



# HUS3 redundant SCREW ANCHOR

**Technical Datasheet**











**Update: Dec-18**


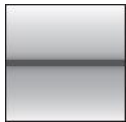


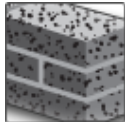
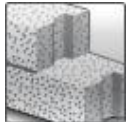





# HUS3 Screw anchor

Ultimate performance screw anchor for redundant fastening applications

Anchor version		Benefits
	HUS3-H/HF (6-10)	<ul style="list-style-type: none"> <li>- Quick and easy setting</li> <li>- Low expansion forces in base materials</li> <li>- Removable</li> <li>- Forged-on washer and hexagon head with no protruding thread</li> <li>- ETA approval for cracked and non cracked concrete and for hollow core slabs</li> <li>- High productivity – less drilling and fewer operations than with conventional anchors</li> <li>- Through-fastening and pre-setting (based on the head configuration)</li> </ul>
	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
 Concrete (non-cracked)	 Static / quasi-static   Fire resistance
 Concrete (cracked)	
 Solid brick	
 Autoclaved aerated concrete	
 Prestressed hollow core slabs	

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

### 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

### Basic loading data (for a single anchor)

#### All data in this section applies to:

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

#### Anchorage depth

Type		HUS <sup>1)</sup>	HUS <sup>2)</sup>	HUS <sup>3)</sup>
		HR, CR	HR,CR	H,P,PS,I,I-Flex,A,C
Nominal embedmt.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 <sup>1)</sup>	HUS <sup>2)</sup>		HUS <sup>3)</sup>
		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
$35 \text{ mm} \leq c < 80 \text{ mm}$	$F_{Rk}^0$ [kN]	2	3		2
$c > 80 \text{ mm}$	$F_{Rk}^0$ [kN]	2	3,5	5	3

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 <sup>1)</sup>	HUS <sup>2)</sup>		HUS <sup>3)</sup>
		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
$35 \text{ mm} \leq c < 80 \text{ mm}$	$F_{Rd}^0$ [kN]	1	1,4		1,3
$c > 80 \text{ mm}$	$F_{Rd}^0$ [kN]	1	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 <sup>1)</sup>	HUS <sup>2)</sup>		HUS <sup>3)</sup>
		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
$35 \text{ mm} \leq c < 80 \text{ mm}$	$F_{Rec}^0$ [kN]	0,7	1,0		0,9
$c > 80 \text{ mm}$	$F_{Rec}^0$ [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 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 <sup>a)</sup>
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

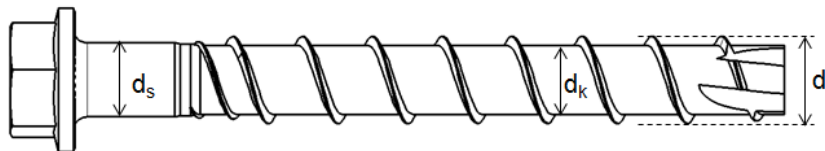
Type		HUS	HUS3
		HR,CR	H,PL,P,PS,I,I-Flex,A,C
Nominal tensile strength $f_{uk}$	[N/mm <sup>2</sup> ]	1040	930
Stressed cross-section $A_s$	[mm <sup>2</sup> ]	22,9	26,9
Moment of resistance $W$	[mm <sup>3</sup> ]	15,5	19,7
Design bending resistance $M^0_{Rd,s}$	[Nm]	12,9	14,6

#### Material quality

Type	Material
HUS3- H,A,C,P,PS,I,I-Flex	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 <sup>2</sup> ]	22,9		26,9							



### Special anchor dimensions

Type	HUS3-C			HUS-CR			HUS3-			
	M6	M8	M10	M6	M8	M10	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

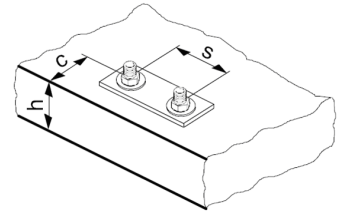
Type	HUS		HUS3								
	HR	CR	H	C	A	P	PL	PS	I	I-Flex	
Nominal diameter of drill bit	$d_0$	[mm]	6								
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40								
Clearance hole diameter	$d_f$	[mm]	9								
Wrench size	SW	[mm]	13	-	13	-	13	-	-	13	13
Installation torque	$T_{inst}$	[mm]	- <sup>1)</sup>	- <sup>1)</sup>	18						
Depth of drill hole in floor/wall position	$h_1 \geq$	[mm]	45 mm								
Depth of drill hole in ceiling position	$h_1 \geq$	[mm]	38 mm								

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

### 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) <sup>1)</sup>
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).



### Screw length and maximum thickness of fixture

Fastener size		6									
Type		HUS		HUS3							
		HR	CR	H	C	A	PL	P	PS	I	I-
Length of screw [mm]	Nominal embedment depth [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

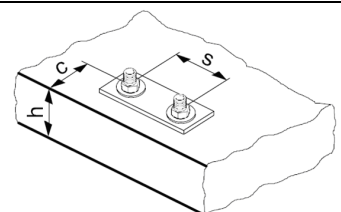
### Installation equipment

Type		HUS		HUS3								
		HR	CR	H	C	A	PL	P	PS	I	I-Flex	
Torx size	TX	-	-	T30	T30	T30	-	T30	T30	T30	-	-
Rotary hammer		TE 6 – TE 7										
Drill bit		TE-CX 6										
Wrench size (H, A, I-type)	SW	[mm]	13	-	13	-	13	-	-	-	13	13
Socket wrench insert (H, A, I-type)			S-NSD 13 ½ (L)									
Impact screw driver	$T_{inst}$	[mm]	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) <sup>1)</sup>									
Critical spacing	$s_{cr}$	[mm]	3 $h_{ef}$									
Critical edge distance	$c_{cr}$	[mm]	1,5 $h_{ef}$									

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

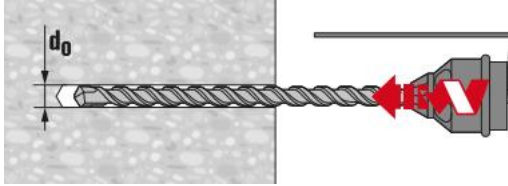


## Setting instructions

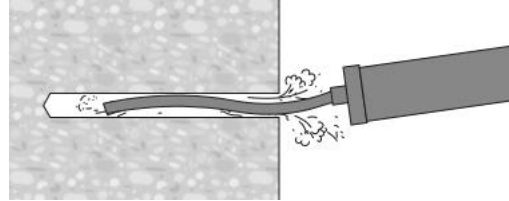
\*For detailed information on installation see instruction for use given with the package of the product

### Setting instruction for HUS-HR,CR

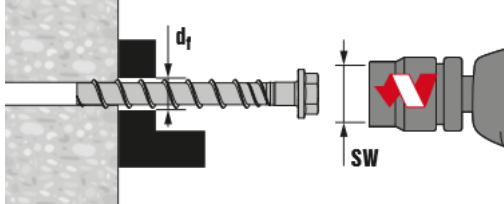
#### 1. Drill hole with the drill bit



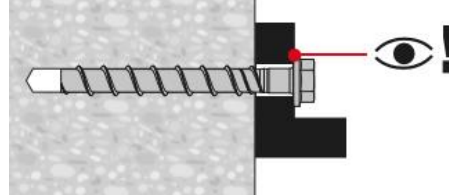
#### 2. Clean hole



#### 3. Installing the anchor by impact screw driver

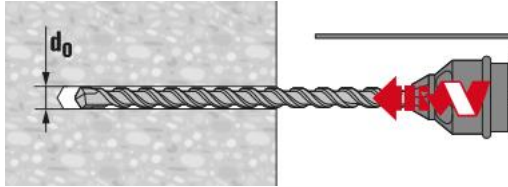


#### 4. Checking

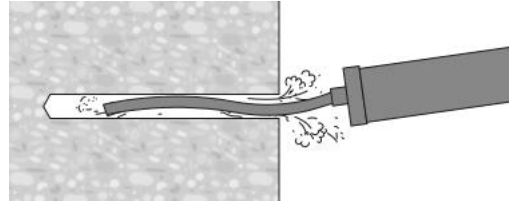


### Setting instruction for HUS3-H, C, I, I-Flex, A, P, PS

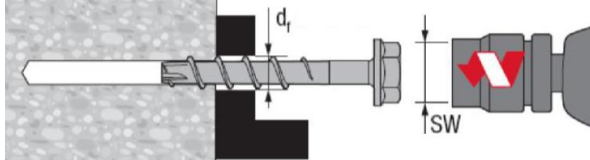
#### 1. Drill hole with drill bit



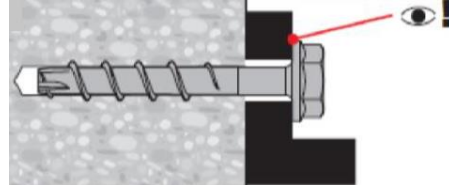
#### 2. Clean hole



#### 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.

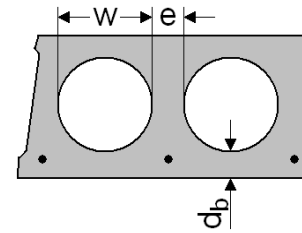
The final embedment depth after adjustment process must be larger or equal than  $h_{nom2}$  or  $h_{nom3}$ .



## 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 <sup>a)</sup>
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 6x40, 6x45		HUS-HR, CR 6x60, 6x70			HUS3-H, PL, P, PS, I, I-Flex, A, C 6 all lengths		
		$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
Bottom flange thickness	$d_b$ [mm]	$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
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 6x40, 6x45		HUS-HR, CR 6x60, 6x70			HUS3-H, PL, P, PS, I, I-Flex, A, C 6 all lengths		
		$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
Bottom flange thickness	$d_b$ [mm]	$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
All load directions	$F_{Rd}$ [kN]	0,7	1,3	0,7	1,3	2,0	0,7	1,3	2,0

### Recommended load for all load directions<sup>a)</sup>

Type		HUS-HR,CR 6x40, 6x45		HUS-HR, CR 6x60, 6x70			HUS3-H, PL, P, PS, I, I-Flex, A, C 6 all lengths		
		$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
Bottom flange thickness	$d_b$ [mm]	$\geq 25$	$\geq 30$	$\geq 25$	$\geq 30$	$\geq 35$	$\geq 25$	$\geq 30$	$\geq 35$
All load directions	$F_{Rec}$ [kN]	0,5	1,0	0,5	1,0	1,4	0,5	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 <sup>a)</sup>	$F_{Rec}$ [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 <sup>1)</sup>		HUS-HR, CR <sup>2)</sup> 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 <sup>4)</sup>	$h_1 \geq$ [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]	- <sup>3)</sup>		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)

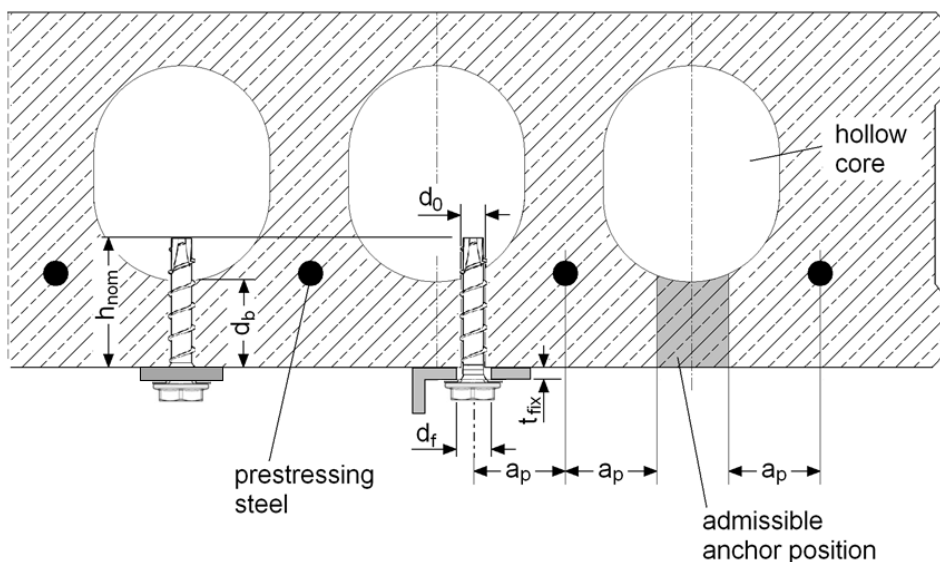
4) Nominal depth of drill hole may be deeper than bottom flange thickness

Anchor size		8	
Type		HUS3-C, H, HF	HUS3-C, H, HF
Effective anchorage depth	$h_{ef}$ [mm]	30	30
Bottom flange thickness	$d_b \geq$ [mm]	30	30
Nominal diameter of drill bit	$d_0$ [mm]	8	10
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8,45	10,45
Nominal depth of drill hole <sup>1)</sup>	$h_1 \geq$ [mm]	40	40
Clearance hole diameter	$d_f$ [mm]	12	14
Distance between anchor and prestressing steel	$a_p \geq$ [mm]	50	50
Core distance	$l_c \geq$ [mm]	100	100
Pre-stressing steel distance	$l_p \geq$ [mm]	100	100

1) 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 6

Anchor size		6									
Type		HUS		HUS3							
		HR	CR	H	C	A	PL	P	PS	I	I-Flex
Length of screw [mm]	Nominal embedment depth [mm]	$h_{nomd}$									
		Thickness of fixture [mm] $t_{fix}$									
35		-	-	-	-	0	-	-	-	0	-
40		-	-	5	5	-	-	5	5	-	-
45		15	-	-	-	-	-	-	-	-	-
55		-	-	-	-	20	-	-	-	20	20
60		5-25	5-25	5-25	5-25	-	5-25	5-25	5-25	-	-
70		15-35	15-35	-	15-35	-	-	-	-	-	-
80		-	-	25-45	-	-	-	25-45	-	-	-
100		-	-	45-65	-	-	-	-	-	-	-
120		-	-	65-85	-	-	-	-	-	-	-
135		-	-	-	-	-	-	-	-	-	80-100
155		-	-	-	-	-	-	-	-	-	100-120
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195		-	-	-	-	-	-	-	-	-	140-160



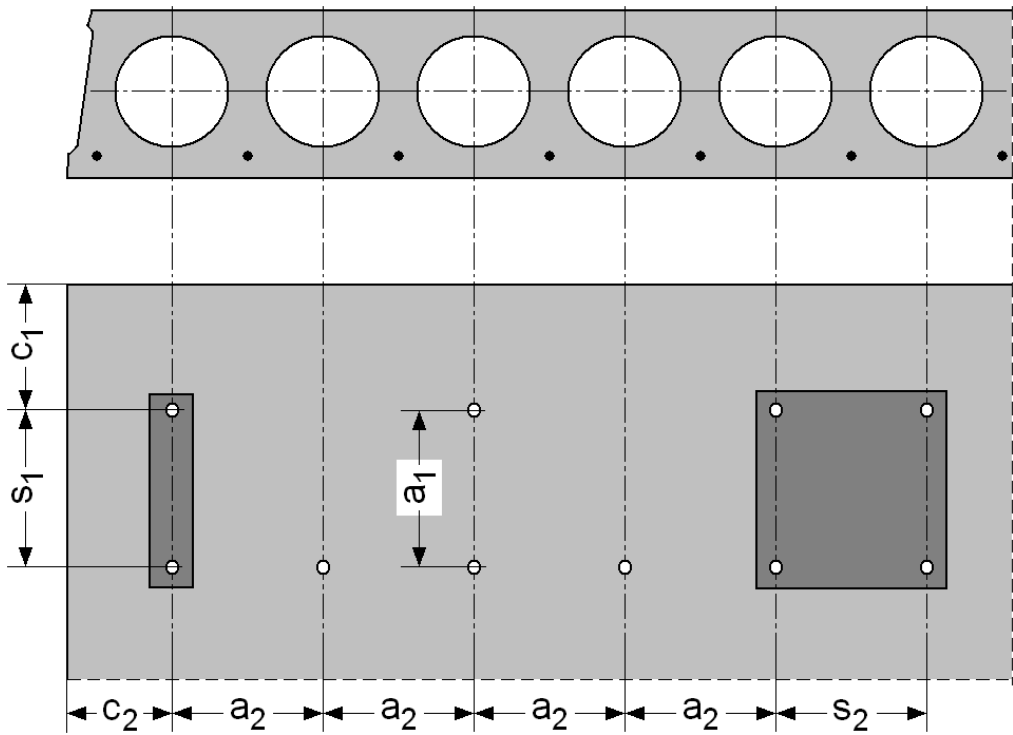


Screw length and thickness of fixture used in precast pre-stressed hollow core slabs for size 8

Anchor Type	Size [mm]	Length [mm]	d <sub>b</sub> =30 [mm]		d <sub>b</sub> =35 [mm]		d <sub>b</sub> =40 [mm]		d <sub>b</sub> =50 [mm]	
			t <sub>fix,min</sub> [mm]	t <sub>fix,max</sub> [mm]	t <sub>fix,min</sub> [mm]	t <sub>fix,max</sub> [mm]	t <sub>fix,min</sub> [mm]	t <sub>fix,max</sub> [mm]	t <sub>fix,min</sub> [mm]	t <sub>fix,max</sub> [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
		130	45	85	45	80	45	75	45	65
		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



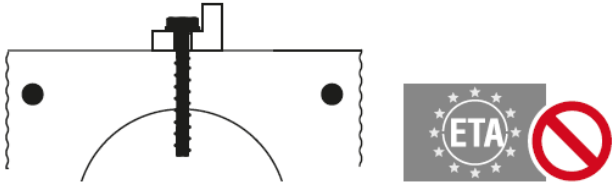
$c_1, c_2$  edge distance  
 $s_1, s_2$  Anchor spacing  
 $a_1, a_2$  Distances between anchor groups

## Setting instructions

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

### Installation in hollow core slabs

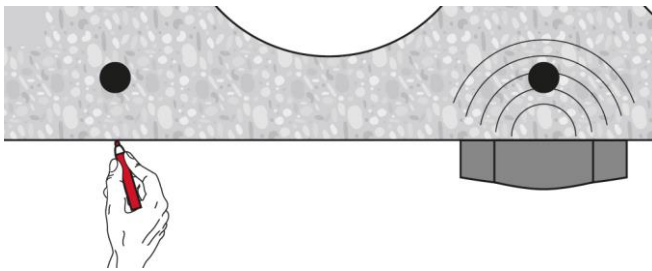
#### 1. Checking the anchor with tube Hilti HSB



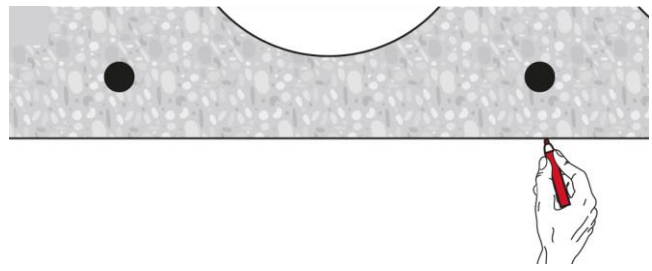
#### 2. Positioning pre-stressed steel



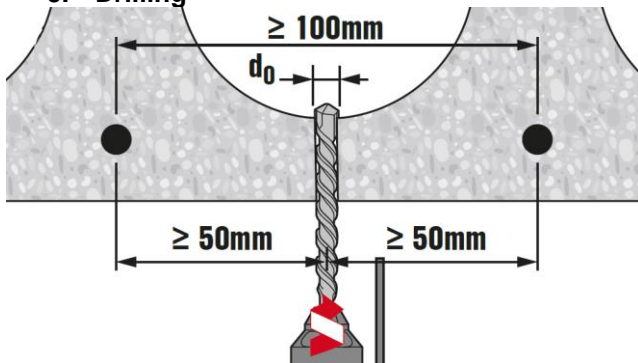
#### 3. Marking pre-stressed steel position



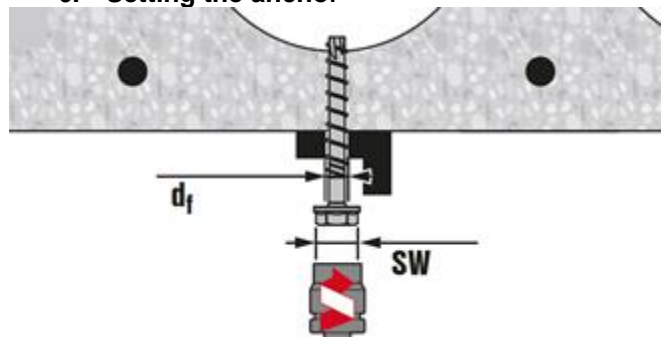
#### 4. Marking pre-stressed steel position



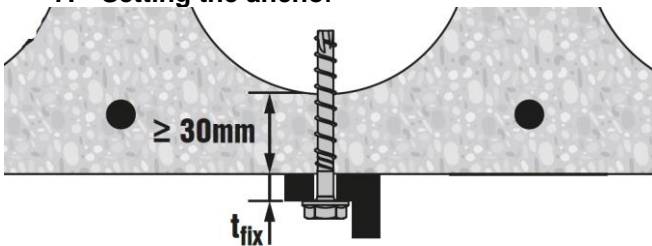
#### 5. Drilling



#### 6. Setting the anchor



#### 7. Setting the anchor



#### 8. Checking

