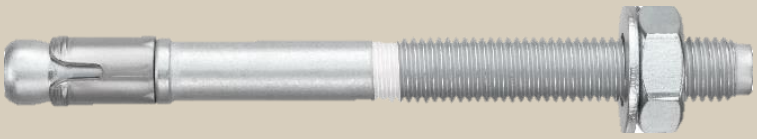
HST-2
EXPANSION ANCHOR

Technical Datasheet

Update: Jul-20



HST2 Expansion anchor

Everyday standard expansion anchor for cracked concrete

Anchor version	Benefits
 HST2 HST2-R (M8-M16)	- 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)

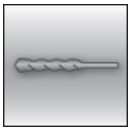
Load conditions


Static/ quasi-static

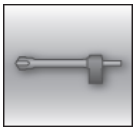

Fire resistance

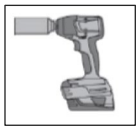

Seismic ETA-C1, C2

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 Anchor design Software

FM approved

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment [a)]	DIBt, Berlin	ETA-15/0435 / 2017-12-21
Fire test report	DIBt, Berlin	ETA-15/0435 / 2017-12-21

a) All data given in this section according to ETA-15/0435, issue 2017-12-21.

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 N/mm²

Effective anchorage depth for static

Anchor size			M8	M10	M12	M16
Eff. Anchorage depth	h_{ef}	[mm]	47	60	70	82

Characteristic resistance

Anchor size			M8	M10	M12	M16
Non-cracked concrete						
Tension N_{Rk}	HST2	[kN]	9,0	16,0	20,0	35,0
	HST2-R		9,0	16,0	20,0	35,0
Shear V_{Rk}	HST2	[kN]	*11,4*	*21,6*	*31,4*	*55,3*
	HST2-R		*15,7*	*25,3*	*36,7*	*63,6*
Cracked concrete						
Tension N_{Rk}	HST2	[kN]	5,0	9,0	12,0	20,0
	HST2-R		5,0	9,0	12,0	25,0
Shear V_{Rk}	HST2	[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 N_{Rd}	HST2	[kN]	6,0	10,7	13,3	23,3
	HST2-R		6,0	10,7	13,3	23,3
Shear V_{Rd}	HST2	[kN]	*9,1*	*17,3*	*25,1*	*44,2*
	HST2-R		*12,6*	*20,2*	*29,4*	*50,9*
Cracked concrete						
Tension N_{Rd}	HST2	[kN]	3,3	6,0	8,0	13,3
	HST2-R		3,3	6,0	8,0	16,7
Shear V_{Rd}	HST2	[kN]	*9,1*	*17,3*	*25,1*	*44,2*
	HST2-R		*12,6*	*20,2*	*29,4*	44,6

Recommended loads [a)]

Anchor size			M8	M10	M12	M16
Non-cracked concrete						
Tension N_{rec}	HST2	[kN]	4,3	7,6	9,5	16,7
	HST2-R		4,3	7,6	9,5	16,7
Shear V_{rec}	HST2	[kN]	6,5	12,3	17,9	31,6
	HST2-R		9,0	14,5	21,0	35,7
Cracked concrete						
Tension N_{rec}	HST2	[kN]	2,4	4,3	5,7	9,5
	HST2-R		2,4	4,3	5,7	11,9
Shear V_{rec}	HST2	[kN]	6,5	12,3	17,9	31,6
	HST2-R		9,0	14,5	21,0	31,8

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, $f_{ck,cube}$ = 25 N/mm²
- α_{gap} = 1,0 (using Hilti seismic filling set)

Effective anchorage depth for static

Anchor size			M10	M12	M16
Eff. Anchorage depth	h_{ef}	[mm]	60	70	82

Characteristic resistance in case of seismic performance C2

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

Design resistance in case of seismic performance C2

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

Characteristic resistance in case of seismic performance C1

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

Design resistance in case of seismic performance C1

Anchor size			M10	M12	M16
Tension $N_{Rd, seis}$	HST2	[kN]	5,3	7,1	12,0
Shear $V_{Rd,seis}$	HST2	[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 N/mm²
- 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
Eff. Anchorage depth	h_{ef}	[mm]	47	60	70	82

Characteristic resistance

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

Materials

Mechanical properties

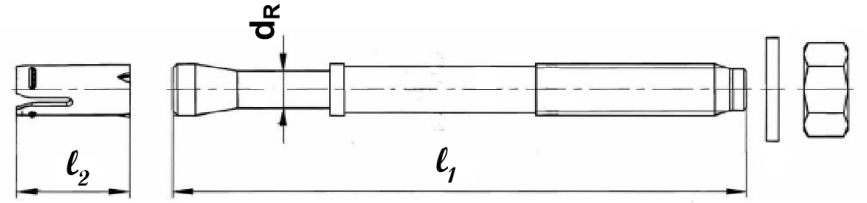
Anchor size			M8	M10	M12	M16
Nominal tensile strength $f_{uk,thread}$	HST2	[N/mm²]	660	730	710	720
	HST2-R		720	710	710	650
Yield strength $f_{yk,thread}$	HST2	[N/mm²]	528	584	568	576
	HST2-R		576	568	568	520
Stressed cross-section A_s		[mm²]	36,6	58,0	84,3	157
Moment of resistance W		[mm³]	31,2	62,3	109	277
Char, bending resistance $M^0_{Rk,s}$	HST2	[Nm]	25	55	93	240
	HST2-R		27	53	93	216

Material quality

Part		Material
Expansion sleve	HST2	Stainless steel A2
	HST2-R	Stainless steel A4
Bolt	HST2	Carbon steel, galvanized
	HST2-R	Stainless steel 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
Maximum length of anchor	$\ell_{1,max}$	[mm]	75	90	105	140
Minimum length of anchor	$\ell_{1,min}$	[mm]	260	280	295	350
Length of expansion sleeve	ℓ_2	[mm]	14,8	18,2	22,7	24,3

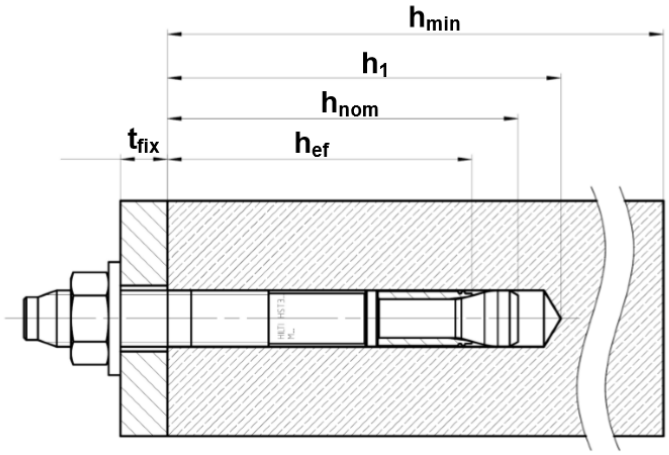


Setting information

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
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.



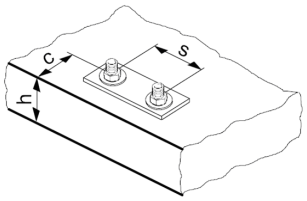
Installation equipment

Anchor size	M8	M10	M12	M16
Rotary hammer	TE2 – TE16			
Diamond coring tool	DD – 30W, DD – EC1			
Hollow drill bit	-	-	TE – CD, TE – YD	
Other tools	hammer, torque wrench, blow ut pump			

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 ≥	[mm]	50	75	80	115	85	100	110	140
	HST2-R	s_{min}	[mm]	60	60	55	55	60	60	70	80
		for c ≥	[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 ≥	[mm]	50	60	70	110	75	100	100	140
	HST2-R	s_{min}	[mm]	40	50	55	55	60	60	70	80
		for c ≥	[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 ≥	[mm]	60	80	115	110	145	130	160	180
	HST2-R	c_{min}	[mm]	60	70	50	70	55	70	70	80
		for c ≥	[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 ≥	[mm]	50	60	90	100	120	130	150	180
	HST2-R	c_{min}	[mm]	45	55	50	70	55	70	60	80
		for c ≥	[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.



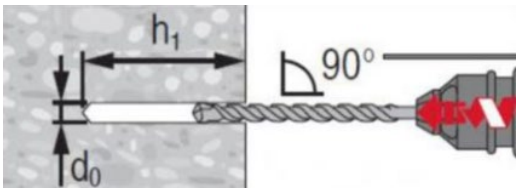
Setting instructions

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

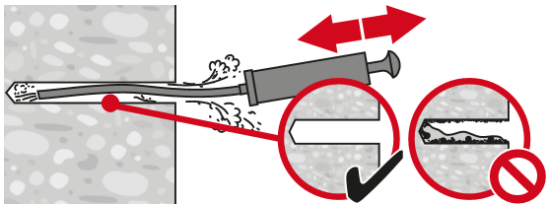
Setting instruction

Hammer drilling

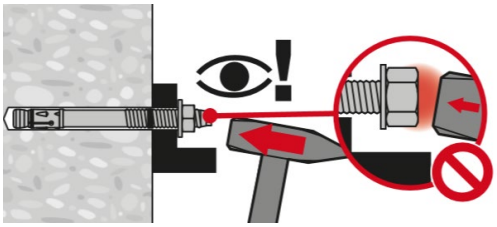
1. Drill the hole



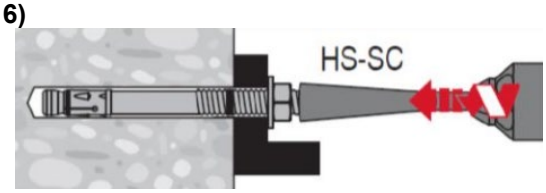
2. Clean the hole



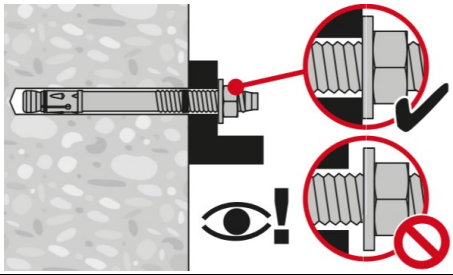
3a. Insert the anchor with hammer



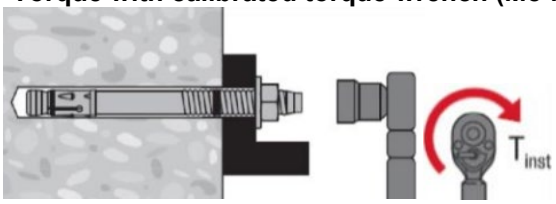
3a. Insert the anchor with setting tool HS-SC (M8-M16)



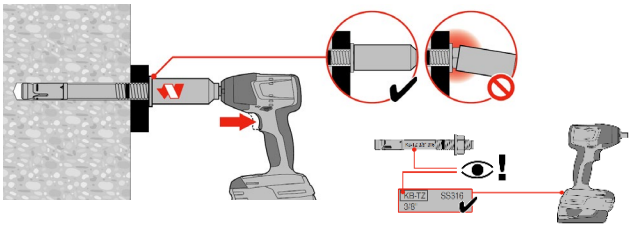
4. Check

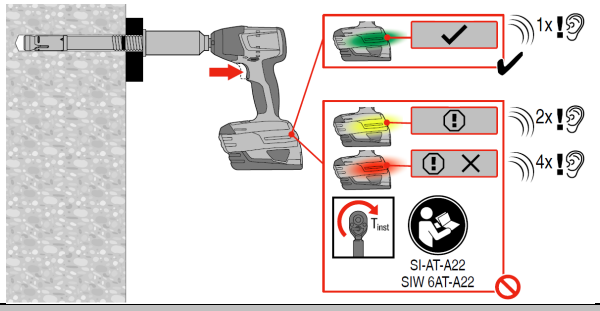


5a. Torque with calibrated torque wrench (M8-M16)



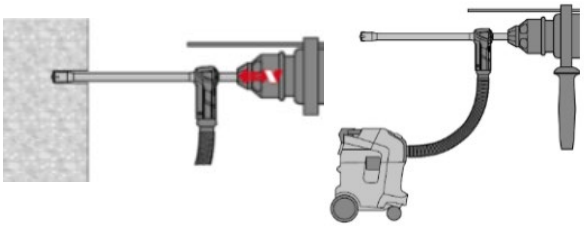
5b. Torque with impact wrench with Adaptative torque module (M8-M12)



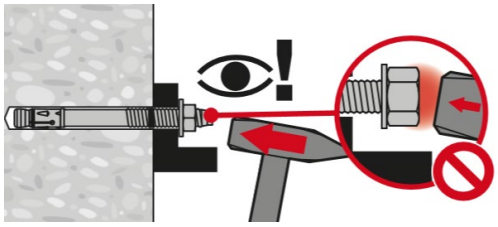


Hollow Drill Bit, no cleaning required

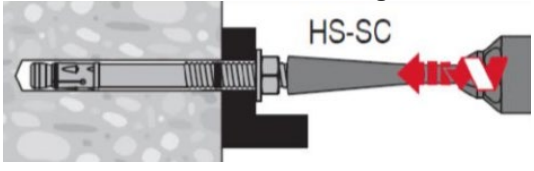
1. Drill the hole with the Hollow drill bit



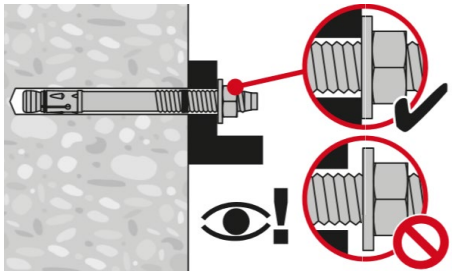
2a. Insert the anchor with hammer



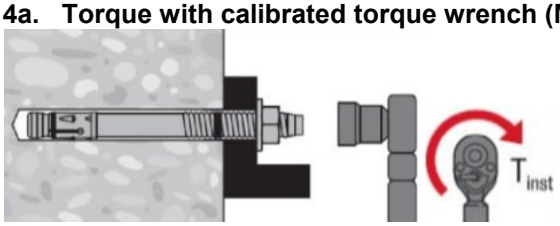
2a. Insert the anchor with setting tool HS-SC



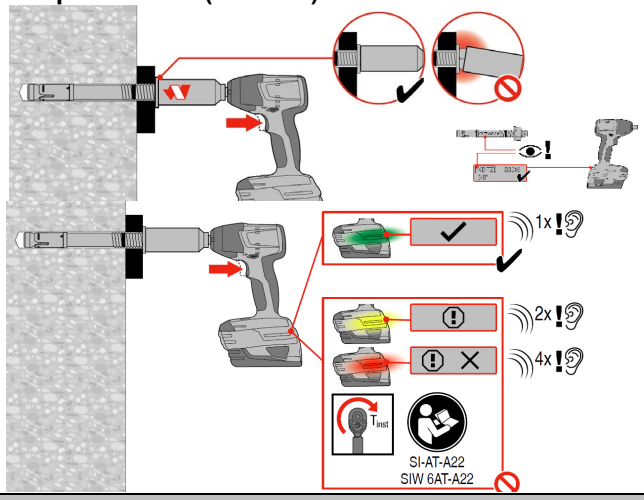
3. Check



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

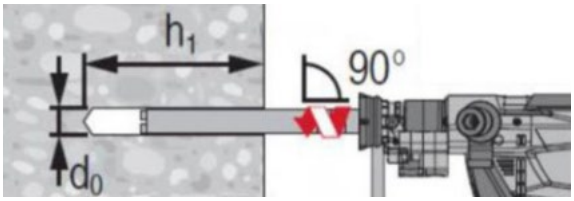


4b. Torque with impact wrench with Adaptative torque module (M8-M12)

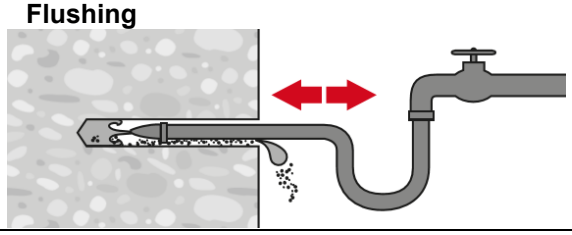


Diamond coring

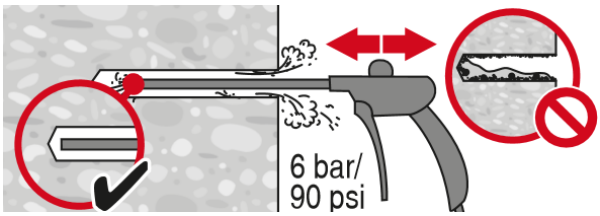
1. Core the hole



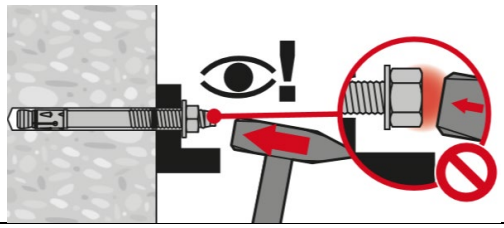
2. Flushing



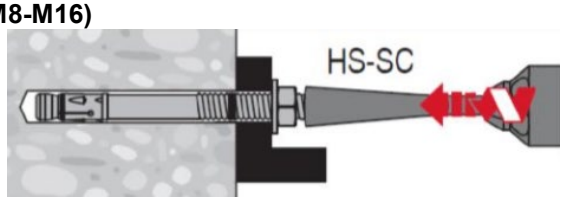
3. Clean the hole



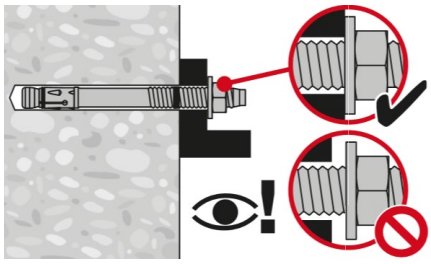
4a. Insert the anchor with hammer



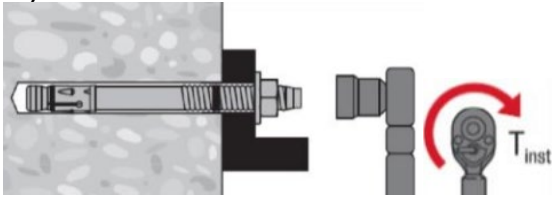
4b. Insert the anchor with setting tool HS-SC (M8-M16)



5. Check



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



6b. Torque with impact wrench with Adaptative torque module (M8-M12)