

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-20/0339**  
**of 19 June 2020**

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

Knauf Screw Anchor KSA

Product family  
to which the construction product belongs

Mechanical fastener for use in concrete

Manufacturer

Hilti Aktiengesellschaft  
9494 SCHAAN  
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

Hilti Werke

This European Technical Assessment  
contains

22 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 330011-0601, Edition 07/2014 and  
EAD 330232-01-0601, Edition 12/2019

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## Specific Part

### 1 Technical description of the product

The Knauf screw anchor KSA is an anchor made of galvanised steel of sizes 6 and 8. 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 product description is 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, C1
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C2
Characteristic resistance and displacements for seismic performance Category C1 and C2	See Annex C3, C4 and C7
Displacements (static and quasi-static loading)	See Annex C6
Durability	See Annex B1

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C5

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

In accordance with the European Assessment Document EAD 330232-01-0601 and the European Assessment Document EAD 330011-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

English translation prepared by DIBt

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

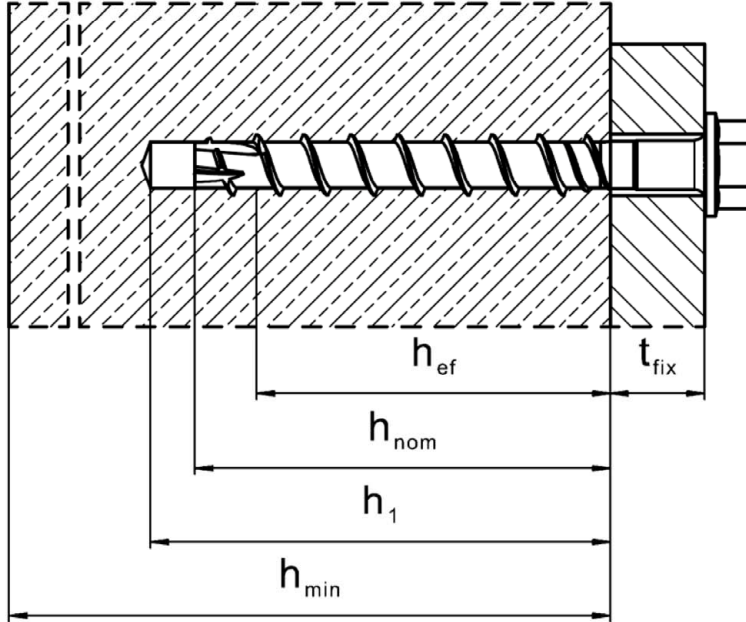
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 19 June 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

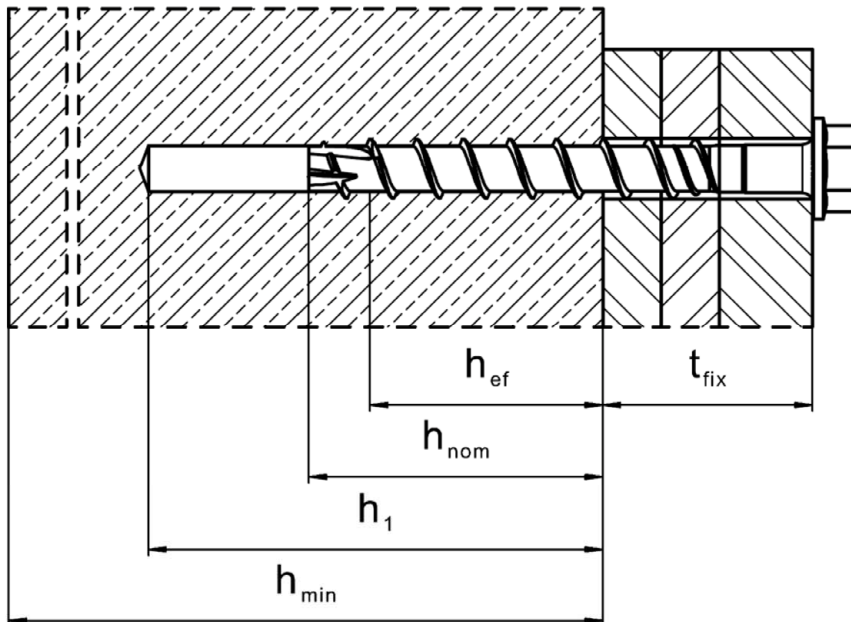
*beglaubigt:*  
Baderschneider

**Installed condition without adjustment**



KSA (hexagon head configuration sizes 6 and 8)

**Installed condition with adjustment**



KSA (hexagon head configuration size 8 –  $h_{nom2}$ ,  $h_{nom3}$ )

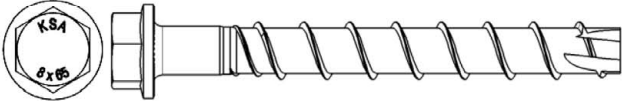
Electronic copy of the ETA by DIBt: ETA-20/0339

**Knauf screw anchor KSA**

**Product description**  
Installed condition

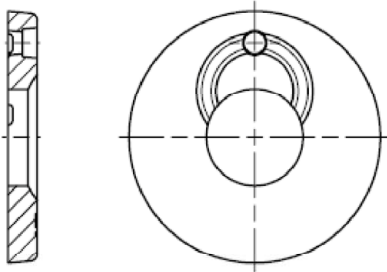
**Annex A1**

**Table A1: Screw types**

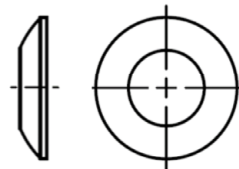
	<p>Knauf KSA, sizes 6 and 8, hexagonal head configuration, galvanized</p>
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**Hilti filling set**

**Sealing washer**



**Spherical washer**



**Injection mortar Hilti HIT-HY 200-A**  
Foil pack 330 ml and 500 ml

Marking:  
HILTI HIT  
Production number and  
production line  
Expiry date mm/yyyy



Product name: "Hilti HIT-HY 200-A"

**Static mixer Hilti HIT-RE-M**



**Knauf screw anchor KSA**

**Production description**  
Screw types  
Components of filling set

**Annex A2**

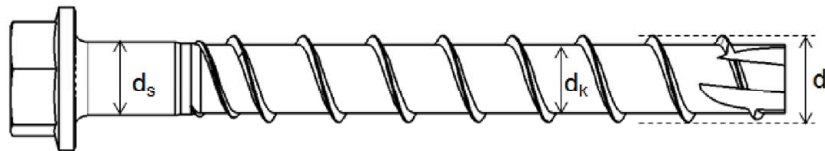
English translation prepared by DIBt

**Table A2: Materials**

Part	Designation	Material	
KSA screw anchor	Size 6 all lengths	$f_{yk} \geq 745 \text{ N/mm}^2$ , $f_{uk} \geq 930 \text{ N/mm}^2$	Carbon steel Rupture elongation $A_5 \leq 8\%$
	Size 8 all lengths	$f_{yk} \geq 695 \text{ N/mm}^2$ , $f_{uk} \geq 810 \text{ N/mm}^2$	

**Table A3: Fastener dimensions and marking**

Fastener size KSA	6		8		
	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth [mm]	40	55	50	60	70
Threaded outer diameter $d_t$ [mm]	7,85		10,30		
Core diameter $d_k$ [mm]	5,85		7,85		
Shaft diameter $d_s$ [mm]	6,15		8,45		
Stressed section $A_s$ [mm <sup>2</sup> ]	26,9		48,4		



**KSA** : Knauf screw anchor

**8** : screw diameter

**65** : screw length

**Knauf screw anchor KSA**

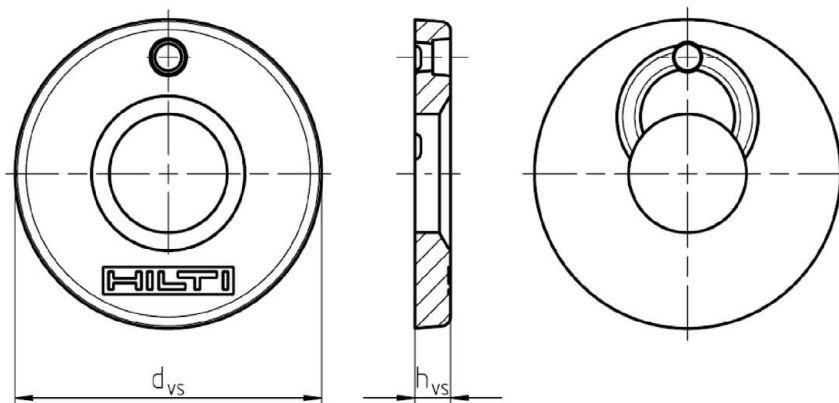
**Production description**  
Materials and fastener dimensions

**Annex A3**

**Table A4: Hilti filling washer dimensions**

Fastener size	Hilti filling set size	Hilti filling washer	
		Diameter $d_{vs}$ [mm]	Thickness $h_{vs}$ [mm]
KSA 8	M10	42	5

**Hilti filling washer**



**Knauf screw anchor KSA**

**Production description**  
Filling washer dimensions

**Annex A4**



## Specifications of intended use

### Anchorage subject to:

- Static and quasi-static loadings: all sizes and all embedment depths.
- Seismic action for performance category C1:  
KSA size 6, standard and maximum embedment depth ( $h_{nom1}$ ,  $h_{nom2}$ ).  
KSA size 8, standard and maximum embedment depth ( $h_{nom2}$ ,  $h_{nom3}$ ).
- Seismic action for performance category C2:  
KSA sizes 8, maximum embedment depth ( $h_{nom3}$ ).
- Fire exposure: All sizes and all embedment depths.

### 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 206:2013+A1:2016.
- Uncracked or cracked 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 according to EN 1992-4:2018 and EOTA Technical Report TR 055.

**Knauf screw anchor KSA**

**Intended use**  
Specifications

**Annex B1**

## Specifications of intended use

### Installation:

- Hammer drilling: all sizes and all embedment depths.
- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the 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 must be supported on the fixture and is not damaged.
- Adjustability according to Annex B7 for:  
KSA size 8 ( $h_{nom2} = 60$  mm and  $h_{nom3} = 70$  mm)
- Installation with Hilti filling set according to Annex B6.

**Knauf screw anchor KSA**

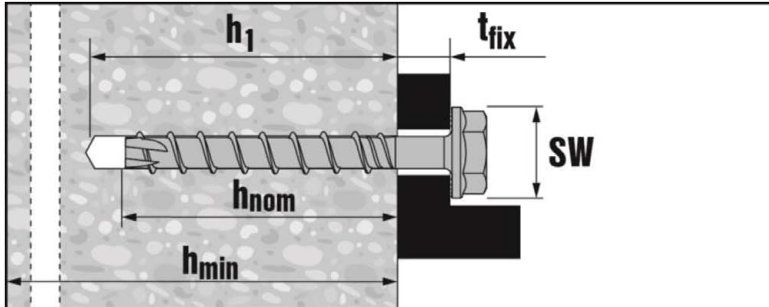
**Intended use**  
Specifications

**Annex B2**

**Table B1: Installation parameters**

Fastener size KSA		6		8		
Nominal embedment depth	$h_{nom}$ [mm]	40	55	50	60	70
Nominal drill hole diameter	$d_0$ [mm]	6		8		
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	6,40		8,45		
Clearance hole diameter	$d_f \leq$ [mm]	9		12		
Wrench size	SW [mm]	13		13		
Countersunk head diameter	$d_h$ [mm]	-		18		
Depth of drill hole in floor/ wall position	$h_1 \geq$ [mm]	50	65	60	70	80
Depth of drill hole in ceiling position	$h_1 \geq$ [mm]	43	58	-	80	90
Installation Torque	$T_{inst}$ [Nm]	20	25	-		
Setting tool <sup>1)</sup>	Strength class $\geq$ C20/25	Hilti SIW 14 A or Hilti SIW 22 A		Hilti SIW 14 A or Hilti SIW 22 A or Hilti SIW 22 T-A		

<sup>1)</sup> Installation with other impact screw driver of equivalent power is possible.



Installation parameters for KSA

**Knauf screw anchor KSA**

**Intended use**  
Installation parameters

**Annex B3**

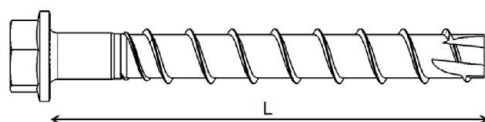
**Table B2: Minimum thickness of concrete member, minimum edge distance and spacing**

Fastener size KSA				6		8		
				$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth	$h_{nom}$	[mm]	40	55	50	60	70	
Minimum thickness of concrete member	$h_{min}$	[mm]	80	100	100	100	120	
Cracked and non-cracked concrete	Minimum spacing	$s_{min}$	35	35	50	50	50	
					40 if $c \geq 50$			
	Minimum edge distance	$c_{min}$	[mm]	35	35	40	40	40

**Table B3: Standard<sup>1)</sup> screw lengths and maximum thickness of fixture**

Fastener size KSA		6		8		
		$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
		40	55	50	60	70
Nominal embedment depth [mm]		Thickness of fixture [mm]				
Length of screw [mm]		$t_{fix1}$	$t_{fix2}$	$t_{fix1}$	$t_{fix2}$	$t_{fix3}$
55		-	-	5	-	-
60		20	5	-	-	-
65		-	-	15	5	-
75		-	-	25	15	5
80		40	25	-	-	-
85		-	-	35	25	15
100		60	45	50	40	30
120		80	65	70	60	50
150		-	-	100	90	80

<sup>1)</sup> non-standard lengths, in the range  $55 \text{ mm} \leq L \leq 150 \text{ mm}$ , are also in the scope of this ETA.



**Knauf screw anchor KSA**

**Intended use**

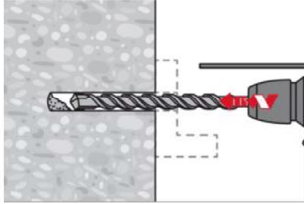
Minimum concrete thickness and minimum edge distance and spacing  
Standard screw lengths and thickness of fixture

**Annex B4**

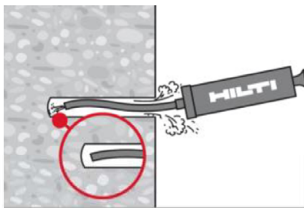
## Installation instructions

### Hole drilling

Hammer drilling (HD):



### Drill hole cleaning



Clean the drill hole. For sizes 6 and 8, hole cleaning is not required when 3x ventilation<sup>1)</sup> after drilling is executed and one of the following conditions is fulfilled:  
- drilling is in the vertical upwards orientation; or  
- drilling is in vertical downwards direction and the drilling depth is increased<sup>2)</sup> by additional  $3 \cdot d_0$ .

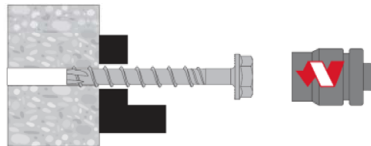
<sup>1)</sup> moving the drill bit in and out of the drill hole 3 times after the recommended drilling depth  $h_1$  is achieved. This procedure shall be done with both revolution and hammer functions activated in the drilling machine. For more details read the relevant MPII.

<sup>2)</sup> it should be verified that the thickness of the concrete member in which the fastener is installed observes the minimum distance between the drilling end and the opposite end of the member, fulfilling the relation  $h > h_1 + \Delta h$  with  $\Delta h = \max(2 \cdot d_0; 30 \text{ mm})$ .

### Fastener setting

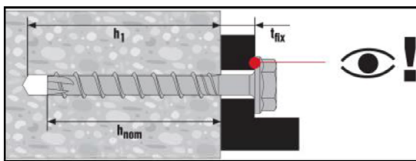
a) Setting by impact screw driver

b) Setting by torque wrench



Setting parameters listed in Table B1

### Setting check



**Knauf screw anchor KSA**

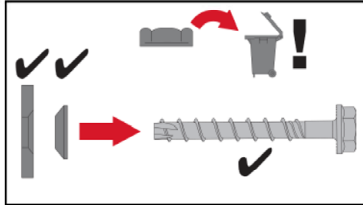
**Intended use**

Installation instructions without adjustment

**Annex B5**

**Fastener setting with Hilti filling set**

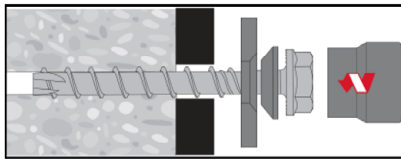
**Installation of sealing washer**



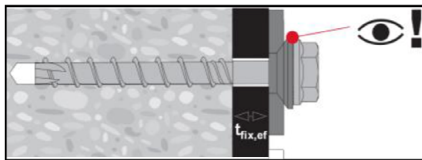
Size Seismic Set	Size KSA	$t_{fix, effective}$ (mm)
M10	8	$t_{fix} - 7 \text{ mm}$

The maximum fixture thickness  $t_{fix}$  is reduced by the overall thickness of the Hilti Filling Set after installation.

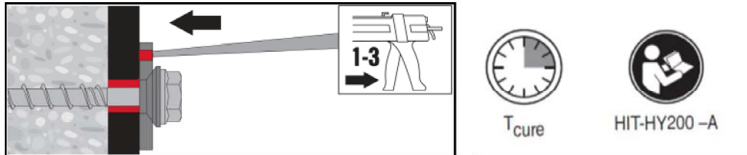
**Setting by impact screw driver**



**Setting check**



**Injection of mortar**



**Table B4: Maximum working time and minimum curing time HY 200-A**

Temperature in the base material T	Maximum working time $t_{work}$	Minimum curing time $t_{cure}$
> 0 °C to 5 °C	25 min	2 hours
> 5 °C to 10 °C	15 min	75 min
> 10 °C to 20 °C	7 min	45 min
> 20 °C to 30 °C	4 min	30 min
> 30 °C to 40 °C	3 min	30 min

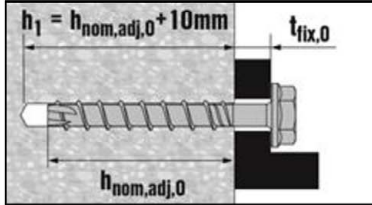
**Knauf screw anchor KSA**

**Intended use**  
Installation instructions with Hilti filling set

**Annex B6**

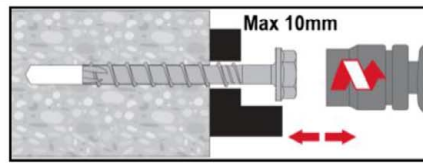
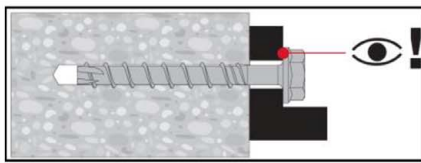
### Fastener setting with adjustment

#### Drilling depth and fixture thickness

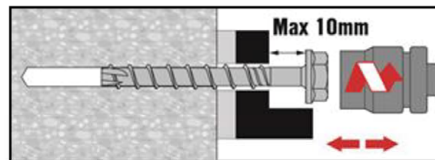
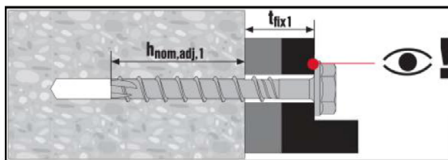


#### Adjusting process

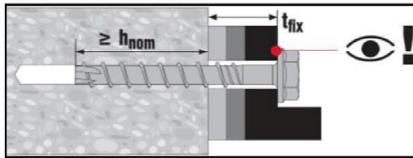
##### 1<sup>st</sup> step



##### 2<sup>nd</sup> step



#### Setting check



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  $h_{nom3}$ .

**Knauf screw anchor KSA**

#### Intended use

Installation instructions with adjustment

**Annex B7**

**Table C1: Characteristic values under static and quasi-static tension and shear loads**

Fastener size KSA			6		8		
			$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth	$h_{nom}$	[mm]	40	55	50	60	70
<b>Adjustment</b>							
Total max. thickness of adjustment layers	$t_{adj}$	[mm]	-	-	-	10	10
Max. number of adjustments	$n_a$	[-]	-	-	-	2	2
<b>Steel failure for tension load</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	24		39,2		
Partial factor	$\gamma_{Ms,N}^{1)}$	[-]	1,4				
<b>Pull-out failure</b>							
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	7	9	9	12	16
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	2,5	6	6	9	12
Increasing factor for concrete $\psi_c$	C30/37	[-]	1,22				
	C40/50	[-]	1,41				
	C50/60	[-]	1,58				
<b>Concrete cone and splitting failure</b>							
Effective embedment depth	$h_{ef}$	[mm]	30	42	40	46,4	54,9
Characteristic resistance to prevent splitting	$N_{Rk,sp}^0$	[kN]	7	9	9	12	16
Factor for	Cracked	$k_{cr,N}$	7,7				
	Non-cracked	$k_{ucr,N}$	11,0				
Concrete cone failure	Edge distance	$c_{cr,N}$	1,5 $h_{ef}$				
	Spacing	$s_{cr,N}$	3 $h_{ef}$				
Splitting failure	Edge distance	$c_{cr,sp}$	60	63	60	70	85
	Spacing	$s_{cr,sp}$	120	126	120	140	170
Installation factor	$\gamma_{inst}$	[-]	1,2				

<sup>1)</sup> In absence of other national regulations.

**Knauf screw anchor KSA**

**Performances**

Characteristics values under static and quasi-static tension and shear loads in concrete

**Annex C1**



**Table C1 continued**

Fastener size KSA			6		8		
			$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth	$h_{nom}$	[mm]	40	55	50	60	70
<b>Adjustment</b>							
Total max. thickness of adjustment layers	$t_{adj}$	[mm]	-	-	-	10	10
Max. number of adjustments	$n_a$	[-]	-	-	-	2	2
<b>Steel failure for shear load</b>							
Characteristic resistance	$V^0_{RK,s}$	[kN]	12,5		19		22
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5				
Ductility factor	$k_7$	[-]	0,8				
Characteristic resistance	$M^0_{RK,s}$	[Nm]	21		46		
<b>Concrete pry-out failure</b>							
Pry-out factor	$k_8$	[-]	1,0	1,5	1,0	2,0	
<b>Concrete edge failure</b>							
Effective length of fastener	$l_f = h_{ef}$	[mm]	30	42	40	46,4	54,9
Outside diameter of fastener	$d_{nom}$	[mm]	6		8		

<sup>1)</sup> In absence of other national regulations.

**Knauf screw anchor KSA**

**Performances**  
Characteristic values under static and quasi-static tension and shear loads in concrete

**Annex C2**

**Table C2: Characteristic values under seismic loading, performance category C1**

<b>Fastener size KSA</b>				<b>6</b>		<b>8</b>	
			$h_{nom1}$	$h_{nom2}$	$h_{nom2}$	$h_{nom3}$	
Nominal embedment depth	$h_{nom}$	[mm]	40	55	60	70	
<b>Steel failure for tension and shear load</b>							
Characteristic resistance	$N_{Rk,s,C1}$	[kN]	24		39,2		
Partial factor	$\gamma_{Ms,N}^{1)}$	[-]	1,4				
Characteristic resistance	$V_{Rk,s,C1}$	[kN]	5		11,9		
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5				
<b>Pull-out failure</b>							
Characteristic resistance in cracked concrete	$N_{Rk,p,C1}$	[kN]	2,5	4	9	12	
<b>Concrete cone failure</b>							
Effective embedment depth	$h_{ef}$	[mm]	30	42	46,4	54,9	
Concrete cone failure	Edge distance	$c_{cr,N}$	1,5 $h_{ef}$				
	Spacing	$s_{cr,N}$	3 $h_{ef}$				
Installation factor	$\gamma_{inst}$	[-]	1,0				
<b>Concrete pry-out failure</b>							
Pry-out factor	$k_8$	[-]	1,0	1,5	2,0		
<b>Concrete edge failure</b>							
Effective length of fastener	$l_f = h_{ef}$	[mm]	30	42	46,4	54,9	
Outside diameter of fastener	$d_{nom}$	[mm]	6		8		

<sup>1)</sup> In absence of other national regulations.

**Knauf screw anchor KSA**

**Performances**

Characteristic values under seismic loading, performance category C1 in concrete

**Annex C3**

**Table C3: Characteristic values under seismic loading, performance category C2**

<b>Fastener size KSA</b>			<b>8</b>
			$h_{nom3}$
Nominal embedment depth	$h_{nom}$	[mm]	70
<b>Adjustment</b>			
Total max. thickness of adjustment layers	$t_{adj}$	[mm]	10
Max. number of adjustments	$n_a$	[-]	2
<b>Steel failure for tension load</b>			
Characteristic resistance	$N_{Rk,s,C2}$	[kN]	39,2
Partial factor	$\gamma_{Ms,N}^{1)}$	[-]	1,4
<b>Pull out failure</b>			
Characteristic resistance in cracked concrete	$N_{Rk,p,C2}$	[kN]	3,2
<b>Concrete cone failure</b>			
Effective embedment depth	$h_{ef}$	[mm]	54,9
Concrete cone failure	Edge distance	$c_{Cr,N}$	$1,5 h_{ef}$
	Spacing	$s_{Cr,N}$	$3 h_{ef}$
Installation factor	$\gamma_{inst}$	[-]	1,0
<b>Steel failure for shear load</b>			
Installation with Hilti filling set; $\alpha_{gap} = 1,0$			
Characteristic resistance	$V_{Rk,s,C2}$	[kN]	14,7
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5
Installation without Hilti filling set; $\alpha_{gap} = 0,5$			
Characteristic resistance	$V_{Rk,s,C2}$	[kN]	10,8
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5
<b>Concrete pry-out failure</b>			
Pry-out factor	$k_8$	[-]	2,0
<b>Concrete edge failure</b>			
Effective length of fastener	$l_f = h_{ef}$	[mm]	54,9
Outside diameter of fastener	$d_{nom}$	[mm]	8

<sup>1)</sup> In absence of other national regulations.

**Knauf screw anchor KSA**

**Annex C4**

**Performances**

Characteristic values under seismic loading, performance category C2 in concrete

**Table C4: Characteristic values under fire exposure**

Fastener KSA			6		8		
			$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth	$h_{nom}$	[mm]	40	55	50	60	70
<b>Steel failure for tension and shear load (<math>F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}</math>)</b>							
Characteristic resistance	R30	$F_{Rk,s,fi}$ [kN]	0,5	1,6	3,2	3,5	3,8
	R60	$F_{Rk,s,fi}$ [kN]	0,5	1,2	2,4	2,6	2,8
	R90	$F_{Rk,s,fi}$ [kN]	0,5	0,8	1,6	1,6	1,9
	R120	$F_{Rk,s,fi}$ [kN]	0,4	0,7	1,2	1,2	1,5
	R30	$M^0_{Rk,s,fi}$ [Nm]	0,4	1,4	3,8	4,1	4,4
	R60	$M^0_{Rk,s,fi}$ [Nm]	0,4	1,1	2,8	3,0	3,4
	R90	$M^0_{Rk,s,fi}$ [Nm]	0,4	0,7	1,9	1,9	2,3
	R120	$M^0_{Rk,s,fi}$ [Nm]	0,3	0,6	1,5	1,4	1,7
<b>Pull-out failure</b>							
Characteristic resistance	R30 R60 R90	$N_{Rk,p,fi}$ [kN]	0,6	1,5	1,5	2,3	3,0
	R120	$N_{Rk,p,fi}$ [kN]	0,5	1,2	1,2	1,8	2,4
<b>Concrete cone failure</b>							
Characteristic resistance	R30 R60 R90	$N^0_{Rk,c,fi}$ [kN]	0,8	1,8	1,8	2,6	4,0
	R120	$N^0_{Rk,c,fi}$ [kN]	0,7	1,5	1,4	2,1	3,2
<b>Edge distance</b>							
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 $\geq 300$ mm							
<b>Fastener spacing</b>							
R30 to R120		$S_{cr,fi}$ [mm]	2 $C_{cr,fi}$				
<b>Concrete pry-out failure</b>							
R30 to R120		$k_8$ [-]	1,0	1,5	1,0	2,0	
The anchorage depth shall be increased for wet concrete by at least 30 mm compared to the given value							

**Knauf screw anchor KSA**

**Performances**  
Characteristic values under fire exposure in concrete

**Annex C5**

**Table C5: Displacements under tension loads**

Fastener size KSA				6		8		
				$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth [mm]				40	55	50	60	70
Cracked concrete C20/25 to C50/60	Tension Load	N	[kN]	1,0	2,4	4,3	5,7	7,6
	Displacement	$\delta_{N0}$	[mm]	0,1	0,1	0,3	0,4	0,3
		$\delta_{N\infty}$	[mm]	0,6	0,6	0,7	0,7	0,6
Non-cracked concrete C20/25 to C50/60	Tension Load	N	[kN]	2,8	3,6	6,6	8,9	11,8
	Displacement	$\delta_{N0}$	[mm]	0,2	0,2	0,1	0,2	0,1
		$\delta_{N\infty}$	[mm]	0,3		0,3		

**Table C6: Displacements under shear loads**

Fastener size KSA				6		8		
				$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom3}$
Nominal embedment depth [mm]				40	55	50	60	70
Cracked concrete C20/25 to C50/60	Shear Load	V	[kN]	6,0		8,1		
	Displacement	$\delta_{V0}$	[mm]	1,1	1,9	2,5	3,4	2,9
		$\delta_{V\infty}$	[mm]	2,0	2,8	3,7	5,1	4,4

**Knauf screw anchor KSA**

**Performances**

Displacement values in case of static and quasi-static loading

**Annex C6**

**Table C7: Displacements under tension load for seismic performance category C2**

<b>Fastener size HUS3</b>		<b>8</b>
		$h_{nom3}$
Nominal embedment depth		70
Displacement DLS	$\delta_{N,C2 (DLS)}$	[mm] 0,35
Displacement ULS	$\delta_{N,C2 (ULS)}$	[mm] 0,65

**Table C8: Displacements under shear load for seismic performance category C2**

<b>Fastener size HUS3</b>		<b>8</b>
		$h_{nom3}$
Nominal embedment depth		70
Installation with Hilti filling set		
Displacement DLS	$\delta_{V,C2 (DLS)}$	[mm] 1,81
Displacement ULS	$\delta_{V,C2 (ULS)}$	[mm] 4,60
Installation without Hilti filling set		
Displacement DLS	$\delta_{V,C2 (DLS)}$	[mm] 3,93
Displacement ULS	$\delta_{V,C2 (ULS)}$	[mm] 5,55

**Knauf screw anchor KSA**

**Performances**

Displacement values in case of seismic performance category C2

**Annex C7**