

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-17/0629  
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

Betongkrue 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

**European Technical Assessment**

**ETA-17/0629**

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**Specific Part**

**1 Technical description of the product**

The Betongskruer mekanisk galvanisert Op. 1 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 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

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

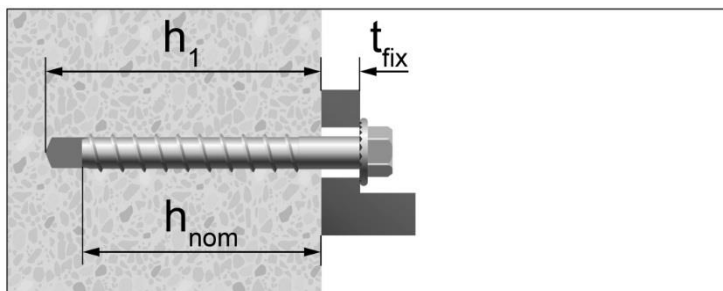
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

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

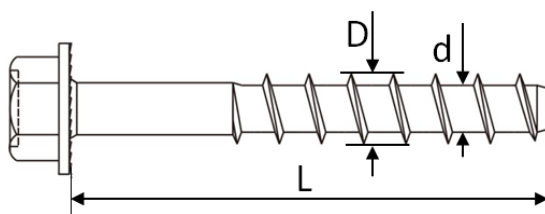
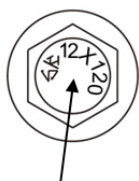
Lars Eckfeldt  
p.p. Head of Department

*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)<br>or mechanical plated (>30µm) |       |       |

Betongskruer mekanisk galvanisert Op. 1

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

Annex A 1

## Specifications of Intended Use

### Anchorage 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.

Betongskruer mekanisk galvanisert Op. 1

**Intended Use**  
Specifications

Annex B 1

**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    |

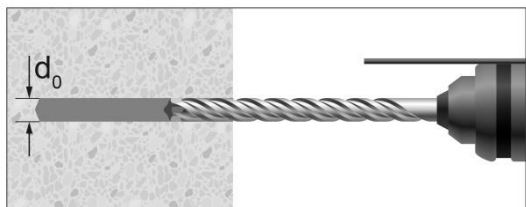
Betongskruer mekanisk galvanisert Op. 1

**Intended Use**

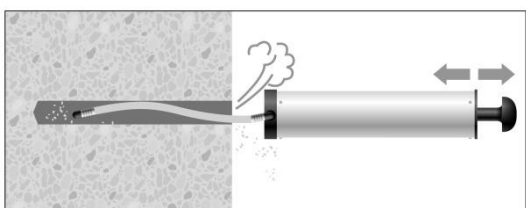
Installation parameters  
Minimum thickness of member, Minimum spacing and edge distance

Annex B 2

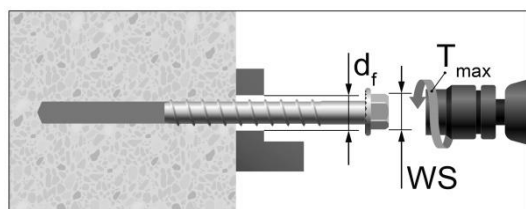
## Installation instruction



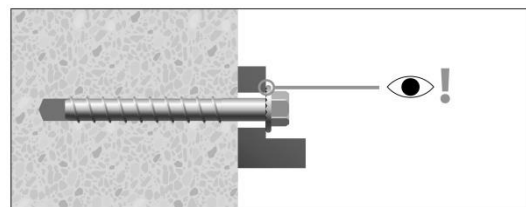
Drill the hole to the depth  $h_1$ .



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.

Betongskruer mekanisk galvaniseret Op. 1

**Intended Use**  
Installation Instructions

Annex B 3



**Table C1: Characteristic resistances under tension loads**

| 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  | $\gamma_{Ms}$ [-] | [kN] | 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   | $\gamma_{inst}$   | [-]  | 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] | 1,5 $h_{ef}$ |              |              |
| Characteristic spacing   | $s_{cr,N}$        | [mm] | 3 $h_{ef}$   |              |              |
| Montagesicherheitsbeiwert  | $\gamma_{inst}$   | [-]  | 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         |              |              |
| <b>Splitting failure</b>   |                   |      |              |              |              |
| Characteristic edge distance for splitting                           | $c_{cr,sp}$       | [mm] | 1,5 $h_{ef}$ | 1,5 $h_{ef}$ | 1,5 $h_{ef}$ |
| Characteristic anchor spacing for splitting                          | $s_{cr,sp}$       | [mm] | 3 $h_{ef}$   | 3 $h_{ef}$   | 3 $h_{ef}$   |

**Table C2: Displacements under tension loads**

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

Betongskruer mekanisk galvanisert Op. 1

**Performances**  
Characteristic values under tension loads,  
Displacements under tension loads

Annex C 1

**Table C3: Characteristic resistance under shear loads**

| <b>Anchor size</b>                          |                 |      | <b>SK 8</b> | <b>SK 10</b> | <b>SK 12</b> |
|---|-----------------|------|-------------|--------------|--------------|
| 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         |
| Partial safety factor                       | $\gamma_{Ms}$   | [-]  | 1,5         |              |              |
| <b>Steel failure with lever arm</b>         |                 |      |             |              |              |
| Characteristic resistance                   | $M^0_{Rk,s}$    | [Nm] | 39,0        | 79,0         | 139,0        |
| Ductility Factor                            | $k_7$           | [-]  | 0,8         |              |              |
| Partial safety factor                       | $\gamma_{Ms}$   | [-]  | 1,5         |              |              |
| <b>Concrete pryout failure</b>              |                 |      |             |              |              |
| Factor für pry-out                          | $k_8$           | [-]  | 1,0         | 2,0          |              |
| Installation safety factor                  | $\gamma_{inst}$ | [-]  | 1,0         |              |              |
| <b>Concrete edge failure</b>                |                 |      |             |              |              |
| 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                  | $\gamma_{inst}$ | [-]  | 1,0         |              |              |

**Table C4: Displacement under shear loads**

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

Betongskruer mekanisk galvanisert Op. 1

**Performances**  
Characteristic values under shear loads,  
Displacements under shear loads

Annex C 2