



HUS-HR / HUS-CR SCREW ANCHOR

Technical Datasheet



Update: Jan-23


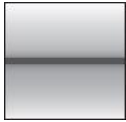
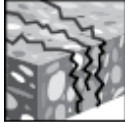
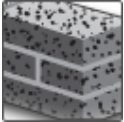












HUS-HR / HUS-CR Screw anchor

Ultimate performance screw anchor for single point fastening

Anchor version	Benefits
 <p>HUS-HR (6-14)</p>	<ul style="list-style-type: none"> - High productivity- less drilling and fewer operations than with conventional anchors - ETA approval for cracked and non-cracked concrete - ETA approval for Seismic C1 - Technical data for reusability in fresh concrete ($f_{ck,cube} = 10/15/20 \text{ Nmm}^2$) for temporary applications
 <p>HUS-CR (6-10)</p>	

Base material	Load conditions
 <p>Concrete (non-cracked)</p>	 <p>Static / quasi-static</p>
 <p>Concrete (cracked)</p>	
 <p>Solid brick</p>	
 <p>Autoclaved aerated concrete</p>	
	 <p>Seismic ETA-C1</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>
		 <p>PROFIS Engineering design software</p>

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment	DIBt, Berlin	ETA-08/0307 / 2018-08-23
Fire test report	DIBt, Berlin	ETA-08/0307 / 2018-08-23
Fire test report ZTV – Tunnel (EBA)	MFPA, Leipzig	PB III / 08-354 / 2008-11-27

a) All data given in this section according ETA-08/0307 issue 2018-08-23.

Static and quasi-static resistance (for a single anchor)

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

Anchorage depth for static

Anchor size		6	8		10			14		
Type	HUS-	HR, CR	HR, CR		HR, CR			HR		
Nominal anchorage depth	h_{nom} [mm]	55	50 ^{a)}	60	80	60 ^{a)}	70	90	70	110

a) Hilti Technical Data for embedment depth

Characteristic resistance

Anchor size		6	8		10			14		
Type	HUS-	HR, CR	HR, CR		HR, CR			HR		
Non-cracked concrete										
Tension	N_{Rk} [kN]	9,0	9,0 ^{a)}	12,0	16,0	12,0 ^{a)}	16,0	25,0	18,4	39,2
Shear	V_{Rk} [kN]	17,0	23,6 ^{a)}	26,0	26,0	31,4 ^{a)}	33,0	33,0	36,9	77,0
Cracked concrete										
Tension	N_{Rk} [kN]	5,0	5,0 ^{a)}	6,0	12,0	7,5 ^{a)}	9,0	16,0	12,0	25,0
Shear	V_{Rk} [kN]	15,6	16,9 ^{a)}	22,2	26,0	22,5 ^{a)}	27,3	33,0	25,8	54,9

a) Hilti Technical Data

Design resistance

Anchor size		6	8		10			14		
Type	HUS-	HR, CR	HR, CR		HR, CR			HR		
Non-cracked concrete										
Tension	N_{Rd} [kN]	4,3	5,0 ^{a)}	6,7	8,9	6,7 ^{a)}	8,9	13,9	10,2	21,8
Shear	V_{Rd} [kN]	11,3	15,7 ^{a)}	17,3	17,3	21,0 ^{a)}	22,0	22,0	24,6	51,3
Cracked concrete										
Tension	N_{Rd} [kN]	2,4	2,8 ^{a)}	3,3	6,7	4,2 ^{a)}	5,0	8,9	6,7	13,9
Shear	V_{Rd} [kN]	10,4	11,2 ^{a)}	14,8	17,3	15,0 ^{a)}	18,2	22,0	17,2	36,6

a) Hilti Technical Data

Recommended ^{b)} loads

Anchor size		6	8		10			14		
Type	HUS-	HR, CR	HR, CR		HR, CR			HR		
Non-cracked concrete										
Tension	N_{Rec} [kN]	3,1	3,6 ^{a)}	4,8	6,3	4,8 ^{a)}	6,3	9,9	7,3	16,0
Shear	V_{Rec} [kN]	8,1	11,2 ^{a)}	12,4	12,4	15,0 ^{a)}	15,7	15,7	17,6	36,7
Cracked concrete										
Tension	N_{Rec} [kN]	1,7	2,0 ^{a)}	2,4	4,8	3,0 ^{a)}	3,6	6,3	4,8	9,9
Shear	V_{Rec} [kN]	7,4	8,0 ^{a)}	10,6	12,4	10,7 ^{a)}	13,0	15,7	12,3	26,2

a) Hilti Technical Data

b) 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 resistance

All data in this section applies to:

- Correct setting
- The following data are based on ETA-08/0307 issue 2018-08-23
- Concrete C20/25
- $\alpha_{\text{gap}} = 1,0$ (using Hilti seismic filling set) or $\alpha_{\text{gap}} = 0,5$ (without using Hilti seismic filling set) accordingly

Effective anchorage depth for seismic C1

Anchor size		8	10	14
Type	HUS-	HR, CR	HR, CR	HR
Nominal anchorage depth	h_{nom} [mm]	80	90	110

Characteristic resistance for seismic C1

Anchor size		8	10	14
with Hilti filling set (HUS-H/HR only)				
Type	HUS-	HR	HR	HR
Tension	$N_{\text{Rk,seis}}$ [kN]	7,7	12,5	17,5
Shear	$V_{\text{Rk,seis}}$ [kN]	11,1	17,9	46,7
without Hilti filling set				
Type	HUS-	HR, CR	HR, CR	HR
Tension	$N_{\text{Rk,seis}}$ [kN]	7,7	12,5	17,5
Shear	$V_{\text{Rk,seis}}$ [kN]	5,6	9,0	23,3

Design resistance for seismic C1

Anchor size		8	10	14
with Hilti filling set (HUS-H/HR only)				
Type	HUS-	HR	HR	HR
Tension	$N_{\text{Rd,seis}}$ [kN]	4,3	6,9	9,7
Shear	$V_{\text{Rd,seis}}$ [kN]	7,4	11,9	31,1
without Hilti filling set				
Type	HUS-	HR, CR	HR, CR	HR
Tension	$N_{\text{Rd,seis}}$ [kN]	4,3	6,9	9,7
Shear	$V_{\text{Rd,seis}}$ [kN]	3,7	6,0	15,6

Fire resistance

All data in this section applies to:

- Correct setting
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- The following technical data are based on: ETA-08/0307 issue 2018-08-23
- For more fire resistance data please see the full ETA-08/0307 report
- Partial safety factor for resistance under fire exposure $\gamma_{M,fi}=1,0$ (in absence of other national regulations)

Anchorage depth

Anchor size		6		8				10				14	
Type	HUS-	HR	CR	HR		CR		HR		CR		HR	
Nominal anchorage depth	h_{nom} [mm]	55	55	60	80	60	80	70	90	70	90	70	110

Characteristic resistance

Anchor size		6		8				10				14	
Type	HUS-	HR	CR	HR		CR		HR		CR		HR	
Fire exposure R30													
Tension	$N_{Rk,fi}$ [kN]	1,3	0,2	1,5	3,0	0,8	0,8	2,3	4,0	1,4	1,4	3,0	6,3
Shear	$V_{Rk,fi}$ [kN]	3,5	0,2	5,2	9,3	0,8	0,8	7,4	14,6	1,4	1,4	6,7	23,6
Fire exposure R120													
Tension	$N_{Rk,fi}$ [kN]	1,0	0,1	1,2	1,7	0,4	0,4	1,8	2,4	0,8	0,8	2,4	5,0
Shear	$V_{Rk,fi}$ [kN]	1,0	0,1	1,7	1,7	0,4	0,4	2,4	2,4	0,8	0,8	5,4	5,4

Design resistance

Anchor size		6		8				10				14	
Type	HUS-	HR	CR	HR		CR		HR		CR		HR	
Fire exposure R30													
Tension	$N_{Rd,fi}$ [kN]	1,3	0,2	1,5	3,0	0,8	0,8	2,3	4,0	1,4	1,4	3,0	6,3
Shear	$V_{Rd,fi}$ [kN]	3,5	0,2	5,2	9,3	0,8	0,8	7,4	14,6	1,4	1,4	6,7	23,6
Fire exposure R120													
Tension	$N_{Rd,fi}$ [kN]	1,0	0,1	1,2	1,7	0,4	0,4	1,8	2,4	0,8	0,8	2,4	5,0
Shear	$V_{Rd,fi}$ [kN]	1,0	0,1	1,7	1,7	0,4	0,4	2,4	2,4	0,8	0,8	5,4	5,4

Materials

Mechanical properties

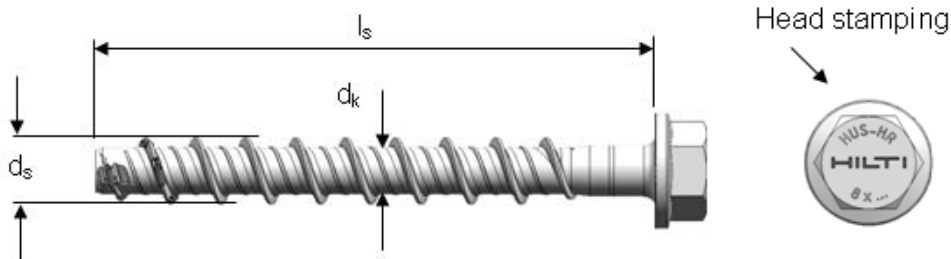
Anchor size		6	8	10	14
Type	HUS-	HR, CR	HR, CR	HR, CR	HR
Nominal tensile strength	f_{uk} [N/mm ²]	1050	870	950	690
Yield strength	f_{yk} [N/mm ²]	900	745	815	590
Stressed cross-section	A_s [mm ²]	22,9	39	55,4	143,1
Moment of resistance	W [mm ³]	15	34	58	255
Characteristic bending resistance	$M^0_{Rk,s}$ [Nm]	19	36	66	193

Material quality

Part	Material
Concrete screw	Stainless steel (grade A4)

Anchor dimensions

Anchor size		6	8	10	14
Type	HUS-	HR, CR	HR, CR	HR, CR	HR
Core diameter	d_k [mm]	5,4	7,05	8,4	12,6
Shaft diameter	d_s [mm]	7,6	10,1	12,3	16,6
Stressed section	A_s [mm]	22,9	39,0	55,4	143,1



Screw length and thickness of fixture for HUS-HR

Anchor size		6	8		10		14	
Embedment depth	h_{nom1}, h_{nom2} [mm]	55	60	80	70	90	70	110
Thickness of fixture		t_{fix}	t_{fix1}	t_{fix2}	t_{fix1}	t_{fix2}	t_{fix1}	t_{fix2}
Length of screw [mm]	60	5	-	-	-	-	-	-
	65	-	5	-	-	-	-	-
	70	15	-	-	-	-	-	-
	75	-	15	-	5	5	10	-
	80	-	-	-	-	-	-	-
	85	-	25	5	15	-	-	-
	90	-	-	-	-	-	-	-
	95	-	35	15	25	5	-	-
	100	-	-	-	-	-	-	-
	105	-	45	25	35	15	-	-
	110	-	-	-	-	-	-	-
	115	-	-	-	45	25	-	-
	120	-	-	-	-	-	50	10
	130	-	-	-	60	40	-	-
135	-	-	-	-	-	65	25	

Screw length and thickness of fixture for HUS-CR

Anchor size		6	8		10	
Embedment depth	h_{nom1}, h_{nom2} [mm]	55	60	80	70	90
Thickness of fixture		t_{fix1}	t_{fix1}	t_{fix2}	t_{fix1}	t_{fix2}
Length of screw [mm]	60	5	-	-	-	-
	70	15	-	-	-	-
	75	-	15	-	-	5
	80	-	-	-	-	-
	85	-	-	-	15	-
	90	-	-	-	-	-
	95	-	35	15	-	-
	100	-	-	-	-	-
	105	-	45	25	35	15

Setting information

Setting details

Anchor size		6	8			10			14		
Type	HUS-	HR, CR	HR, CR ^{a)}			HR, CR ^{a)}			HR		
Nominal anchorage depth	h_{nom} [mm]	55	50	60	80	60	70	90	70	110	
Effective anchorage depth	h_{ef} [mm]	45	38	47	64	46	54	71	52	86	
Nominal diameter of drill bit	d_0 [mm]	6	8			10			14		
Cutting diameter of drill bit	d_{cut} [mm]	6,4	8,45			10,45			14,5		
Clearance hole diameter	d_f [mm]	9	12			14			18		
Depth of drill hole	h_1 [mm]	65	60	70	90	70	80	100	80	120	
Wrench size	SW [mm]	13	13			15			21		
Diameter of countersunk	d_h [mm]	-	-			21			-		
Installation torque	Concrete	T_{inst} [Nm]	- ^{a)}	35	- ^{a)}	- ^{a)}	45 ^{c)}			65	
	Solid m, Mz 12	T_{inst} [Nm]	10	- ^{b)}	16	16	- ^{b)}	20	20	- ^{b)}	- ^{b)}
	Solid m, KS 12	T_{inst} [Nm]	10	- ^{b)}	16	16	- ^{b)}	20	20	- ^{b)}	- ^{b)}
	Aerated	T_{inst} [Nm]	4	- ^{b)}	8	8	- ^{b)}	10	10	- ^{b)}	- ^{b)}

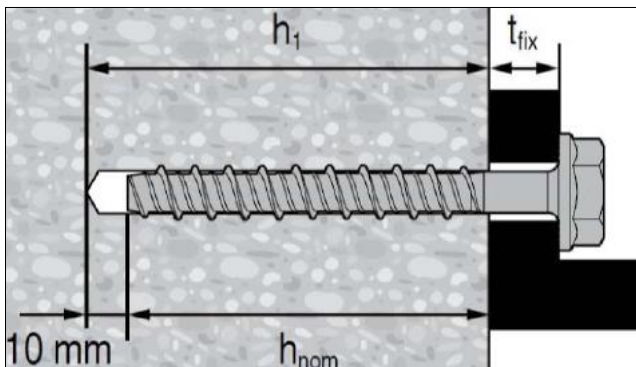
a) Hand setting in concrete base material not allowed (machine setting only)

b) Hilti does not recommend this setting process for this application.

c) Installation torque refer to HUS-HR only

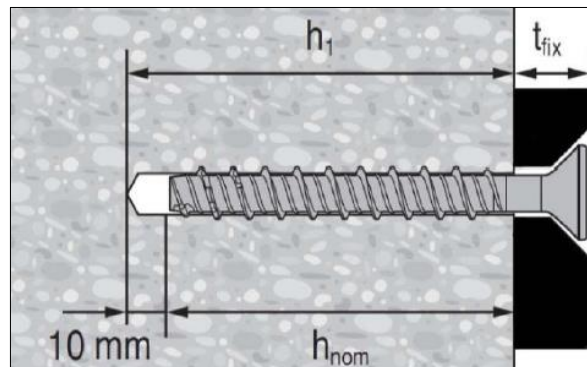
HUS-HR (hexagonal head)

6, 8, 10 and 14



HUS-CR (countersunk)

6, 8 and 10



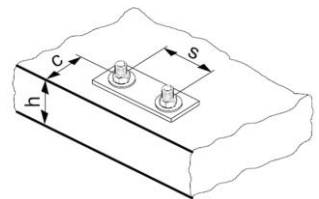
Anchor size		6	8	10	14
Type	HUS-	HR, CR	HR, CR	HR, CR	HR
Rotary hammer	TE 2 – TE 30				
Drill bit		TE-C3X 6/17	TE-C3X 8/17	TE-C3X 10/22	TE-C3X 14/22
Socket wrench insert		S-NSD 13 ½	S-NSD 13 ½	S-NSD 15 ½	S-NSD 21 ½
Torx (CR type only)		-	S-SY TX 45	S-SY TX 50	-
Impact screw driver		Hilti SIW 14-A, 22-A	Hilti SIW 22 T-A		SIW 22 T-A, SIW 9

Setting parameters

Anchor size		6	8		10			14		
Type	HUS-	HR, CR	HR, CR ^{a)}		HR, CR ^{a)}			HR		
Nominal anchorage depth	h_{nom} [mm]	55	50	60	80	60	70	90	70	110
Minimum base material thickness	h_{min} [mm]	100	100	100	120	120	120	140	140	160
Minimum spacing	s_{min} [mm]	35	45	45	50	50	50	50	50	60
Minimum edge distance	c_{min} [mm]	35	45	45	50	50	50	50	50	60
Critical spacing for splitting failure	$s_{cr,sp}$ [mm]	135	114	114	192	166	194	256	187	310
Critical edge distance for splitting failure	$c_{cr,sp}$ [mm]	68	57	71	96	83	97	128	94	155
Critical spacing for concrete cone failure	$s_{cr,N}$ [mm]	135	114	114	192	166	194	256	187	310
Critical edge distance for concrete cone failure	$c_{cr,N}$ [mm]	68	57	71	96	83	97	128	94	155

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

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 instructions

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

Setting instruction	
<p>1. Make a cylinder hole</p>	<p>2. Clean the borehole</p>
<p>3. Install the screw anchor by impact screw driver</p>	<p>4. Ensure that the fixture is caught</p>




All data in this section applies to:

- Load values valid for holes drilled with TE rotary hammers in hammering mod
- Correct anchor setting (see instruction for use, setting details)
- The core/material ratio may not exceed 15 % of a bed joint area
- The brim area around holes must be at least 70mm
- Edge distances, spacing and other influences, see below
- All data given in this section according to Hilti Technical Data

Nominal embedment depth

Anchor size		6	8	10
Type	HUS-	HR	HR	HR, CR
Nominal embedment depth	h_{nom} [mm]	55	60	70

Recommended loads for HUS-HR / HUS-CR

Anchor size			6	8	10
	Solid clay brick Mz 12/2,0 DIN 105 / EN 771-1 $f_b^{a)} \geq 12 \text{ N/mm}^2$	Tension N_{Rec} [kN]	0,9	1,0	1,1
		Shear V_{Rec} [kN]	1,4	2,0	2,3
	Solid sand-lime brick Mz 12/2,0 DIN 106/EN 771-2 $f_b^{a)} \geq 12 \text{ N/mm}^2$	Tension N_{Rec} [kN]	0,6	0,6	1,0
		Shear V_{Rec} [kN]	0,9	1,1	1,7
	Aerated concrete PPW 6-0,4 DIN 4165/EN 771-4 $f_b^{a)} \geq 6 \text{ N/mm}^2$	Tension N_{Rec} [kN]	0,2	0,2	0,4
		Shear V_{Rec} [kN]	0,4	0,4	0,9

Permissible anchor location in brick and block walls

Edge distance and spacing influence

- The technical data for HUS-HR anchors are reference loads for MZ 12 and KS 12. Due to the large variation of natural stone slid bricks, on site anchor testing is recommended to validate technical data
- The HUS-HR anchor was installed and tested in center of solid bricks as shown. The HUS-HR anchor was not tested in the mortar joint between solid bricks or in hollow bricks, however a load reduction is expected
- For brick walls where anchor position in brick can not be determined, 100 % anchor testing is recommended
- Distance to free edge free edge to solid masonry (Mz and KS) units $\geq 170\text{mm}$
- Distance to free edge free edge to solid masonry (autoclaved aerated gas concrete) units $\geq 170\text{mm}$
- The minimum distance to horizontal and vertical mortar joint (c_{min}) is started in drawing below
- Minimum anchor spacing (s_{min}) in one brick/block is $\geq 2 \cdot c_{min}$

Limits

- Applied load to individual bricks may not exceed 1,0 kN without compression or 1,4 kN with compression
- All data is for multiple use for non-structural applications
- Plaster, graveling, lining or levelling courses are regarded as non-bearing and may not be taken into account for the calculation of embedment depth

