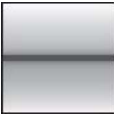
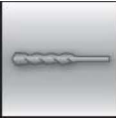
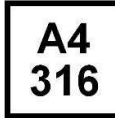


HSC Undercut anchors

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 - Suitable for cracked concrete - Self-cutting undercut anchor
 HSC-I HSC-IR (M6-M12)	- Available as bolt version for through applications - Stainless steel available for external applications

Base material	Load conditions
 Concrete (non-cracked)  Concrete (cracked)	 Static/ quasi-static  Shock  Fire resistance
Installation conditions	Other information
 Hammer drilled holes	 European Technical Assessment  CE conformity  PROFIS Anchor design Software  Corrosion resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	CSTB, Marne-la-Vallée	ETA-02/0027 / 2017-09-20
Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	BZS D 06-601 / 2006-07-10
Fire test report	IBMB, Braunschweig	UB 3177/1722-1 / 2006-06-28
Fire report	warringtonfire	WF 327804/A / 2013-07-10

a) All data given in this section according to ETA-02/0027 issue 2017-09-20.



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 C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$

HSC-A (R)

Effective anchorage depth of HSC-A (R)

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

Mean ultimate resistance of HSC-A (R)

Anchor size			M8 x 40	M8 x 50	M10 x 40	M12 x 60
Non-cracked concrete						
Tension $N_{Ru,m}$	HSC-A, HSC-AR	[kN]	16,6	23,3	16,6	30,6
Shear $V_{Ru,m}$	HSC-A	[kN]	19,0	19,0	30,2	43,8
	HSC-AR		16,6	16,6	26,4	38,4
Cracked concrete						
Tension $N_{Ru,m}$	HSC-A, HSC-AR	[kN]	13,3	18,6	13,3	24,5
Shear $V_{Ru,m}$	HSC-A	[kN]	19,0	19,0	30,2	43,8
	HSC-AR		16,6	16,6	26,4	38,4

Characteristic resistance of HSC-A (R)

Anchor size			M8 x 40	M8 x 50	M10 x 40	M12 x 60
Non-cracked concrete						
Tension N _{Rk}	HSC-A, HSC-AR	[kN]	12,8	17,8	12,8	23,4
Shear V _{Rk}	HSC-A	[kN]	14,6	14,6	23,2	33,7
	HSC-AR		12,8	12,8	20,3	29,5
Cracked concrete						
Tension N _{Rk}	HSC-A, HSC-AR	[kN]	9,1	12,7	9,1	16,7
Shear V _{Rk}	HSC-A	[kN]	14,6	14,6	18,2	33,5
	HSC-AR		12,8	12,8	18,2	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 N_{Rd}	HSC-A, HSC-AR	[kN]	8,5	11,9	8,5	15,6
Shear V_{Rd}	HSC-A	[kN]	11,7	11,7	17,0	27,0
	HSC-AR		8,2	8,2	13,0	18,9
Cracked concrete						
Tension N_{Rd}	HSC-A, HSC-AR	[kN]	6,1	8,5	6,1	11,2
Shear V_{Rd}	HSC-A	[kN]	11,7	11,7	12,1	22,3
	HSC-AR		8,2	8,2	12,1	18,9

Chemical anchors

Undercut

Mechanical anchors

Plastic / Light duty metal anchors

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 N _{Rec}	HSC-A, HSC-AR	[kN]	6,1	8,5	6,1	11,2
Shear V _{Rec}	HSC-A	[kN]	8,3	8,3	12,1	19,3
	HSC-AR		5,9	5,9	9,3	13,5
Cracked concrete						
Tension N _{Rec}	HSC-A, HSC-AR	[kN]	4,3	6,1	4,3	8,0
Shear V _{Rec}	HSC-A	[kN]	8,3	8,3	8,7	15,9
	HSC-AR		5,9	5,9	8,7	13,5

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.

HSC-I (R)

Effective anchorage depth of HSC-I (R)

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

Mean ultimate 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 N _{Ru,m}	HSC-I	[kN]	16,6	16,6	23,3	30,6	30,6
	HSC-IR		14,8				
Shear V _{Ru,m}	HSC-I	[kN]	10,4	15,9	19,8	19,8	23,4
	HSC-IR		9,1	13,9	17,3	17,3	20,8
Cracked concrete							
Tension N _{Ru,m}	HSC-I, HSC-IR [kN]		13,3	13,3	18,6	24,5	24,5
Shear V _{Ru,m}	HSC-I	[kN]	10,4	15,9	19,8	19,8	23,4
	HSC-IR		9,1	13,9	17,3	17,3	20,8

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 N _{Rk}	HSC-I, HSC-IR	[kN]	12,8	12,8	17,8	23,4	23,4
Shear V _{Rk}	HSC-I	[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 N _{Rk}	HSC-I, HSC-IR	[kN]	9,1	9,1	12,7	12,7	16,7
Shear V _{Rk}	HSC-I	[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 N _{Rd}	HSC-I	[kN]	8,5	8,5	11,9	15,6	15,6
	HSC-IR		7,5	8,5	11,9	14,2	15,6
Shear V _{Rd}	HSC-I	[kN]	4,6	11,7	17,0	11,7	27,0
	HSC-IR		4,5	8,2	13,0	8,2	18,9
Cracked concrete							
Tension N _{Rd}	HSC-I, HSC-IR	[kN]	4,3	4,3	6,1	8,0	8,0
Shear V _{Rd}	HSC-I	[kN]	4,6	7,0	8,7	8,7	10,4
	HSC-IR		3,2	4,9	6,1	6,1	7,3

**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 N_{Rec}	HSC-I	6,1	6,1	8,5	11,2	11,2
	HSC-IR	5,4	6,1	8,5	10,1	11,2
Shear V_{Rec}	HSC-I	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 N_{Rec}	HSC-I, HSC-IR	4,3	4,3	6,1	8,0	8,0
Shear V_{Rec}	HSC-I	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.

Materials**Mechanical properties for HSC-A (R)**

Anchor size			M8 x 40	M10 x 40	M10 x 40	M8 x 50
Nominal tensile strength	f_{uk}	HSC-A	800	800	800	800
		HSC-AR	700	700	700	700
Yield strength	f_{yk}	HSC-A	640	640	640	640
		HSC-AR	450	450	450	450
Stressed cross-section for bolt version	$A_{s,A}$	HSC-A HSC-AR	36,6	36,6	58,0	84,3
Moment of resistance	W	HSC-A HSC-AR	31,2	31,2	62,3	109,2
Design bending resistance without sleeve	$M_{Rd,s}$	HSC-A	24	24	48	84
		HSC-AR	16,7	16,7	33,3	59,0

Mechanical properties for HSC-I (R)

Anchor size			M6	M8	M10	M10	M12
Nominal tensile strength	f_{uk}	HSC-I	800	800	800	800	800
		HSC-IR	700	700	700	700	700
Yield strength	f_{yk}	HSC-I	640	640	640	640	640
		HSC-IR	355	355	350	350	340
Stressed cross-section for internal thread version	$A_{s,I}$	HSC-I HSC-IR	22,0	28,3	34,6	34,6	40,8
Stressed cross-section for external thread version	$A_{s,A}$	HSC-I HSC-IR	20,1	36,6	58,0	58,0	84,3
Moment of resistance	W	HSC-I HSC-IR	12,7	31,2	62,3	62,3	109,2
Design bending resistance without sleeve	$M_{Rd,s}$	HSC-I	9,6	24	48	48	84
		HSC-IR	7,1	16,7	33,3	33,3	59,0

Chemical anchors

Undercut

Mechanical anchors

Plastic / Light duty metal anchors

Material quality

Part	Material
HSC-A / HSC-I Carbon steel	
Cone bolt with internal thread	Carbon steel strength 8.8, galvanized to min. 5 µm
Cone bolt with external thread	
Expansion sleeve and washer	Galvanized to min. 5 µm
Hexagon nut	Grade 8
HSC-AR / HSC-IR Stainless steel	
Cone bolt with internal thread	Steel grade 1.4401, 1.4571 A4-70
Cone bolt with internal thread	
Expansion sleeve and washer	Steel grade 1.4401, 1.4571
Hexagon nut	Steel grade 1.4401, 1.4571 A4-70

Anchor dimension of HSC-A (R)

Anchor size		M8 x 40	M8 x 50	M8 x 50	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	M8	M10	M10	M12
Length of cone bolt	l _b [mm]	43,8	43,8	54,8	64,8	64,8
Diameter of cone bolt	b [mm]	43,8	13,5	15,5	13,5	17,5
Length of expansion sleeve	l _s [mm]	40,8	40,8	50,8	50,8	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	M8 x 50	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 _r ≤ [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	M8	M10	M10	M12
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} ≤ [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 _r ≤ [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	M10 x 40	M8 x 50	M12 x 60
Effective anchorage depth	h_{ef} [mm]	40	40	50	60
Minimum base material thickness	$h_{min} \geq$ [mm]	100	100	100	130
Minimum spacing	$s_{min} \geq$ [mm]	40	40	50	60
Minimum edge distance	$c_{min} \geq$ [mm]	40	40	50	60
Critical spacing for splitting failure	$s_{cr,sp}$ [mm]	130	120	170	180
Critical edge distance for splitting failure	$c_{cr,sp}$ [mm]	65	60	85	90
Critical spacing for concrete cone failure	$s_{cr,N}$ [mm]	120	120	150	180
Critical edge distance for concrete cone failure	$c_{cr,N}$ [mm]	60	60	75	90

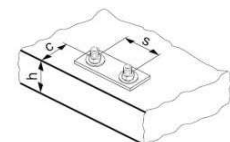
Setting parameters for HSC-I (R)

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	40	50	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 ETAG 001, Annex C

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.



Chemical anchors

Undercut

Mechanical anchors

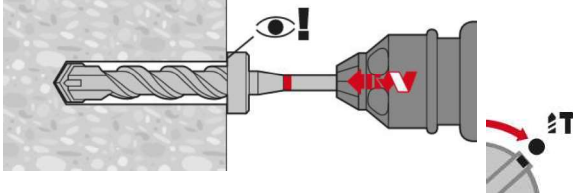
Plastic / Light duty metal anchors

Setting instruction

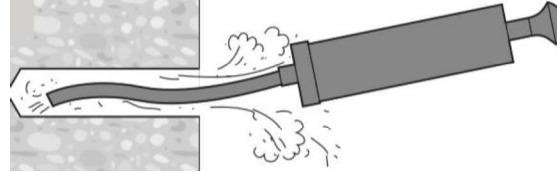
*For detailed information on installation see instruction for use given with the package of the product.

Setting instruction for HSC-A (R)

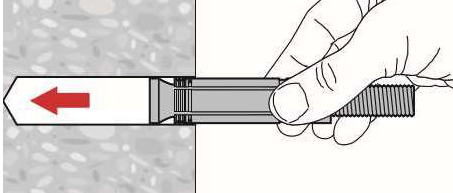
1. Drilling



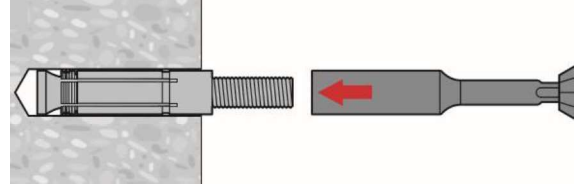
2. Cleaning



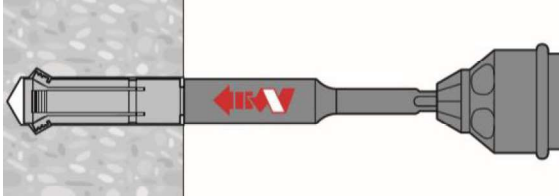
3. Inserting the anchor by hand



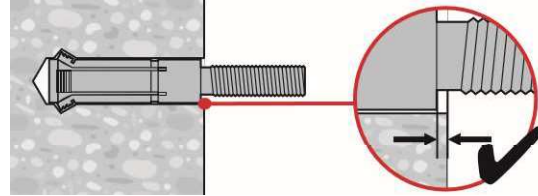
4. Applying hammer drill



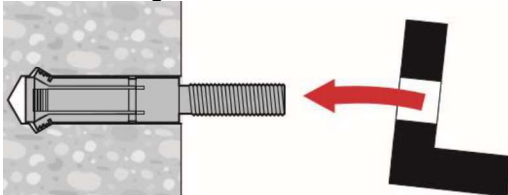
5. Applying hammer drill



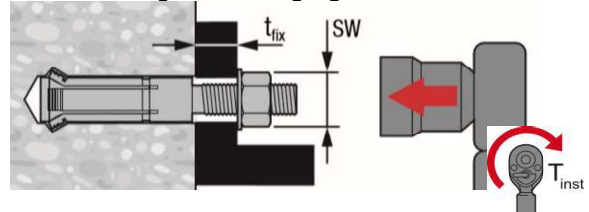
6. Checking



7. Attaching the fixture



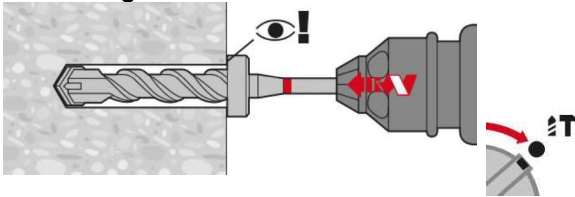
8. Attaching the belonging washer



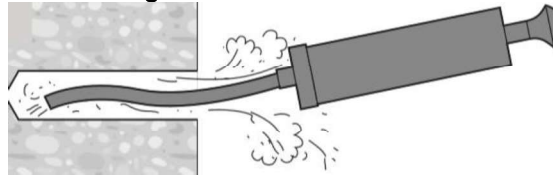


Setting instruction for HSC-I (R)

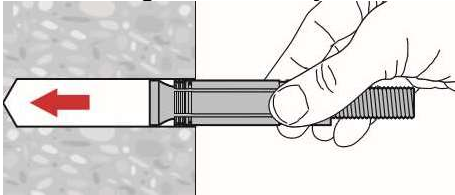
1. Drilling



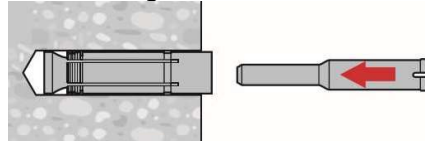
2. Cleaning



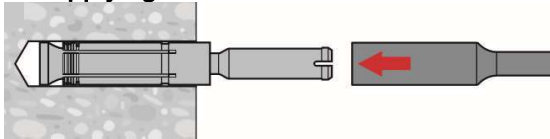
3. Inserting the anchor by hand



4. Inserting the tool HSC-EW14



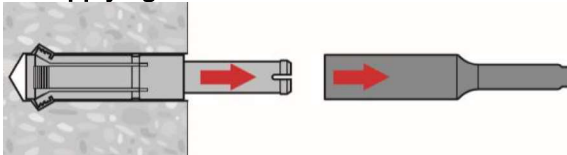
5. Applying hammer drill



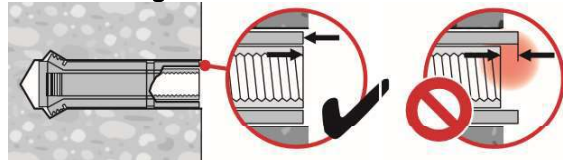
6. Applying hammer drill



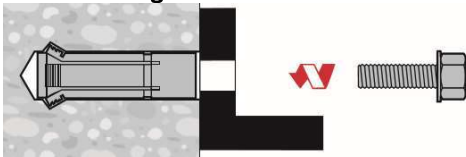
7. Applying hammer drill



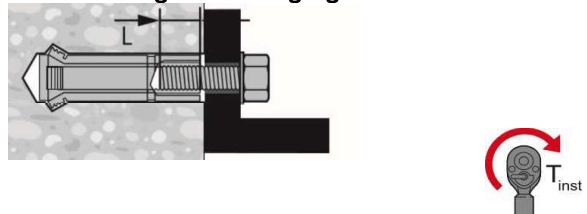
8. Checking



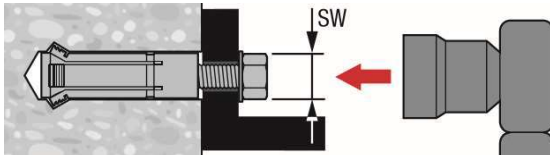
9. Attaching the fixture



10. Attaching the belonging washer



11.



Chemical anchors

Undercut

Mechanical anchors

Plastic / Light duty metal anchors