

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-16/0698
of 22 November 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

EFCO Concrete Screw SK

Product family
to which the construction product belongs

Concrete screw

Manufacturer

EFCO Befestigungstechnik
by Egli Fischer & Co. AG
Grabenstraße 1
8606 NÄNIKON
SCHWEIZ

Manufacturing plant

EFCO Befestigungstechnik
by Egli Fischer & Co. AG, Werk 4
EFCO Engineered Fixings
by Egli Fischer & Co. AG, factory 4

This European Technical Assessment
contains

10 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

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 EFCO 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 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

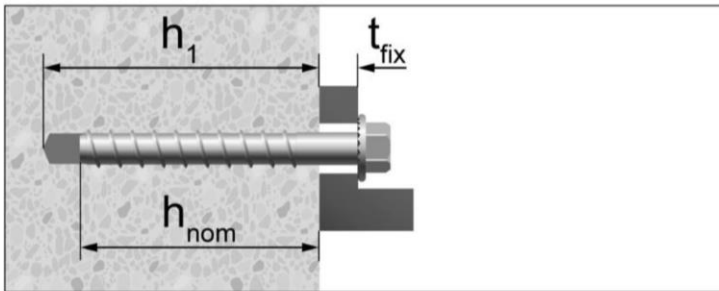
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 22 November 2016 by Deutsches Institut für Bautechnik

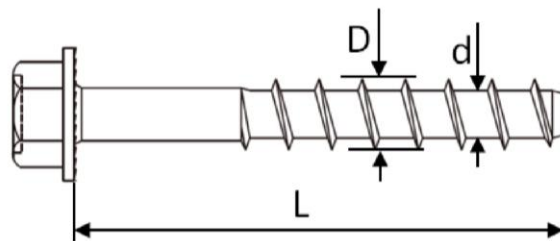
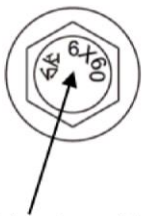
Uwe Bender
Head of Department

beglaubigt:
Baderschneider

Concrete screw after installation



Marking of head



Reverse Locking
Serrations

Head marking:

Identifying mark of producer: SK

Nominal size: 6 mm

Length L: e.g. 60mm

Table A1: Dimension and materials

Anchor size			SK 6
Length of anchor	min L	[mm]	60
	max L	[mm]	140
Thread diameter	D	[mm]	7,5
Shaft diameter	d	[mm]	5,5
Thread pitch	p	[mm]	4,45
Material			Steel 10B21 acc. to SAE-J403 Elongation $A_5 \leq 8\%$
Coating			zink coating: elektro plated ($>5\mu\text{m}$) or mechanical plated ($>30\mu\text{m}$)

EFCO Concrete Screw SK

Product description

Installed condition, dimensions and materials

Annex A 1

Intended use

Anchorage subject to:

- Static and quasi-static loads.
- Used only for multiple use for non structural application according to ETAG 001, Teil 6.

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.

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 under static or quasi-static actions are designed for design method A in accordance with:
 - Either ETAG 001, Annex C, Edition August 2010
 - Or CEN/TS 1992-4:2009

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 must not be possible.
- The head of the anchor must be supported on the fixture and is not damaged.

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**Intended Use
Specifications**

Annex B 1

Table B1: Installation parameters

Anchor size			SK 6
Nominal diameter of drill bit	d_0	[mm]	6
Nominal embedment depth	h_{nom}	[mm]	55
Min. hole depth in concrete	$h_1 \geq$	[mm]	64
Effective anchorage depth	h_{ef}	[mm]	42,6
Clearance hole	d_f	[mm]	9
Thickness of fixture	t_{fix}	[mm]	5-85
Installation torque	T_{inst}	[Nm]	20
Wrench size	WS	[mm]	10
Max. torque moment, machine setting	$T_{max} \leq$	[Nm]	80

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

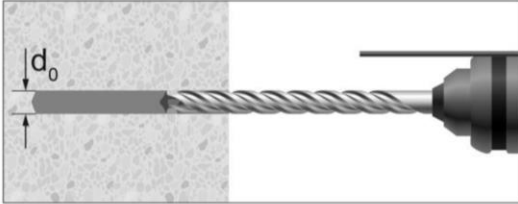
Anchor size			SK 6
Minimum member thickness	h_{min}	[mm]	100
Minimum edge distance	c_{min}	[mm]	40
Minimum spacing	s_{min}	[mm]	40

EFCO Concrete Screw SK

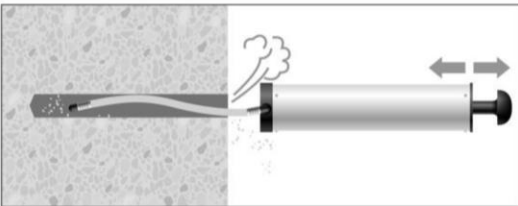
Intended Use
Installation parameters

Annex B 2

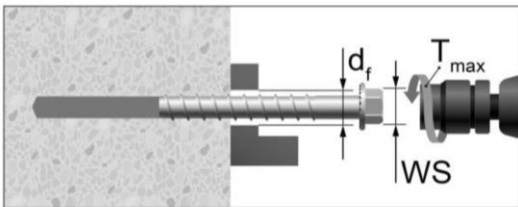
Installation instruction



Drill the hole to the depth h_1 .



Clean the hole.

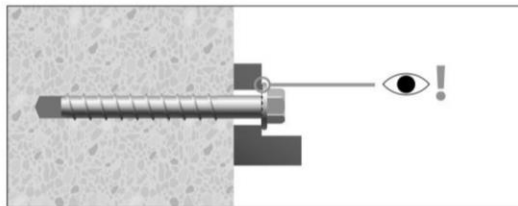


Screw in the anchor by using a torque wrench or an impact screw driver.

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.

EFCO Concrete Screw SK

Intended Use
Installation instruction

Annex B 3

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

Anchor size			SK 6
Steel failure			
Characteristic resistance	$N_{Rk,s}$	[kN]	19,7 ⁴⁾
Partial safety factor	γ_{Ms} [-]	[kN]	1,4
Pull-out failure			
Characteristic resistance in cracked and uncracked concrete C20/25	$N_{Rk,p}$	[kN]	5,0
Installation safety factor	$\gamma_{2^2} = \gamma_{Inst}^1$	[-]	1,0
Concrete cone failure			
Effective anchorage depth	h_{ef}	[mm]	42,6
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}
Installation safety factor	$\gamma_{2^2} = \gamma_{Inst}^1$	[-]	1,0
Factor for cracked concrete	k_{cr}^1	[-]	7,2
Factor for uncracked concrete	k_{ucr}^1	[-]	10,1
Splitting failure³⁾			
Characteristic edge distance for splitting	$c_{cr,sp}$	[mm]	1,5 h_{ef}
Characteristic anchor spacing for splitting	$s_{cr,sp}$	[mm]	3 h_{ef}
Installation safety factor	$\gamma_{2^2} = \gamma_{Inst}^1$	[-]	1,0
Factor for cracked concrete	k_{cr}^1	[-]	7,2
Factor for uncracked concrete	k_{ucr}^1	[-]	10,1

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) 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.

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

EFCO Concrete Screw SK

Performances
Characteristic values under tension loading

Annex C 1

Table C2: Characteristic resistance under shear loading, Design method A

Anchor size			SK 6
Setting depth	h_{nom}	[mm]	55
Effective embedment depth	h_{ef}	[mm]	42,6
Steel failure without lever arm			
Characteristic resistance	$V_{Rk,s}$	[kN]	7,3
Factor for groups	$k_2^{1)}$	[-]	0,8
Partial safety factor	γ_{Ms}	[-]	1,4
Steel failure with lever arm			
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	15,9
Partial safety factor	γ_{Ms}	[-]	1,4
Concrete pryout failure			
k-factor	$k^{2)} = k_3^{1)}$	[-]	1,0
Partial safety factor	γ_{Mcp}	[-]	1,5
Concrete edge failure			
Effective length of anchor in shear loading	ℓ_f	[mm]	42,6
Effective diameter of anchor	d_{nom}	[mm]	5,37
Partial safety factor	γ_{Mc}	[-]	1,5

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

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

EFCO Concrete Screw SK

Performances
Characteristic values under shear loading

Annex C 2