

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0505
of 21 August 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

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

Deutsches Institut für Bautechnik

SMART sleeve anchor type S-HA

Torque controlled expansion anchor
for use in non-cracked concrete

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41-807 ZABRZE
POLEN

pgb-polska plant 6

12 pages including 3 annexes which form an integral part
of this assessment

European Assessment Document (EAD)
330232-00-0601

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Specific Part

1 Technical description of the product

The SMART sleeve anchor type S-HA is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

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)

Essential characteristic	Performance
Characteristic values and displacements under tension load	See Annex C1
Characteristic values and displacements under shear load	See Annex 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

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.

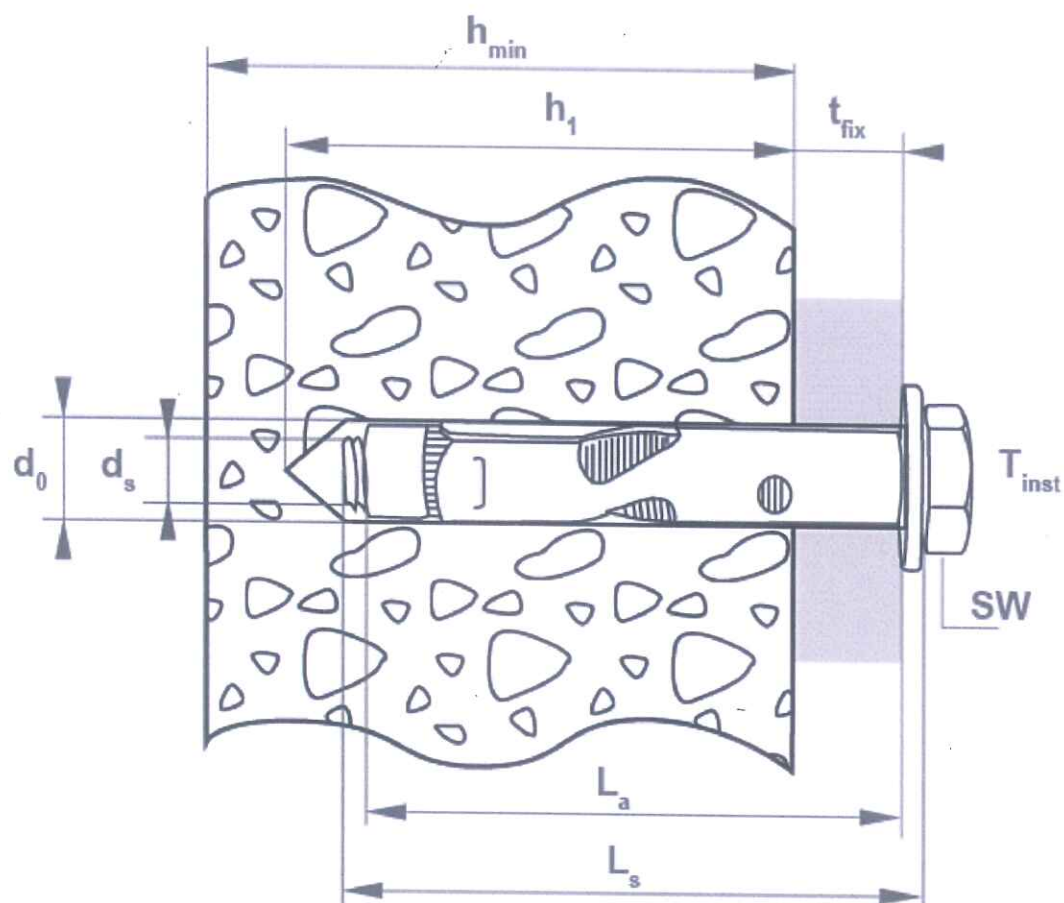
Issued in Berlin on 21 August 2017 by Deutsches Institut für Bautechnik

Lars Eckfeldt
p.p. Head of Department

beglaubigt:
Baderschneider

Installed conditions

Pre-setting Installation SMART S-HA:

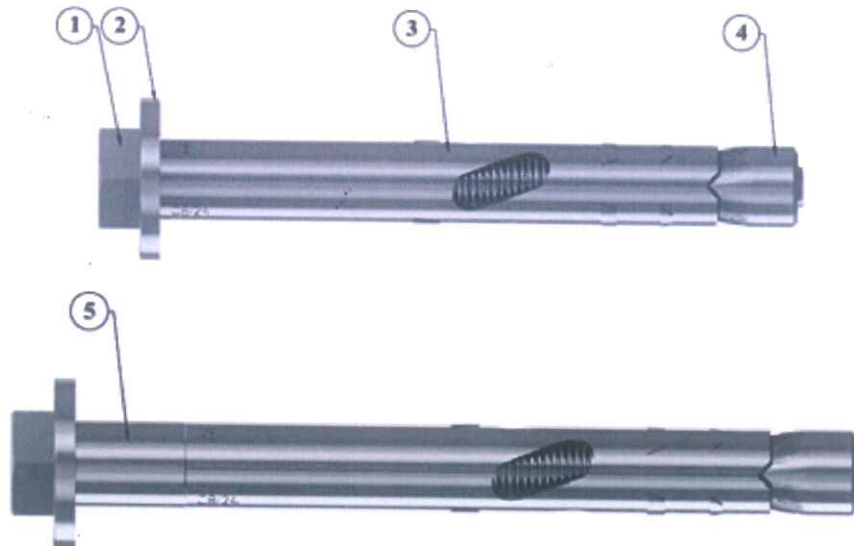


SMART sleeve anchor type S-HA

Product description
Installed conditions

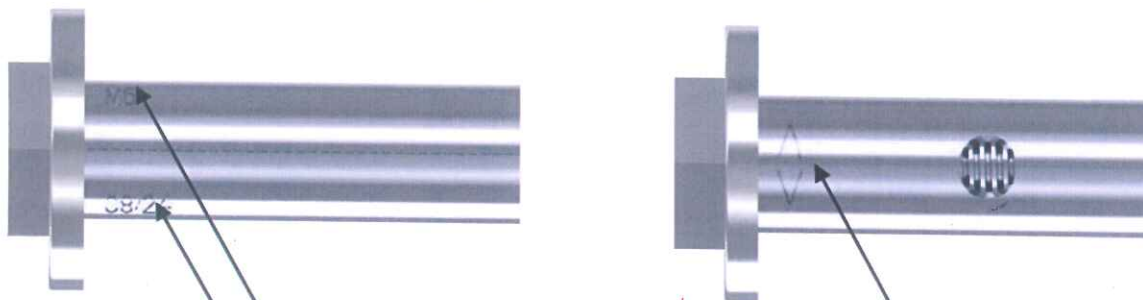
Annex A 1

Denomination and Marking



COMPONENTS:

- 1 – Hexagonal head bolt
- 2 – Washer
- 3 – Expander
- 4 – Conical nut
- 5 – Extension (for some dimensions only)



READING:

Manufacturer and product logo (< > or S)

Thread of the bolt (ex. M6)

Hole diameter/t_{fix} (ex. Ø8/24)

SMART sleeve anchor type S-HA

Product description
Marking and denomination

Annex A 2

Table A1: Materials and components

COMPONENT	DENOMINATION	FOR DIMENSIONS	MATERIAL
1	Hexagonal head bolt	All	Steel, property class 8.8 EN ISO 898-1 <i>Electrolytic zinc plated min. 5µm</i>
2	Washer	All	Steel, DD11 UNI EN 10111 (JIS G 3131 SPHC) <i>Electrolytic zinc plated min. 5µm</i>
3	Expander	All	Steel, DC01 EN 10139 – EN 10130 (SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>
4	Conical nut	All	Steel, DC01-DC04 EN 10139 (SAE 1006 - SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>
5	Extension	8/54-100 10/45-100 10/65-120 12/45-100 12/65-120 16/50-130	Steel, DC01 EN 10139 – EN 10130 (SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>

SMART sleeve anchor type S-HA

Product description
Materials

Annex A 3

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 concrete.

Use conditions (Environmental conditions):

- Anchorages subject to dry internal conditions (zinc coated steel or stainless steel).

Design:

- 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 under the responsibility of an engineer experienced in anchorages and concrete work.
- Design of fastenings in accordance to FprEN 1992-4:2016 and EOTA Technical Report TR 055

Installation:

- Hole drilling by hammer drilling only.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Hexagonal head bolt and washer may be used if the following requirements are fulfilled:
 - material, dimensions and mechanical properties of the metal parts according to the specifications given in Annex A 3 and B 2,
 - confirmation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204:2004, the documents should be stored,
 - Length of hexagonal head bolt according to Table B1 shall be complied with.
- 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 drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured, if the leading edge of expander does not more exceed the concrete surface.

SMART sleeve anchor type S-HA

Intended Use
Specifications

Annex B 1

Table B1: Installation parameters

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Effective anchorage depth	h_{ef}	[mm]	31	35	40	60
Nominal drill hole diameter	d_0	[mm]	8	10	12	16
Drill hole depth	$h_1 \geq$	[mm]	50	55	60	85
Clearance hole in the fixture	d_f	[mm]	10	12	14	18
Torque moment	T_{inst}	[Nm]	10	25	40	65
Minimum fixture thickness	$T_{fix,min}$	[mm]	1	1	1	1
Maximum fixture thickness	$T_{fix,max}$	[mm]	24/54	25/45/65	25/45/65	10/30/50
Hexagonal head bolt length	L_s	[mm]	70/100	75/100/120	80/100/120	90/110/130

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

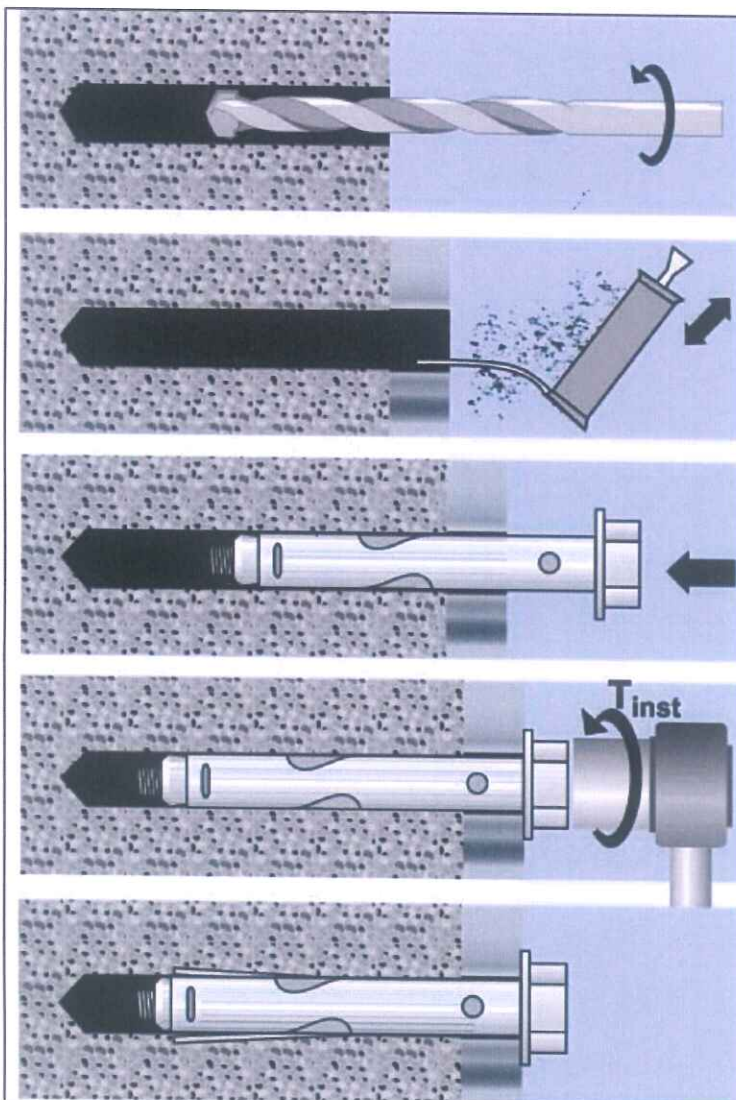
Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Minimum thickness of the member	h_{min}	[mm]	80	100	120	150
Minimum spacing	S_{min}	[mm]	95	120	145	175
Minimum edge distance	C_{min}	[mm]	50	60	75	90

SMART sleeve anchor type S-HA

Intended Use
Installation Parameters,
Minimum thickness of concrete member, minimum spacing and edge distance

Annex B 2

Installation instruction



1. Make a drill hole with a hammer drilling
2. Clean the drill hole
3. Place the anchor
4. Apply the required installation torque
5. Anchor is installed

SMART sleeve anchor type S-HA

Intended Use
Installation instructions

Annex B 3

Table C1: Characteristic values for tension loads

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	16,1	29,3	46,4	67,4
Partial safety factor	γ_{MS}	[-]	1,5	1,5	1,5	1,5
Pullout failure						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,P}$	[kN]	6,0	7,5	12,0	20,0
Increasing factor for concrete	ψ_C	C30/37	1,0			
		C40/50				
		C50/60				
Concrete cone failure						
Effective anchoring depth	h_{ef}	[mm]	31	35	40	60
Factor for k_1	$k_{ucr,N}$	[-]	11,0			
Spacing	$s_{cr,N}$	[mm]	$3 h_{ef}$			
Edge distance	$c_{cr,N}$	[mm]	$1,5 h_{ef}$			
Splitting failure						
Spacing	$s_{cr,sp}$	[mm]	200	300	340	430
Edge distance	$c_{cr,sp}$	[mm]	100	150	170	215
Installation safety factor	γ_{inst}	[-]	1,0			

Table C2: Displacements under tension loads

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Tension load	N	[kN]	3,4	5,2	5,3	11,6
Displacement	δ_{N0}	[mm]	0,10	0,19	0,39	0,51
	$\delta_{N\infty}$	[mm]	0,39			

SMART sleeve anchor type S-HA

Performances

Characteristic values and displacements under tension loads

Annex C 1

Table C3: Characteristic values for shear loads

Anchor size			M6 / $\varnothing 8$	M8 / $\varnothing 10$	M10 / $\varnothing 12$	M12 / $\varnothing 16$
Steel failure without level arm						
Characteristic resistance	$V_{Rk,s}$	[kN]	7,5	12,0	20,0	30,0
Partial safety factor	γ_{MS}	[-]	1,25			
Steel failure with level arm						
Characteristic bending moment	$M_{Rk,s}$	[kN]	12,2	30,0	59,8	104,8
Ductility factor	k_7	[-]	0,8			
Partial safety factor	γ_{MS}	[-]	1,25			
Concrete pry out failure						
Factor for pryout failure	k_8	[mm]	1	1	1	2
Installation safety factor	γ_{inst}	[mm]	1,0			
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	31	35	40	60
Effective external diameter of anchor	d_{nom}	[mm]	10	12	14	18
Installation safety factor	γ_{inst}	[-]	1,0			

Table C4: Displacements under shear loads

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Shear load	V	[kN]	3,8	7,0	11,0	16,1
Displacement	δ_{V0}	[mm]	1,1	1,4	2,6	2,7
	$\delta_{V\infty}$	[mm]	1,6	2,1	3,9	4,1

SMART sleeve anchor type S-HA

Performances

Characteristic values and displacements under shear loads

Annex C 2