



General construction technique permit

Translation prepared by Hilti – Original version in German language

Number:
Z-21.8-2137

Period of validity
of: **21 December 2021**
to: **21 December 2026**

Applicant:
Hilti Deutschland AG
Hiltistraße 2
86916 Kaufering

Subject of this approval:
Hilti HUS4 concrete screw for temporary fastenings in concrete

The subject named above is herewith granted a general construction technique permit (*allgemeine Bauartgenehmigung*). This decision contains five pages and ten annexes.

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I. GENERAL PROVISIONS

- 1 The general construction technique permit (*allgemeine Bauartgenehmigung*) confirms the fitness for the application of the subject concerned within the meaning of the Building Codes of federal states (*Landesbauordnungen*).
- 2 This decision does not replace the statutory permits, consents and certificates specified for the implementation of construction projects.
- 3 This decision is granted without prejudice to the rights of third parties, in particular private property rights.
- 4 Notwithstanding further provisions set forth under “Special Provisions”, copies of this decision shall be made available to the installer of the subject concerned. Furthermore, the installer of the subject concerned shall also be notified that this decision must be available at the place of application. The authorities involved must also be provided with copies on request.
- 5 Only copies of the complete permit may be made. Partial publication requires the consent of the Deutsche Institut für Bautechnik (German Institute for Structural Engineering). Texts and drawings of promotional literature shall not contradict this decision. Translations of the approval must contain the note “Translation of the original German version not checked by the Deutsche Institut für Bautechnik”.
- 6 The decision may be revoked. The provisions may be subsequently supplemented and amended, in particular if this is required by new technical findings.
- 7 This decision is based on the information provided and documents submitted by the applicant on the subject concerned during the permit process. Any amendments to these approval bases shall not be covered by this decision and shall be notified to Deutsches Institut für Bautechnik without delay.

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II. SPECIAL PROVISIONS

1 Subject of approval and scope of application

1.1 Subject concerned

The item subject to approval is the Hilti HUS4 concrete screw (hereinafter referred to as 'anchor') in the sizes 8, 10, 12, 14 and 16 mm according to European Technical Assessment ETA-20/0867 dated 2 December 2021. The Hilti HUS4 concrete screw is a special screw having a hexagonal head or connection thread made of galvanised steel.

The anchor is anchored by screwing it into a pre-drilled cylindrical hole. The anchor's special thread cuts a thread into the anchoring substrate. The anchor is anchored through positive locking of the special thread in the concrete.

Annexe 1 shows the anchor in its installed state.

1.2 Field of application

The anchor may be used for anchorages in reinforced and unreinforced normal weight concrete of strength classes C20/25 minimum and C50/60 maximum according to DIN EN 206-1:2001-07 "Concrete - Part 1: Specification, performance, production and conformity". The screw may be anchored and placed under load before the required characteristic compressive strength of the concrete is reached, following verification according to section 2.3.1.

The anchor shall only be used as a temporary fastening for site equipment, e.g. for construction piles, guardrails and scaffolding. The anchor can be reused in new drill holes after it is unscrewed. However, a drilled hole may not be reused after an anchor has been unscrewed. Before reuse, the anchor must in each case be checked visually and with a tube gauge according to section 2.3.3. Installed anchors shall be checked continuously for visible damage (e.g. corrosion) and replaced if necessary.

The anchor may be anchored in cracked and non-cracked concrete.

The anchor may be used for the intended temporary use in indoor and outdoor areas.

2 Provisions relating to planning, design and execution

2.1 Planning

The anchorages shall be planned in accordance with special engineering knowledge. Verifiable calculations and design drawings shall be prepared while taking the loads to be anchored into consideration.

The design drawings shall indicate the precise position and size of the anchor.

2.2 Design

The calculations performed here serve as verification of the direct local force transmission into the concrete. The transmission of the loads to be anchored in the component must be verified.

Additional stresses – caused for instance by impairments through deformation (e.g. 8 due to temperature changes) – which may occur in the screw, in the component to be connected or in the component in which the anchor is anchored shall be taken into consideration.

The minimum anchor spacings (edge distance and spacing) and minimum component thicknesses according to Annexes 5, 6 and 7 shall be observed.

It shall be verified that the design value of action F_{Ed} does not exceed the design value of resistance F_{Rd} : $F_{Ed} \leq F_{Rd}$

The design values of the resistance are valid for all load directions, independent of the failure mode. The resistances are given in Annexe 10 as a function of the screw size, the screw-in depth and concrete strength $f_{ck,cube}$.

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2.3 Execution

2.3.1 General

The anchor to be anchored shall be fitted in accordance with the design drawings prepared pursuant to section 2.1.

The screw may be used in fresh concrete before the characteristic concrete compressive strength $f_{ck,cube}$ of the nominal strength class is reached. In this case the compressive strength of the concrete shall have reached a value of $f_{ck,cube} \geq 10 \text{ N/mm}^2$.

The user of the type or the company undertaking construction shall submit a declaration of conformity in accordance with §§ 16 a para. 5, 21 para. 2 MBO to confirm the conformity of the construction type with this National Type Approval.

2.3.2 Drilling and cleaning the drilled hole

The position of the drill hole shall be coordinated with the reinforcement such that damage to the reinforcement is avoided.

The drill hole shall be drilled at right angles to the concrete surface using a carbide masonry drill bit. The carbide masonry drill bit shall comply with the specifications of the code of practice of the German Institute for Structural Engineering relating to "Characteristic values, requirements and testing of carbide masonry drill bits used for drilling holes for anchor anchorages" (version of January 2002). Compliance with the drill characteristic values must be verified by the test mark of the Prüfgemeinschaft Mauerbohrer e.V., Remscheid (masonry drill bit testing association (see leaflet, Section 5).

The drill core diameter, cutting diameter of the drill bit and drill hole depth must correspond to the values set forth in Annexes 5 to 7. The drilling swarf shall be removed from the drill hole.

Should the drilled hole be faulty, a new drill hole must be drilled at a distance of at least 2 x the depth of the faulty drill hole.

2.3.3 Anchor installation

The anchor is only intended for temporary use in a single drilled hole. Once it has been unscrewed, it can be reused in other drill holes. However, it must not be screwed into the same drill hole a second time.

Before reusing the anchor, always check for thread wear using a related type HRG tube gauge. The anchor may only be reused provided it penetrates the sleeve to the maximum extent that it does not protrude on the back of the sleeve (see Annexe 8). Screws that exhibit visible damage, e.g. corrosion, must not be reused under any circumstances.

The anchor may be screwed in using an impact screw driver with tangential action.

To prevent the screw thread from stripping, a driver having a power output in the upper range shall be equipped with an automatic shut-off device, e.g.8 above the depth stop.

The anchor is correctly anchored when

- the footplate (attachment) to be fastened is screwed against the concrete over its whole surface without an intermediate layer,
- the anchor head lies on the footplate,
- it is impossible to slightly tighten the screw any further,
- the setting depth h_{nom} is observed.

2.3.4 Inspection of execution

During the installation of the anchor, the contractor commissioned with the anchoring of the site manager appointed by him, or the site manager's competent representative must be present on site. He shall ensure that the work is carried out properly.

During the production of the anchorages, records of the verification of the existing concrete compressive strength according to Section 2.3.1 and the proper installation of the anchor shall be

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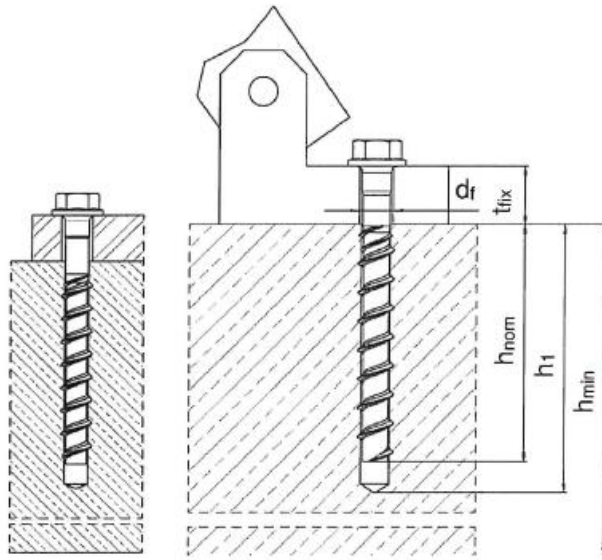
kept by the site manager or his representative. The installed anchors must be regularly checked by the site manager or his representative in accordance with Section 1.2. The results shall be documented.

The records shall be readily available on the site during the construction period and shall be presented to the person charged with the inspection upon request. As for delivery notes, they must be retained by the company for a period of at least 5 years following completion of the work.

Dipl.-Ing. Beatrix Wittstock, B.Eng.
Head of Division

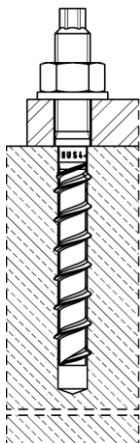
Certified

Installed condition



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

- d_f : Clearance hole diameter
- t_{fix} : Thickness of fixture
- h_{nom} : Nominal embedment depth
- h_1 : Depth of drill hole
- h_{min} : Minimum thickness of concrete member



HUS4-A
 (size 10 with external thread M12
 and size 14 with external thread M16)

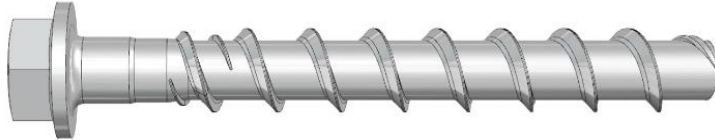
Hilti HUS4 concrete screw for temporary fastenings in concrete

Product description
 Installed condition

Annex 1

Table 1: Screw types

Hilti HUS4-H, sizes 8,10, 12, 14 and 16, hex head, galvanized



Hilti HUS4-A, size 10 with M12 external thread and size 14 with M16 external thread, galvanized

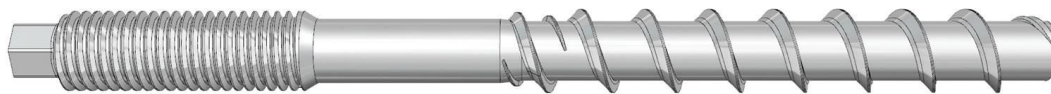
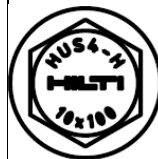
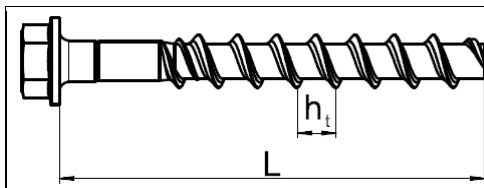


Table 2: Material

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

Table 3: Dimensions and head marking HUS4-H

Size HUS4-	H 8		H 10			H 12			H 14			H 16	
Nominal anchor diameter d [mm]	8		10			12			14			16	
Thread pitch h_t [mm]	8		10			12			14			13.2	
Nominal embedment depth h_{nom} [mm]	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}
	60	70	55	75	85	60	80	100	65	85	115	85	130
Screw length min / max L [mm]	65 / 150		60 / 305			70 / 150			75 / 150			100 / 205	



HUS4: Hilti Universal Screw 4th Generation

H: Hexagonal head, galvanized

10: Nominal screw diameter d [mm]

100: Screw length [mm]

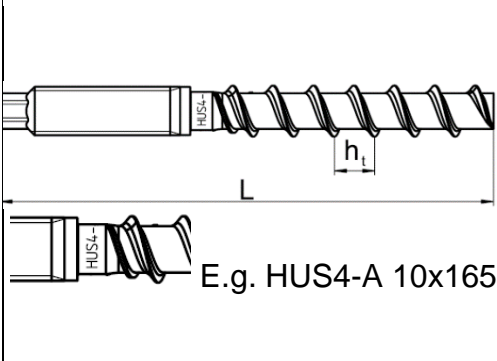
Hilti HUS4 concrete screw for temporary fastenings in concrete

Product description
Screw types, dimensions, labelling, material

Annex 2

Table 4: Dimensions and marking HUS4-A

Size HUS4-			A 10			A 14		
Nominal anchor diameter	d	[mm]	10			14		
External thread connection			M12			M16		
Thread pitch	h_t	[mm]	10			14		
Length of the anchor in the concrete	h_{nom}	[mm]	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			55	75	85	65	80	115
Screw length min / max		L	120 / 165			155 / 205		

 <p>E.g. HUS4-A 10x165</p>	HUS4: Hilti Universal Screw 4 th Generation					
	A: External thread, galvanized					
	10: Nominal screw diameter d [mm]					
	165: Screw length L [mm]					
	8: Carbon steel					
	K: Length identification HUS4-A 10x165					
	G	I	K	J	L	N
10x120	10x140	10x165	14x155	14x185	14x205	

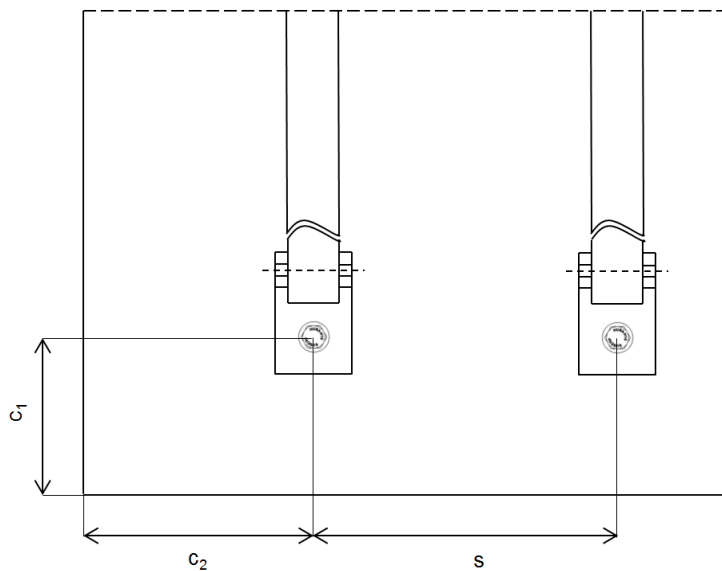
Hilti HUS4 concrete screw for temporary fastenings in concrete

Product description
Dimensions, labelling

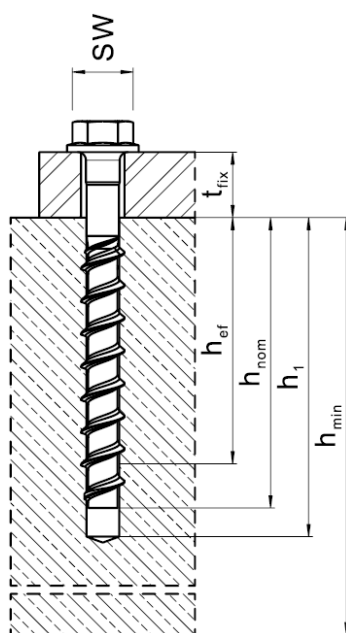
Annex 3

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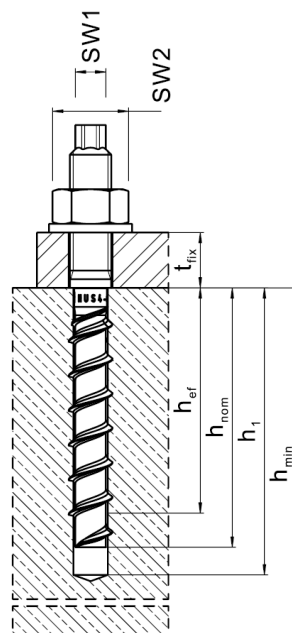
Installation parameters



Dimensions c_1 , c_2 and s
 see Tables 5 to 7



HUS4-H



HUS4-A

Hilti HUS4 concrete screw for temporary fastenings in concrete

Intended use
 Installation parameters

Annex 4

Table 5: Installation parameters for HUS4-8 and 10

Size HUS4 Type			8		10		
			H		H, A		
			h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth	h_{nom}	[mm]	60	70	55	75	85
Nominal drill bit diameter	d_0	[mm]	8		10		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45		10,45		
Cutting diameter of diamond coring bit	$d_{cut} \leq$	[mm]	-		9,9		
Clearance hole diameter Through setting	$d_f \leq$	[mm]	14		16		
Clearance hole diameter Pre-setting (A-type)	$d_f \leq$	[mm]	-		14		
Wrench size (H-type)	SW	[mm]	13		15		
Wrench size for hex head (A-type)	SW1	[mm]	-		8		
Wrench size for nut (A-type)	SW2	[mm]	-		19		
Maximum installation torque (A-type)	$\max T_{inst}$	[Nm]	-		20		
Depth of drill hole	$h_1 \geq$	[mm]	$(h_{nom} + 10 \text{ mm})$				
			70	80	65	85	95
Minimum edge distance	$c_2 \geq$	[mm]	$1,5 \cdot c_1$				
Minimum spacing distance	$s \geq$	[mm]	$3 \cdot c_1$				
Combination 1							
Minimum edge distance	$c_1 \geq$	[mm]	80	100	75	100	115
Minimum thickness of the concrete member	$h_{min} \geq$	[mm]	120	150	115	150	175
Combination 2							
Minimum edge distance	$c_1 \geq$	[mm]	85	110	85	120	135
Minimum thickness of the concrete component	$h_{min} \geq$	[mm]	100	120	100	130	140
Setting tool							
Hilti setting tool ¹⁾			SIW6.2 G1		SIW6.2 G2		
Tube gauge HRG			8		10		

¹⁾ Installation using other impact screw driver with equivalent power is possible.

Hilti HUS4 concrete screw for temporary fastenings in concrete

Intended use
Installation parameters

Annex 5

Table 6: Installation parameters for HUS4-12 and 14

Size HUS4 Type			12			14		
			H			H, A		
			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
Nominal embedment depth	h_{nom}	[mm]	60	80	100	65	85	115
Nominal drill bit diameter	d_0	[mm]	12			14		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	12,50			14,50		
Clearance hole diameter Through setting	$d_f \leq$	[mm]	20			22		
Clearance hole diameter Pre-setting (A-type)	$d_f \leq$	[mm]	-			18		
Wrench size (H-type)	SW	[mm]	17			21		
Wrench size for hex head (A-type)	SW1	[mm]	-			12		
Wrench size for nut (A-type)	SW2	[mm]	-			24		
Maximum installation torque (A-type)	$\max T_{inst}$	[Nm]	-			80		
Depth of drill hole	$h_1 \geq$	[mm]	$(h_{nom} + 10 \text{ mm})$					
			70	90	110	75	95	125
Minimum edge distance	$c_2 \geq$	[mm]	$1,5 \cdot c_1$					
Minimum spacing distance	$s \geq$	[mm]	$3 \cdot c_1$					
Combination 1								
Minimum edge distance	$c_1 \geq$	[mm]	65	105	135	85	115	180
Minimum thickness of the concrete component	$h_{min} \geq$	[mm]	110	160	205	130	175	255
Combination 2								
Minimum edge distance	$c_1 \geq$	[mm]	65	120	160	100	135	300
Minimum thickness of the concrete member	$h_{min} \geq$	[mm]	110	130	150	120	160	200
Setting tool								
Hilti setting tool ¹⁾			SIW6.2 G2			SIW6.2 G2		
Tube gauge HRG			12			14		

¹⁾ Installation using other impact screw driver with equivalent power is possible.

Hilti HUS4 concrete screw for temporary fastenings in concrete

Intended use
Installation parameters

Annex 6

Table 7: Installation parameters for HUS4 size 16

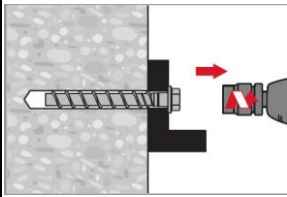
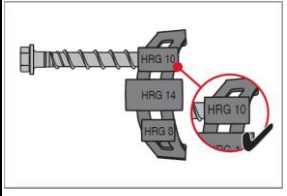
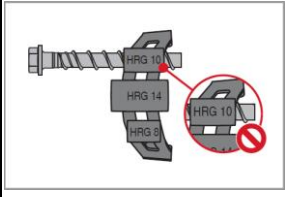
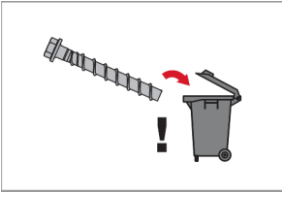
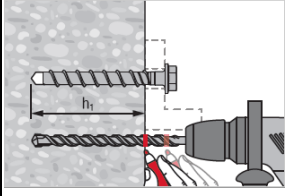
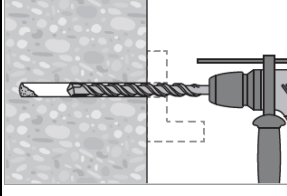
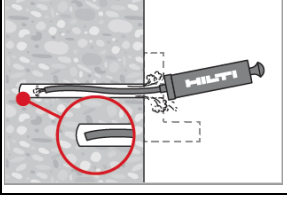
Size HUS4			16	
Type			H	
			h_{nom1}	h_{nom2}
Nominal embedment depth	h_{nom}	[mm]	85	130
Nominal drill bit diameter	d_0	[mm]	16	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	16,50	
Clearance hole diameter through setting	$d_f \leq$	[mm]	24	
Wrench size (H-type)	SW	[mm]	24	
Depth of drill hole	$h_1 \geq$	[mm]	($h_{nom} + 10 \text{ mm}$)	
			95	140
Minimum edge distance	$c_2 \geq$	[mm]	$1,5 \cdot c_1$	
Minimum spacing distance	$s \geq$	[mm]	$3 \cdot c_1$	
Combination 1				
Minimum edge distance	$c_1 \geq$	[mm]	105	180
Minimum thickness of the concrete member	$h_{min} \geq$	[mm]	160	220
Combination 2				
Minimum edge distance	$c_1 \geq$	[mm]	115	215
Minimum thickness of the concrete member	$h_{min} \geq$	[mm]	130	195
Setting tool				
Hilti setting tool ¹⁾			SIW6.2 G2	
Tube gauge HRG			16	

¹⁾ Installation using a different tangential impact screw driver with equivalent performance is possible.

Hilti HUS4 concrete screw for temporary fastenings in concrete

Intended use
Installation parameters

Annex 7

Setting instructions	
Drilling and cleaning	
Hammer drilling (HD) all sizes	
	The Hilti HUS4-H and HUS4-A concrete screws are intended for temporary use in a single drill hole. Once unscrewed it can be reused in other drill holes. It must not be screwed into the same drill hole a second time.
	Before reusing the anchor, always check for thread wear using a related type HRG tube gauge in accordance with Tables 5 to 7. The concrete screw may be reused provided it does not protrude from the tube. Screws that exhibit visible damage (e.g. corrosion damage) must not be reused under any circumstances.
	 If the screw protrudes from the tube or if it exhibits other visible damage, the screw must not be reused.
	Mark the required drill hole depth h_1 for through- or pre-assembly on the drill bit. For details on drill hole depth h_1 see Tables 5 to 7.
	Making the drill hole by hammer drilling.
	Clean the drill hole by blowing out or vacuuming.
Hilti HUS4 concrete screw for temporary fastenings in concrete	
Intended use Setting instructions	Annex 8

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	<p>Set the concrete screw according to the installation parameters set forth in Tables 5 to 7. The screw length must be selected such that the setting depth h_{nom} (length of the screw in the concrete) is maintained in accordance with Tables 3 and 4.</p>
	<p>Checking setting:</p> <ul style="list-style-type: none"> • the attachment to be fastened is screwed against the concrete over its whole surface without an intermediate layer, • the anchor head (HUS4-H) or the washer with nut (HUS4-A) rests on the base plate, • it is not possible to slightly tighten the anchor any further, • the necessary setting depth h_{nom} is observed.
<p>Hilti HUS4 concrete screw for temporary fastenings in concrete</p>	
<p>Intended use Setting instructions</p>	<p>Annex 9</p>

Table 8: Design resistance for all load directions in cracked and non-cracked concrete

Concrete screw			HUS4-H 8		HUS4-H 10 HUS4-A 10			HUS4-H 12			HUS4-H 14 HUS4-A 14			HUS4-H 16	
			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}
Nominal embedment depth	h_{nom}	[mm]	60	70	55	75	85	60	80	100	65	85	115	85	130
$f_{ck,cube} \geq 10 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	3,3	4,7	3,3	5,3	6,3	2,6	5,4	7,8	4,4	7,0	12,3	5,5	12,6
$f_{ck,cube} \geq 15 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4,0	5,7	4,0	6,4	7,8	3,5	7,3	10,6	5,4	8,5	15,0	7,5	17,0
$f_{ck,cube} \geq 20 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4,6	6,6	4,7	7,4	9,0	4,0	8,4	12,2	6,2	9,9	17,3	8,7	19,7
$f_{ck,cube} \geq 25 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	5,1	7,4	5,3	8,3	10,1	4,5	9,4	13,6	6,9	11,1	19,3	9,7	22,0

¹⁾ Partial safety factor is included.

Hilti HUS4 concrete screw for temporary fastenings in concrete

Performance
Design resistance for all load directions

Annex 10