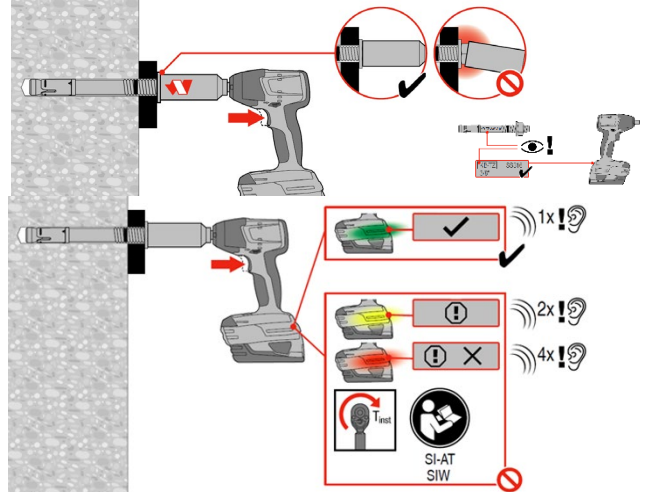
3. Check



4a. Torque with calibrated torque wrench (M8-M16)



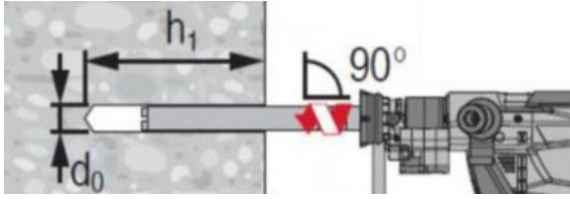
4b. Torque with impact wrench with Adaptive torque module (M8-M12) ^{a)}



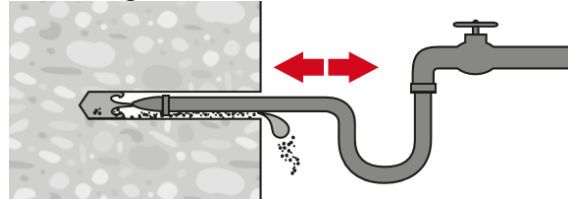
a) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 4AT-22 with SI-AT-22 for sizes M8-M12)

Diamond coring

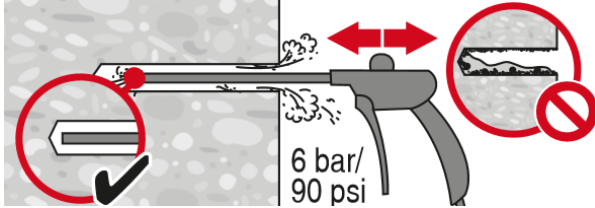
1. Core the hole



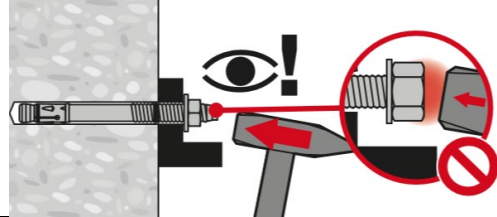
2. Flushing



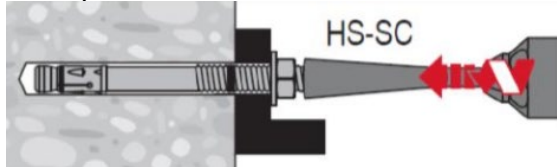
3. Clean the hole



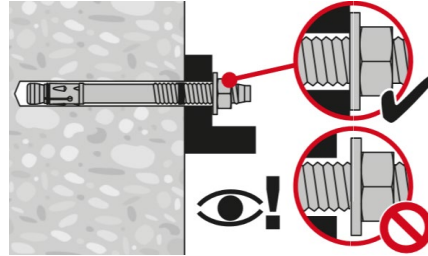
4a. Insert the anchor with hammer



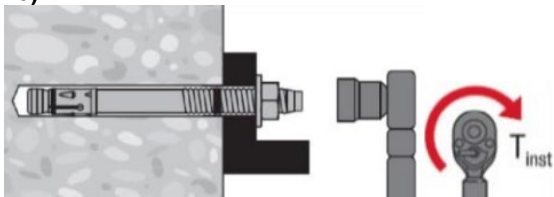
4b. Insert the anchor with setting tool HS-SC (M8-M16)



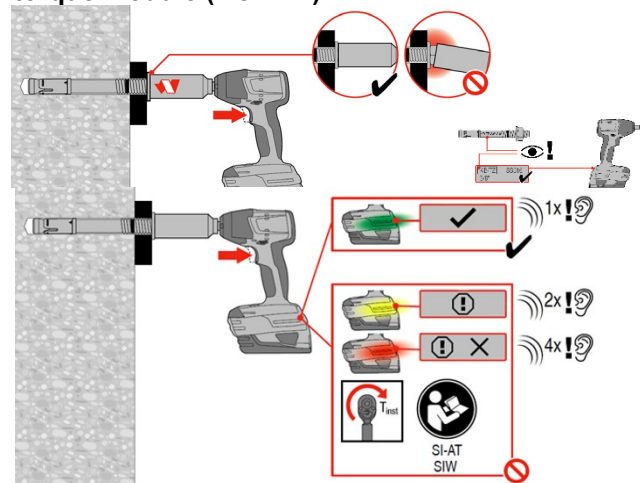
5. Check



6a. Torque with calibrated torque wrench (M8-M16)



6b. Torque with impact wrench with Adaptive torque module (M8-M12) ^{a)}



a) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. SIW 4AT-22 with SI-AT-22 for sizes M8-M12)