



HUS3 redundant SCREW ANCHOR

Technical Datasheet











Update: Jan-23






HUS3, HUS-HR / HUS-CR Screw anchor

Ultimate performance screw anchor for redundant fastening applications

Anchor version		Benefits
	HUS3-H/HF (6-10)	<ul style="list-style-type: none"> - Quick and easy setting - Low expansion forces in base materials - Removable - Forged-on washer and hexagon head with no protruding thread - ETA approval for cracked and non cracked concrete and for hollow core slabs - High productivity – less drilling and fewer operations than with conventional anchors - Through-fastening and pre-setting (based on the head configuration)
	HUS-HR (6)	
	HUS3-C (6-10)	
	HUS-CR (6)	
	HUS3-A (6)	
	HUS3-PL (6)	
	HUS3-P (6)	
	HUS3-PS (6)	
	HUS3-I (6)	
	HUS3-I Flex (6)	

Base material	Load conditions
 <p>Concrete (non-cracked)</p>	 <p>Static / quasi-static</p>
 <p>Concrete (cracked)</p>	
 <p>Prestressed hollow core slabs</p>	
	 <p>Fire resistance</p>

Installation conditions	Other information
 <p>Small edge distance and spacing</p>	 <p>European Technical Assessment</p>
	 <p>CE conformity</p>
	 <p>Corrosion resistance</p>

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment	DIBt, Berlin	ETA-10/0005 / 2018-11-12
Fire test report	DIBt, Berlin	ETA-10/0005 / 2018-11-12

a) All data given in this section according ETA-10/0005 issue 2018-11-12

Static and quasi-static resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Anchors in redundant fastening

Anchorage depth

Type	HUS ¹⁾	HUS ²⁾	HUS ³⁾
	HR, CR	HR,CR	H,PL,P,PS,I,I-Flex,A,C
Nominal embedment depth h_{nom} [mm]	30	35	35

1) Hilti Technical Data for embedment depth of 30 mm

2) ETA-10/0005 issue 2018-11-12

Characteristic resistance for all loads directions

Type	HUS ¹⁾	HUS ²⁾		HUS ³⁾
	HR,CR	HR,CR		H,PL,P,PS,I,I-Flex,A,C
Fastener size	6 all lengths	6x40 6x45	6x60 6x70	6 all lengths
$35 \text{ mm} \leq c < 80 \text{ mm}$ F^0_{Rk} [kN]	2,0	3,0		2,0
$c > 80 \text{ mm}$ F^0_{Rk} [kN]	2,0	3,5	5,0	3,0

1) Hilti Technical Data for embedment depth of 30 mm

2) ETA-10/0005 issue 2018-11-12

Design resistance for all loads directions

Type	HUS ¹⁾	HUS ²⁾		HUS ³⁾
	HR,CR	HR	CR	H,PL,P,PS,I,I-Flex,A,C
Fastener size	6 all lengths	6x40 6x45	6x60 6x70	6 all lengths
$35 \text{ mm} \leq c < 80 \text{ mm}$ F^0_{Rd} [kN]	1,0	1,4		1,3
$c > 80 \text{ mm}$ F^0_{Rd} [kN]	1,0	1,7	2,4	2,0

1) Hilti Technical Data for embedment depth of 30 mm

2) ETA-10/0005 issue 2018-11-12

Recommended loads for all load directions

Type	HUS ¹⁾	HUS ²⁾		HUS ³⁾
	HR,CR	HR	CR	H,PL,P,PS,I,I-Flex,A,C
Fastener size	6 all lengths	6x40 6x45	6x60 6x70	6 all lengths
$35 \text{ mm} \leq c < 80 \text{ mm}$ F^0_{Rec} [kN]	0,7	1,0		0,9
$c > 80 \text{ mm}$ F^0_{Rec} [kN]	0,7	1,2	1,7	1,4

1) Hilti Technical Data for embedment depth of 30 mm

2) ETA-10/0005 issue 2018-11-12

3) 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

Requirements for redundant fastening

The definition of redundant fastening according to Member States is given in EN 1992-4 and CEN/TR 17079. In absence of a definition by a Member State the following default values may be taken.

Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action N_{sd} per fixing point ^{a)}
3	1	2 kN
4	1	3 kN



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 to C50/60
- Partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1,0$ (in absence of other national regulations)

Anchorage depth

Type	HUS		HUS3 ²⁾
	HR	CR	H, P, PS, PL, I, I-Flex, A, C
Nominal embedment depth h_{nom} [mm]	35		

Characteristic resistance

Type	HUS		HUS3
	HR	CR	H, P, PS, PL, I, I-Flex, A, C
Fire exposure R30			
All load directions $F_{Rk,fi}$ [kN]	0,7	0,2	0,5
Fire exposure R120			
All load directions $F_{Rk,fi}$ [kN]	0,5	0,1	0,4

Design resistance

Type	HUS		HUS3
	HR	CR	H, P, PS, PL, I, I-Flex, A, C
Fire exposure R30			
All load directions $F_{Rk,fi}$ [kN]	0,7	0,2	0,5
Fire exposure R120			
All load directions $F_{Rk,fi}$ [kN]	0,5	0,1	0,4

For more information about fire resistance please see the full ETA-10/0005 report.

Requirements for redundant fastening

The definition of redundant fastening according to Member States is given in EN 1992-4 and CEN/TR 17079. In absence of a definition by a Member State the following default values may be taken.

Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action N_{Sd} per fixing point ^{a)}
3	1	2 kN
4	1	3 kN

- a) The value for maximum design load of actions per fastening point N_{Sd} is valid in general that means all fastening points are considered in the design of the redundant structural system. The value N_{Sd} may be increased if the failure of one (=most unfavourable) fixing point is taken into account in the design (serviceability and ultimate limit state) of the structural system e.g. suspended ceiling.

Materials

Mechanical properties

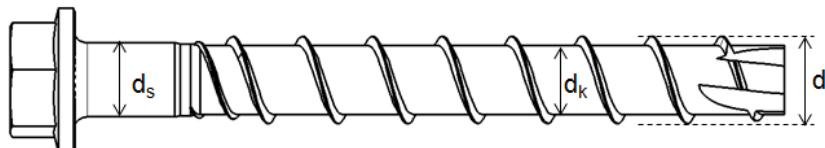
Type			HUS	HUS3
			HR,CR	H,PL,P,PS,I,I-Flex,A,C
Nominal tensile strength	f_{uk}	[N/mm ²]	1040	930
Stressed cross-section	A_s	[mm ²]	22,9	26,9
Moment of resistance	W	[mm ³]	15,5	19,7
Characteristic bending resistance	$M^{0}_{Rk,s}$	[Nm]	19,0	22,0

Material quality

Type	Material
HUS3- H,PL,P,PS,I,I-Flex,A,C	Carbon steel, galvanized $\geq 5 \mu\text{m}$
HUS- HR,CR	Stainless steel, grade A4

Anchor dimensions

Type			HUS	HUS3							
			HR,CR	H	C	A	PL	P	PS	I	I-Flex
Nominal length	l_s	[mm]	40-70	40-120	40-70	35-55	60	40-80	40-60	35-55	55-195
Threaded outer diameter	d_t	[mm]	7,6	7,85							
Core diameter	d_k	[mm]	5,4	5,85							
Shaft diameter	d_s	[mm]	5,8	6,15							
Diameter of integrated washer	d_i	[mm]	-	16,5	-	-	-	-	-	-	-
Stressed section	A_s	[mm ²]	22,9	26,9							

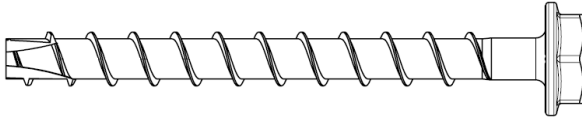

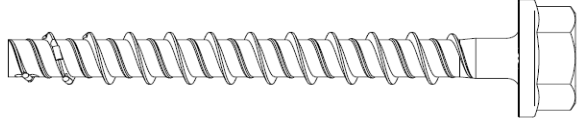

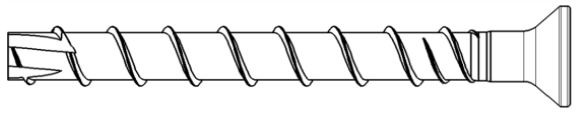

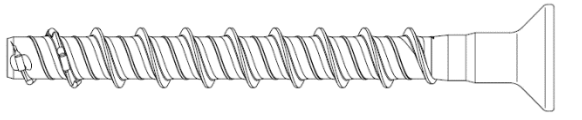
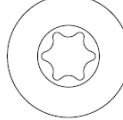
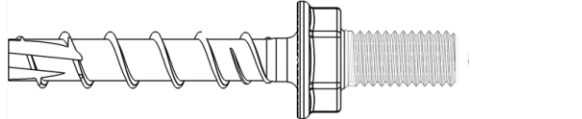
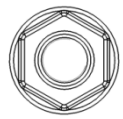
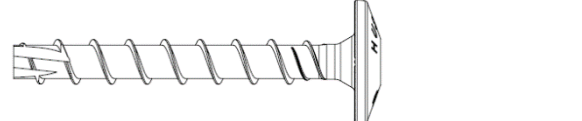

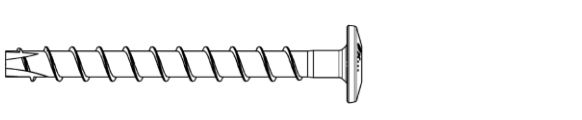

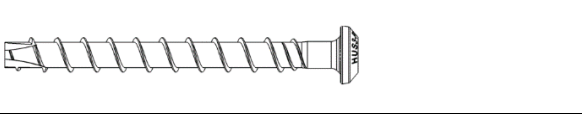
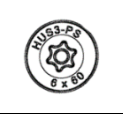
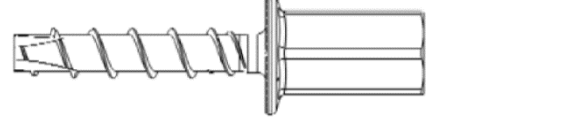

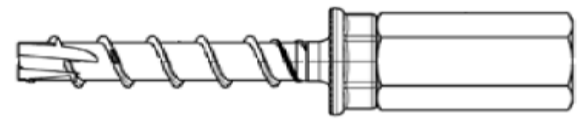
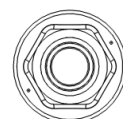


Special anchor dimensions

Type			HUS3-C			HUS-CR			HUS3-		
			d6	d8	d10	d6	d8	d10	PL	P	PS
Countersunk height	h_c	[mm]	4,0	6,3	6,9	4,3	6,3	7,0	-	-	-
Diameter of the countersunk	d_c	[mm]	11,5	18	21	11,5	18	21	-	-	-
Pan head diameter	d_p	[mm]	-	-	-	-	-	-	21,8	17,6	13,3



Head configuration

Type	Head		
HUS3-H 6	Hexagonal head		
HUS-HR 6	Hexagonal head		
HUS3-C 6	Countersunk head		
HUS-CR 6	Countersunk head		
HUS3-A 6	External thread		
HUS3-PL	Pan head (large)		
HUS3-P	Pan head		
HUS3-PS 6	Pan head (small)		
HUS3-I 6	Internal thread		
HUS3-I Flex 6	External thread		

Setting information

Setting details

Type	HUS		HUS3									
	HR	CR	H	C	A	P	PL	PS	I	I-Flex		
Nominal diameter of drill bit	d ₀	[mm]	6									
Cutting diameter of drill bit	d _{cut} ≤	[mm]	6,40									
Clearance hole diameter	d _f	[mm]	9									
Wrench size	SW	[mm]	13	-	13	-	13	-	-	-	13	13
Countersunk diameter	d _h	[mm]	-	11,0	-	11,5	-	-	-	-	-	-
Torx size	TX	[-]	-	T30	T30	T30	-	T30	T30	T30	-	-
Installation torque	T _{inst}	[mm]	- ¹⁾	- ¹⁾	18							
Depth of drill hole in floor/wall position	h ₁ ≥	[mm]	45 mm									
Depth of drill hole in ceiling position	h ₁ ≥	[mm]	38 mm									

1) Hand setting in concrete base material not allowed (machine setting only).

Screw length and maximum thickness of fixture

Fastener size		6									
Type	Nominal embedment depth [mm]	HUS		HUS3							
		HR	CR	H	C	A	PL	P	PS	I	I-Flex
Length of screw [mm]		h _{nom}									
		Thickness of fixture [mm] t _{fix}									
35		-	-	-	-	0	-	-	-	0	-
40		-	5	5	5	-	-	5	5	-	-
45		10	-	-	-	-	-	-	-	-	-
55		-	-	-	-	20	-	-	-	20	20
60		25	25	25	25	-	25	25	25	-	-
70		35	35	-	35	-	-	-	-	-	-
80		-	-	45	-	-	-	45	-	-	-
100		-	-	65	-	-	-	-	-	-	-
120		-	-	85	-	-	-	-	-	-	-
135		-	-	-	-	-	-	-	-	-	100
155		-	-	-	-	-	-	-	-	-	120
175		-	-	-	-	-	-	-	-	-	140
195		-	-	-	-	-	-	-	-	-	160

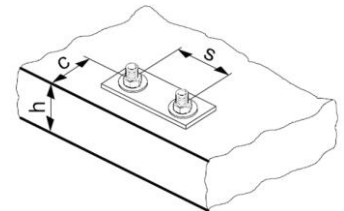
Installation equipment

Type	HUS		HUS3							
	HR	CR	H	C	A	PL	P	PS	I	I-Flex
Rotary hammer	TE 6 – TE 7									
Drill bit	TE-CX 6									
Socket wrench insert (H, A, I-type)	S-NSD 13 ½ (L)									
Impact screw driver	Hilti SIW 14-A /Hilti SIW 22-A									

Setting parameters

Type			HUS-HR, CR HUS3-H, PL, P, PS, I, I-Flex, A, C
Minimum base material	h_{min}	[mm]	80
Minimum spacing	s_{min}	[mm]	35
Minimum edge distance	c_{min}	[mm]	35(80) ¹⁾
Critical spacing	s_{cr}	[mm]	3 h_{ef}
Critical edge distance	c_{cr}	[mm]	1,5 h_{ef}

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



Setting instructions

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

Setting instruction for HUS-HR,CR	
1. Drill hole with the drill bit 	2. Clean hole
3. Installing the anchor by impact screw driver 	4. Checking
Setting instruction for HUS3-H, C, I, I-Flex, A, P, PS, PL	
1. Drill hole with drill bit 	2. Clean hole
3. Installing the anchor by impact screw driver 	4. Checking

The anchor can be adjusted max. two times.

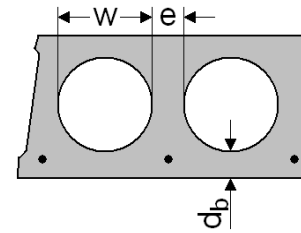
The total allowed thickness of shims added during the adjustment process is 10 mm.

The final embedment depth after adjustment process must be larger or equal than h_{nom2} or h_{nom3} .

Basic loading data for redundant fastening in prestressed hollow core slabs

All data in this section applies to:

- Correct anchor setting (See setting instruction)
- No edge distance and spacing influence
- Ratio core width/web thickness $w/e \leq 4,2$
- Concrete C 30/37 to C50/56
- Data for size 6 is according to ETA-10/0005
- Data for size 8 and 10 is according to Hilti technical data



Requirements for redundant fastening

The definition of redundant fastening according to Member States is given in the EAD 330747 § 1.2.1. In Absence of a definition by a Member State the following default values may be taken.

Minimum number of fixing points	Minimum number of anchors per fixing point	Maximum design load of action N_{Sd} per fixing point ^{a)}
3	1	2 kN
4	1	3 kN

- a) The value for maximum design load of actions per fastening point N_{Sd} is valid in general that means all fastening points are considered in the design of the redundant structural system. The value N_{Sd} may be increased if the failure of one (=most unfavourable) fixing point is taken into account in the design (serviceability and ultimate limit state) of the structural system e.g. suspended ceiling.

Characteristic resistance for all load directions

Type	HUS-HR,CR		HUS-HR, CR			HUS3-H, PL, P, PS, I, I-Flex, A, C				
	6x40, 6x45		6x60, 6x70			6 all lengths				
Bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 25	≥ 30	≥ 35	≥ 25	≥ 30	≥ 35
All load directions	F_{Rk}	[kN]	1,0	2,0	1,0	2,0	3,0	1,0	2,0	3,0

Design resistance for all load directions

Type	HUS-HR,CR		HUS-HR, CR			HUS3-H, PL, P, PS, I, I-Flex, A, C				
	6x40, 6x45		6x60, 6x70			6 all lengths				
Bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 25	≥ 30	≥ 35	≥ 25	≥ 30	≥ 35
All load directions	F_{Rd}	[kN]	0,7	1,3	0,7	1,3	2,0	1,0	1,3	2,0

Recommended load for all load directions^{a)}

Type	HUS-HR,CR		HUS-HR, CR			HUS3-H, PL, P, PS, I, I-Flex, A, C				
	6x40, 6x45		6x60, 6x70			6 all lengths				
Bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 25	≥ 30	≥ 35	≥ 25	≥ 30	≥ 35
All load directions	F_{Rec}	[kN]	0,5	1,0	0,5	1,0	1,4	1,0	1,0	1,4

- 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.



Characteristic resistance for all load directions

Anchor size		8	10
Type		HUS3-C, H, HF	HUS3-C, H, HF
Bottom flange thickness	$d_b \geq$ [mm]	30	30
All load directions	F_{Rk} [kN]	2,0	2,0

Design resistance for all load directions

Anchor size		8	10
Type		HUS3-C, H, HF	HUS3-C, H, HF
Bottom flange thickness	$d_b \geq$ [mm]	30	30
All load directions	F_{Rd} [kN]	1,3	1,3

Recommended loads for all load directions

Anchor size		8	10
Type		HUS3-C, H, HF	HUS3-C, H, HF
Bottom flange thickness	$d_b \geq$ [mm]	30	30
All load directions ^{a)}	F_{Rec} [kN]	0,95	0,95

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.

Setting information

Setting details

Anchor size		6		
Type		HUS ¹⁾		HUS-HR, CR ²⁾ HUS3-H, PL, P, PS, I, I-Flex, A, C
		HR	CR	
Effective anchorage depth	h_{ef} [mm]	25		
Bottom flange thickness	$d_b \geq$ [mm]	25		
Nominal diameter of drill bit	d_0 [mm]	6		
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	6,4		
Nominal depth of drill hole ⁴⁾	$h_1 \geq$ [mm]	38		
Clearance hole diameter	d_f [mm]	9		
Distance between anchor and prestressing steel	$a_p \geq$ [mm]	50		
Core distance	$l_c \geq$ [mm]	100		
Pre-stressing steel distance	$l_p \geq$ [mm]	100		
Installation torque	T_{inst} [mm]	- ³⁾		18

1) Hilti Technical Data for embedment depth of 30 mm

2) ETA-10/0005 issue 2018-11-12

3) Hand setting in concrete base material not allowed (machine setting only)

4) Nominal depth of drill hole may be deeper than bottom flange thickness

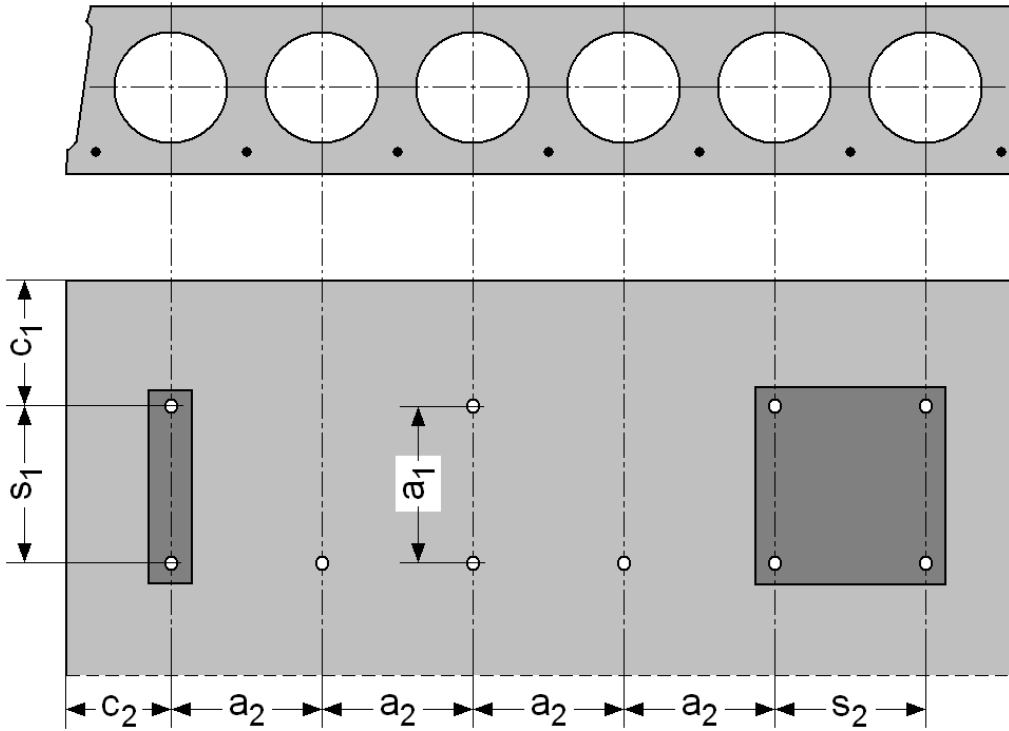


Screw length and thickness of fixture used in precast pre-stressed hollow core slabs for size 8

Anchor Type	Size	Length [mm]	d _b =30 [mm]		d _b =35 [mm]		d _b =40 [mm]		d _b =50 [mm]	
	[mm]		t _{fix,min} [mm]	t _{fix,max} [mm]	t _{fix,min} [mm]	t _{fix,max} [mm]	t _{fix,min} [mm]	t _{fix,max} [mm]	t _{fix,min} [mm]	t _{fix,max} [mm]
HUS3-H	8	55	5	15	5	10	5	5	5	5
		65	5	25	5	20	5	15	5	5
		75	5	35	5	30	5	25	5	15
		85	15	45	15	40	15	35	15	25
		100	30	60	30	55	30	50	30	40
		120	50	80	50	75	50	70	50	60
		150	80	110	80	105	80	100	80	90
HUS3-HF	8	65	5	25	5	20	5	15	5	5
		75	5	35	5	30	5	25	5	15
		85	15	45	15	40	15	35	15	25
		100	30	60	30	55	30	50	30	40
HUS3-C	8	65	15	25	15	20	15	15	15	5
		75	15	35	15	30	15	25	15	15
		85	15	45	15	40	15	35	15	25
HUS3-H	10	60	5	15	5	10	5	5	5	5
		70	15	25	15	20	15	15	15	5
		80	5	35	5	30	5	25	5	15
		90	5	45	5	40	5	35	5	25
		100	15	55	15	50	15	45	15	35
		110	25	65	25	60	25	55	25	45
		150	65	105	65	100	65	95	65	85
HUS3-HF	10	60	5	15	5	10	5	5	5	5
		80	5	35	5	30	5	25	5	15
		100	15	55	15	50	15	45	15	35
		110	25	65	25	60	25	55	25	45
HUS3-C	10	70	15	25	15	20	15	15	15	10
		90	15	45	15	40	15	35	15	25
		100	15	55	15	50	15	45	15	35

Anchor spacing and edge distance

Type		HUS-HR, CR HUS3-H, PL,P, PS, I, I-Flex, A, C
Minimum edge distance	$c_{min} \geq$ [mm]	100
Minimum anchor spacing	$s_{min} \geq$ [mm]	100
Minimum distance between anchor groups	$a_{min} \geq$ [mm]	100



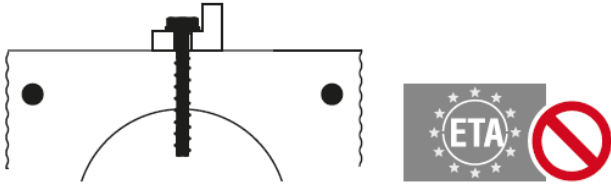
- c_1, c_2 edge distance
- s_1, s_2 Anchor spacing
- a_1, a_2 Distances between anchor groups

Setting instructions

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

Installation in hollow core slabs

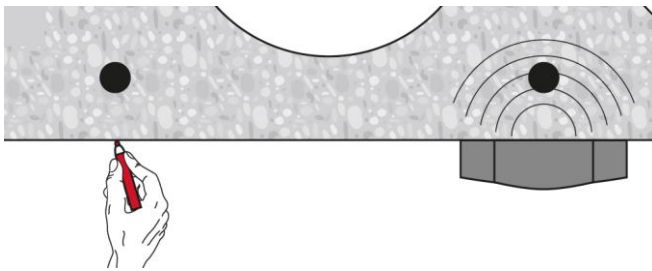
1. Checking the anchor with tube Hilti HSB



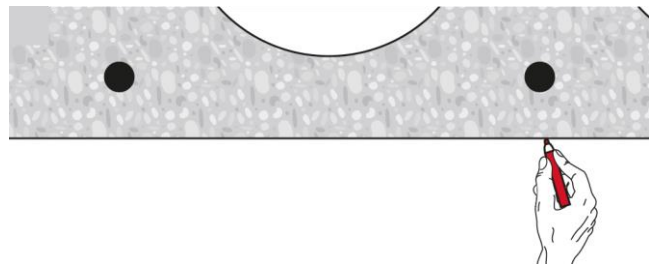
2. Positioning pre-stressed steel



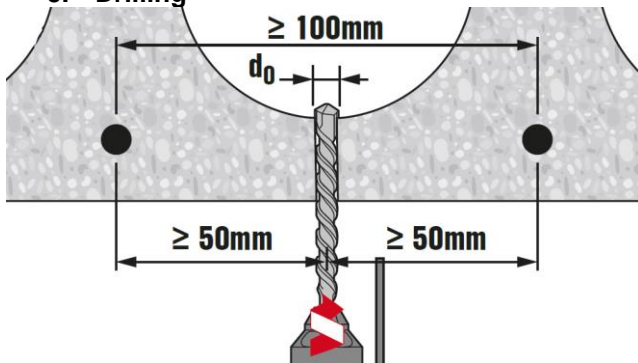
3. Marking pre-stressed steel position



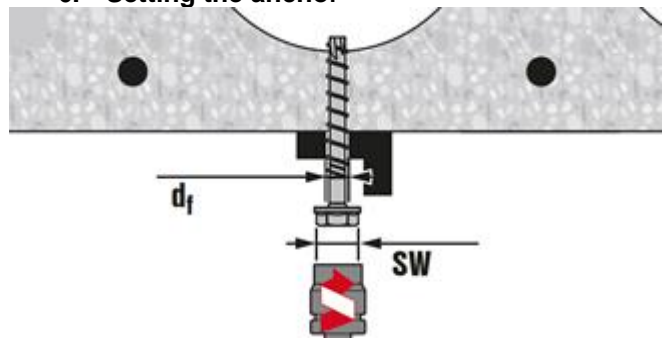
4. Marking pre-stressed steel position



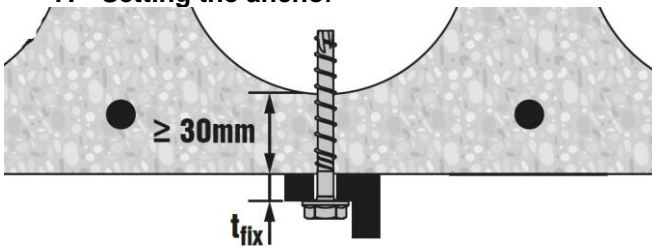
5. Drilling



6. Setting the anchor



7. Setting the anchor



8. Checking

