

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-15/0815**  
**of 1 February 2016**

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

Sheh Kai Concrete Screw SK

Product family  
to which the construction product belongs

Concrete screw

Manufacturer

SHEH KAI PRECISION CO., LTD  
No. 1, Ben Gong 1st Rd., Ben Chou Industrial Park,  
KAOHSIUNG 82059  
TAIWAN R.O.C

Manufacturing plant

SHEH KAI PRECISION CO., LTD  
No. 1, Ben Gong 1st Rd., Ben Chou Industrial Park,  
KAOHSIUNG 82059  
TAIWAN R.O.C

This European Technical Assessment  
contains

10 pages including 3 annexes

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

Guideline for European technical approval of "Metal  
anchors for use in concrete", ETAG 001 Part 3:  
"Undercut anchors", April 2013,  
used as European Assessment Document (EAD)  
according to Article 66 Paragraph 3 of Regulation (EU)  
No 305/2011.

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## Specific Part

### 1 Technical description of the product

The Sheh Kai concrete screw of sizes SK 8, SK 10 and SK 12 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)

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

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

Essential characteristic	Performance
Reaction to fire	Anchorage satisfies requirements for Class A1
Resistance to fire	No performance determined

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

For Basic Works Requirement Safety in use the same criteria are valid as for Basic Works Requirement Mechanical resistance and stability.

### 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, April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, and European Assessment Document EAD 330011-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

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

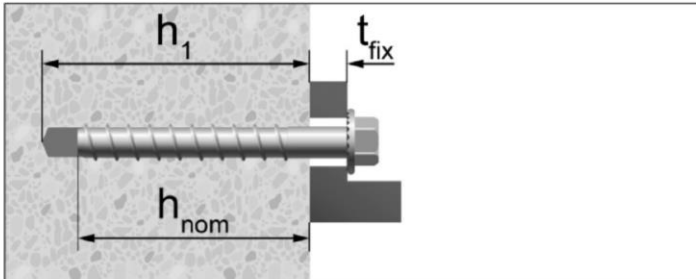
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 1 February 2015 by Deutsches Institut für Bautechnik

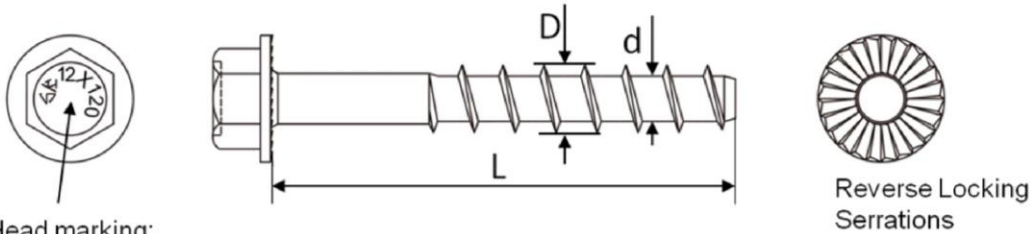
Andreas Kummerow  
p. p. Head of Department

Beglaubigt

### Concrete screw after installation



### Marking of head



Head marking:

Identifying mark of producer: SK

Nominal size: e.g. 12 mm

Length L: e.g. 120 mm

**Table A1: Dimensions and materials**

Anchor size			SK 8	SK 10	SK 12
Length of anchor	min L	[mm]	70	80	100
	max L	[mm]	150	150	150
Thread diameter	D	[mm]	9,95	12,5	14,2
Shaft diameter	d	[mm]	7,4	9,4	11,3
Thread pitch	p	[mm]	5,8	7,8	8,1
Material			Steel 10B21 acc. To SAE-J403		
Coating			zinc coating: electro plated (>5µm) or mechanical plated (>30µm)		

**Sheh Kai Concrete Screw SK**

**Product description**  
Installed condition, dimensions and materials

**Annex A 1**

<p><b>Intended use</b></p> <p><b>Anchorage subject to:</b></p> <ul style="list-style-type: none"> <li>• Static and quasi-static loads: All sizes.</li> </ul> <p><b>Base materials:</b></p> <ul style="list-style-type: none"> <li>• Reinforced or unreinforced normal weight concrete according to EN 206-1:2000,</li> <li>• Strength classes C20/25 to C50/60 according to EN 206-1:2000,</li> <li>• Non-cracked or cracked concrete: all sizes.</li> </ul> <p><b>Use conditions (Environmental conditions)</b></p> <ul style="list-style-type: none"> <li>• Anchorages subject to dry internal conditions.</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>• Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.</li> <li>• 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.).</li> <li>• Anchorages under static or quasi-static actions are designed for design method A in accordance with: <ul style="list-style-type: none"> <li>- Either ETAG 001, Annex C, Edition August 2010</li> <li>- Or CEN/TS 1992-4:2009</li> </ul> </li> </ul> <p><b>Installation:</b></p> <ul style="list-style-type: none"> <li>• Hammer drilling only: all sizes and all embedment depths.</li> <li>• Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.</li> <li>• 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.</li> <li>• After installation further turning of the anchor must not be possible.</li> <li>• The head of the anchor must be supported on the fixture and is not damaged.</li> </ul>	
<b>Sheh Kai Concrete Screw SK</b>	
<b>Intended Use Specifications</b>	<b>Annex B 1</b>

**Table B1: Installation parameters**

Anchor size			SK 8	SK 10	SK 12
Nominal diameter of drill bit	$d_0$	[mm]	8	10	12
Nominal embedment depth	$h_{nom}$	[mm]	65	75	95
Min. hole depth in concrete	$h_1 \geq$	[mm]	75	85	105
Effective anchorage depth	$h_{ef}$	[mm]	50,6	58,1	75,4
Clearance hole	$d_f$	[mm]	11	13	15
Thickness of fixture	$t_{fix}$	[mm]	5-85	5-75	5-55
Installation torque	$T_{inst}$	[Nm]	40	60	80
Wrench size	WS	[mm]	13	17	19
Max. torque moment, machine setting	$T_{max} \leq$	[Nm]	185	350	350

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

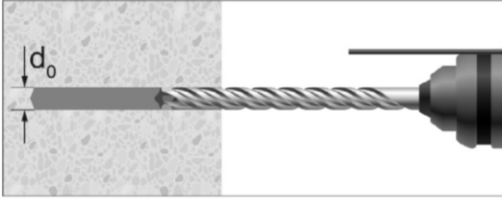
Anchor size			SK 8	SK 10	SK 12
Minimum member thickness	$h_{min}$	[mm]	110	130	150
Minimum edge distance	$c_{min}$	[mm]	50	60	70
Minimum spacing	$s_{min}$	[mm]	50	60	70

**Sheh Kai Concrete Screw SK**

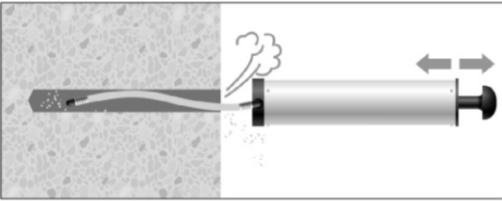
**Intended Use**  
Installation parameters

**Annex B 2**

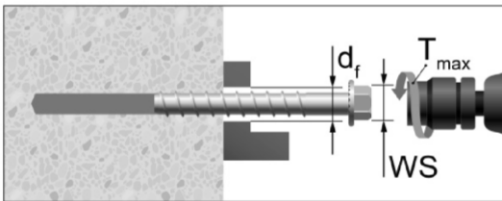
### Installation instruction



Drill the hole to the depth  $h_1$ .



Clean the hole.

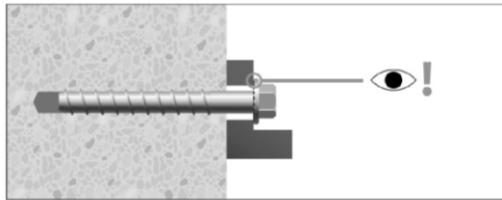


Screw in the anchor by using a torque wrench or an impact screw driver.

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.

**Sheh Kai Concrete Screw SK**

**Intended Use**  
Installation instruction

**Annex B 3**



**Table C1: Characteristic resistances under tension loading, Design method A**

Anchor size		SK 8	SK 10	SK 12	
<b>Steel failure</b>					
Characteristic resistance	$N_{Rk,s}$	[kN]	35,9	57,0	83,0
Partial safety factor	$\gamma_{Ms}$	[-]	1,4	1,4	1,4
<b>Pull-out failure</b>					
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	4,0	7,5	12,0
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	9,0	16,0	25,0
Increasing factors for $N_{Rk,p}$ in cracked or non-cracked concrete	$\psi_c$	[-]	C30/37		
			C40/50		
			C50/60		
Installation safety factor	$\gamma_2^{(2)} = \gamma_{inst}^{(1)}$	[-]	1,4	1,0	1,2
<b>Concrete cone failure</b>					
Effective anchorage depth	$h_{ef}$	[mm]	50,6	58,1	75,4
Characteristic edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$		
Characteristic spacing	$s_{cr,N}$	[mm]	$3h_{ef}$		
Installation safety factor	$\gamma_2^{(2)} = \gamma_{inst}^{(1)}$	[-]	1,4	1,0	1,2
Factor for cracked concrete	$k_{cr}^{(1)}$	[-]	7,2		
Factor for uncracked concrete	$k_{ucr}^{(1)}$	[-]	10,1		
<b>Splitting failure<sup>3)</sup></b>					
Characteristic edge distance for splitting	$c_{cr,sp}$	[mm]	$1,5h_{ef}$	$1,5h_{ef}$	$1,5h_{ef}$
Characteristic anchor spacing for splitting	$s_{cr,sp}$	[mm]	$3h_{ef}$	$3h_{ef}$	$3h_{ef}$

1) Parameters relevant only for design according to CEN/TS 1992-4:2009

2) Parameter relevant only for design according to ETAG001 Annex C

3) For the sizes SK 8 and SK 10 the value  $N_{Rk,p}$  has to be inserted as  $N_{Rk,c}^0$  in Equation (5.3) of ETAG 001, Annex C or as  $N_{Rk}^0$  in Equation (12) of CEN/TS 1992-4-4:2009 resp.

**Table C2: Displacements under tension loads for non-cracked and cracked concrete**

Anchor size	Concrete	Tension load N	Displacement	
			$\delta_{N0}$	$\delta_{N\infty}$
[-]	[-]	[kN]	[mm]	[mm]
SK 8	cracked C20/25	1,4	0,1	0,8
SK 10		3,6	0,1	1,0
SK 12		4,8	0,3	1,2
SK 8	non- cracked C20/25	3,1	0,1	0,8
SK 10		7,6	0,1	1,0
SK 12		9,9	0,2	1,2

**Sheh Kai Concrete Screw SK**

**Design method A,**  
Characteristic values under tension loading,  
Displacements under tension loads

**Annex C 1**

**Table C3: Characteristic resistance under shear loading, Design method A**

Anchor size			SK 8	SK 10	SK 12
Setting depth	$h_{nom}$	[mm]	65	75	95
Effective embedment depth	$h_{ef}$	[mm]	50,6	58,1	75,4
<b>Steel failure without lever arm</b>					
Characteristic resistance	$V_{Rk,s}$	[kN]	13,4	21,3	37,8
Factor for groups	$k_2^{1)}$	[-]		0,8	
Partial safety factor	$\gamma_{Ms}$	[-]		1,5	
<b>Steel failure with lever arm</b>					
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	39,0	79,0	139,0
Partial safety factor	$\gamma_{Ms}$	[-]		1,5	
<b>Concrete pryout failure</b>					
k-factor	$k^{2)} = k_3^{1)}$	[-]		1,0	2,0
<b>Concrete edge failure</b>					
Effective length of anchor in shear loading	$\ell_f$	[mm]	50,6	58,1	75,4
Effective diameter of anchor	$d_{nom}$	[mm]	7,25	9,24	11,15

1) Parameters relevant only for design according to CEN/TS 1992-4:2009

2) Parameter relevant only for design according to ETAG001 Annex C

**Table C4: Displacement under shear loads**

Anchor size	Concrete	Shear load V	Displacement	
			$\delta_{V0}$	$\delta_{V\infty}$
[-]	[-]	[kN]	[mm]	[mm]
SK 8	C20/25	6,4	1,8	2,7
SK 10		10,1	1,8	2,7
SK 12		18,0	1,8	2,7

**Sheh Kai Concrete Screw SK**

**Design method A,**  
Characteristic values under shear loading,  
Displacements under shear loads

**Annex C 2**