

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-17/0452**  
**of 27 July 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

Hilti metal expansion anchor HSB

Product family  
to which the construction product belongs

Mechanical fastener for use in concrete

Manufacturer

Hilti AG  
BU Anchors  
Feldkircherstraße 100  
9494 SCHAAN  
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

Hilti Werke

This European Technical Assessment  
contains

11 pages including 3 annexes

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 Hilti metal expansion anchor HSB is a torque controlled expansion fastener 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 resistance for static and quasi static action, 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 the European Assessment Document EAD 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 EAD**

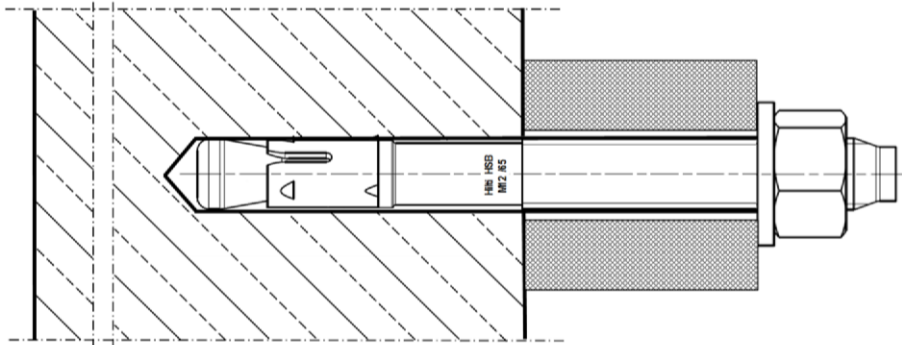
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 27 July 2017 by Deutsches Institut für Bautechnik

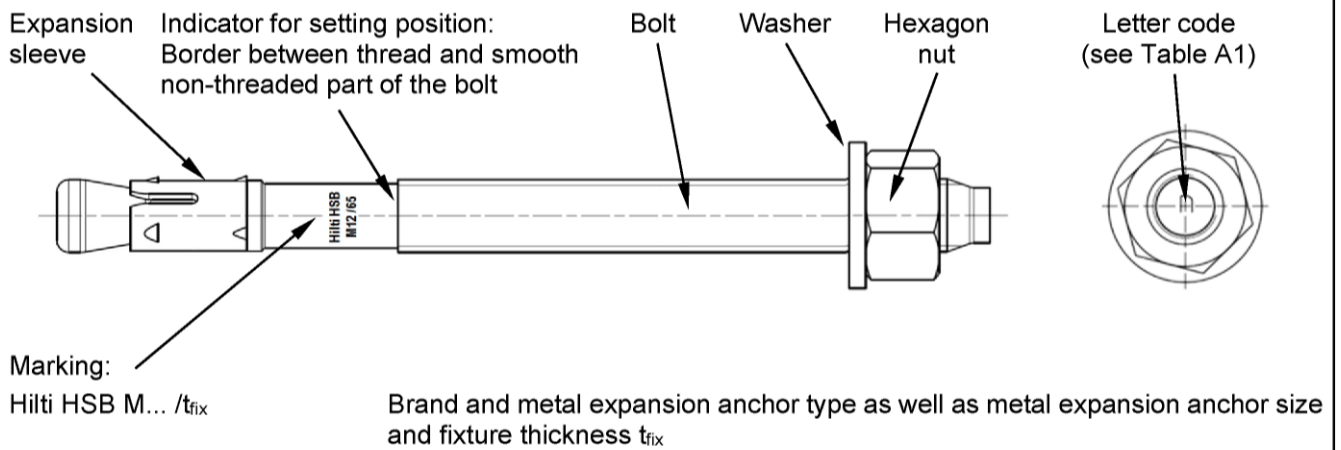
BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Lange

### Installed condition



### Product description: Hilti metal expansion anchor HSB



**Hilti metal expansion anchor HSB**

**Product description**

Installed condition, product marking and identification of metal expansion anchor

**Annex A1**

**Table A1: Letter code for identification of fixture thickness**

Size	M8	M10	M12	M16
	$t_{fix}$	$t_{fix}$	$t_{fix}$	$t_{fix}$
	[mm]	[mm]	[mm]	[mm]
<u>z</u>	5	5	5	5
<u>w</u>	20	20	20	20
<u>t</u>	35	35	35	-/-
<u>s</u>	-/-	-/-	-/-	40
<u>q</u>	-/-	50	-/-	-/-
<u>p</u>	55	-/-	-/-	-/-
<u>n</u>	-/-	-/-	65	-/-
<u>m</u>	-/-	70	-/-	-/-
<u>i</u>	-/-	-/-	-/-	85
<u>h</u>	-/-	-/-	95	-/-

**Table A2: Materials**

Designation	Material
Expansion sleeve	Carbon steel, galvanized
Bolt	Carbon steel, galvanized, rupture elongation ( $l_0 = 5d$ ) > 8 %
Washer	Carbon steel, galvanized
Hexagon nut	Carbon steel, galvanized

**Table A3: Dimensions of Hilti metal expansion anchor HSB**

Size	M8	M10	M12	M16
Min. inner diameter of washer $d_1$ [mm]	8,4	10,5	13	17
Min. outer diameter of washer $d_w$ [mm]	16	20	24	30
Min. thickness of washer $h$ [mm]	1,6	2	2,5	3

**Figure A1: Hilti metal expansion anchor HSB**



**Hilti metal expansion anchor HSB**

**Product description**  
Letter code, materials and dimensions

**Annex A2**

## Specifications of intended use

### Anchorage subject to:

- Static and quasi static loading.

### 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):

- Structures 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 metal expansion anchor is indicated on the design drawings (e. g. position of the metal expansion anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi static loading are designed in accordance with: FprEN 1992-4:2016 and EOTA Technical Report TR 055, 12/2016.

### Installation:




- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- The metal expansion anchor may only be set once.

Hilti metal expansion anchor HSB

Intended use  
Specifications

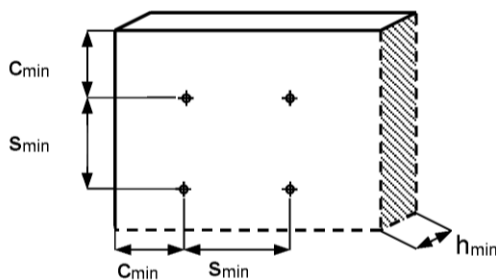
Annex B1

**Table B1: Installation methods**

Size		M8	M10	M12	M16
Drilling technique	Hammer drilling (HD) 	✓	✓	✓	✓
Drill hole cleaning	Manual cleaning (MC): Hilti hand pump for blowing out drill holes. 	✓	✓	✓	✓
Anchor setting	Hammer setting	✓	✓	✓	✓
Method for application of torque moment	Torque wrench 	✓	✓	✓	✓

**Table B2: Installation parameters**

Size			M8	M10	M12	M16
Nominal diameter of drill bit	$d_0$	[mm]	8	10	12	16
Max. cutting diameter of drill bit	$d_{cut}$	[mm]	8,45	10,45	12,5	16,5
Diameter of clearance hole in the fixture	$d_f$	[mm]	9	12	14	18
Width across flats	SW	[mm]	13	17	19	24
Min. thickness of concrete member	$h_{min}$	[mm]	100	100	100	140
Nominal anchorage depth	$h_{nom}$	[mm]	39	50	64	77
Effective anchorage depth	$h_{ef}$	[mm]	30	40	50	65
Min. drill hole depth	$h_1$	[mm]	44	55	72	85
Installation torque moment	$T_{inst}$	[Nm]	15	30	50	80
Min. spacing	$s_{min}$	[mm]	60	70	80	100
Min. edge distance	$c_{min}$	[mm]	60	70	90	100



**Hilti metal expansion anchor HSB**

**Intended use**  
Installation method and installation parameters

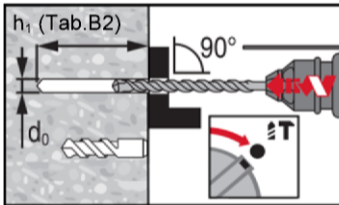
**Annex B2**



## Installation instruction

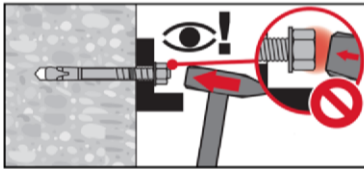
### Hole drilling and cleaning

Hammer drilling (HD) with manual cleaning (MC)

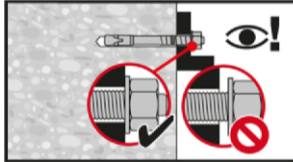


### Anchor setting

Hammer setting

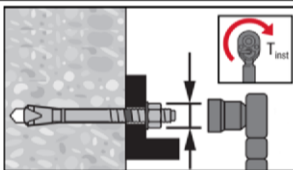


### Check setting

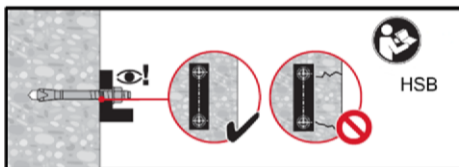


### Anchor torqueing

Torque wrench



### Check installation



Hilti metal expansion anchor HSB

Intended use  
Installation instructions

Annex B3

**Table C1: Characteristic resistance under tension load in non-cracked concrete**

Size		M8	M10	M12	M16
Effective anchorage depth	$h_{ef}$ [mm]	30 <sup>1)</sup>	40	50	65
<b>Steel failure</b>					
Partial safety factor	$\gamma_{Ms}$ <sup>2)</sup> [-]	1,5			
Characteristic resistance	$N_{Rk,s}$ [kN]	15,6	26,1	42,0	69,8
<b>Pullout failure</b>					
Installation safety factor	$\gamma_{inst}$ [-]	1,2	1,0		1,2
Characteristic resistance	$N_{Rk,p}$ [kN]	12,1	12,0	14,6	29,9
Increasing factor $\psi_c$	C20/25 [-]	1,00			
	C30/37 [-]	1,22			
	C40/50 [-]	1,41			
	C50/60 [-]	1,55			
<b>Concrete cone and splitting failure</b>					
Installation safety factor	$\gamma_{inst}$ [-]	1,2	1,0		1,2
Factor	$k_1=k_{ucr,N}$ [-]	11,0			
Spacing	$s_{cr,N}$ [mm]	$3 \cdot h_{ef}$			
	$s_{cr,sp}$ [mm]	180	240	300	390
Edge distance	$c_{cr,N}$ [mm]	$1,5 \cdot h_{ef}$			
	$c_{cr,sp}$ [mm]	90	120	150	195

<sup>1)</sup> Use is restricted to anchoring of statically indeterminate structural components.

<sup>2)</sup> In absence of other national regulations.

Hilti metal expansion anchor HSB

**Performance**

Characteristic resistance under tension load in non-cracked concrete

**Annex C1**

**Table C2: Characteristic resistance under shear load in non-cracked concrete**

Size			M8	M10	M12	M16
<b>Steel failure without lever arm</b>						
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,25			
Ductility factor	$k_7$	[-]	1,0			
Characteristic resistance	$V_{Rk,s}$	[kN]	8,5	14,4	22,6	42,4
<b>Steel failure with lever arm</b>						
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,25			
Ductility factor	$k_7$	[-]	1,0			
Characteristic resistance	$M^{0}_{Rk,s}$	[Nm]	19,5	41,1	72,1	166,5
<b>Concrete pry-out failure</b>						
Installation safety factor	$\gamma_{inst}$	[-]	1,2	1,0		1,2
Pry-out factor	$k_8$	[-]	1,0		2,0	
<b>Concrete edge failure</b>						
Installation safety factor	$\gamma_{inst}$	[-]	1,2	1,0		1,2
Effective length of anchor	$l_f$	[mm]	30	40	50	65
Effective outside diameter of anchor	$d_{nom}$	[mm]	8	10	12	16

<sup>1)</sup> In absence of other national regulations.

**Table C3: Displacements under tension and shear loads in non-cracked concrete**

Size			M8	M10	M12	M16
Effective anchorage depth	$h_{ef}$	[mm]	30	40	50	65
<b>Displacements under tension loads</b>						
Tension force	$N$	[kN]	3,2	5,7	6,9	10,2
Corresponding displacement	$\delta_{N0}$	[mm]	0,2	0,4	0,3	0,4
	$\delta_{N\infty}$	[mm]	0,5	0,8	0,6	0,7
<b>Displacements under shear loads</b>						
Shear force	$V$	[kN]	4,9	8,2	12,9	24,2
Corresponding displacement	$\delta_{V0}$	[mm]	1,6	1,6	1,7	1,9
	$\delta_{V\infty}$	[mm]	2,4	2,3	2,5	2,8

Hilti metal expansion anchor HSB

**Performance**

Characteristic resistance under shear load in non-cracked concrete;  
Displacement under tension and shear loads in non-cracked concrete

**Annex C2**