

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-17/0628  
of 15 June 2018

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

Betongskruue

Product family  
to which the construction product belongs

Concrete screw for multiple use  
for non-structural applications

Manufacturer

HITACHI POWER TOOLS NORWAY AS  
Kjeller Vest 7  
2007 KJELLER  
NORWEGEN

Manufacturing plant

Taiwan plant no. 1

This European Technical Assessment  
contains

14 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

ETAG 001 Part 6: "Anchors for multiple use for non-  
structural applications", January 2011,  
used as EAD according to Article 66 Paragraph 3 of  
Regulation (EU) No 305/2011.

This version replaces

ETA-17/0628 issued on 31 August 2017

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## Specific Part

### 1 Technical description of the product

The Betongskruer of sizes SK 6 and SK 8 is an anchor 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.

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)

The essential characteristics regarding Mechanical resistance and stability are included under the Basic Works Requirement Safety in use.

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

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C3 and C4

#### 3.3 Safety in use (BWR 4)

Wesentliches Merkmal	Leistung
Characteristic resistance under static and quasi-static loading, displacements	See Annex C1 and C2

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

In accordance with guideline for European technical approval ETAG 001-6, January 2011 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [97/161/EC].

The system to be applied is: 2+

**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 15 June 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Baderschneider

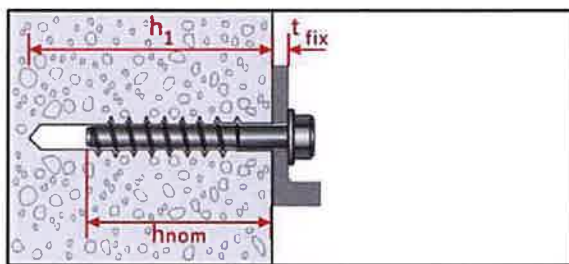
**Product in the installed condition**



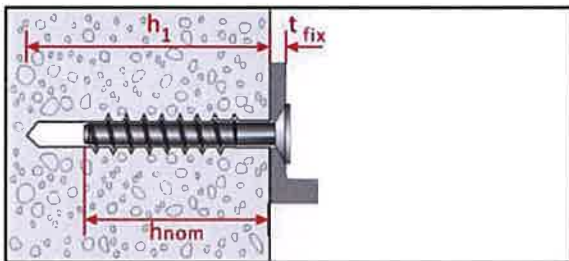
Steel 10B21



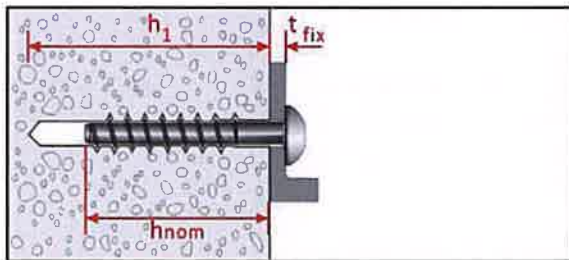
Stainless steel A2 /A4



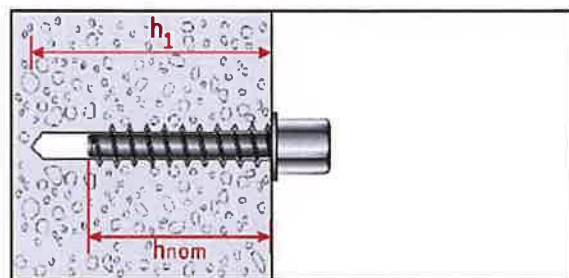
Hexagon Head : SK-H,-HF  
10B21 (SK6)  
A4 (SK6, SK8)  
A2 (SK8)



Countersunk Head : SK-C  
10B21 (Sk6)  
A4 (SK6)



Pan Head : SK-P  
10B21 (SK6)  
A4 (SK6)



















Internal Thread : SK-I  
10B21 (SK6-M8, SK6-M10,  
SK6-M8/M10)

**Betongskrue**

**Product description  
Installed condition**

**Annex A1**

**Table A1: Materials and screw types**

Name	Material							
Screw anchor	Head marking		material					
	SK	Steel 10B21 acc. To SAE-J403 zinc coating: electro plated (> 5 µm) or mechanical plated (> 30 µm)						
SK A4	Stainless steel 1.4401, 1.4404 (both A4)							
SK A2	Stainless steel 1.4301							
Anchor size / head types			SK 6			SK 8		
			-H -HF -C -P -I	-H -HF	-C -P	-H	-H	
material			10B21	A4		A2	A4	
Nominal value of the characteristic yield strength		$f_{yk}$	N/mm <sup>2</sup>	780	640	432	640	640
Nominal value of the characteristic teisile strength		$f_{uk}$	N/mm <sup>2</sup>	870	800	540	800	800
Elongation at rupture		$A_s$	[%]	≤ 8				
   			<b>Hexagon washer head</b> 1) SK-H size 6 (10B21 steel) 2) SK-H A4 size 6,8 (stainless A4) 3) SK-H A2 size 8 (stainless A2)					
  			<b>Hexagon washer head</b> 3) SK-HF size 6 (10B21 steel) 4) SK-HF A4 size 6 (stainless A4)					
  			<b>Countersunk head</b> 5) SK-C size 6 (10B21 steel) 6) SK-C A4 size 6 (stainless A4)					
  			<b>Pan head</b> 7) SK-P size 6 (10B21 steel) 8) SK-P A4 size 6 (stainless A4)					
  			<b>Internal thread head (10B21 steel)</b> 9) SK-I size 6 with internal thread M8 or M10 10) SK-I size 6 with internal thread M8 and M10					

**Betongskrue**

**Product description**  
Materials and screw types

**Annex A2**



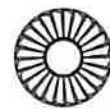
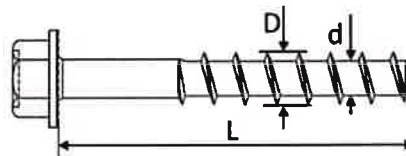
**Table A2: Dimensions and markings**

Anchor size			SK 6				SK 8		
Head type			H, HF, P	C	H, HF, P	C	I	H	H
Material			Steel 10B21		Stainless A4		Steel 10B21	Stainless A2	Stainless A4
Nominal Embedment depth	$h_{nom}$	[mm]	55		70		55	52	52
Length of anchor	min L	[mm]	60	65	75	80	57	55	55
	max L	[mm]	140				57	150	
Thread diameter	D	[mm]	7,5				9,9		
Shaft diameter	d	[mm]	5,5				7,4		
Thread pitch	p	[mm]	4,45				5,8		

Steel  
10B21



Head marking:  
Identifying mark of producer: SK  
Nominal size: e.g. 6mm  
Length L: 70mm

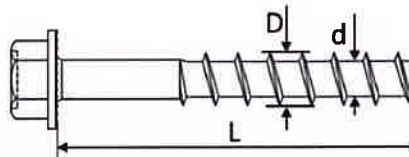


Reverse Locking  
Serrations

Stainless Steel  
A4



Head marking:  
Identifying mark of producer: SK  
Nominal size: e.g. 6mm  
Length L: 85mm  
Material: A4

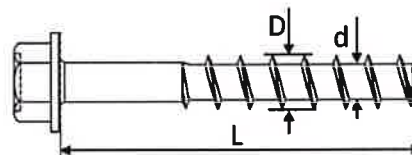


Reverse Locking  
Serrations

Stainless Steel  
A2



Head marking:  
Identifying mark of producer: SK  
Nominal size: e.g. 8mm  
Length L: 65mm  
Material: A2



Reverse Locking  
Serrations

**Betongkrue**

**Product description**  
Dimensions and markings

**Annex A3**

### Specifications of Intended use

#### Anchorage subject to:

- Static and quasi-static loads:
- Used only for multiple use for non-structural application according to ETAG 001, part 6.
- Fire exposure: only for concrete C20/25 to C50/60.

#### Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000,
- Strength classes C20/25 to C50/60 according to EN 206-1:2000,
- Non-cracked or cracked concrete: all sizes.

#### Use conditions (Environmental conditions)

- Anchorages subject to dry internal conditions. (zinc plated steel and stainless steel)
- Anchorages subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. (Stainless steel)

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere or indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

#### 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 anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed in accordance with FprEN 1992-4:2016 and TR 055, Edition December 2016

#### Installation:

- Hammer drilling only: all sizes and all embedment depths.
- Anchor 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 anchor shall not be possible.
- The head of the anchor must be fully engaged on the fixture and show no signs of damage.

<b>Betongskruue</b>	<b>Annex B1</b>
<b>Intended use Specifications</b>	



**Table B1: Installation parameters**

Anchor size			SK 6						SK 8		
Head type			H, HF	P	I	C	H, HF	P	C	H	H
Material			Steel 10B21			Stainless A4			Stainless A2	Stainless A4	
Nominal diameter of drill bit	$d_0$	[mm]	6						8		
Nominal embedment depth	$h_{nom}$	[mm]	55			70			52		
Min. hole depth in concrete	$h_1 \geq$	[mm]	64			80			65		
Effective anchorage depth	$h_{ef}$	[mm]	42,6			43,1			22,2		
Clearance hole	$d_f$	[mm]	9						11		
Thickness of fixture	$t_{fix}$	[mm]	5-85	-	10-85	5-70	10-70	3-98			
Installation torque <sup>1)</sup>	$T_{inst}$	[Nm]	20	- <sup>1)</sup>	20	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	31		
Wrench size	WS	[mm]	10	-	12,7	-	-	-	13		
Torx size	TX	-	-	40	-	40	-	40	40	-	
Max. power output, machine setting	$T_{max} \leq$	[Nm]	80			120	80	80	185		

1) Screws can only be set using a impact screw driver.

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

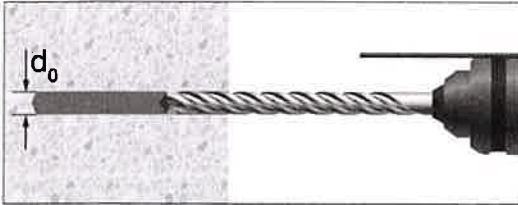
Anchor size			SK 6			SK 8	
			H, HF, C, P, I			H, HF, C, P	
Material			Steel 10B21			Stainless A4	
			Stainless A2		Stainless A4		
Minimum member thickness	$h_{min}$	[mm]	100		110		100
Minimum edge distance	$c_{min}$	[mm]	40		40		55
Minimum spacing	$s_{min}$	[mm]	40		40		55

**Betongskruue**

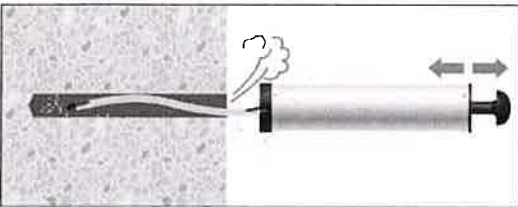
**Intended use**  
Installation parameters

**Annex B2**

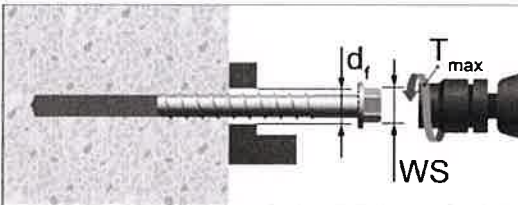
## Installation instruction



Drill the hole to the depth  $h_1$ .



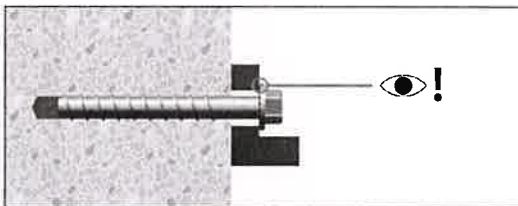
Clean the hole.



Screw in the anchor by using a torque wrench or an impact screw driver.

In case of using torque wrench:  $T_{inst}$  acc. to Table B1.

In case of using impact screw driver:  $T_{max}$  acc. to Table B1.  
WS= Wrench Size



Control of complete setting, full contact of screw head with fixture part.

**Betongskruve**

**Intended Use**  
Installation Instruction

**Annex B3**

**Table C1: Characteristic resistance under tension loading**

Anchor size			SK 6				SK 8				
Head type			H, HF, I	C	P	H, HF	C	P	H	H	
Material			Steel 10B21			Stainless A4		Stainless A2	Stainless A4		
<b>Steel failure</b>											
Characteristic resistance	$N_{Rk,s}^{1)}$	[kN]	19,7		18,1	12,2	12,2	33,0	33,0		
Partial factor	$\gamma_{Ms}^{2)}$	[-]	1,4		1,5		1,5				
<b>Pull-out failure</b>											
Characteristic resistance in cracked and uncracked concrete C20/25	$N_{Rk,p}^{1)}$	[kN]	5,0	5,0	4,0	5,0	3,5	2,5	2,0		
Increasing factors for $N_{Rk,p}$ in cracked or non-cracked concrete	$\psi_c$	C30/37	1,22					1,20			
		C40/50	1,41					1,37			
		C50/60	1,58					1,51			
Installation factor	$\gamma_{inst}^{2)}$	[-]	1,0		1,0		1,0				
<b>Concrete cone failure</b>											
Effective anchorage depth	$h_{ef}$	[mm]	42,6		43,1		22,2				
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 $h_{ef}$								
Characteristic spacing	$s_{cr,N}$	[mm]	3,0 $h_{ef}$								
Installation factor	$\gamma_{inst}^{2)}$	[-]	1,0		1,0		1,0				
Factor for cracked concrete	$k_{cr}^{3)}$	[-]	7,7								
Factor for uncracked concrete	$k_{ucr}^{3)}$	[-]	11,0								
<b>Splitting failure</b>											
Proof of splitting is required	-	[-]	Yes		Yes		Yes				
Characteristic edge distance for splitting	$c_{cr,sp}$	[mm]	1,5 $h_{ef}$		1,5 $h_{ef}$		2,5 $h_{ef}$				
Characteristic anchor spacing for splitting	$s_{cr,sp}$	[mm]	3,0 $h_{ef}$		3,0 $h_{ef}$		5,0 $h_{ef}$				
Installation factor	$\gamma_{inst}^{2)}$	[-]	1,0		1,0		1,0				
Factor for cracked concrete	$k_{cr}^{3)}$	[-]	7,7								
Factor for uncracked concrete	$k_{ucr}^{3)}$	[-]	11,0								

1) The design value  $N_{Rd,s}$  has to be limited according to ETAG001, part 6, Annex 1.

2) In absence of other national regulations.

3) Based on concrete strength measured on cylinders.

**Betongskruue**

**Performance**

Characteristic values under tension loading

**Annex C1**

**Table C2: Characteristic resistance under shear loading**

Anchor size			SK 6				SK 8			
Head type			H, HF, I	C	P	H, HF	C	P	H	H
Material			Steel 10B21			Stainless A4			Stainless A2	Stainless A4
Setting depth	$h_{nom}$	[mm]	55			70			52	
Effective embedment depth	$h_{ef}$	[mm]	42,6			43,1			22,2	
<b>Steel failure without lever arm</b>										
Characteristic resistance	$V_{Rk,s}^{1)}$	[kN]	7,9			9,0	6,1	6,1	13,2	
Ductility factor	$k_7$	[-]	0,8							
Partial factor	$\gamma_{Ms}^{2)}$	[-]	1,5			1,25			1,25	
<b>Steel failure with lever arm</b>										
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	15,9			14,6	9,9	9,9	35,9	
Partial factor	$\gamma_{Ms}^{2)}$	[-]	1,5			1,25			1,25	
<b>Concrete pryout failure</b>										
k-factor	$k_8$	[-]	1,0			1,0			1,0	
Partial factor	$\gamma_{Mcp}^{2)}$	[-]	1,5							
<b>Concrete edge failure</b>										
Effective length of anchor in shear loading	$\ell_f$	[mm]	42,6			43,1			22,2	
Effective diameter of anchor	$d_{nom}$	[mm]	5,37						7,4	
Partial factor	$\gamma_{Mc}^{2)}$	[-]	1,5							

1) The design value  $V_{Rd,s}$  has to be limited according to ETAG001, part 6, Annex 1.

2) In absence of other national regulations

**Betongskruer**

**Performance**  
Characteristic values under shear loading

**Annex C2**

**Table C3: Characteristic values for resistance to fire (Tension)**

Anchor size				SK 6						SK 8			
Head type				H, HF, I	C	P	H, HF	C	P	H	H		
Material				Steel 10B21			Stainless A4			Stainless A2	Stainless A4		
Partial factor		$\gamma_{M,fi}$ <sup>1)</sup>	[-]	1,0			1,0			1,0			
<b>Steel failure</b>													
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,23			0,23			0,8			
	R60	$N_{Rk,s,fi}$	[kN]	0,20			0,20			0,7			
	R90	$N_{Rk,s,fi}$	[kN]	0,16			0,16			0,5			
	R120	$N_{Rk,s,fi}$	[kN]	0,11			0,11			0,4			
<b>Pull-out failure</b>													
Characteristic resistance in concrete $\geq$ C20/25	R30	$N_{Rk,p,fi}$	[kN]	1,3	1,0	1,3	0,9	0,6	0,5				
	R60												
	R90	$N_{Rk,p,fi}$	[kN]	1,0	0,8	1,0	0,7	0,5	0,4				
	R120												
<b>Concrete cone failure</b>													
Characteristic resistance in concrete $\geq$ C20/25	R30	$N^0_{Rk,c,fi}$	[kN]	2,0			2,1		0,4				
	R60												
	R90	$N^0_{Rk,c,fi}$	[kN]	1,6			1,7		0,3				
	R120												
Effective embedment depth	$h_{ef}$	[mm]	42,6			43,1			22,2				
Minimum member thickness	$h_{min}$	[mm]	100			110			100				
Spacing	$s_{cr,N,fi}$	[mm]	4 $h_{ef}$										
	$s_{min}$	[mm]	40						55				
Edge distance	$c_{cr,N,fi}$	[mm]	2 $h_{ef}$										
Fire exposure from one side only	$c_{min}$	[mm]	40						55				
Fire exposure from more than one side			$\geq 300$ mm										

1) In absence of other national regulations.

**Betongskruer**

**Performance**  
Characteristic values for resistance to fire

**Annex C3**

**Table C4: Characteristic values for resistance to fire (Shear)**

Anchor size				SK 6						SK 8	
Head type				H, HF, I	C	P	H, HF	C	P	H	H
Material				Steel 10B21			Stainless A4			Stainless A2	Stainless A4
Partial factor		$\gamma_{M,fi}$ <sup>1)</sup>	[-]	1.0							
<b>Steel failure without level arm</b>											
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,23			0,23			0,8	
	R60	$V_{Rk,s,fi}$	[kN]	0,20			0,20			0,7	
	R90	$V_{Rk,s,fi}$	[kN]	0,16			0,16			0,5	
	R120	$V_{Rk,s,fi}$	[kN]	0,11			0,11			0,4	
<b>Steel failure with level arm</b>											
Characteristic resistance	R30	$M^0_{Rk,p,fi}$	[Nm]	0,18			0,18			0,9	
	R60	$M^0_{Rk,p,fi}$	[Nm]	0,16			0,16			0,7	
	R90	$M^0_{Rk,p,fi}$	[Nm]	0,13			0,13			0,5	
	R120	$M^0_{Rk,p,fi}$	[Nm]	0,09			0,09			0,4	
<b>Pry-out failure</b>											
$k_8$			[-]	1,0			1,0			1,0	
Characteristic resistance	R30	$V_{Rk,cp,fi}$	[kN]	2,0			2,1			0,4	
	R60										
	R90										
	R120	$V_{Rk,cp,fi}$	[kN]	1,6			1,7			0,3	
<b>Concrete edge failure</b>											
Characteristic resistance	≤ R90	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi} = 0,25 * V^0_{Rk,c}$							
	R120	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi} = 0,20 * V^0_{Rk,c}$							

1) In absence of other national regulations.

**Betongkrue**

**Performance**  
Characteristic values for resistance to fire

**Annex C4**