

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

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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

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

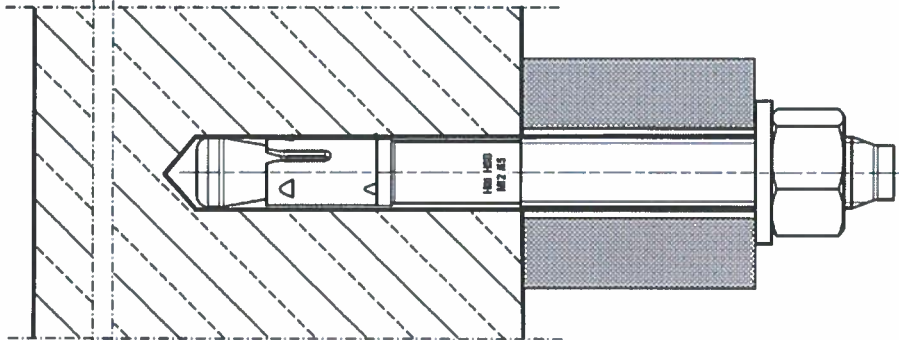
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

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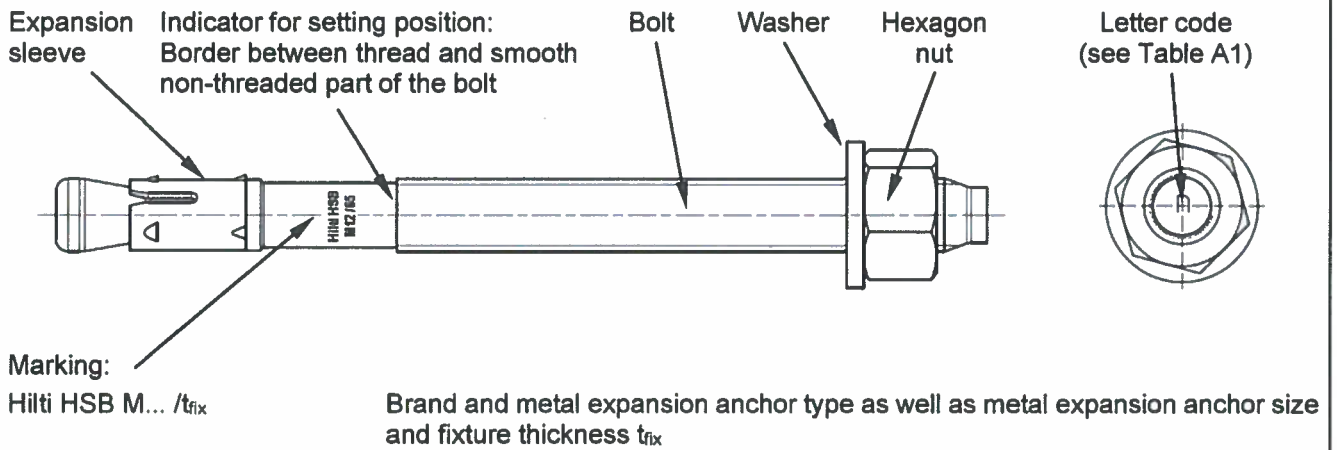
BD Dipl.-Ing. Andreas Kummerow
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beglaubigt:
Lange

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]
z	5	5	5	5
w	20	20	20	20
t	35	35	35	-/-
s	-/-	-/-	-/-	40
q	-/-	50	-/-	-/-
p	55	-/-	-/-	-/-
n	-/-	-/-	65	-/-
m	-/-	70	-/-	-/-
i	-/-	-/-	-/-	85
h	-/-	-/-	95	-/-

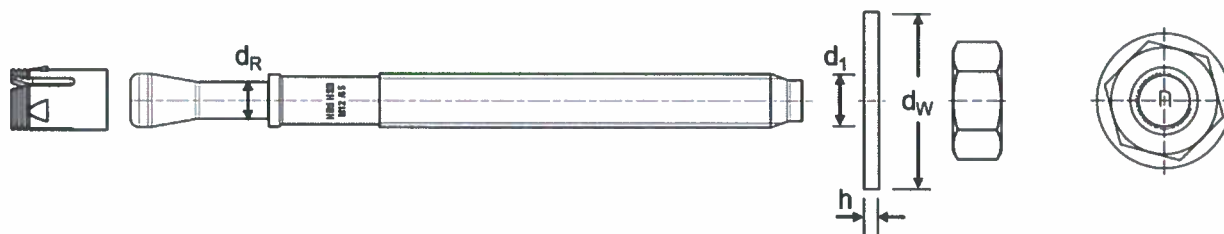
Table A2: Materials

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




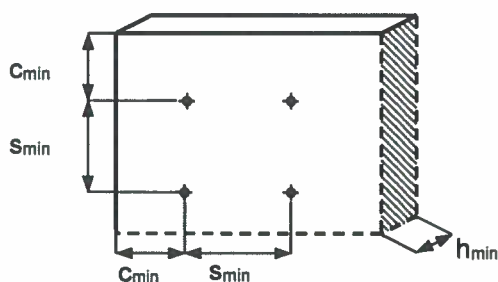
Size		M8	M10	M12	M16
Drilling technique	Hammer drilling (HD) 	✓	✓	✓	✓
Drill hole cleaning	Manual cleaning (MC): Hilti hand pump for blowing out drill holes. 	✓	✓	✓	✓
Anchor setting	Hammer setting	✓	✓	✓	✓
Method for application of torque moment	Torque wrench 	✓	✓	✓	✓

Table B2: Installation parameters

Size			M8	M10	M12	M16
Nominal diameter of drill bit	d_o	[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

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

Size		M8	M10	M12	M16
Effective anchorage depth	h_{ef} [mm]	30 ¹⁾	40	50	65
Steel failure					
Partial safety factor	γ_{Ms} ²⁾ [-]	1,5			
Characteristic resistance	$N_{Rk,s}$ [kN]	15,6	26,1	42,0	69,8
Pullout failure					
Installation safety factor	γ_{inst} [-]	1,2	1,0		1,2
Characteristic resistance	$N_{Rk,p}$ [kN]	12,1	12,0	14,6	29,9
Increasing factor ψ_c	C20/25 [-]	1,00			
	C30/37 [-]	1,22			
	C40/50 [-]	1,41			
	C50/60 [-]	1,55			
Concrete cone and splitting failure					
Installation safety factor	γ_{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

¹⁾ Use is restricted to anchoring of statically indeterminate structural components.

²⁾ 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
Steel failure without lever arm						
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
Steel failure with lever arm						
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
Concrete pry-out failure						
Installation safety factor	γ_{inst}	[-]	1,2	1,0		1,2
Pry-out factor	k_8	[-]	1,0			2,0
Concrete edge failure						
Installation safety factor	γ_{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

¹⁾ 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
Displacements under tension loads						
Tension force	N	[kN]	3,2	5,7	6,9	10,2
Corresponding displacement	δ_{N0}	[mm]	0,2	0,4	0,3	0,4
	$\delta_{N\infty}$	[mm]	0,5	0,8	0,6	0,7
Displacements under shear loads						
Shear force	V	[kN]	4,9	8,2	12,9	24,2
Corresponding displacement	δ_{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