HUS-HR screw anchor

Anchor version

HUS-HR

Stainless steel
Concrete Screw

Benefits

- Quick and easy setting
- Low expansion forces in base materials
- Through fastening
- Removable
- Forged-on washer and hexagon head with no protruding thread


Concrete


Tensile zone


Small edge distance & spacing


Solid brick


Autoclaved aerated concrete


Fire resistance


European Technical Approval

Corrosion resistance


CE conformity

Hilti anchor design software

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval [a)]	DIBt, Berlin	ETA-08/0307 / 2013-06-04
Fire test report	DIBt, Berlin	ETA-08/0307 / 2013-06-04
Fire test report ZTV – Tunnel (EBA)	MFPA, Leipzig	PB III / 08-354 / 2008-11-27

a) Data for HUS-HR with standard and reduced embedment depth is given in this section according ETA-08/0307 issue 2009-03-30.

Design process for typical anchors layout in non cracked concrete

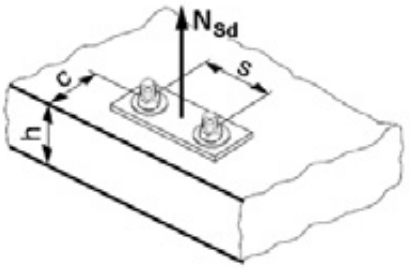
Background of the design method:

Values of the design resistances are obtained from PROFIS 2.1.1 in compliance with ETAG No.001 Annex C Design Method.

Design Process:

STEP 1: TENSION LOADING

The design tensile resistance N_{Rd} is the lower of:



- **Concrete cone or concrete splitting resistance. whichever governing**
  $N_{Rd} = f_B \cdot N^*_{Rd.c}$

$N^*_{Rd.c}$ is obtained from the relevant design tables

f_B influence of concrete strength

Concrete Strengths $f'_{c,cyl}$ (MPa)	20	25	32	40	50
f_B	0.79	0.87	1.00	1.11	1.22

a) extra reduced embedment depth b) reduced embedment depth

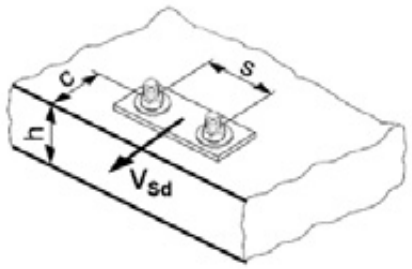
■ Design steel resistance (tension) $N_{Rd.s}$

Anchor size		HUS-HR 6	HUS-HR 8	HUS-HR 10	HUS-HR 14
$N_{Rd,s}$	[kN]	17.0	24.3	37.6	73.0

$N_{Rd} = \min \{ N_{Rd,c} , N_{Rd,s} \}$
CHECK $N_{Rd} \geq N_{Sd}$

STEP 2: SHEAR LOADING

The design shear resistance V_{Rd} is the lower of:



- **Design concrete edge resistance**
  $V_{Rd,c} = f_B \cdot V^*_{Rd,c}$

$V^*_{Rd,c}$ is obtained from the relevant design tables

f_B influence of concrete strength

Concrete Strengths $f'_{c,cyl}$ (MPa)	20	25	32	40	50
f_B	0.79	0.87	1.00	1.11	1.22

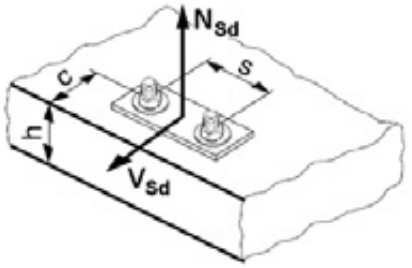
- **Design steel resistance (shear) $V_{Rd,s}$**

Anchor size			HUS-HR 6	HUS-HR 8	HUS-HR 10	HUS-HR 14
Extra reduced embedment	$V_{Rd,s}$	[kN]	11.3	17.3	22.0	-
Reduced embedment	$V_{Rd,s}$	[kN]	-	17.3	22.0	36.7
Standard embedment	$V_{Rd,s}$	[kN]	11.3	17.3	22.0	36.7

$$V_{Rd} = \min \{ V_{Rd,c}, V_{Rd,s} \}$$
$$\text{CHECK } V_{Rd} \geq V_{Sd}$$

STEP 3: COMBINED TENSION AND SHEAR LOADING

The following equations must be satisfied:



$$N_{Sd}/N_{Rd} + V_{Sd}/V_{Rd} \leq 1.2$$

and

$$N_{Sd}/N_{Rd} \leq 1, V_{Sd}/V_{Rd} \leq 1$$

Precalculated table values – design resistance values

General:

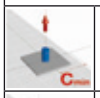
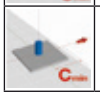
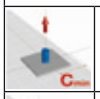
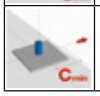
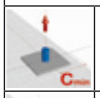
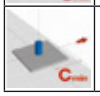
The following tables provide the total ultimate limit state design resistance for the configurations.
All tables are based upon:

- correct setting (See setting instruction)
- non-cracked concrete – $f_{c,cyl}$ = 32 MPa
- minimum base material thickness, as specified in the table below

Single anchor – no edge effects

			Non-cracked concrete				Cracked concrete			
Anchor size HUS-HR			**6**	**8**	**10**	**14**	**6**	**8**	**10**	**14**
Extra reduced embedment										
h_{nom}		[mm]	30	50	60	-	30	50	60	-
Min. base material thickness h_{min}		[mm]	80	100	120	-	80	100	120	-
	Tension $N^*_{Rd,c}$	[kN]	-	6.3	8.4	-	-	3.5	5.2	-
	Shear $V^*_{Rd,c}$	[kN]	-	20.0	26.5	-		14.2	18.8	-
Reduced embedment										
h_{nom}		[mm]	-	60	70	70	-	60	70	70
Min. base material thickness h_{min}		[mm]	-	100	120	140	-	100	120	140
	Tension $N^*_{Rd,c}$	[kN]	-	8.4	11.2	13.3	-	4.2	6.3	8.4
	Shear $V^*_{Rd,c}$	[kN]	-	Steel governs refer $V_{Rd,s}$ table		31.9	-	19.5	24.0	22.7
Standard embedment										
h_{nom}		[mm]	55	80	90	110	55	80	90	110
Min. base material thickness h_{min}		[mm]	100	120	140	160	100	120	140	160
	Tension $N^*_{Rd,c}$	[kN]	5.4	11.2	17.6	28.3	3.0	8.4	11.2	17.6
	Shear $V^*_{Rd,c}$	[kN]	Steel governs refer $V_{Rd,s}$ table				13.7	Steel governs refer $V_{Rd,s}$ table		

Single anchor, min. edge distance (c = c_{min})

		Non-cracked concrete				Cracked concrete			
Anchor size HUS-HR		**6**	**8**	**10**	**14**	**6**	**8**	**10**	**14**
Extra reduced embedment									
h_{nom}	[mm]	30	50	60	-	30	50	60	-
Min. base material thickness h_{min}	[mm]	80	100	120	-	80	100	120	-
Min. edge distance $c=c_{min}$	[mm]	40	45	50	-	40	45	50	-
 Tension $N^*_{Rd,c}$	[kN]	-	6.3	7.8	-	-	3.5	5.2	-
 Shear $V^*_{Rd,c}$	[kN]	-	4.8	5.9	-	-	3.3	4.1	-
Reduced embedment									
h_{nom}	[mm]	-	60	70	70	-	60	70	70
Min. base material thickness h_{min}	[mm]	-	100	120	140	-	100	120	140
Min. edge distance $c=c_{min}$	[mm]	-	45	50	50	-	45	50	50
 Tension $N^*_{Rd,c}$	[kN]	-	8.4	10.1	9.7	-	4.2	6.3	6.9
 Shear $V^*_{Rd,c}$	[kN]	-	5.0	6.1	6.4	-	3.5	4.3	4.5
Standard embedment									
h_{nom}	[mm]	55	80	90	110	55	80	90	110
Min. base material thickness h_{min}	[mm]	100	120	140	160	100	120	140	160
Min. edge distance $c=c_{min}$	[mm]	40	50	50	60	40	50	50	60
 Tension $N^*_{Rd,c}$	[kN]	5.4	11.2	13.1	17.4	3.0	8.4	9.3	12.4
 Shear $V^*_{Rd,c}$	[kN]	4.0	6.0	6.4	9.0	2.8	4.3	4.5	6.3

Materials

Mechanical properties

Anchor size			HUS-HR 6	HUS-HR 8	HUS-HR 10	HUS-HR 14
Nominal tensile strength	f_{uk}	[N/mm²]	1040	870	950	820
Stressed cross-section	A_s	[mm²]	23	39	55	125
Section modulus	Z	[mm³]	15.5	34.4	58.2	196.4
Design bending resistance	$M_{Rd,s}$	[Nm]	12.9	23.9	44.2	128.8

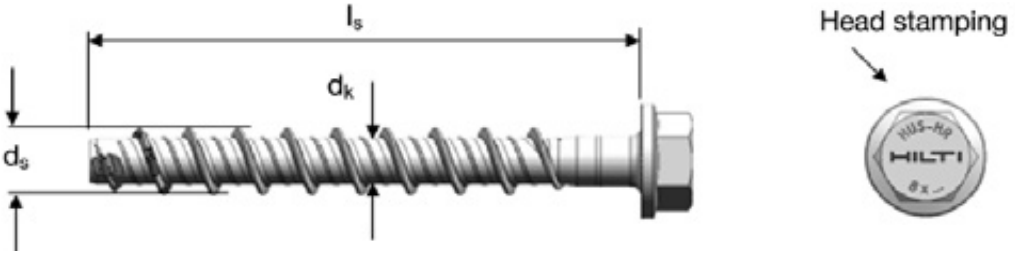
Material quality

Part	Material
Stainless steel hexagonal head concrete screw	Stainless steel (grade A4)

Anchor dimensions

Dimensions of HUS - HR

Anchor version	l_s (mm)	d_s (mm)	d_k (mm)
HUS-HR 6 x 60	60	7.5	5.4
HUS-HR 8 x 85	85	10.1	7.1
HUS-HR 10 x 75, 105	75, 105	12.3	8.4
HUS-HR 14 x 120	120	16.5	12.6

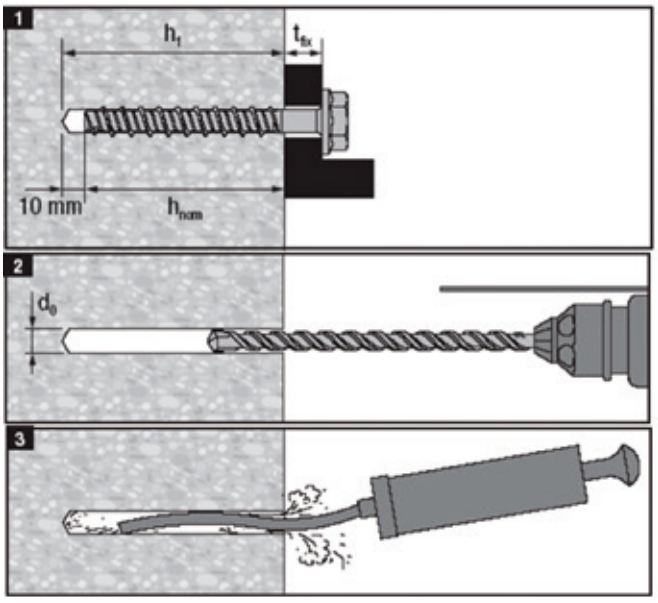


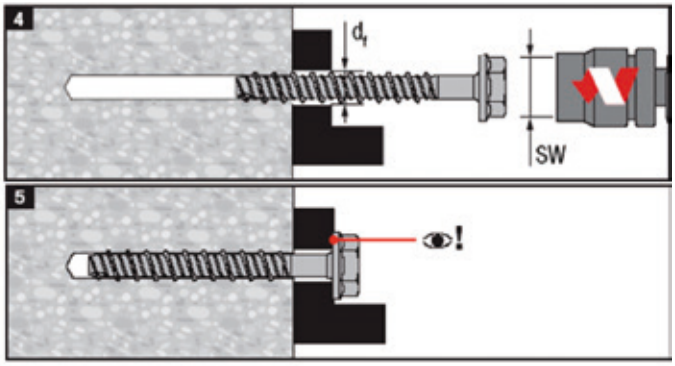
Setting

Recommended installation equipment

Anchor size	HUS-HR 6	HUS-HR 8	HUS-HR 10	HUS-HR 14
Rotary hammer	Hilti TE 6	Hilti TE 6	Hilti TE 16	Hilti -TE 16
drill bit	TE-C3X 6/17	TE-C3X 8/17	TE-C3X 10/22	TE-C3X 14/22
Socket wrench insert	S-NSD 13 ½ (L)	S-NSD 13 ½ (L)	S-NSD 15 ½ (L)	S-NSD 21 ½
Impact screw driver	Hilti SIW 144 or 121 Hilti TKI 2500	Hilti SI 100		

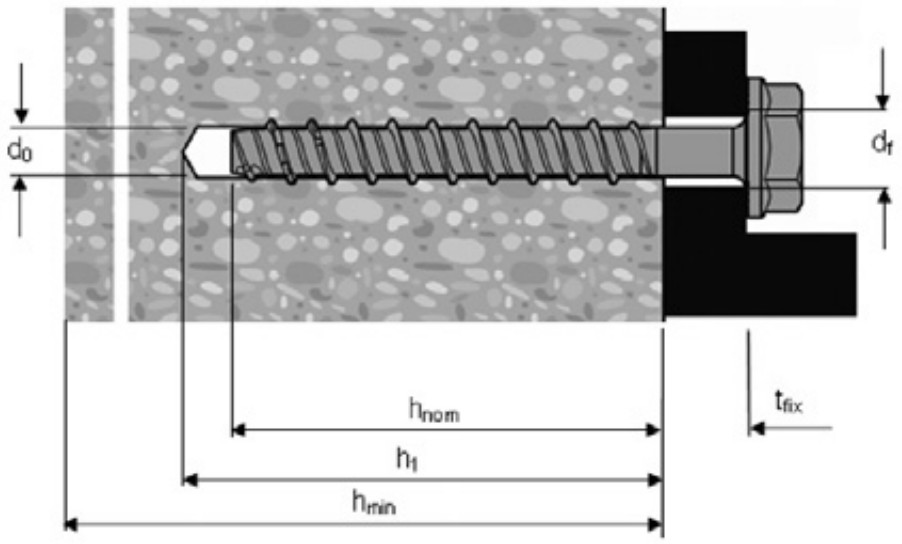
Setting instruction





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

Setting details: depth of drill hole h_1 and effective anchorage depth h_{ef}



Setting details

Anchor version		HUS-HR		6	8			10			14	
Nominal embedment depth		h_{nom}	[mm]	55	50[a]	60[b]	80	60[a]	70[b]	90	70[b]	110
Nominal diameter of drill bit		d_0	[mm]	6	8			10			14	
Cutting diameter of drill bit		$d_{cut} \leq$	[mm]	6.4	8.45			10.45			14.5	
Depth of drill hole		$h_1 \geq$	[mm]	65	60	70	90	70	80	100	80	120
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	9	12			14			18	
Effective anchorage depth		h_{ef}	[mm]	45	38	47	64	46	54	71	52	86
Max. fastening thickness		T_{fix}										
Max. installation torque	Concrete	T_{inst}	[Nm]	- [c]	35	- [c]	- [c]	45	45	45	65	65
	Solid m. Mz 12	T_{inst}	[Nm]	10	- [d]	16	16	-	20	20	- [d]	- [d]
	Solid m. KS 12	T_{inst}	[Nm]	10	- [d]	16	16	-	20	20	- [d]	- [d]
	Aerated conc.[c]	T_{inst}	[Nm]	4	- [d]	8	8	-	10	10	- [d]	- [d]

a) extra reduced embedment depth b) reduced embedment depth c) Hilti recommends machine setting only in concrete
d) Hilti does not recommend this setting process for this application

Base material thickness, anchor spacing and edge distance

Anchor size		HUS-HR 6		HUS-HR 8			HUS-HR 10			HUS-HR 14	
Nominal embedment depth	h_{nom} [mm]	30	55	50	60	80	60	70	90	70	110
Minimum base material thickness non-cracked concrete	h_{min} [mm]	100	100	100	100	120	120	120	140	140	160
Minimum spacing	s_{min} [mm]	40	40	45	45	50	50	50	50	50	60
Minimum edge distance	c_{min} [mm]	40	40	45	45	50	50	50	50	50	60