Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-17/0629 of 21 August 2017

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	Betongskrue mekanisk galvanisert Op. 1
Product family to which the construction product belongs	Concrete screw
Manufacturer	HITACHI POWER TOOLS NORWAY AS Kjeller Vest 7 2007 KJELLER NORWEGEN
Manufacturing plant	Taiwan plant no. 1
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	European Assessment Document (EAD) 330232-00-0601

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Specific Part

1 Technical description of the product

The Betongskrue mekanisk galvanisert Op. 1 of sizes SK 8, SK 10 and SK 12 is and 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	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

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

In accordance with European Assessment Documents EAD No. 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

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

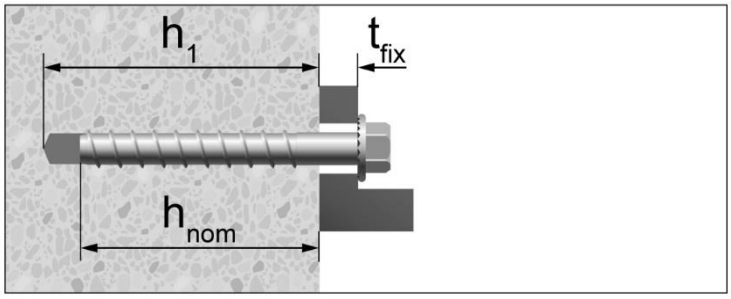
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 21 August 2017 by Deutsches Institut für Bautechnik

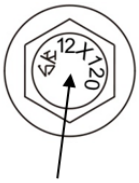
Lars Eckfeldt
p.p. Head of Department

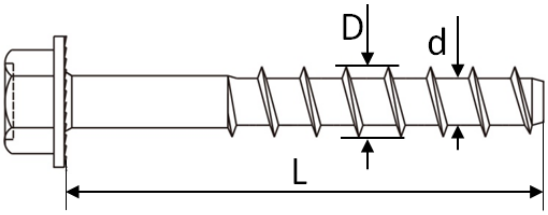
beglaubigt:
Baderschneider

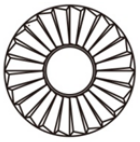
Concrete screw after installation



Marking of head







Reverse Locking Serrations

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)		

Betongskrue mekanisk galvanisert Op. 1	Annex A 1
Product description Installed condition, dimensions and materials	

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Specifications of Intended Use

Anchorages subject to:

- Static and quasi-static loads:

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

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.).
- Design of fastenings in accordance to FprEN 1992-4:2016 and EOTA Technical Report TR 055

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.

Betongskrue mekanisk galvanisert Op. 1	Annex B 1
Intended Use Specifications	

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

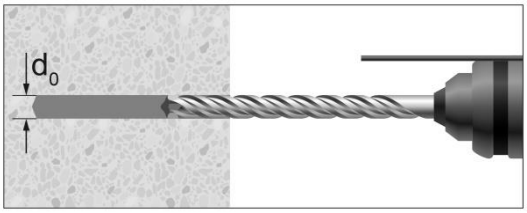
Anchor size			**SK 8**	**SK 10**	**SK 12**
Minimum member thickness	h_{min}	[mm]	110	130	150
Minimum edge distance	c_{min}	[mm]	50	60	70
Minimum spacing	s_{min}	[mm]	50	60	70

Betongskrue mekanisk galvanisert Op. 1

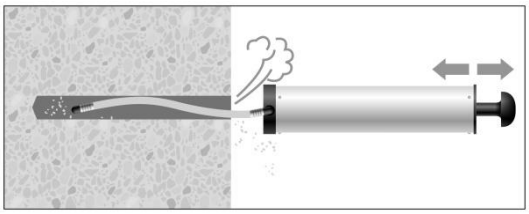
Intended Use
Installation parameters
Minimum thickness of member, Minimum spacing and edge distance

Annex B 2

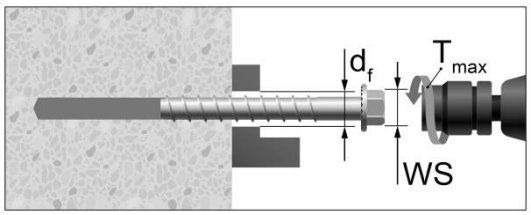
Installation instruction



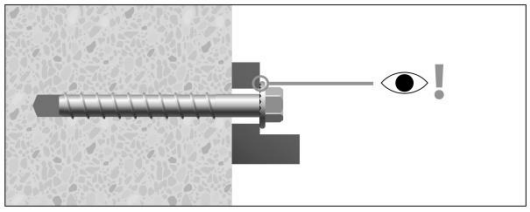
Drill the hole to the depth $\mathbf{h_1}$.



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.

Betongskrue mekanisk galvanisert Op. 1	Annex B 3
Intended Use Installation Instructions	

Table C1: Characteristic resistances under tension loads

Anchor size				**SK 8**	**SK 10**	**SK 12**
Steel failure						
Characteristic resistance	$N_{Rk,s}$		[kN]	35,9	57,0	83,0
Partial safety factor	γ_{Ms} [-]		[kN]	1,4	1,4	1,4
Pull-out failure						
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	ψ_c	C30/37	[-]	1,23		
		C40/50		1,41		
		C50/60		1,58		
Installation safety factor	γ_{inst}		[-]	1,4	1,0	1,2
Concrete cone failure						
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]	$3h_{ef}$		
Montagesicherheitsbeiwert	γ_{inst}		[-]	1,4	1,0	1,2
Factor for k_1 cracked concrete	$k_{cr,N}$		[-]	7,7		
Factor for k_1 non-cracked concrete	$k_{ucr,N}$		[-]	11,0		
Splitting failure						
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]	$3h_{ef}$	$3h_{ef}$	$3h_{ef}$

Table C2: Displacements under tension loads

Anchor size	Concrete	Tension load N	Displacement	
			δ_{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

Betongskrue mekanisk galvanisert Op. 1

Performances
Characteristic values under tension loads,
Displacements under tension loads

Annex C 1

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Table C3: Characteristic resistance under shear loads

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
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s}$	[kN]	13,4	21,3	37,8
Partial safety factor	γ_{Ms}	[-]		1,5	
Steel failure with lever arm					
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	39,0	79,0	139,0
Ductility Factor	k_7	[-]		0,8	
Partial safety factor	γ_{Ms}	[-]		1,5	
Concrete pryout failure					
Factor für pry-out	k_8	[-]		1,0	2,0
Installation safety factor	γ_{inst}	[-]		1,0	
Concrete edge failure					
Effective length of anchor in shear loading	ℓ_f	[mm]	50,6	58,1	75,4
Effective diameter of anchor	d_{nom}	[mm]	7,25	9,24	11,15
Installation safety factor	γ_{inst}	[-]		1,0	

Table C4: Displacement under shear loads

Anchor size	Concrete	Shear load V	Displacement	
			δ_{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

Betongskrue mekanisk galvanisert Op. 1

Performances
Characteristic values under shear loads,
Displacements under shear loads

Annex C 2