

## Allgemeine bauaufsichtliche Zulassung

### General Construction Supervisory Authority Approval

(Translation of the German original text which has not been checked by the DIBt.)

**Zulassungsnummer:**

**Approval no.: Z-21.8-2018**

**Geltungsdauer**

**vom: Period of validity: April 1, 2014**

**bis: until: April 1, 2019**

**Antragsteller:**

**Hilti Deutschland AG**

Hiltistraße 2

86916 Kaufering

Germany

**Zulassungsgegenstand:**

**Subject of approval: Hilti Betonschraube HUS3-H**

**Hilti HUS3-H concrete screw anchor**

The aforementioned subject of approval is herewith granted General Construction Supervisory Authority Approval.

This General Construction Supervisory Authority Approval comprises five pages and five annexes.

## I GENERAL PROVISIONS

- 1 This General Construction Supervisory Authority Approval verifies the suitability (fitness for the intended purpose) of the subject of the approval in keeping with the state construction ordinances.
- 2 If the General Construction Supervisory Authority Approval lays down requirements regarding the special expertise and experience that persons in charge of the manufacturing of construction products are required to have in accordance with state regulations corresponding to § 17 Section 5 of the model building code, please note that this expertise and experience can be attested through equivalent evidence or verification provided by other member states of the European Union. This also applies to equivalent verification presented within the scope of the European Economic Area (EEA) or other bilateral agreement.
- 3 The General Construction Supervisory Authority Approval is no substitute for the mandatory authorization, consent, permission and certification required for prospective building projects.
- 4 The General Construction Supervisory Authority Approval is granted without prejudice to the rights of third parties, especially private protective rights.
- 5 Notwithstanding any further regulations in the “Special Provisions” Section, the manufacturer and distributor of the subject of the approval shall provide the user with copies of the General Construction Supervisory Authority Approval. Furthermore, they shall inform the user that the General Construction Supervisory Authority Approval must be available at the place of use. Copies of the General Construction Supervisory Authority Approval must be made available to the applicable authorities on request.
- 6 The General Construction Supervisory Authority Approval may be copied only in its entirety. Publication of extracts is subject to approval by the DIBt. The text and depiction of the product in advertising material must **not** contradict The General Construction Supervisory Authority Approval. Translations of the General Construction Supervisory Authority Approval must contain the following notice: “Translation of the German original text which has not been checked by the DIBt”.
- 7 The General Construction Supervisory Authority Approval is revocable. The provisions made in the General Construction Supervisory Authority Approval may be subsequently amended or modified, especially when new technical findings give reason for such amendment.

## **II SPECIAL PROVISIONS**

### **1 Subject of approval and scope**

#### **1.1 Subject of approval**

The subject of this approval is the Hilti HUS3-H concrete screw anchor (hereinafter referred to as the “anchor”) in the sizes 10 mm and 14 mm diameter, each with three different setting depths (length of thread engagement). The HUS3-H concrete screw anchor is a special screw bolt, with hexagonal head, made from 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.

The anchor in an installed state is shown in Annex 1.

#### **1.2 Scope**

The anchor may be set in reinforced or unreinforced concrete of the grade (strength class) of at least C20/25 and maximum of C50/60 in accordance with DIN EN 206-1:2001-07 “Concrete - Part 1: Specification, performance, production and conformity”. The anchor may be set before the concrete has reached its required characteristic compressive strength so long as the strength of the concrete is verified in accordance with Section 4.1.

The anchor may be used only for the temporary fastening of construction site equipment or facilities, e.g. supports, safety railings and scaffolds. After removal by unscrewing, the anchor may be reused in other drilled holes. It may not, however, be screwed back into the same hole a second time. Before each reuse, the anchor must be checked visually and using the sleeve gauge in accordance with the instructions given in Section 4.3. After installation, the anchors must be continuously checked for visible signs of damage (e.g. due to corrosion) and replaced if necessary.

The anchor may be set in cracked or uncracked concrete.

The anchor may be used only in situations where no requirements regarding fire resistance (duration of resistance to fire) require to be met by the entire structure, including the screw anchor.

The anchor may be used only for the temporary fastening applications for which it is intended, in indoor and outdoor environments.

### **2 Provisions applicable to the construction product**

#### **2.1 Characteristics and composition**

The anchor must comply with the drawings and specifications given in the annexes to this approval and with the European Technical Approval ETA-13/1038.

The anchor is made from a non-flammable material of the Class A in accordance with DIN 4102-1:1998-05 “Fire behavior of building materials and building components - Part 1: Building materials; concepts, requirements and tests”.

### 3 Provisions for planning and design

#### 3.1 Planning

The anchor fastenings must be planned in accordance with good engineering practice. Checkable calculations and design drawings must be produced, taking into account the loads that are to be carried.

The design drawings must contain details of the exact position and size of the anchor.

#### 3.2 Design

The forces that can be taken up by the concrete in the immediately surrounding area have been verified. Verification must be provided of how the loads to be anchored are taken up by the structural member.

Additional stresses in the screw anchor, in the part to be fastened or in the structural member in which the anchor is set, that may result from restricted changes in shape or size (e.g. due to temperature changes), must be taken into account.

The minimum distances (spacing or distances from edges) and minimum member thicknesses given in Annex 5 must always be complied with.

Proof must be provided that the design/rated value for the action  $F_{Ed}$  does not exceed the design/rated value for the action  $F_{Rd}$ :

$$F_{Ed} \leq F_{Rd} \quad F_{Ed}, F_{Rd} \text{ in [kN]}$$

The design/rated resistance values apply to all loading directions, irrespective of the failure mode. The resistance values with reference to anchor size, setting depth and concrete strength  $f_{ck,cube}$  are given in Annex 5.

### 4 Provisions for installation or use of the product

#### 4.1 General points

Installation of the anchors is to be carried out in accordance with the design drawings provided in Section 3.1.

The screw anchor may be set in young concrete before it has reached its characteristic compressive strength  $f_{ck,cube}$  (i.e. less than 28 days after the concrete was poured). In this case the concrete compressive strength must be determined according to the principles of DIN 1048 and it must reach a value of at least  $f_{c,cube} \geq 10 \text{ N/mm}^2$ .

#### 4.2 Drilling and cleaning of the hole

The hole to be drilled must be positioned in such a way that it does not come into conflict with the reinforcement in the concrete, i.e. avoiding damage to the reinforcement.

The hole must be drilled perpendicular to the surface of the concrete using a carbide-tipped concrete/masonry drill bit. The carbide-tipped concrete/masonry drill bit must comply with the requirements given in the information sheet published by the DIBt "Specification, requirements and testing of carbide-tipped concrete/masonry drill bits used for drilling anchor holes" (issued January 2002).

Proof that the drill bit specification is adhered to must be provided in the form of acceptance test certificate 3.2 (DIN EN 10204) or by the test mark (see information sheet) issued by the *Prüfgemeinschaft Mauerbohrer e.V., Remscheid* (PGM Masonry Drill Bit Certification Board).

Nominal drill bit diameter, diameter at the cutting edge and hole depth must meet the specifications given in Annex 3. The drilling dust must be removed from the hole.

If a hole is drilled or positioned incorrectly, a new hole must be drilled at a distance equal to at least twice the depth of the incorrectly drilled hole.

#### 4.3 Setting the anchor

The anchor is intended only for temporary use in a single drilled hole. After unscrewing and removal, the anchor may be used in other drilled holes. It may not, however, be screwed into the same hole a second time.

Before each reuse, thread wear must be checked using the corresponding sleeve gauge as shown in Annex 2. The anchor may be reused only if it does not project beyond the rear end of the sleeve when inserted into the gauge (see illustration B7.b, Annex 4). As a fundamental principle, anchors that show visible signs of damage, e.g. material loss due to corrosion, may not be reused.

The screw anchor may be driven into the hole using a tangential impact wrench.

In order to prevent the anchor spinning in the hole, wrenches with a high power output should be equipped with an automatic cut-out, e.g. controlled by way of the depth gauge.

The anchor is anchored correctly when:

- the entire surface of the foot plate of the part to be fastened is pulled against the surface of the concrete (no gap),
- the head of the anchor is in contact with the foot plate,
- the anchor cannot (easily) be tightened any further,
- the setting depth  $h_{nom}$  has been achieved.

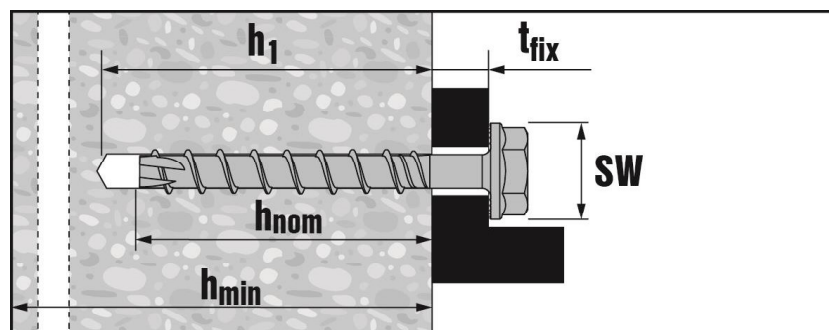
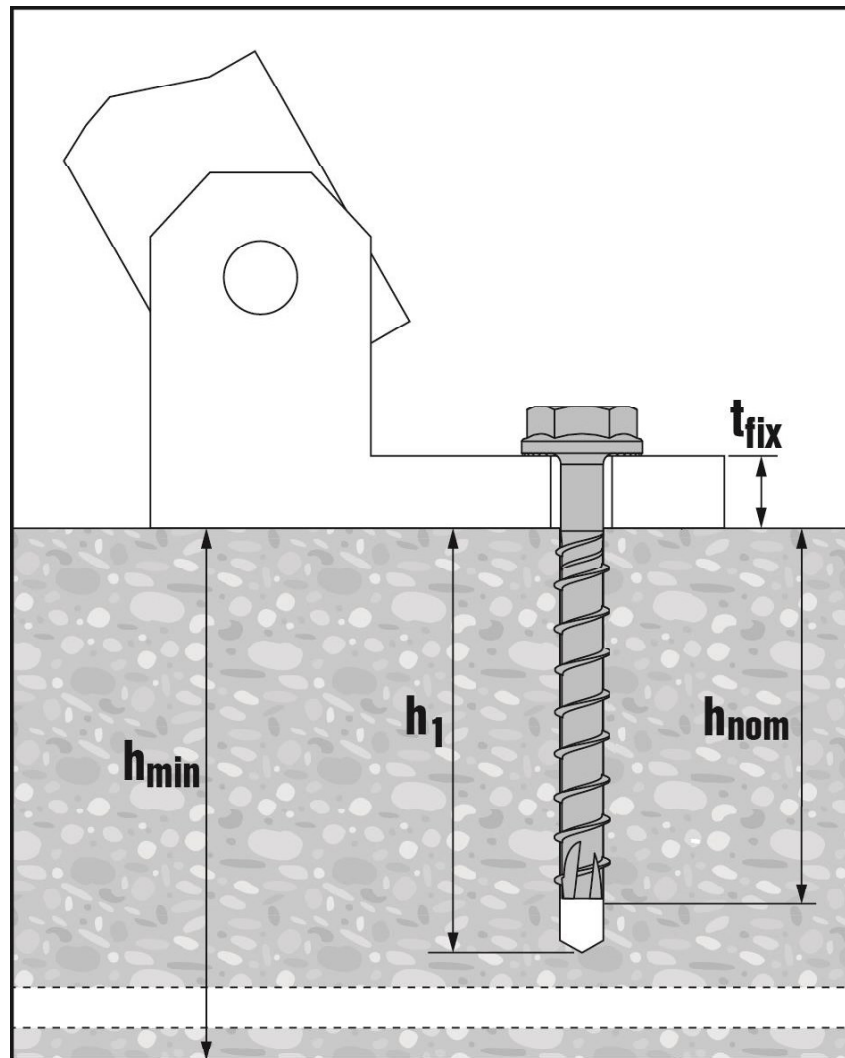
#### 4.4 Checking the installation

When installing the anchors, the contractor responsible for the anchor installation work or his appointed site supervisor or a suitably qualified and experienced deputy site supervisor must be present on the site. He/she must ensure that the work is carried out correctly.

While the installation of the anchors is being carried out, a record of the concrete compressive strength, in accordance with Section 4.1, must be kept by the site supervisor or his deputy for verification purposes and to confirm that the anchors have been installed correctly. The installed anchors must be checked correspondingly by the site supervisor or his deputy, in accordance with the information given in Section 1.2, and records kept of the results of the checks.

The records must be kept available on the site for the duration of the construction work and must be presented on demand to persons authorized to check these records. After completion of the work they must be kept along with the supplier's delivery note for at least 5 years by the contractor responsible for the work.

## Product after installation



HUS3-H sizes 10 and 14 (hexagonal head)

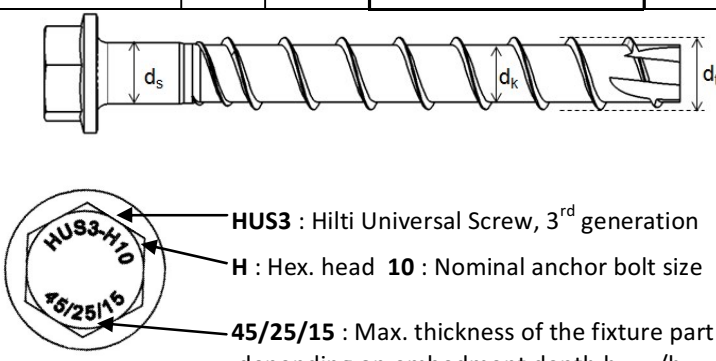
**Hilti HUS3-H concrete screw anchor**

**Product description**  
State after installation

**Annex 1**

**Table 1: Specification and markings**

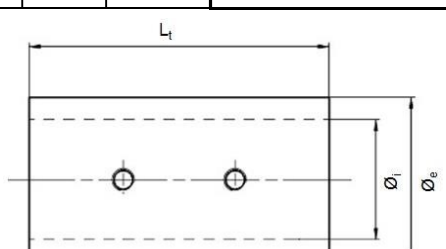
Anchor size			10			14		
Length of anchor in concrete	$h_{nom}$	[mm]	$h_{nom1}$ 55	$h_{nom2}$ 75	$h_{nom3}$ 85	$h_{nom1}$ 65	$h_{nom2}$ 85	$h_{nom3}$ 115
Threaded outer diameter	$d_t$	[mm]	12.4			16.85		
Core diameter	$d_k$	[mm]	9.90			12.95		
Shank diameter	$d_s$	[mm]	10.55			13.80		
Cross section	$A_s$	[mm <sup>2</sup> ]	77.0			131.7		



**HUS3** : Hilti Universal Screw, 3<sup>rd</sup> generation  
**H** : Hex. head **10** : Nominal anchor bolt size  
**45/25/15** : Max. thickness of the fixture part  $t_{fix1}/t_{fix2}/t_{fix3}$  depending on embedment depth  $h_{nom1}/h_{nom2}/h_{nom3}$

**Table 2: Sleeve gauge specification**

Anchor size			10	14
Sleeve inner diameter	$\varnothing_i$	[mm]	11.7	16.0
Sleeve outside diameter	$\varnothing_e$	[mm]	17.0	22.0
Sleeve length	$L_t$	[mm]	28.0	40.3



**Hilti HUS3-H concrete screw anchor**

**Product description**  
Material and specification

**Annex 2**

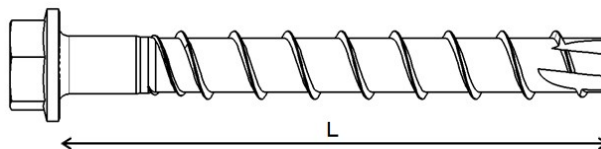
**Table 3: Installation parameters**

Anchor size			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
Nominal drill hole diameter	$d_0$	[mm]	10			14		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	10.45			14.50		
Clearance hole diameter	$d_f$	[mm]	14			18		
Wrench size	AF	[mm]	15			21		
Depth of drill hole	$h_1 \geq$	[mm]	65	85	95	75	95	125
Setting tool to set the anchor	-	-	Hilti SIW 22 T-A <sup>1)</sup>					

<sup>1)</sup> Installation using other impact screw driver with equivalent power output is permissible

**Table 4: Installation parameters: Screw length and max. thickness of part to be fastened  $t_{fix}$**

Anchor size		10			14		
		$h_{nom1}$	$h_{nom2}$	$h_{nom3}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth [mm]		55	75	85	65	85	115
		Thickness of part to be fastened [mm]					
Thread length [mm]		$t_{fix1}$	$t_{fix2}$	$t_{fix3}$	$t_{fix1}$	$t_{fix2}$	$t_{fix3}$
60		5	-	-	-	-	-
70		15	-	-	-	-	-
75		-	-	-	10	-	-
80		25	5	-	-	-	-
90		35	15	5	-	-	-
100		45	25	15	35	15	-
110		55	35	25	-	-	-
130		75	55	45	65	45	15
150		95	75	65	85	65	35



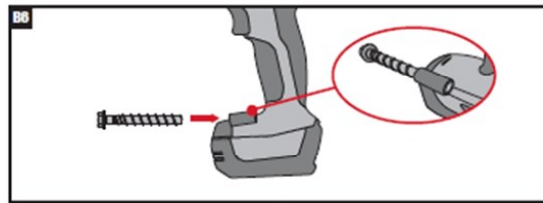
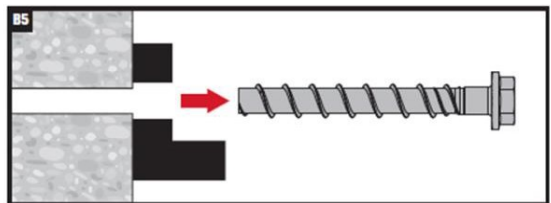
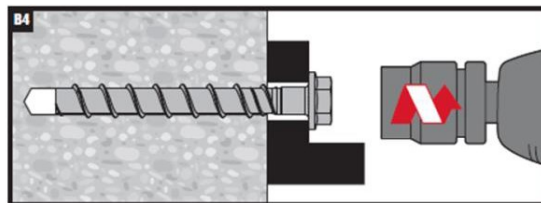
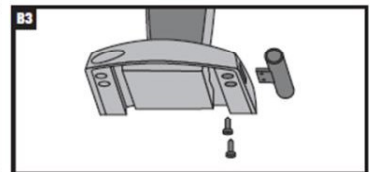
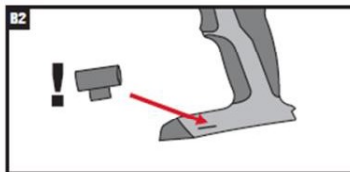
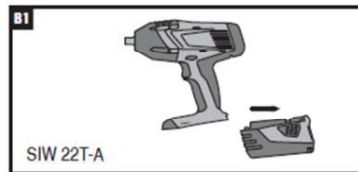
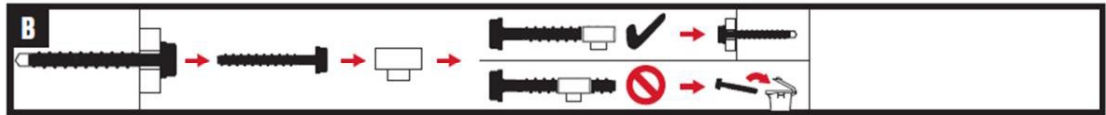
**Hilti HUS3-H concrete screw anchor**

Intended use  
Installation parameters

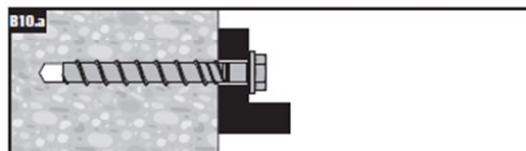
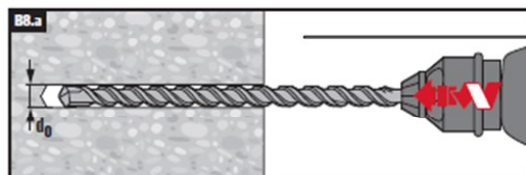
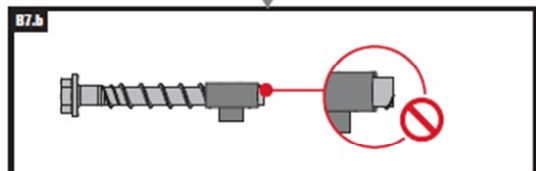
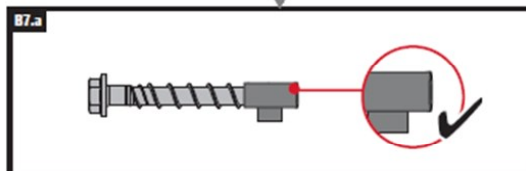
**Annex 3**



## Anchor setting (driving) instructions for reuse in temporary fastening applications



or



**Hilti HUS3-H concrete screw anchor**

**Intended use**

Anchor setting instructions for reuse in temporary fastening applications

**Annex 4**

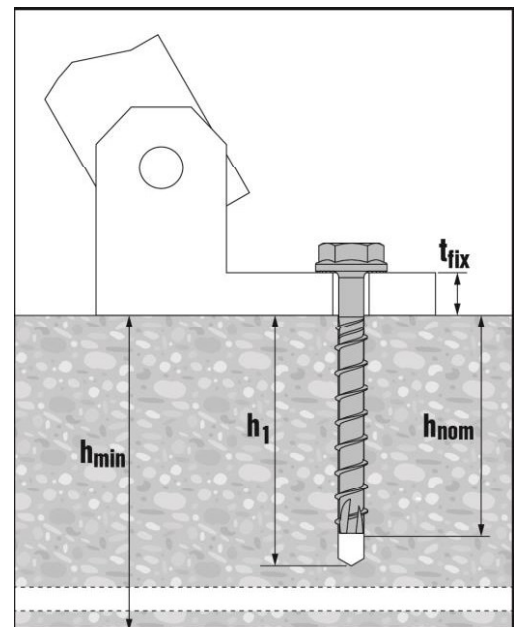
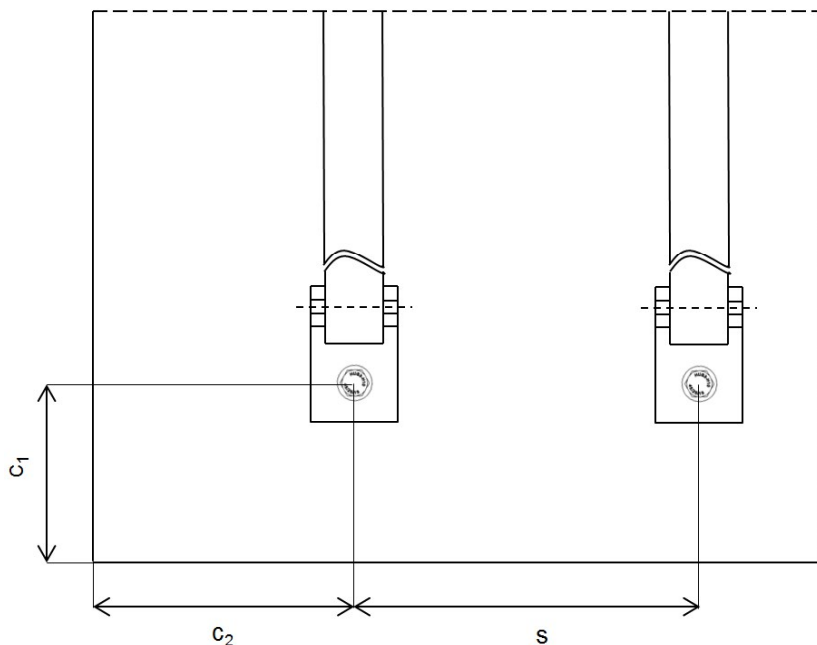
**Table 5: Minimum thickness of concrete member, minimum spacing and edge distances in cracked and uncracked concrete**

HUS3 anchor size			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
Min. thickness of concrete member	$h_{min}$	[mm]	115	150	175	130	175	255
Min. spacing distance	s	[mm]	225	300	345	255	345	510
Min. edge distance (load direction 1)	$c_1$	[mm]	75	100	115	85	115	170
Min. edge distance (load direction 1)	$c_2$	[mm]	115	150	175	130	180	260

**Table 6: Design resistance for all loading directions in cracked and uncracked concrete**

HUS3 anchor size			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
Design resistance in concrete with compressive strength $f_{ck,cube} \geq 10 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	3.3	5.3	6.3	4.4	7.0	12.3
Design resistance in concrete with compressive strength $f_{ck,cube} \geq 15 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4.0	6.4	7.8	5.4	8.5	15.0
Design resistance in concrete with compressive strength $f_{ck,cube} \geq 20 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4.7	7.4	9.0	6.2	9.9	17.3

<sup>1)</sup> Partial safety factor is included.



## Hilti HUS3-H concrete screw anchor

### Performances

Min. thickness of concrete member, min. spacing and distances and design resistance

## Annex 5