Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-20/0867 of 14 April 2022

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Hilti concrete screw HUS4
Product family to which the construction product belongs	Mechanical fastener for use in concrete
Manufacturer	Hilti Aktiengesellschaft Feldkircherstrasse 100 9494 SCHAAN FÜRSTENTUM LIECHTENSTEIN
Manufacturing plant	Hilti Werke
This European Technical Assessment contains	29 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330232-01-0601, Edition 05/2021
This version replaces	ETA-20/0867 issued on 2 December 2021

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Specific Part

1 Technical description of the product

The Hilti concrete screw HUS4 is an anchor in size 8, 10, 12, 14 and 16 mm made of galvanized steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description are given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex B4 to B6, Annex C1 and C3
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C2 and C4
Displacements (static and quasi-static loading)	See Annex C12 and C13
Characteristic resistance for seismic performance categories C1 and C2	See Annex C5 to C7

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C8 to C11

3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	Performance
Durability	See Annex B1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with European Assessment Document EAD No. 330232-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 14 April 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Tempel

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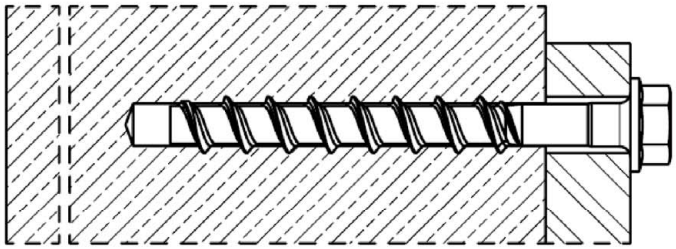
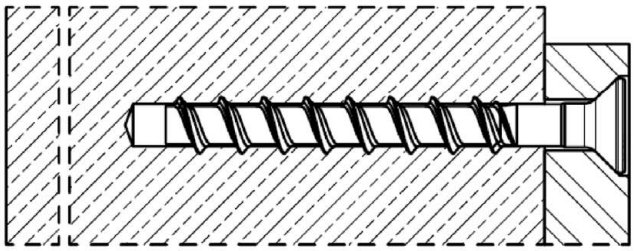
Installed condition without adjustment

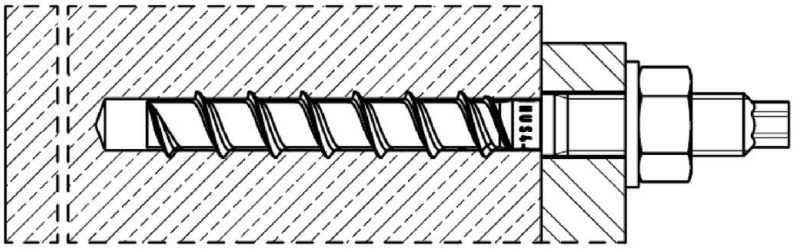


HUS4-H (hexagon head configuration sizes 8, 10, 12, 14 and 16)

HUS4-HF (hexagon head configuration sizes 8, 10, 14 and 16)



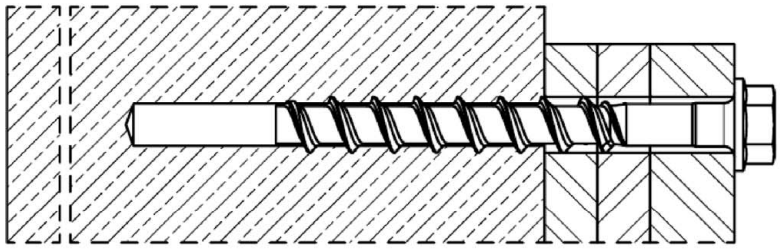
HUS4-C (countersunk head configuration sizes 8 and 10)



HUS4-A
(threaded rod connection
sizes 10 with M12 and 14 with M16)

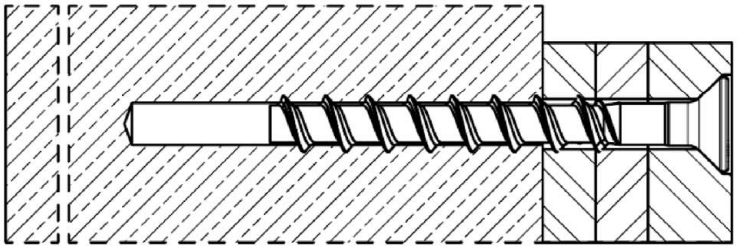
HUS4-AF
(threaded rod connection
sizes 10 with M12 and 14 with M16)

Installed condition with adjustment - h_{nom2}, h_{nom3}



HUS4-H (hexagon head configuration sizes 8, 10, 12, and 14)

HUS4-HF (hexagon head configuration sizes 8, 10, and 14)



HUS4-C (countersunk head configuration sizes 8 and 10)

Hilti screw anchor HUS4	**Annex A1**
Product description Installed condition with and without adjustment	

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Table A1: Screw types

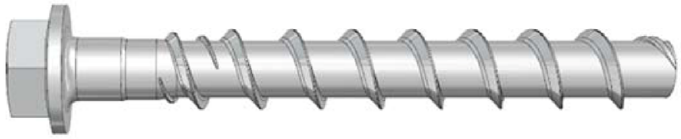
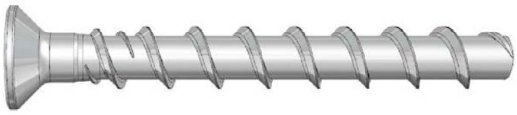
Hilti HUS4-H, sizes 8,10, 12, 14 and 16, hexagonal head configuration, galvanized **Hilti HUS4-HF**, sizes 8,10, 14 and 16, hexagonal head configuration, multilayer coating

Hilti HUS4-C, sizes 8 and 10, countersunk head configuration, galvanized

Hilti HUS4-A, size 10 with external thread M12 and size 14 with external thread M16, galvanized **Hilti HUS4-AF,** size 10 with external thread M12 and size 14 with external thread M16, multilayer coating


Table A2: Hilti filling set (for HUS4-H and HUS4-A) and Hilti injection mortar

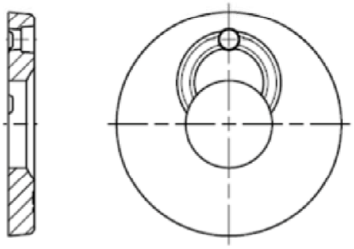
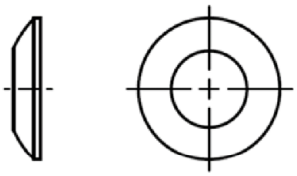
Filling washer	Spherical washer	Injection mortar
		 Hilti HIT-HY … with ETA Hilti HIT-RE … with ETA

Table A3: Materials

Part	Material
HUS4 screw anchor (all types in Table A1)	Carbon steel Rupture elongation $A_5 \leq 8\%$

Hilti screw anchor HUS4	**Annex A2**
Product description HUS4 screw types, Filling set and Hilti injection mortar Materials	

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Table A4: Filling set dimensions

Filling set size			**M10**	**M12**	**M16**	**M20**
Diameter	d_{vs}	[mm]	42	44	52	60
Thickness	h_{vs}	[mm]	5	5	6	6
HUS4-H			8	10	12 + 14	-
HUS4-A			-	10	14	16

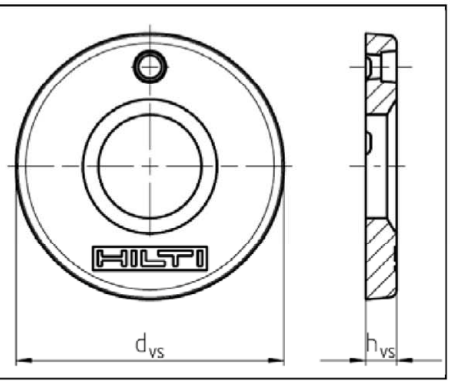
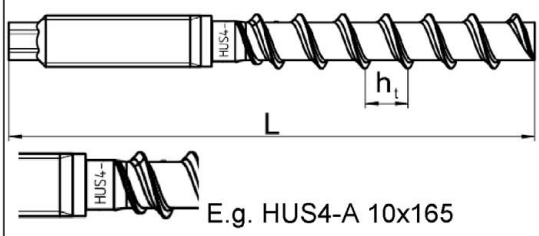


Table A5: Fastener dimensions and marking HUS4-A(F)

Fastener size HUS4-			**A(F) 10**			**A(F) 14**		
Nominal fastener diameter	d	[mm]	10			14		
Metric thread conection			M12			M16		
Pitch of the thread	h_t	[mm]	10			14		
Nominal embedment depth			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
	h_{nom}	[mm]	55	75	85	65	80	115
Effective embedment depth	h_{ef}	[mm]	$h_{ef} = 0{,}85 * (h_{nom} - 0{,}5 * h_t) \leq h_{ef,max}$					
Limits of effective embedment depth	$h_{ef,max}$	[mm]	68,0			91,8		
Length of screw min / max	L	[mm]	120 / 165			155 / 205		



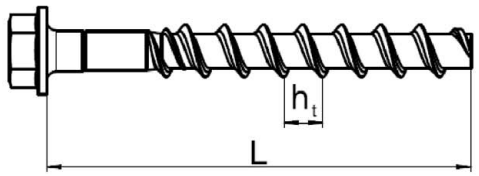
HUS4:	Hilti Universal Screw 4th generation
A: **AF:**	Thread connection, galvanized Thread connection, multilayer coating
10:	Nominal screw diameter d [mm]
165:	Length of screw L [mm]
8:	Carbon steel
K:	Length identification HUS4-A 10x165

G	**I**	**K**	**J**	**L**	**N**
10x120	10x140	10x165	14x155	14x185	14x205

Hilti screw anchor HUS4	**Annex A3**
Production description Fastener dimensions and head marking	

Table A6: Fastener dimensions and marking HUS4-H

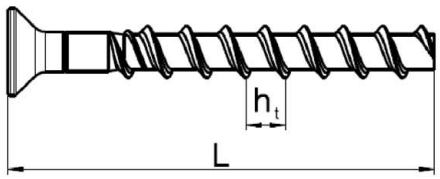
Fastener size HUS4-			**H(F) 8**			**H(F) 10**			**H 12**			**H(F) 14**			**H(F) 16**	
Nominal fastener diameter	d	[mm]	8			10			12			14			16	
Pitch of the thread	h_t	[mm]	8			10			12			14			13,2	
Nominal embedment depth			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
	h_{nom}	[mm]	40	60	70	55	75	85	60	80	100	65	85	115	85	130
Effective embedment depth	h_{ef}	[mm]	$h_{ef} = 0{,}85 * (h_{nom} - 0{,}5 * h_t) \leq h_{ef,max}$													
Limits of effective embedment depth	$h_{ef,max}$	[mm]	56,1			68,0			79,9			91,8			104,9	
Length of screw min / max	L	[mm]	45 / 150			60 / 305			70 / 150			75 / 150			100 / 205	



HUS4:	Hilti Universal Screw 4th generation
H:	Hexagonal head, galvanized
HF:	Hexagonal head, multilayer coating
10:	Nominal screw diameter d [mm]
100:	Length of screw [mm]

Table A7: Fastener dimensions and marking HUS4-C

Fastener size HUS4-			**C 8**			**C 10**		
Nominal fastener diameter	d	[mm]	8			10		
Pitch of the thread	h_t	[mm]	8			10		
Nominal embedment depth			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
	h_{nom}	[mm]	40	60	70	55	75	85
Effective embedment depth	h_{ef}	[mm]	$h_{ef} = 0{,}85 * (h_{nom} - 0{,}5 * h_t) \leq h_{ef,max}$					
Limits of effective embedment depth	$h_{ef,max}$	[mm]	56,1			68,0		
Length of screw min / max	L	[mm]	55 / 85			70 / 120		



HUS4:	Hilti Universal Screw 4th generation
C:	Countersunk head, galvanized
10:	Nominal screw diameter d [mm
100:	Length of screw [mm]

Hilti screw anchor HUS4	**Annex A4**
Production description Fastener dimensions and head marking	

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loadings
- Seismic action for performance category C1 and C2
- Fire exposure

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 +A1:2016.
- Strength classes C20/25 to C50/60 according to EN 206-1:2010+A1:2016.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

- Anchorages subject to dry internal conditions.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e. g. position of the fastener relative to reinforcement or to supports, etc.).
- Anchorages are designed in accordance with:
  EN 1992-4:2018 and EOTA Technical Report TR 055 edition February 2018.
- In case of requirements to resistance to fire local spalling of the concrete cover must be avoided.

Installation:

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.
- After installation further turning of the fastener must not be possible.
- The head of the fastener (HUS4-H and HUS4-C) must be supported on the fixture and is not damaged.
- Hilti filling set is suitable for HUS4-H and HUS4-A

Hilti screw anchor HUS4	**Annex B1**
Intended use Specifications	

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Specifications of intended use: Drilling and cleaning

Table B1: Static and quasi static loading

HUS4		**Fastener size and embedment depth h_{nom}**
Cracked and uncracked concrete		
Hammer drilling (HD)[1)]	cleaned 	sizes 8 to 16 at all h_{nom}
	not cleanded	sizes 8 to 14 at all h_{nom}
Hammer drilling with Hilti hollow drill bit TE-CD (HDB) [1)] 		sizes 12 and 14 at all h_{nom}
Uncracked concrete		
Diamond coring (DD) DD30-W handheld and with stand DD-EC1 handheld 		sizes 10 to 14 at h_{nom3}

[1)] Adjustment is possible for sizes 8 to 14 at h_{nom2+3}

Table B2: Seismic performance category C1

HUS4		**Fastener size and embedment depth h_{nom}**
Hammer drilling (HD)[1)]	cleaned 	sizes 8 to 14 at h_{nom2+3} size 16 at h_{nom1+2}
	not cleanded	sizes 8 to 14 at h_{nom2+3}
Hammer drilling with Hilti hollow drill bit TE-CD (HDB) [1)] 		sizes 12 and 14 at h_{nom2+3}

[1)] Adjustment is possible for sizes 8 to 14 at h_{nom2+3}

Table B3: Seismic performance category C2

HUS4		**Fastener size and embedment depth h_{nom}**
Hammer drilling (HD)[1)]	cleaned 	sizes 8 to 14 at h_{nom3}
	not cleanded	sizes 8 to 14 at h_{nom3}

[1)] Adjustment is possible for sizes 8 to 14 at h_{nom3}

Table B4: Static and quasi static loading under fire exposure

HUS4		**Fastener size and embedment depth h_{nom}**
Hammer drilling (HD)[1)]	cleaned 	sizes 8 to 16 at all h_{nom}
	not cleanded	sizes 8 to 14 at all h_{nom}
Hammer drilling with Hilti hollow drill bit TE-CD (HDB) [1)] 		sizes 12 and 14 at all h_{nom}

[1)] Adjustment is possible for sizes 8 to 14 at h_{nom2+3}

Hilti screw anchor HUS4	**Annex B2**
Intended use Specifications	

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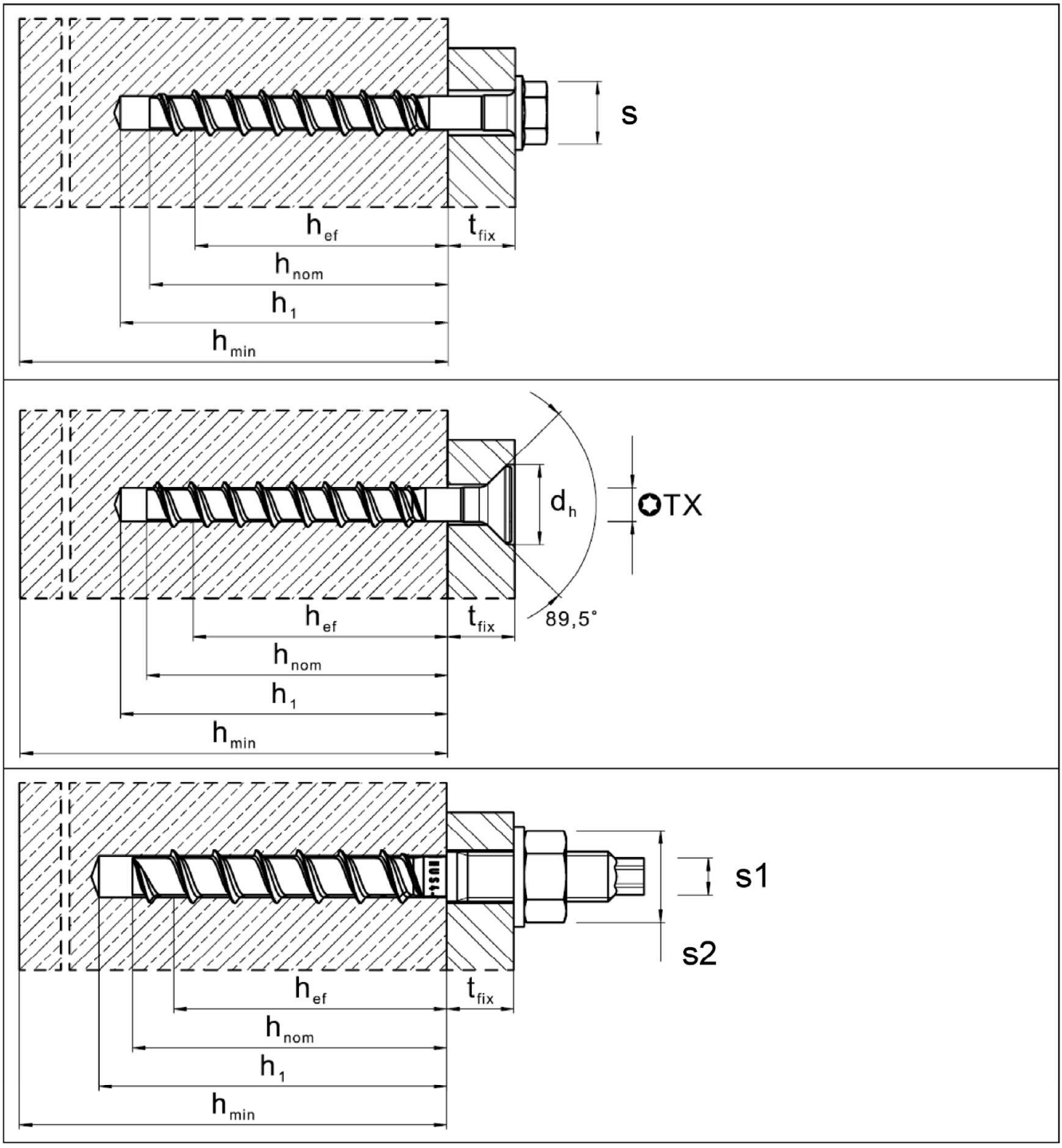
Installation parameters



Hilti screw anchor HUS4	**Annex B3**
Intended use Installation parameters	

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Table B5: Installation parameters HUS4-8 and 10

Fastener size HUS4			**8**			**10**		
Type			**H, C**			**H, C, A**		
			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedmenth depth	h_{nom}	[mm]	40	60	70	55	75	85
Nominal drill hole diameter	d_0	[mm]	8			10		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45			10,45		
Cutting diameter of diamond core bit	$d_{cut} \leq$	[mm]	-			9,9		
Clearance hole diameter through setting	$d_f \leq$	[mm]	12			14		
Clearance hole diameter pre setting (A-type)	$d_f \leq$	[mm]	-			14		
Wrench size (H, HF-type)	s	[mm]	13			15		
Wrench size for hex head (A-type)	s1	[mm]	-			8		
Wrench size for nut (A-type)	s2	[mm]	-			19		
Maximum installation torque (A-type)	max T_{inst}	[Nm]	-			40		
Torx size (C-type)	TX	-	45			50		
Diameter of countersunk head	d_h	[mm]	18			21		
Depth of drill hole for cleaned hole hammer drilling, diamond coring or for uncleanded hole when drilling upwards	$h_1 \geq$	[mm]	(h_{nom} + 10 mm)					
			50	70	80	65	85	95
Depth of drill hole for uncleanded hole hammer drilling in wall and floor position	$h_1 \geq$	[mm]	(h_{nom} + 10 mm) + 2 * d_0					
			66	86	96	85	105	115
Depth of drill hole (with adjustability) for cleaned hole hammer drilling, diamond coring or for uncleanded hole when drilling upwards	$h_1 \geq$	[mm]	(h_{nom} + 20 mm)					
			-	80	90	-	95	105
Depth of drill hole (with adjustability) for uncleaned hole hammer drilling in wall and floor position	$h_1 \geq$	[mm]	(h_{nom} + 20 mm) + 2 * d_0					
			-	96	106	-	115	125
Minimum thickness of concrete member	$h_{min} \geq$	[mm]	(h_1 + 30 mm)					
			80	100	120	100	130	140
Minimum spacing	$s_{min} \geq$	[mm]	35			40		
Minimum edge distance	$c_{min} \geq$	[mm]	35			40		
Hilti Setting tool [1)]			SIW 6 AT-A22 SIW 6.2 AT-A22 gear 1			SIW 22T-A SIW 6 AT-A22 SIW 6.2 AT-A22 SIW 8.1 AT gear 1 SIW 9-A22		

[1)] Installation with other impact screw driver of equivalent power is possible.

Hilti screw anchor HUS4

Intended use
Installation parameters

Annex B4

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Table B6: Installation parameters HUS4-12 and 14

Fastener size HUS4			**12**			**14**		
Type			**H**			**H, A**		
			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedmenth depth	h_{nom}	[mm]	60	80	100	65	85	115
Nominal drill hole diameter	d_0	[mm]	12			14		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	12,50			14,50		
Cutting diameter of diamond core bit	$d_{cut} \leq$	[mm]	12,2			-		
Clearance hole diameter through setting	$d_f \leq$	[mm]	16			18		
Clearance hole diameter pre setting (A-type)	$d_f \leq$	[mm]	-			18		
Wrench size (H, HF-type)	s	[mm]	17			21		
Wrench size for hex head (A-type)	s1	[mm]	-			12		
Wrench size for nut (A-type)	s2	[mm]	-			24		
Maximum installation torque (A-type)	max T_{inst}	[Nm]	-			80		
Depth of drill hole for cleaned hole hammer drilling, diamond coring or for uncleanded hole when drilling upwards	$h_1 \geq$	[mm]	(h_{nom} + 10 mm)					
			70	90	110	75	95	125
Depth of drill hole for uncleanded hole hammer drilling in wall and floor position	$h_1 \geq$	[mm]	(h_{nom} + 10 mm) + 2 * d_0					
			94	114	134	103	123	153
Depth of drill hole (with adjustability) for cleaned hole hammer drilling, diamond coring or for uncleanded hole when drilling upwards	$h_1 \geq$	[mm]	(h_{nom} + 20 mm)					
			-	100	120	-	105	135
Depth of drill hole (with adjustability) for uncleaned hole hammer drilling in wall and floor position	$h_1 \geq$	[mm]	(h_{nom} + 20 mm) + 2 * d_0					
			-	124	144	-	133	163
Minimum thickness of concrete member	$h_{min} \geq$	[mm]	(h_1 + 30 mm)					
			110	130	150	120	160	200
Minimum spacing	$s_{min} \geq$	[mm]	50			60		
Minimum edge distance	$c_{min} \geq$	[mm]	50			60		
Hilti Setting tool [1)]			SIW 22T-A SIW 6.2 AT-A22 SIW 8.1 AT SIW 9-A22			SIW 22T-A SIW 6.2 AT-A22 SIW 8.1 AT SIW 9-A22		

[1)] Installation with other impact screw driver of equivalent power is possible.

Hilti screw anchor HUS4

Intended use
Installation parameters

Annex B5

Table B7: Installation parameters HUS4-16

Fastener size HUS4			**16**	
Type			**H**	
			h_{nom1}	h_{nom2}
Nominal embedmenth depth	h_{nom}	[mm]	85	130
Nominal drill hole diameter	d_0	[mm]	16	
Nominal drill hole diameter	d_0	[mm]	16	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	16,50	
Clearance hole diameter through setting	$d_f \leq$	[mm]	20	
Wrench size	s	[mm]	24	
Depth of drill hole for cleaned hole hammer drilling or for uncleanded hole when drilling upwards	$h_1 \geq$	[mm]	(h_{nom} + 10 mm)	
			95	140
Minimum thickness of concrete member	$h_{min} \geq$	[mm]	130	195
Minimum spacing	$s_{min} \geq$	[mm]	90	
Minimum edge distance	$c_{min} \geq$	[mm]	65	
Hilti Setting tool [1)]			SIW 22T-A SIW 6.2 AT-A22 SIW 8.1 AT SIW 9-A22	

[1)] Installation with other impact screw driver of equivalent power is possible.

Hilti screw anchor HUS4	**Annex B6**
Intended use Installation parameters	

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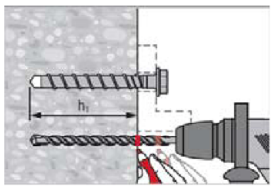
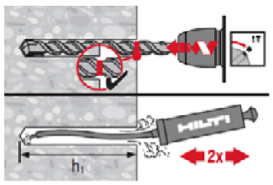
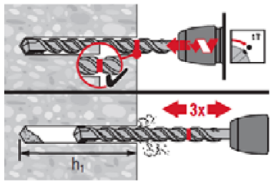
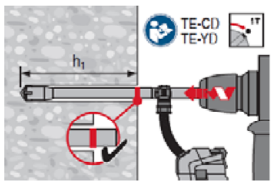
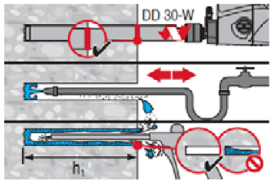
Installation instructions

Hole drilling and cleaning

Hammer drilling (HD) all sizes (size 16 with cleaning only)	
	Mark drilling depth h_1 for pre or through installation. Details for drilling depth h_1 see table B5 to B7.
	Cleaning needed in downward and horizontal installation direction with drill hole depth. $h_1 = h_{nom} + 10$ mm
	No cleaning is allowed in upward installation direction. No cleaning is allowed in downward and horizontal installation direction when 3x ventilation[1)] after drilling is executed. Drill hole depth $h_1 = h_{nom} + 10$ mm$+ 2 * d_0$ [1)] moving the drill bit in and out of the drill hole 3 times after the recommended drilling depth h_1 is achieved. This procedure shall be done with both revolution and hammer functions activated in the drilling machine. For more details read the relevant MPII.
Hammer drilling with Hilti hollow drill bit (HDB) TE-CD size 12 and 14.	
	No cleaning needed. $h_1 = h_{nom} + 10$ mm
Diamond coring with DD-EC1 or DD-30W size 10 to 14	
	Cleaning needed in all installation directions. $h_1 = h_{nom} + 10$ mm

Hilti screw anchor HUS4	**Annex B7**
Intended use Installation instructions	

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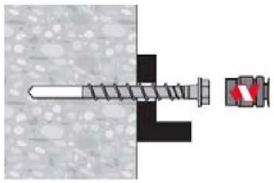
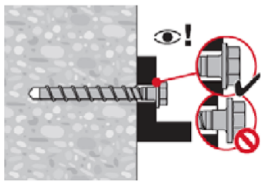
Fastener setting without adjustment

Setting by impact screw driver



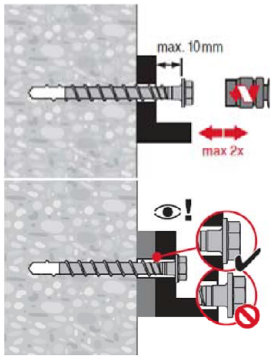
Setting parameters listed in Table B5 to B7.

Setting check



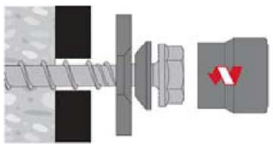
Fastener setting with adjustment

Adjusting process

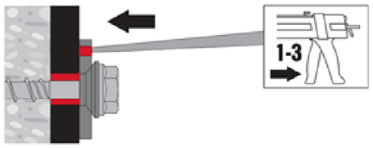


A screw can be adjusted maximum two times. The total allowed thickness of shims added during the adjustment process is 10 mm. The final embedment depth after adjustment process must be larger or equal than h_{nom2} or h_{nom3}.

Fastener setting with Hilti filling set



Injection of Hilti HIT mortar and curing time



Fill the annular gap between screw and fixture with 1-3 strokes of a Hilti injection mortar HIT-HY … or HIT-RE … .
Follow the installation instructions supplied with the respective Hilti injection mortar.
After required curing time t_{cure} the fastening can be loaded.

Hilti screw anchor HUS4	**Annex B8**
Intended use Installation instructions	

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Table C1: Essential characteristics under static and quasi-static load in concrete for HUS4 size 8 and 10

Fastener size HUS4				**8**			**10**		
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	40	60	70	55	75	85
Adjustment									
Total max. thickness of adjustment layers		t_{adj}	[mm]	-	10	10	-	10	10
Max. number of adjustments		n_a	[-]	-	2	2	-	2	2
Steel failure for tension load									
Characteristic resistance		$N_{Rk,s}$	[kN]	36,0			55,0		
Partial factor		$\gamma_{Ms,N}$ [1]	[-]	1,5					
Pull-out failure									
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	≥ $N^0_{Rk,c}$ [3]			13	22	≥ $N^0_{Rk,c}$ [3]
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	5,5	≥ $N^0_{Rk,c}$ [3]				
Increasing factor for $N_{Rk,p} = N_{Rk,p(C20/25)} * \psi_c$		ψ_c	[-]	$(f_{ck}/20)^{0,5}$					
Concrete cone and splitting failure									
Effective embedment depth		h_{ef} [2]	[mm]	30,6	47,6	56,1	42,5	59,5	68,0
Factor for	Uncracked	$k_{ucr,N}$	[-]	11,0					
	Cracked	$k_{cr,N}$	[-]	7,7					
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
	Spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Characteristic resistance		$N^0_{Rk,sp}$	[kN]	$N_{Rk,p}$					
Splitting failure	Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}			1,65 h_{ef}		
	Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}			3,3 h_{ef}		
Installation factor		γ_{inst}	[-]	1,0			1,2	1,0	

[1] In absence of other national regulations.
[2] In case $h_{nom} > h_{nom1}$ and $< h_{nom3}$ the actual h_{ef} for concrete failure can be calculated according to: $h_{ef} = 0,85 * (h_{nom} - 0,5 * h_t)$
[3] $N^0_{Rk,c}$ according to EN 1992-4:2018

Hilti screw anchor HUS4

Annex C1

Performances
Essential characteristics under static and quasi-static load in concrete

Deutsches Institut für Bautechnik DIBt

Table C1 continued

Fastener size HUS4			**8**			**10**		
			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth	h_{nom}	[mm]	40	60	70	55	75	85
Steel failure for shear load								
Characteristic resistance	$V^0_{Rk,s}$	[kN]	18,8		21,9	28,8		32,0
Partial factor	$\gamma_{Ms,V}$ [1)]	[-]	1,25					
Ductility factor	k_7	[-]	0,8					
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	32			64		
Concrete pry-out failure								
Pry-out factor	k_8	[-]	1,0	2,0		1,0	2,0	
Concrete edge failure								
Effective length of fastener	l_f	[mm]	40	60	70	55	75	85
Outside diameter of fastener	d_{nom}	[mm]	8			10		

[1)] In absence of other national regulations.

Hilti screw anchor HUS4	**Annex C2**
Performances Essential characteristics under static and quasi-static load in concrete	

Deutsches Institut für Bautechnik DIBt

Table C2: Essential characteristics under static and quasi-static load in concrete for HUS4 size 12 to 16

Fastener size HUS4				**12**			**14**			**16**	
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
Nominal embedment depth		h_{nom}	[mm]	60	80	100	65	85	115	85	130
Adjustment											
Total max. thickness of adjustment layers		t_{adj}	[mm]	-	10	10	-	10	10	-	-
Max. number of adjustments		n_a	[-]	-	2	2	-	2	2	-	-
Steel failure for tension load											
Characteristic resistance		$N_{Rk,s}$	[kN]	79,0			101,5			107,7	
Partial factor		$\gamma_{Ms,N}$ [1]	[-]	1,5							
Pull-out failure											
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	≥ $N^0_{Rk,c}$ [3]						22	46
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	10	≥ $N^0_{Rk,c}$ [3]					16	32
Increasing factor for $N_{Rk,p} = N_{Rk,p(C20/25)} * \psi_c$		ψ_c	[-]	$(f_{ck}/20)^{0,5}$							
Concrete cone and splitting failure											
Effective embedment depth		h_{ef} [2]	[mm]	45,9	62,9	79,9	49,3	66,3	91,8	66,6	104,9
Factor for	Uncracked	$k_{ucr,N}$	[-]	11,0							
	Cracked	$k_{cr,N}$	[-]	7,7							
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}							
	Spacing	$s_{cr,N}$	[mm]	3 h_{ef}							
Characteristic resistance		$N^0_{Rk,sp}$	[kN]	$N_{Rk,p}$							
Splitting failure	Edge distance	$c_{cr,sp}$	[mm]	1,65 h_{ef}			1,60 h_{ef}				
	Spacing	$s_{cr,sp}$	[mm]	3,30 h_{ef}			3,20 h_{ef}				
Installation factor		γ_{inst}	[-]	1,0							

[1] In absence of other national regulations.
[2] In case $h_{nom} > h_{nom1}$ and $< h_{nom3}$ the actual h_{ef} for concrete failure can be calculated according to: $h_{ef} = 0,85 * (h_{nom} - 0,5 * h_t)$
[3] $N^0_{Rk,c}$ according to EN 1992-4:2018

Hilti screw anchor HUS4

Annex C3

Performances
Essential characteristics under static and quasi-static load in concrete

Deutsches Institut für Bautechnik DIBt

Table C2 continued

Fastener size HUS4			**12**			**14**			**16**	
			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
Nominal embedment depth	h_{nom}	[mm]	60	80	100	65	85	115	85	130
Steel failure for shear load										
Characteristic resistance	$V^0_{Rk,s}$	[kN]	38,9		44,9	55	62		65,1	73,1
Partial factor	$\gamma_{Ms,V}$ [1)]	[-]	1,25							
Ductility factor	k_7	[-]	0,8							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	125			186			240	
Concrete pry-out failure										
Pry-out factor	k_8	[-]	2,0							
Concrete edge failure										
Effective length of fastener	l_f	[mm]	60	80	100	65	85	115	85	130
Outside diameter of fastener	d_{nom}	[mm]	12			14			16	

[1)] In absence of other national regulations.

Deutsches Institut für Bautechnik DIBt

Table C3: Essential characteristics for seismic performance category C1 in concrete for HUS4

Fastener size HUS4			**8**		**10**		**12**		**14**	
			h_{nom2}	h_{nom3}	h_{nom2}	h_{nom3}	h_{nom2}	h_{nom3}	h_{nom2}	h_{nom3}
Nominal embedment depth	h_{nom}	[mm]	60	70	75	85	80	100	85	115
Steel failure for tension and shear load										
Characteristic resistance	$N_{Rk,s,C1}$	[kN]	36,0		55,0		79,0		101,5	
Partial factor	$\gamma_{Ms,N}$ [1)]	[-]	1,5							
Characteristic resistance	$V_{Rk,s,C1}$	[kN]	18,8		26,7		38,9		22,5	34,5
Partial factor	$\gamma_{Ms,V}$ [1)]	[-]	1,25							
Reduction factor annular gap unfilled	α_{gap}	[-]	0,5							
Reduction factor annular gap filled	α_{gap}	[-]	1,0							
Pull-out failure										
Characteristic resistance in cracked concrete	$N_{Rk,p,C1}$	[kN]	$\geq N^0_{Rk,c}$ [3)]							
Concrete cone failure										
Effective embedment depth	h_{ef} [2)]	[mm]	47,6	56,1	59,5	68,0	62,9	79,9	66,3	91,8
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}							
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}							
Installation factor	γ_{inst}	[-]	1,0							
Concrete pry-out failure										
Pry-out factor	k_8	[-]	2,0							
Concrete edge failure										
Effective length of fastener	l_f	[mm]	60	70	75	85	80	100	85	115
Outside diameter of fastener	d_{nom}	[mm]	8		10		12		14	

[1)] In absence of other national regulations.
[2)] In case $h_{nom} > h_{nom2}$ and $< h_{nom3}$ the actual h_{ef} for concrete failure can be calculated according to "$h_{ef} = 0,85 * (h_{nom} - 0,5 * h_t)$
[3)] $N^0_{Rk,c}$ according to EN 1992-4:2018

Hilti screw anchor HUS4

Annex C5

Performances
Essential characteristics for seismic performance category C1 in concrete

Table C3 continued

Fastener size HUS4			16	
			h_{nom1}	h_{nom2}
Nominal embedment depth	h_{nom}	[mm]	85	130
Steel failure for tension and shear load				
Characteristic resistance	$N_{Rk,s,C1}$	[kN]	107,7	
Partial factor	$\gamma_{Ms,N}$ [1)]	[-]	1,5	
Characteristic resistance	$V_{Rk,s,C1}$	[kN]	42,9	25,3
Partial factor	$\gamma_{Ms,V}$ [1)]	[-]	1,25	
Reduction factor annular gap unfilled	α_{gap}	[-]	0,5	
Reduction factor annular gap filled	α_{gap}	[-]	1,0	
Pull-out failure				
Characteristic resistance in cracked concrete	$N_{Rk,p,C1}$	[kN]	7,5	19,0
Concrete cone failure				
Effective embedment depth	h_{ef} [2)]	[mm]	66,6	104,9
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}	
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}	
Installation factor	γ_{inst}	[-]	1,0	
Concrete pry-out failure				
Pry-out factor	k_8	[-]	2,0	
Concrete edge failure				
Effective length of fastener	l_f	[mm]	85	130
Outside diameter of fastener	d_{nom}	[mm]	16	

[1)] In absence of other national regulations.
[2)] In case $h_{nom} > h_{nom2}$ and $< h_{nom3}$ the actual h_{ef} for concrete failure can be calculated according to "$h_{ef} = 0,85 * (h_{nom} - 0,5 * h_t)$

Hilti screw anchor HUS4	**Annex C6**
Performances Essential characteristics for seismic performance category C1 in concrete	

Deutsches Institut für Bautechnik DIBt

Table C4: Essential characteristics for seismic performance category C2 in concrete for HUS4

Fastener size HUS4				**8** h_{nom3}	**10** h_{nom3}	**12** h_{nom3}	**14** h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	70	85	100	115
Adjustment							
Total max. thickness of adjustment layers		t_{adj}	[mm]	10	10	10	10
Max. number of adjustments		n_a	[-]	2	2	2	2
Steel failure for tension							
Characteristic resistance		$N_{Rk,s,C2}$	[kN]	36,0	55,0	79,0	101,5
Partial factor		$\gamma_{Ms,N}$[1)]	[-]	1,5			
Steel failure for shear load							
Partial factor		$\gamma_{Ms,V}$[1)]	[-]	1,25			
Installation with Hilti filling set (HUS4-H and HUS4-A)							
Characteristic resistance		$V_{Rk,s,C2}$	[kN]	13,9	21,5	27,2	46,5
Reduction factor annular gap filled		α_{gap}	[-]	1,0			
Installation without Hilti filling set							
Characteristic resistance		$V_{Rk,s,C2}$	[kN]	9,4	13,7	22,5	34,4
Reduction factor annular gap filled		α_{gap}	[-]	0,5			
Pull-out failure							
Characteristic resistance in cracked concrete		$N_{Rk,p,C2}$	[kN]	2,7	5,4	11,4	17,7
Concrete cone failure							
Effective embedment depth		h_{ef}	[mm]	56,1	68,0	79,9	91,8
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
	Spacing	$s_{cr,N}$	[mm]	3 h_{ef}			
Installation factor		γ_{inst}	[-]	1,0			
Concrete pry-out failure							
Pry-out factor		k_8	[-]	2,0			
Concrete edge failure							
Effective length of fastener		l_f	[mm]	70	85	100	115
Outside diameter of fastener		d_{nom}	[mm]	8	10	12	14

[1)] In absence of other national regulations.

Hilti screw anchor HUS4	**Annex C7**
Performances Essential characteristics for seismic performance category C2 in concrete	

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Table C5: Essential characteristics under fire exposure in concrete for HUS4-H

Fastener size HUS4-H					**8**			**10**		
					h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth			h_{nom}	[mm]	40	60	70	55	75	85
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)										
Characteristic resistance	R30		$F_{Rk,s,fi}$	[kN]	2,6			4,1	4,2	
	R60		$F_{Rk,s,fi}$	[kN]	1,9			3,1	3,1	
	R90		$F_{Rk,s,fi}$	[kN]	1,2			2,2	2,3	
	R120		$F_{Rk,s,fi}$	[kN]	0,9			1,5	1,7	
	R30		$M^0_{Rk,s,fi}$	[Nm]	2,3			4,8	4,9	
	R60		$M^0_{Rk,s,fi}$	[Nm]	1,7			3,6	3,7	
	R90		$M^0_{Rk,s,fi}$	[Nm]	1,1			2,6	2,7	
	R120		$M^0_{Rk,s,fi}$	[Nm]	0,8			1,8	1,9	
Pull-out failure										
Characteristic resistance	R30 R60 R90		$N^0_{Rk,p,fi}$	[kN]	1,3	2,8	3,6	2,3	3,9	4,7
	R120		$N^0_{Rk,p,fi}$	[kN]	1,0	2,2	2,8	1,9	3,1	3,7
Concrete cone failure										
Characteristic resistance	R30 R60 R90		$N^0_{Rk,c,fi}$	[kN]	0,8	2,6	4,0	2,0	4,7	6,5
	R120		$N^0_{Rk,c,fi}$	[kN]	0,7	2,1	3,2	1,6	3,7	5,2
Edge distance										
R30 to R120			$c_{cr,fi}$	[mm]	2 h_{ef}					
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm										
Fastener spacing										
R30 to R120			$s_{cr,fi}$	[mm]	2 h_{ef}					
Concrete pry-out failure										
R30 to R120			k_8	[-]	1,0	2,0		1,0	2,0	
The anchorage depth shall be increased for wet concrete by at least 30 mm compared to the given value										

Hilti screw anchor HUS4

Annex C8

Performances
Essential characteristics under fire exposure in concrete

Deutsches Institut für Bautechnik DIBt

Table C5 continued

Fastener size HUS4-H				**12**			**14**			**16**	
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
Nominal embedment depth		h_{nom}	[mm]	60	80	100	65	85	115	85	130
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)											
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	7,5	7,6	7,6	10,3	10,4	10,5	10,6	10,7
	R60	$F_{Rk,s,fi}$	[kN]	5,5	5,7	5,8	7,7	7,9	8,0	8,1	8,2
	R90	$F_{Rk,s,fi}$	[kN]	3,7	3,9	4,1	5,2	5,6	5,8	5,7	5,9
	R120	$F_{Rk,s,fi}$	[kN]	2,8	3,0	3,1	3,9	4,2	4,4	4,3	4,5
	R30	$M^0_{Rk,s,fi}$	[Nm]	11,4	11,6	11,6	18,9	19,2	19,3	23,7	23,9
	R60	$M^0_{Rk,s,fi}$	[Nm]	8,4	8,8	8,9	14,1	14,6	14,8	18,1	18,3
	R90	$M^0_{Rk,s,fi}$	[Nm]	5,7	6,0	6,2	9,5	10,2	10,7	12,7	13,2
	R120	$M^0_{Rk,s,fi}$	[Nm]	4,3	4,6	4,7	7,2	7,7	8,1	9,6	10,0
Pull-out failure											
Characteristic resistance	R30, R60, R90	$N^0_{Rk,p,fi}$	[kN]	2,6	4,2	6,1	2,9	4,5	7,5	4,6	8,7
	R120	$N^0_{Rk,p,fi}$	[kN]	2,1	3,4	4,9	2,3	3,6	6,0	3,7	7,0
Concrete cone failure											
Characteristic resistance	R30, R60, R90	$N^0_{Rk,c,fi}$	[kN]	2,4	5,4	9,8	2,9	6,1	13,9	6,2	19,4
	R120	$N^0_{Rk,c,fi}$	[kN]	1,9	4,3	7,8	2,3	4,9	11,1	4,9	15,5
Edge distance											
R30 to R120		$c_{cr,fi}$	[mm]	$2\ h_{ef}$							
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm											
Fastener spacing											
R30 to R120		$s_{cr,fi}$	[mm]	$2\ c_{cr,fi}$							
Concrete pry-out failure											
R30 to R120		k_8	[-]	2,0							
The anchorage depth shall be increased for wet concrete by at least 30 mm compared to the given value											

Hilti screw anchor HUS4

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Performances
Essential characteristics under fire exposure in concrete

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Table C6: Essential characteristics under fire exposure in concrete for HUS4-C

Fastener size HUS4-C				**8**			**10**		
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	40	60	70	55	75	85
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)									
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	0,5			1,0		
	R60	$F_{Rk,s,fi}$	[kN]	0,4			0,9		
	R90	$F_{Rk,s,fi}$	[kN]	0,3			0,7		
	R120	$F_{Rk,s,fi}$	[kN]	0,2			0,6		
	R30	$M^0_{Rk,s,fi}$	[Nm]	0,4			1,2		
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,3			1,0		
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,2			0,8		
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,2			0,6		
Pull-out failure									
Characteristic resistance	R30 R60 R90	$N^0_{Rk,p,fi}$	[kN]	1,3	2,8	3,6	2,3	3,9	4,7
	R120	$N^0_{Rk,p,fi}$	[kN]	1,0	2,2	2,8	1,9	3,1	3,7
Concrete cone failure									
Characteristic resistance	R30 R60 R90	$N^0_{Rk,c,fi}$	[kN]	0,8	2,6	4,0	2,0	4,7	6,5
	R120	$N^0_{Rk,c,fi}$	[kN]	0,7	2,1	3,2	1,6	3,7	5,2
Edge distance									
R30 to R120		$c_{cr,fi}$	[mm]	$2\ h_{ef}$					
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm									
Fastener spacing									
R30 to R120		$s_{cr,fi}$	[mm]	$2\ h_{ef}$					
Concrete pry-out failure									
R30 to R120		k_8	[-]	1,0	2,0		1,0	2,0	
The anchorage depth shall be increased for wet concrete by at least 30 mm compared to the given value									

Hilti screw anchor HUS4	**Annex C10**
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Table C7: Essential characteristics under fire exposure in concrete for HUS4-A

Fastener size HUS4-A				**10**			**14**		
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	55	75	85	65	85	115
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)									
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	4,2			8,4		
	R60	$F_{Rk,s,fi}$	[kN]	3,3			6,8		
	R90	$F_{Rk,s,fi}$	[kN]	2,5			5,1		
	R120	$F_{Rk,s,fi}$	[kN]	2,1			4,3		
	R30	$M^0_{Rk,s,fi}$	[Nm]	4,8			15,4		
	R60	$M^0_{Rk,s,fi}$	[Nm]	3,8			12,4		
	R90	$M^0_{Rk,s,fi}$	[Nm]	2,9			9,3		
	R120	$M^0_{Rk,s,fi}$	[Nm]	2,4			7,8		
Pull-out failure									
Characteristic resistance	R30 R60 R90	$N^0_{Rk,p,fi}$	[kN]	2,3	3,9	4,7	2,9	4,5	7,5
	R120	$N^0_{Rk,p,fi}$	[kN]	1,9	3,1	3,7	2,3	3,6	6,0
Concrete cone failure									
Characteristic resistance	R30 R60 R90	$N^0_{Rk,c,fi}$	[kN]	2,0	4,7	6,5	2,9	6,1	13,9
	R120	$N^0_{Rk,c,fi}$	[kN]	1,6	3,7	5,2	2,3	4,9	11,1
Edge distance									
R30 to R120		$c_{cr,fi}$	[mm]	2 h_{ef}					
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm									
Fastener spacing									
R30 to R120		$s_{cr,fi}$	[mm]	2 h_{ef}					
Concrete pry-out failure									
R30 to R120		k_8	[-]	1,0	2,0				
The anchorage depth shall be increased for wet concrete by at least 30 mm compared to the given value									

Hilti screw anchor HUS4

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Table C8: Displacements under tension loads

Fastener size HUS4				**8**			**10**		
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	40	60	70	55	75	85
Cracked concrete C20/25 to C50/60	Tension Load	N	[kN]	2,6	5,4	6,9	3,8	7,5	8,6
	Displacement	δ_{N0}	[mm]	0,1	0,3	0,4	0,2	0,4	0,4
		$\delta_{N\infty}$	[mm]	0,3	0,4	0,4	0,7	0,7	0,9
Uncracked concrete C20/25 to C50/60	Tension Load	N	[kN]	3,7	7,1	9,1	5,2	10,5	12,2
	Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,1	0,3	0,3
		$\delta_{N\infty}$	[mm]	0,3	0,4	0,4	0,7	0,7	0,9

Fastener size HUS4				**12**			**14**			**16**	
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
Nominal embedment depth		h_{nom}	[mm]	60	80	100	65	85	115	85	130
Cracked concrete C20/25 to C50/60	Tension Load	N	[kN]	5,1	8,2	11,7	5,7	8,6	14,4	8,7	16,7
	Displacement	δ_{N0}	[mm]	0,3	0,4	0,6	0,3	0,4	0,7	0,1	0,4
		$\delta_{N\infty}$	[mm]	0,9	0,9	1,2	1,3	1,3	1,5	1,3	1,4
Uncracked concrete C20/25 to C50/60	Tension Load	N	[kN]	6,8	10,8	15,5	7,5	11,7	19,1	11,5	22,9
	Displacement	δ_{N0}	[mm]	0,2	0,3	0,4	0,2	0,3	0,5	0,4	0,3
		$\delta_{N\infty}$	[mm]	0,9	0,9	1,2	1,3	1,3	1,5	1,3	1,4

Table C9: Displacements under shear loads

Fastener size HUS4				**8**			**10**		
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth		h_{nom}	[mm]	40	60	70	55	75	85
Concrete C20/25 to C50/60	Shear Load	V	[kN]	10,7	10,7	12,5	16,5	16,5	18,3
	Displacement	δ_{V0}	[mm]	1,3	1,1	0,9	1,4	1,3	1,0
		$\delta_{V\infty}$	[mm]	2,0	1,7	1,4	2,1	2,0	1,5

Fastener size HUS4				**12**			**14**			**16**	
				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}
Nominal embedment depth		h_{nom}	[mm]	60	80	100	65	85	115	85	130
Concrete C20/25 to C50/60	Shear Load	V	[kN]	22,2	22,2	25,7	31,4	35,4	35,4	37,2	41,8
	Displacement	δ_{V0}	[mm]	1,6	1,6	0,9	5,3	5,3	4,0	2,3	1,8
		$\delta_{V\infty}$	[mm]	2,3	2,4	1,4	7,9	7,9	6,0	3,5	2,7

Hilti screw anchor HUS4

Annex C12

Performances
Displacement values in case of static and quasi-static loading

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Table C10: Displacements under tension and shear loads for seismic category 2

Fastener size HUS4			**8** h_{nom3}	**10** h_{nom3}	**12** h_{nom3}	14 h_{nom3}
Nominal embedment depth	h_{nom}	[mm]	70	85	100	115
Tension load						
Displacement DLS	$\delta_{N,C2\ (DLS)}$	[mm]	0,59	0,80	0,77	1,06
Displacement ULS	$\delta_{N,C2\ (ULS)}$	[mm]	1,36	3,66	2,78	3,89
Shear load with Hilti filling set (HUS4-H and HUS4-A)						
Displacement DLS	$\delta_{V,C2\ (DLS)}$	[mm]	1,85	1,72	1,73	2,52
Displacement ULS	$\delta_{V,C2\ (ULS)}$	[mm]	5,44	6,88	5,62	6,79
Shear load without Hilti filling set						
Displacement DLS	$\delta_{V,C2\ (DLS)}$	[mm]	4,64	5,02	4,90	4,93
Displacement ULS	$\delta_{V,C2\ (ULS)}$	[mm]	7,96	8,97	7,00	9,14

Hilti screw anchor HUS4

Annex C13

Performances
Displacement values in case of seismic C2 loading