HILTI HSC
UNDERCUT ANCHOR

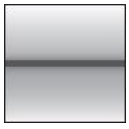
Technical Datasheet

Update: Jan-23

HSC Undercut anchors

Ultimate-performance undercut anchor for shallow embedment depth

Anchor version		Benefits
	HSC-A HSC-AR (M8-M12)	- The perfect solution for small edge and space distance - Suitable for thin concrete blocks due to low embedment depth - Seismic design with ETA C2 approval - Suitable for cracked concrete - Self-cutting undercut anchor - Available as bolt version for through applications - Stainless steel available for external applications
	HSC-I HSC-IR (M6-M12)	

Base material		Load conditions			
					
Concrete (non-cracked)	Concrete (cracked)	Static/ quasi-static	Shock	Fire resistance	Seismic ETA-C2

Installation conditions	Other information			
				
Hammer drilled holes	European Technical Assessment	CE conformity	PROFIS Engineering design Software	Corrosion resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment [a)]	CSTB, Marne-la-Vallèe	ETA-02/0027 / 2018-07-04
Fire test report [a)]	CSTB, Marne-la-Vallèe	ETA-02/0027 / 2018-07-04
Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	BZS D 06-601 / 2006-07-10

a) All data given in this section according to ETA-02/0027 issue 2018-07-04.

Static 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 C20/25, $f_{ck,cube}$ = 25 N/mm²

HSC-A (R)

Effective anchorage depth of HSC-A (R)

Anchor size				M8	M8	M10	M12
Effective anchorage depth		h_{ef}	[mm]	40	50	40	60

Characteristic resistance of HSC-A (R)

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Non-cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rk}	[kN]	12,4	17,4	12,4	22,9
Shear	HSC-A	V_{Rk}	[kN]	14,6	14,6	23,2	33,7
	HSC-AR			12,8	12,8	20,3	29,5
Cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rk}	[kN]	8,7	12,2	8,7	16,0
Shear	HSC-A	V_{Rk}	[kN]	14,6	14,6	17,4	32,0
	HSC-AR			12,8	12,8	17,4	29,5

Design resistance of HSC-A (R)

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Non-cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rd}	[kN]	8,3	11,6	8,3	15,2
Shear	HSC-A	V_{Rd}	[kN]	11,7	11,7	16,6	27,0
	HSC-AR			8,2	8,2	13,0	18,9
Cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rd}	[kN]	5,8	8,1	5,8	10,7
Shear	HSC-A	V_{Rd}	[kN]	11,7	11,7	11,6	21,3
	HSC-AR			8,2	8,2	11,6	18,9

Recommended loads [a] of HSC-A (R)

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Non-cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rec}	[kN]	5,9	8,3	5,9	10,9
Shear	HSC-A	V_{Rec}	[kN]	8,3	8,3	11,9	19,3
	HSC-AR			5,9	5,9	9,3	13,5
Cracked concrete							
Tension	HSC-A, HSC-AR	N_{Rec}	[kN]	4,1	5,8	4,1	7,6
Shear	HSC-A	V_{Rec}	[kN]	8,3	8,3	8,3	15,2
	HSC-AR			5,9	5,9	8,3	13,5

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.

HSC-I (R)

Effective anchorage depth of HSC-I (R)

Anchor size				M6	M8	M10	M10	M12
Eff. anchorage depth		h_{ef}	[mm]	40	40	50	60	60

Characteristic resistance of HSC-I (R)

Anchor size				M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Non-cracked concrete								
Tension	HSC-I, HSC-IR	N_{Rk}	[kN]	12,4	12,4	17,4	22,9	22,9
Shear	HSC-I	V_{Rk}	[kN]	8,0	12,2	15,2	15,2	18,2
	HSC-IR			7,0	10,7	13,3	13,3	16,0
Cracked concrete								
Tension	HSC-I, HSC-IR	N_{Rk}	[kN]	8,7	8,7	12,2	16,0	16,0
Shear	HSC-I	V_{Rk}	[kN]	8,0	12,2	15,2	15,2	18,2
	HSC-IR			7,0	10,7	13,3	13,3	16,0

Design resistance of HSC-I (R)

Anchor size				M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Non-cracked concrete								
Tension	HSC-I	N_{Rd}	[kN]	8,3	8,3	11,6	15,2	15,2
	HSC-IR			7,5	8,3	11,6	14,2	15,2
Shear	HSC-I	V_{Rd}	[kN]	6,4	9,8	12,2	12,2	14,6
	HSC-IR			4,5	6,9	8,5	8,5	10,3
Cracked concrete								
Tension	HSC-I, HSC-IR	N_{Rd}	[kN]	5,8	5,8	8,1	10,7	10,7
Shear	HSC-I	V_{Rd}	[kN]	6,4	9,8	12,2	12,2	14,6
	HSC-IR			4,5	6,9	8,5	8,5	10,3

Recommended loads [a] of HSC-I (R)

Anchor size				M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Non-cracked concrete								
Tension	HSC-I	N_{Rec}	[kN]	5,9	5,9	8,3	10,9	10,9
	HSC-IR			5,4	5,9	8,3	10,1	10,9
Shear	HSC-I	V_{Rec}	[kN]	4,6	7,0	8,7	8,7	10,4
	HSC-IR			3,2	4,9	6,1	6,1	7,3
Cracked concrete								
Tension	HSC-I, HSC-IR	N_{Rec}	[kN]	4,1	4,1	5,8	7,6	7,6
Shear	HSC-I	V_{Rec}	[kN]	4,6	7,0	8,7	8,7	10,4
	HSC-IR			3,2	4,9	6,1	6,1	7,3

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
- Cracked concrete
- 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 of HSC-A

Anchor size				M8	M8	M10	M12
Effective anchorage depth range		h_{ef}	[mm]	40	50	40	60

Characteristic resistance for HSC-A in case of seismic performance C2

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Tension	HSC-A	$N_{Rk,\ seis}$	[kN]	2,4	2,4	4,5	-
Shear	HSC-A	$V_{Rk,seis}$	[kN]	12,4	12,4	17,4	-

Deisgn resistance for HSC-A in case of seismic performance C2

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Tension	HSC-A	$N_{Rd,\ seis}$	[kN]	1,6	1,6	3,0	-
Shear	HSC-A	$V_{Rd,seis}$	[kN]	9,9	9,9	11,6	-

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

HSC-A (R)

Effective anchorage depth of HSC-A (R)

Anchor size			M8	M8	M10	M12
Effective anchorage depth	h_{ef}	[mm]	40	50	40	60

Characteristic/design[1] resistance

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Fire Exposure R30							
Tension	HSC-A	$N_{Rk,fi}$	[kN]	0,4	0,4	0,9	1,7
	HSC-AR			0,7	0,7	1,5	2,5
Shear	HSC-A	$V_{Rk,fi}$	[kN]	0,4	0,4	0,9	1,7
	HSC-AR			0,7	0,7	1,5	2,5
Fire Exposure R120							
Tension	HSC-A	$N_{Rk,fi}$	[kN]	0,2	0,2	0,5	0,8
	HSC-AR			0,4	0,4	0,8	1,3
Shear	HSC-A	$V_{Rk,fi}$	[kN]	0,2	0,2	0,5	0,8
	HSC-AR			0,4	0,4	0,8	1,3

1) The safety factor is γ=1.0 for all load cases

HSC-I (R)

Effective anchorage depth of HSC-I (R)

Anchor size			M6	M8	M10	M10	M12
Effective anchorage depth	h_{ef}	[mm]	40	40	50	60	60

Characteristic/design[1] resistance

Anchor size				M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Fire Exposure R30								
Tension	HSC-I	$N_{Rk,fi}$	[kN]	0,2	0,4	0,9	0,4	1,7
	HSC-IR			0,2	0,7	1,5	0,7	2,5
Shear	HSC-I	$V_{Rk,fi}$	[kN]	0,2	0,4	0,9	0,4	1,7
	HSC-IR			0,2	0,7	1,5	0,7	2,5
Fire Exposure R120								
Tension	HSC-I	$N_{Rk,fi}$	[kN]	0,1	0,2	0,5	0,2	0,8
	HSC-IR			0,1	0,4	0,8	0,4	1,3
Shear	HSC-I	$V_{Rk,fi}$	[kN]	0,1	0,2	0,5	0,2	0,8
	HSC-IR			0,1	0,4	0,8	0,4	1,3

1) The safety factor is γ=1.0 for all load cases

Materials

Mechanical properties for HSC-A (R)

Anchor size				M8 x 40	M8 x 50	M10 x 40	M12 x 60
Nominal tensile strength	HSC-A	f_{uk}	[N/mm²]	800	800	800	800
	HSC-AR			700	700	700	700
Yield strength	HSC-A	f_{yk}	[N/mm²]	640	640	640	640
	HSC-AR			450	450	450	450
Stressed cross-section for bolt version	HSC-A HSC-AR	$A_{s,A}$	[mm²]	36,6	36,6	58,0	84,3
Moment of resistance	HSC-A HSC-AR	W	[mm³]	31,2	31,2	62,3	109,2
Characteristic bending resistance	HSC-A	$M^0_{Rk,s}$	[Nm]	30	30	60	105
	HSC-AR			26	26	52	92

Mechanical properties for HSC-I (R)

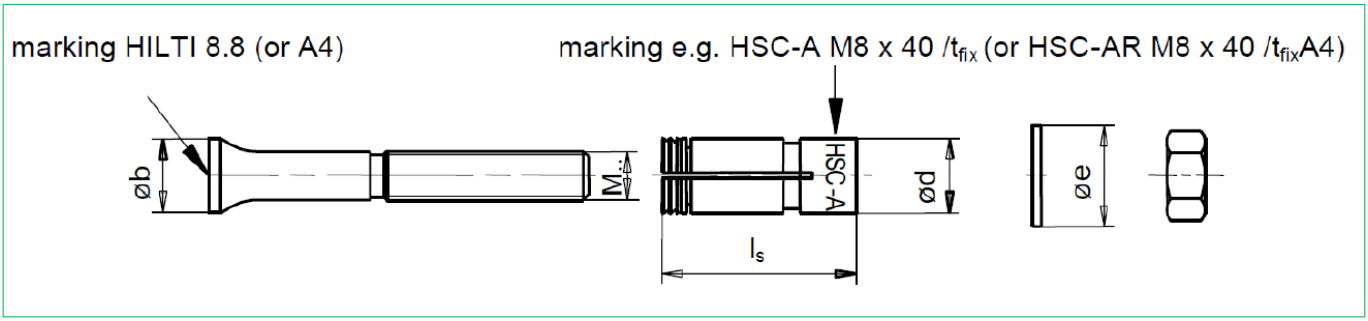
Anchor size				M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Nominal tensile strength	HSC-I	f_{uk}	[N/mm²]	800	800	800	800	800
	HSC-IR			700	700	700	700	700
Yield strength	HSC-I	f_{yk}	[N/mm²]	640	640	640	640	640
	HSC-IR			355	355	350	350	340
Stressed cross-section for internal thread version	HSC-I HSC-IR	$A_{s,I}$	[mm²]	22,0	28,3	34,6	34,6	40,8
Moment of resistance	HSC-I HSC-IR	W	[mm³]	12,7	31,2	62,3	62,3	109,2
Characteristic bending resistance	HSC-I	$M^0_{Rk,s}$	[Nm]	12	30	60	60	105
	HSC-IR			11	26	52	52	92

Material quality

Part		Material
Metal parts made of zinc coated steel		
HSC-A HSC-I	Cone bolt with external thread (-A)	Carbon steel strength 8.8, galvanized to min. 5 µm
	Cone bolt with internal thread (-I)	
	Expansion sleeve	Galvanized to min. 5 µm
	Washer	
	Hexagon nut	Grade 8
HSC-AR / HSC-IR Stainless steel		
HSC-AR HSC-IR	Cone bolt with external thread (-AR)	A4-70, Stainless steel 1.4401, 1.4571 EN 10088-1:2014
	Cone bolt with internal thread (-IR)	
	Expansion sleeve	Stainless steel 1.4401, 1.4571 EN 10088-1:2014
	Washer	
	Hexagon nut	A4-70, Stainless steel 1.4401, 1.4571 EN 10088-1:2014

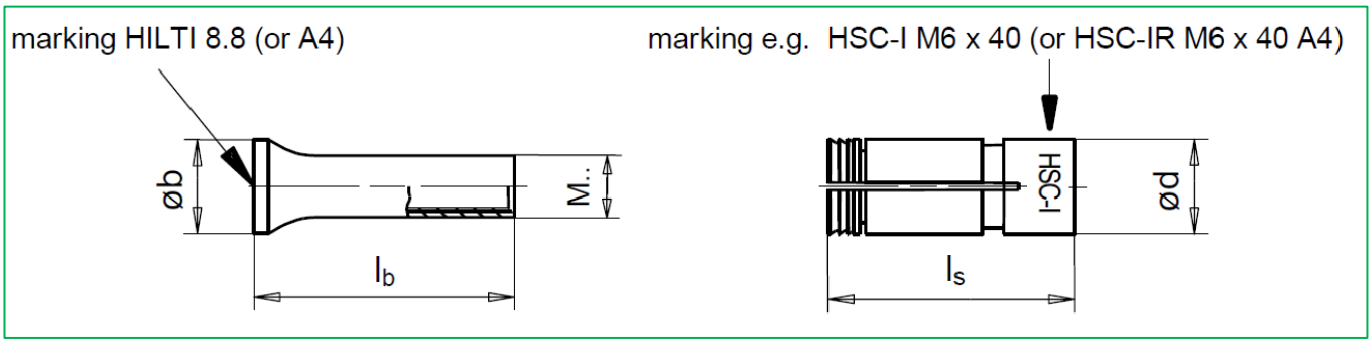
Anchor dimension of HSC-A (R)

Anchor size			M8 x 40	M8 x 50	M10 x 40	M12 x 60
Diameter of cone bolt	b	[mm]	13,5	13,5	15,5	17,5
Length of expansion sleeve	l_s	[mm]	40,8	50,8	40,8	60,8
Diameter of expansion sleeve	d	[mm]	13,5	13,5	15,5	17,5
Diameter of washer	e	[mm]	16	16	20	24



Anchor dimension of HSC-I (R)

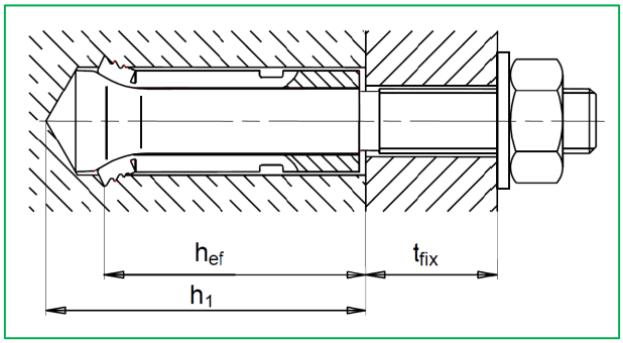
Anchor size			M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Length of cone bolt	l_b	[mm]	43,3	43,3	54,8	64,8	64,8
Diameter of cone bolt	b	[mm]	13,5	15,5	17,5	17,5	19,5
Length of expansion sleeve	l_s	[mm]	40,8	40,8	50,8	60,8	60,8
Diameter of expansion sleeve	d	[mm]	13,5	15,5	17,5	17,5	19,5



Setting information

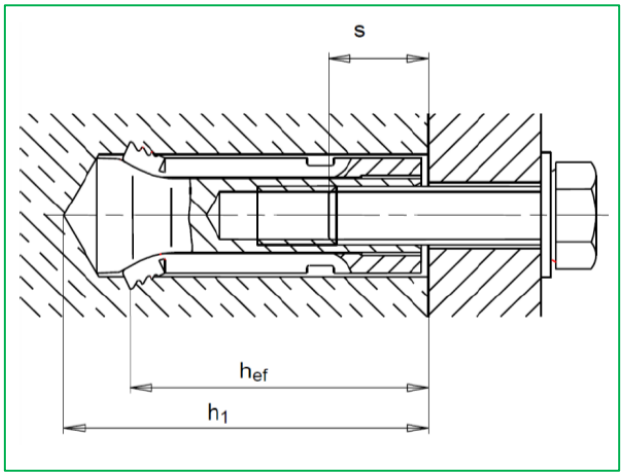
Setting details of HSC-A (R)

Anchor size			M8 x 40	M8 x 50	M10 x 40	M12 x 60
Effective anchorage depth	h_{ef}	[mm]	40	50	40	60
Nominal Diameter of drill bit	d_0	[mm]	14	14	16	18
Cutting diameter of drill bit [1)]	d_{cut}	[mm]	14,5	14,5	16,5	18,5
Maximum fastening thickness	t_{fix}	[mm]	15	15	20	20
Depth of drill hole	h_1	[mm]	46	56	46,5	68
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	9	12	14
Torque moment	T_{inst}	[Nm]	10	10	20	30
Width across nut flats	SW	[mm]	13	13	17	19



Setting details of HSC-I (R)

Anchor size			M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Effective anchorage depth	h_{ef}	[mm]	40	40	50	60	60
Nominal Diameter of drill bit	d_0	[mm]	14	16	18	18	20
Cutting diameter of drill bit [1)]	$d_{cut} \leq$	[mm]	14,5	16,5	18,5	18,5	20,5
Depth of drill hole	$h_1 =$	[mm]	46	46,5	56	68	68,5
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	12	14
Torque moment	T_{inst}	[Nm]	10	10	20	30	30
Width across nut flats	SW	[mm]	10	13	17	17	19
Screwing depth	min s	mm]	6	8	10	10	12
	max s	mm]	16	22	28	28	30



Installation equipment for HSC-A (R)

Anchor size		M8 x 40	M8 x 50	M10 x 40	M12 x 60
Rotary hammer for setting		TE 7-C; TE 7-A; TE 16; TE 16-C; TE 16-M; TE 25; TE 30; TE 35		TE 7-C; TE 7-A; TE 25; TE 35	TE 16; TE 16-C; TE 16-M; TE 25; TE 30; TE 35; TE 40; TE 40-AVR
Stepped drill bit	TE-C-HSC-B	14x40	14x50	16x40	18x60
Setting tool	TE-C-HSC-MW	14	14	16	18

Installation equipment for HSC-I (R)

Anchor size		M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Rotary hammer for setting		TE 7-C; TE 7-A; TE 16; TE 16-C; TE 16-M; TE 25; TE 30; TE 35				TE 16; TE 16-C; TE 16-M; TE 25; TE 30; TE 35; TE 40; TE 40-AVR
Stepped drill bit	TE-C-HSC-B	14x40	16x40	18x50	18x60	20x60
Setting tool	TE-C-HSC-MW	14	16	18	18	20
Insert tool	TE-C-HSC-EW	14	16	18	18	20

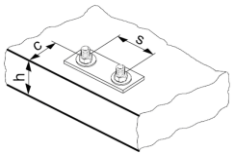
Setting parameters for HSC-A (R)

Anchor size			M8 x 40	M8 x 50	M10 x 40	M12 x 60
Effective anchorage depth	h_{ef}	[mm]	40	50	40	60
Minimum base material thickness	$h_{min} \geq$	[mm]	100	100	100	130
Minimum spacing	$s_{min} \geq$	[mm]	40	50	40	60
Minimum edge distance	$c_{min} \geq$	[mm]	40	50	40	60
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	130	170	120	180
Critical edge distance for splitting failure	$c_{cr,sp}$	[mm]	65	85	60	90
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	120	150	120	180
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	60	75	60	90

Setting parameters for HSC-I (R)

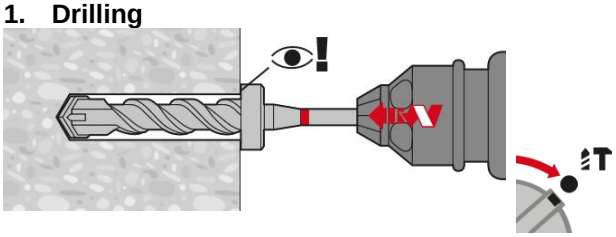
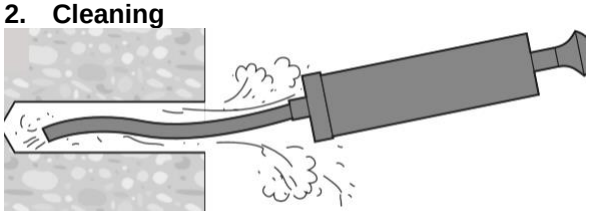
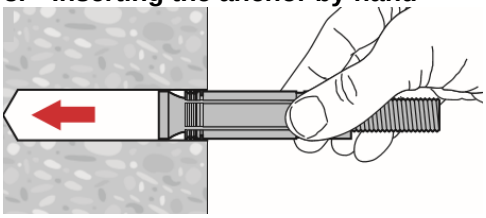
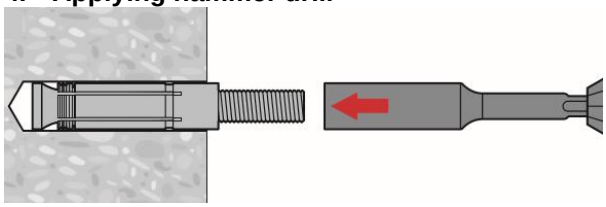
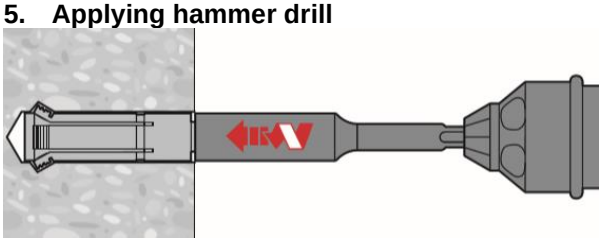
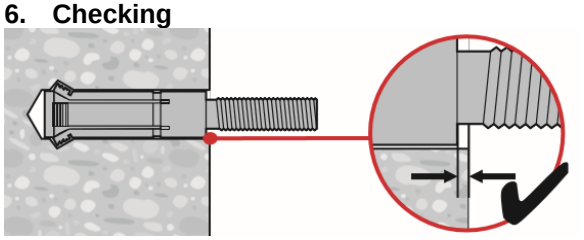
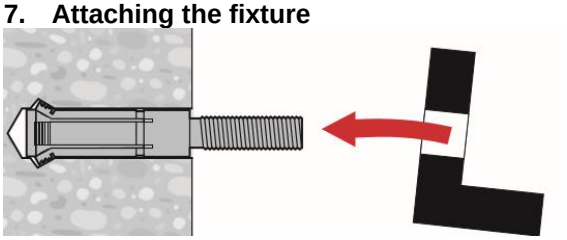
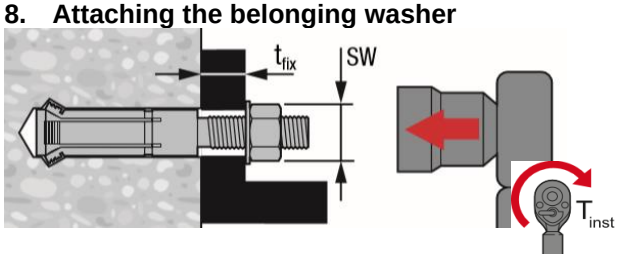
Anchor size			M6 x 40	M8 x 40	M10 x 50	M10 x 60	M12 x 60
Effective anchorage depth	h_{ef}	[mm]	40	40	50	60	60
Minimum base material thickness	$h_{min} \geq$	[mm]	100	100	100	100	130
Minimum spacing	$s_{min} \geq$	[mm]	40	40	50	60	60
Minimum edge distance	$c_{min} \geq$	[mm]	40	40	50	60	60
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	130	120	170	180	180
Critical edge distance for splitting failure	$c_{cr,sp}$	[mm]	65	60	85	90	90
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	120	120	150	180	180
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	60	60	75	90	90

In case of smaller edge distance and spacing than $c_{cr,sp}$, $s_{cr,sp}$, $c_{cr,N}$ and $s_{cr,N}$ the load values shall be reduced according EN 1992-4.
Critical spacing and critical edge distance for splitting failure apply only for non-cracked concrete.
For cracked concrete only the critical spacing and critical edge distance for concrete cone failure are decisive.



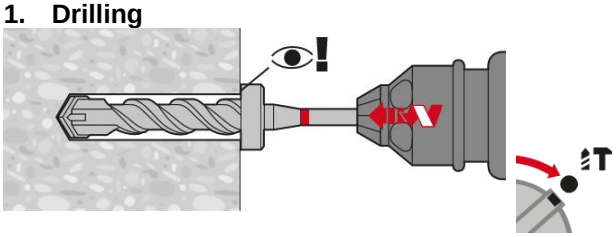
Setting instruction

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

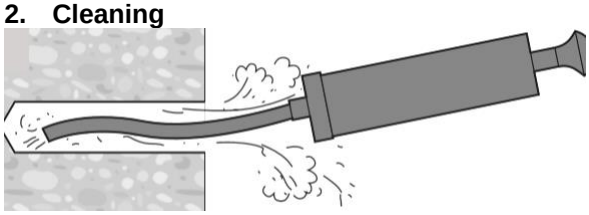
Setting instruction for HSC-A (R)	
1. Drilling 	**2. Cleaning** 
3. Inserting the anchor by hand 	**4. Applying hammer drill** 
5. Applying hammer drill 	**6. Checking** 
7. Attaching the fixture 	**8. Attaching the belonging washer** 

Setting instruction for HSC-I (R)

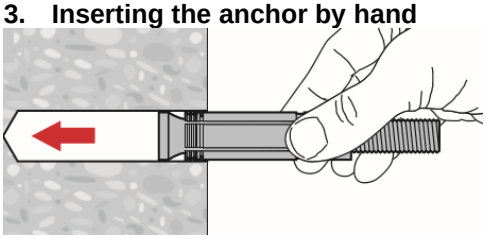
1. Drilling



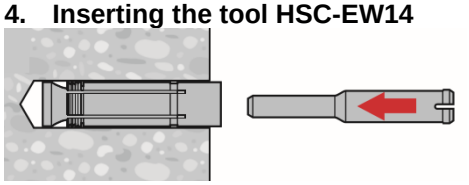
2. Cleaning



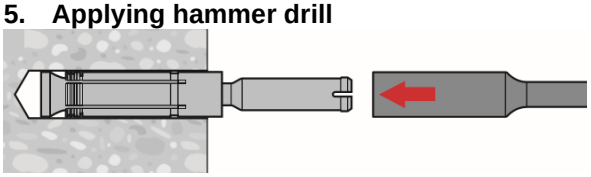
3. Inserting the anchor by hand



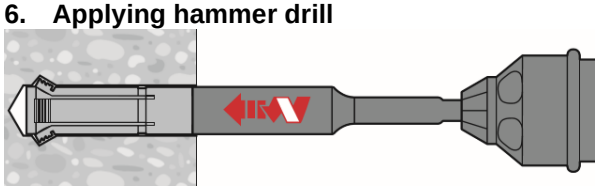
4. Inserting the tool HSC-EW14



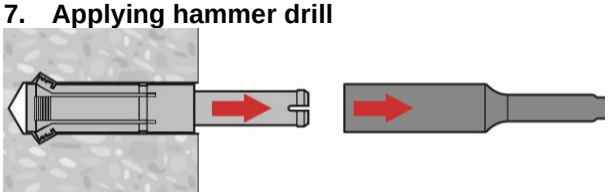
5. Applying hammer drill



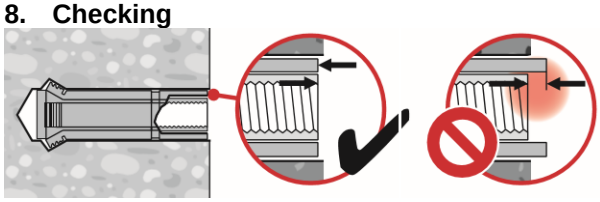
6. Applying hammer drill



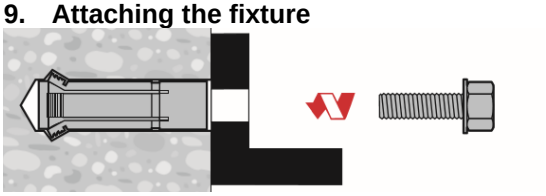
7. Applying hammer drill



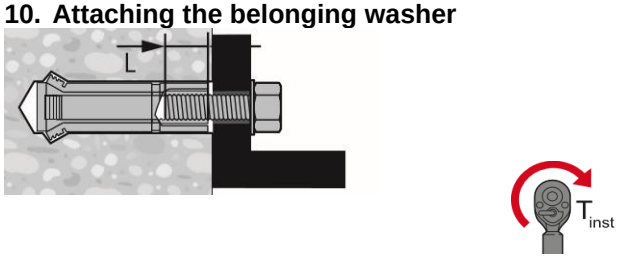
8. Checking



9. Attaching the fixture



10. Attaching the belonging washer



11.