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European Technical Assessment

ETA-17/0168
of 10.04.2019

English version prepared by ZAG

General Part

Organ za tehnično ocenjevanje, ki je izdal ETA
Technical Assessment Body issuing the ETA

ZAG Ljubljana

Komercialno ime gradbenega proizvoda
Trade name of the construction product

Hilti nail anchor HFB

Družina proizvoda, ki ji gradbeni proizvod pripada

33: Kovinsko sidro velikosti 6 za skupinsko nekonstrukcijsko uporabo v betonu

Product family to which the construction product belongs

33: Metal anchor of size 6 for multiple use for non-structural applications in concrete

Proizvajalec
Manufacturer

**HILTI Aktiengesellschaft
Feldkircherstrasse 100
9494 SCHAAN
Liechtenstein
www.hilti.com**

Proizvodni obrat
Manufacturing plant

**HILTI Aktiengesellschaft
Feldkircherstrasse 100
9494 SCHAAN
Liechtenstein**

Ta Evropska tehnična ocena vsebuje

This European Technical Assessment contains

14 strani vključno s 11 prilogami, ki so sestavni del te ocene
14 pages including 11 annexes, which form an integral part of the document

Ta Evropska tehnična ocena je izdana na podlagi Uredbe (EU) št. 305/2011 na osnovi

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

EAD 330747-00-0601, izdaja maj 2018

EAD 330747-00-0601, Edition May 2018

Ta Evropska tehnična ocena zamenjuje

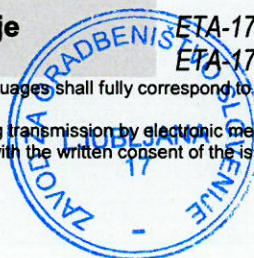
This European Technical Assessment replaces

ETA-17/0168 izdano dne 23.01.2019

ETA-17/0168 issued on 23.01.2019

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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Specific parts

1 Technical description of the product

The Hilti nail anchor HFB is load – controlled metal anchor size 6 made of galvanised carbon steel (HFB), stainless steel (HFB-R) and high corrosion resistance steel (HFB-HCR). The anchor is used in three different effective embedment depths of 25 mm, 30 mm and 35 mm, except galvanised carbon anchor (HFB) which is used only for two embedment depths – 25 mm and 30 mm. The anchor is pushed into a drilled hole and expanded by loading. The anchor head is provided with nail (HFB, HFB-R and HFB-HCR) and thread (versions HFB-A-R and HFB-A-HCR).

Product description is given in Annex A.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The performances given in Chapter 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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)

For basic work requirement mechanical resistance and stability are included under the basic work requirement safety in use.

3.2 Safety in case of fire (BWR 2)

The basic work requirements for safety in case of fire are listed in Annex C2.

3.3 Hygiene, health and environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transported European legislation and national laws, regulations and administrative provisions). In order to meet provisions of the regulation (EU) No 305/2011, these requirements need also to be complied with, when they apply.

3.4 Safety in use (BWR 4)

The basic work requirements for safety in use are listed in Annex C1.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

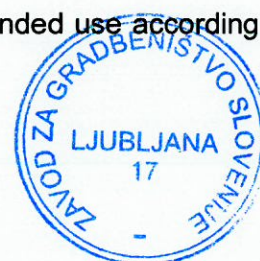
Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

No performance assessed.

3.8 General aspects relating to fitness for use

Durability and serviceability are only ensured if specifications of intended use according to Annex B are kept.



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

According to the decision 97/161/EC of the European Commission¹ the system of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) **2+** apply.

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

Technical details necessary for the implementation of the AVCP system are laid down in chapter 3 of EAD 330747-00-0601.

Issued in Ljubljana on 10.04.2019



Signed by:

Franc Capuder, M.Sc.

Head of Service of TAB

Installed condition

Multiple use for non-structural applications only

Figure A1:
Hilti nail anchor HFB

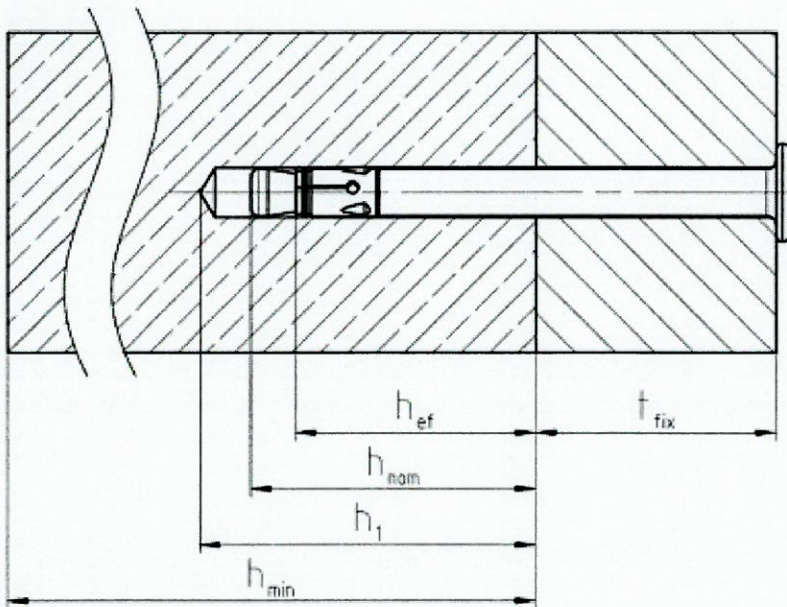
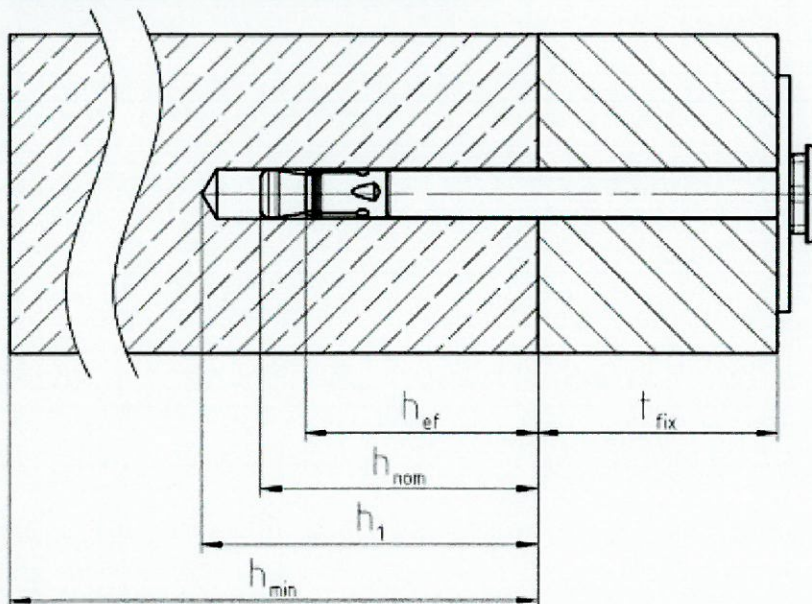


Figure A2:
Hilti nail anchor HFB-R and HFB-HCR



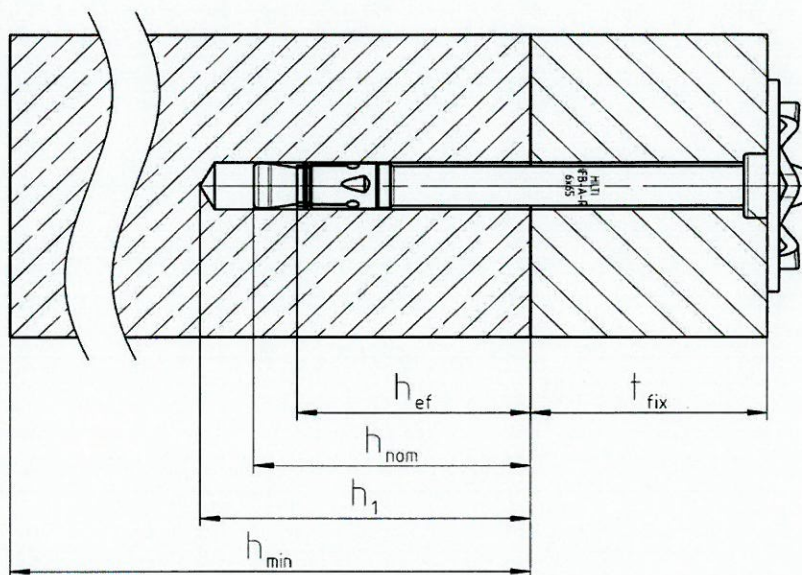
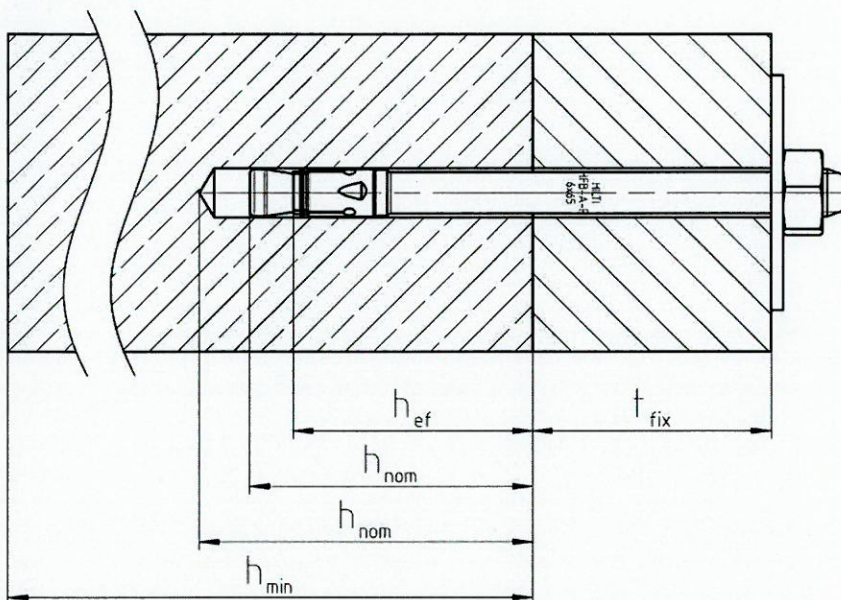
Hilti nail anchor HFB

Product description

Installed condition



Figure A3:
Hilti nail anchor HFB-A-R and HFB-A-HCR



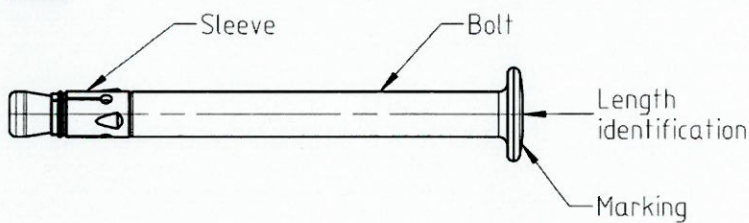
Hilti nail anchor HFB

Product description
 Installed condition

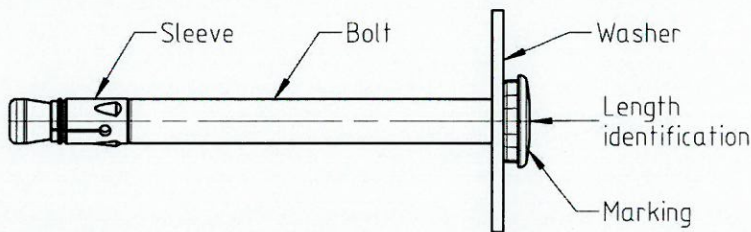


Product description: Hilti nail anchor HFB

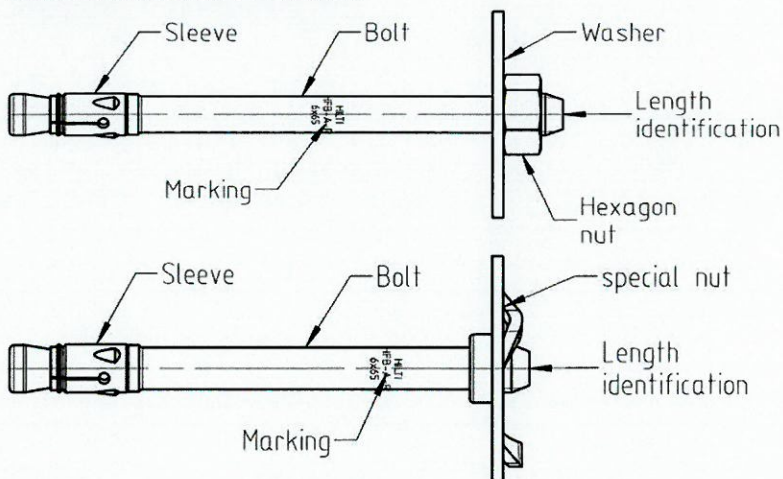
HFB



HFB-R and HFB-HCR



HFB-A-R and HFB-A-HCR



Hilti nail anchor HFB

Product description
Anchor types and marking



Marking:

Head marking HFB, HFB-R and HFB-HCR for example: HFB-R 6x60: Marking "6 x 60"

Head marking HFB-A-R and HFB-A-HCR for example: HFB-A-R 6x60: Marking "u" (according Table A1)

Table A1: Length marking of total length of HFB-A-R and HFB-A-HCR anchor

Letter and corresponding anchor total length [mm]									
40	50	55	60	65	70	75	85	95	105
y	w	v	u	t	s	r	p	n	l

Table A2: Materials

Designation	Material
HFB	
Anchor bolt	Carbon steel, galvanized, coated, rupture elongation ($l_0 = 5d$) > 8%
Expansion sleeve	Stainless steel A4
HFB-R and HFB-A-R	
Anchor bolt	Stainless steel A4, coated, rupture elongation ($l_0 = 5d$) > 8%
Expansion sleeve	Stainless steel A4
Washer	Stainless steel A4
Hexagon nut Special nut	Stainless steel A4
HFB-HCR and HFB-A-HCR	
Anchor bolt	High corrosion resistance steel, coated, rupture elongation ($l_0 = 5d$) > 8%
Expansion sleeve	High corrosion resistance steel
Washer	High corrosion resistance steel
Hexagon nut Special nut	High corrosion resistance steel

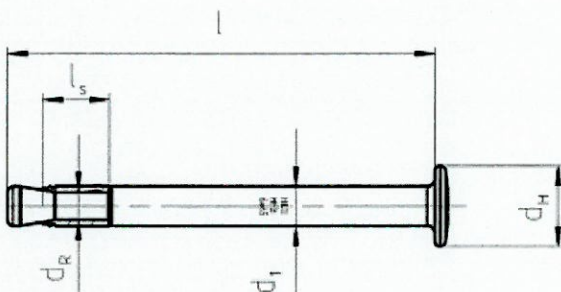
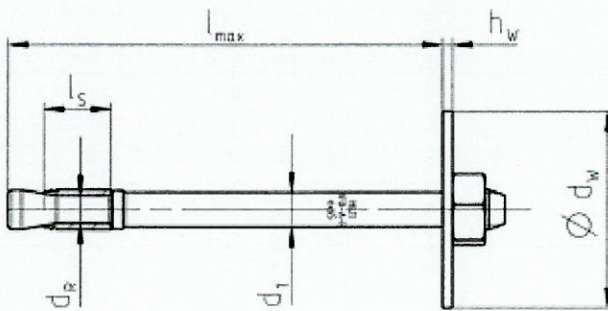
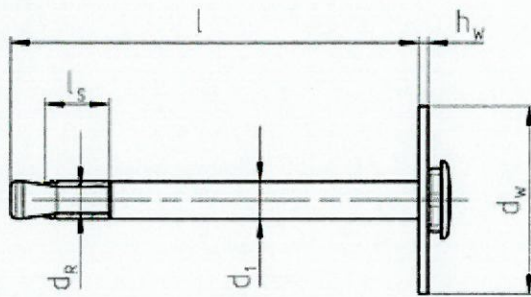
Hilti nail anchor HFB**Product description**

Anchor marking and materials



Table A3: Dimensions

Anchor		HFB	HFB-R and HFB-HCR	HFB-A-R and HFB-A-HCR
Anchor length	$l \leq$ [mm]	150		
Anchor diameter	d_1 [mm]	5,9		5,2
Shaft diameter at cone	d_R [mm]	4,2		
Diameter of head	$d_H \leq$ [mm]	12,2		-
Diameter of washer	$d_w \leq$ [mm]	-	30	
Thickness of washer	$h_w \leq$ [mm]	-	1,5	
Length of expansion sleeve	l_s [mm]	10,1		

**Hilti nail anchor HFB****Product description**

Anchor dimensions



Specifications of intended use**Multiple use for non-structural applications only****Base materials:**

- Reinforced or unreinforced normal weight concrete according to EN 206:2013+A1:2016.
- Strength classes C16/20 to C50/60 according to EN 206:2013+A1:2016.

Use conditions (Environmental conditions):

- Hilti nail anchor HFB made of galvanised steel:
Structures subject to dry internal conditions.
- Hilti nail anchor HFB-R and HFB-A-R made of stainless steel A4:
Structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).
- Hilti nail anchor HFB-HCR and HFB-A-HCR made of high corrosion resistance steel:
Structures subject to dry internal conditions and also in structures subject to external atmospheric exposure, in permanently damp internal conditions or in other particular aggressive conditions. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

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.).
- Anchorages under static or quasi-static loading are designed in accordance with: EN 1992-4:2018 and EOTA Technical Report TR 055, 12/2016
- Anchorages for multiple use for non-structural applications only according to EAD 330747-00-0601 Edition May 2018
- Anchorages under fire exposure are designed in accordance with: EN 1992-4:2018 and EOTA Technical Report TR 020, 4/2004

Installation:


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

Hilti nail anchor HFB**Intended use**

Specifications



Table B1: Specifications of intended use

Anchorage subject to:	HFB, HFB-R, HFB-A-R, HFB-HCR and HFB-A-HCR
Hammer drilling 	✓
Static and quasi static loading in cracked and non-cracked concrete	Table: C1
Static and quasi static loading under fire exposure	Table: C2

Hilti nail anchor HFBIntended use
Specifications**Annex B2**

Table B2: Installation parameters

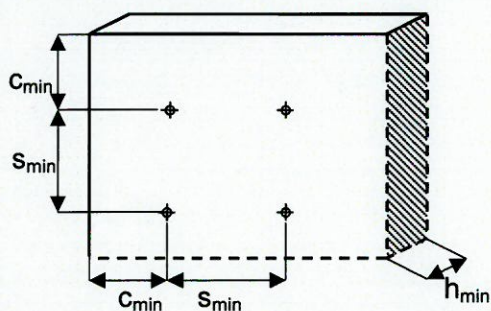
HFB, HFB-R, HFB-A-R, HFB-HCR and HFB-A-HCR					
Nominal diameter of drill bit	d_0	[mm]	6		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40		
Maximum diameter of clearance hole in the fixture	d_f	[mm]	7		
Nominal embedment depth	h_{nom}	[mm]	30	35	40 ²⁾
Effective embedment depth	h_{ef}	[mm]	25	30	35 ²⁾
Drill hole depth	$h_1 \geq$	[mm]	34	39	44 ²⁾

Table B3: Minimum spacing and minimum edge distance

HFB, HFB-R, HFB-A-R, HFB-HCR and HFB-A-HCR					
Effective embedment depth	h_{ef}	[mm]	25	30	35 ²⁾
Minimum thickness of concrete member					
Minimum thickness of concrete member	h_{min}	[mm]	80	80	80 ²⁾
Minimum spacing ¹⁾	$s_{min} \geq$	[mm]	50	50	50 ²⁾
	for $c \geq$	[mm]	50	50	50 ²⁾
Minimum edge distance ¹⁾	$c_{min} \geq$	[mm]	40	40	40 ²⁾
	for $s \geq$	[mm]	75	80	80 ²⁾

1) Linear interpolation for s_{min} and c_{min} allowed.

2) Not for HFB



Hilti nail anchor HFB

Intended use

Installation parameters; Minimum spacing and minimum edge distance; Installation instructions

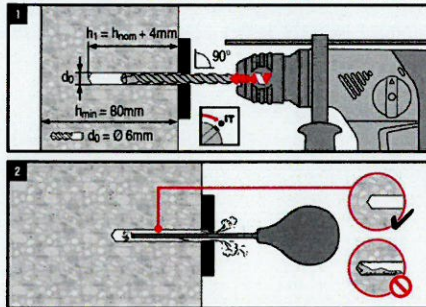
Annex B3



Installation instruction

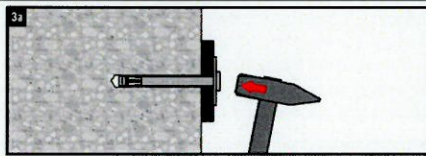
Hole drilling and cleaning

a) Hammer drilling (HD):

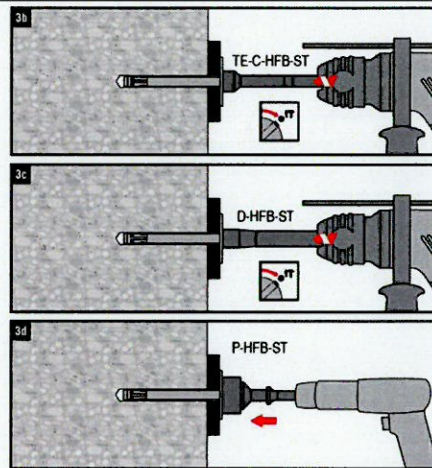


Anchor setting

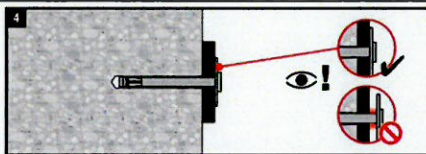
a) Hammer setting:



b) Machine setting (setting tool):



Check setting



Hilti nail anchor HFB

Intended use
Installation instructions



Table C1: Characteristic values of resistance for Hilti nail anchor HFB for all load directions

HFB, HFB-R, HFB-A-R, HFB-HCR and HFB-A-HCR					
Effective embedment depth	h_{ef}	[mm]	25	30	35 ³⁾
Installation safety factor	γ_2	[-]	1,0		
All load directions					
Characteristic resistance in C20/25 HFB-R, HFB-HCR, HFB-A-HCR	F_{Rk}^0	[kN]	3,0	5,0	6,0 ³⁾
Characteristic resistance in C20/25 HFB, HFB-A-R	F_{Rk}^0	[kN]	3,0	4,5	6,0 ³⁾
Increasing factors of concrete	ψ_c	C20/25	1,00		
		C25/30	1,12		
		C30/37	1,23		
		C35/45	1,32		
		C40/50	1,41		
		C45/55	1,50		
		C50/60	1,58		
Characteristic spacing	s_{cr}	[mm]	3,0 h_{ef}	3,2 h_{ef}	3,2 h_{ef}
Characteristic edge distance	c_{cr}	[mm]	1,5 h_{ef}	1,6 h_{ef}	1,6 h_{ef}
Characteristic resistance in C20/25 ²⁾ 40 mm $\leq c < 50$ mm	F_{Rk}^0	[kN]	1,8	1,8	1,9 ³⁾
Characteristic resistance in C20/25 ²⁾ 50 mm $\leq c < c_{cr}$	F_{Rk}^0	[kN]	2,0	2,2	2,2 ³⁾
Shear load with lever arm					
Characteristic bending moment HFB, HFB-R and HFB-HCR	$M_{Rk,s}^0$	[Nm]	19,1		
Characteristic bending moment HFB-A-R and HFB-A-HCR	$M_{Rk,s}^0$	[Nm]	13,1		
Partial safety factor	γ_{Ms}	1) ¹⁾ [-]	1,25		

¹⁾ In absence of other national regulations.

²⁾ For group of two or four anchors according to Table B3.

³⁾ Not for HFB.

The anchor is to be used only for multiple use for non-structural applications. The definition of multiple use is given in EAD 330747-00-0601.

Hilti nail anchor HFB

Performance

Characteristic values of resistance

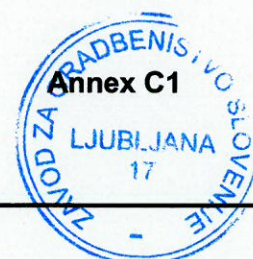


Table C2: Characteristic values of resistance for Hilti nail anchor HFB under fire exposure in concrete C20/25 to C50/60 for all load directions HFB, HFB-R, HFB-HCR, HFB-A-R and HFB-A-HCR

HFB, HFB-R, HFB-A-R, HFB-HCR and HFB-A-HCR						
Effective embedment depth		h_{ef}	[mm]	25	30	35
All load directions						
HFB						
R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,89	-
R 60	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,67	-
R 90	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,41	0,45	-
R 120	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,31	0,34	-
R 30 to R 120	Spacing	$s_{cr,fi}$	[mm]	$3,0 \cdot h_{ef}$	$3,2 \cdot h_{ef}$	-
R 30 to R 120	Edge distance	$c_{cr,fi}$	[mm]	$1,5 \cdot h_{ef}$	$1,6 \cdot h_{ef}$	-
HFB-R and HFB-HCR						
R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,89	1,25
R 60	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,89	1,25
R 90	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,89	1,24
R 120	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,23	0,71	1,00
R 30 to R 120	Spacing	$s_{cr,fi}$	[mm]	$3,0 \cdot h_{ef}$	$3,2 \cdot h_{ef}$	$3,2 \cdot h_{ef}$
R 30 to R 120	Edge distance	$c_{cr,fi}$	[mm]	$1,5 \cdot h_{ef}$	$1,6 \cdot h_{ef}$	$1,6 \cdot h_{ef}$
HFB-A-R and HFB-A-HCR						
R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,89	1,00
R 60	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,56	0,66	0,66
R 90	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,32	0,32	0,32
R 120	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,15	0,15	0,15
R 30 to R 120	Spacing	$s_{cr,fi}$	[mm]	$3,0 \cdot h_{ef}$	$3,2 \cdot h_{ef}$	$3,2 \cdot h_{ef}$
R 30 to R 120	Edge distance	$c_{cr,fi}$	[mm]	$1,5 \cdot h_{ef}$	$1,6 \cdot h_{ef}$	$1,6 \cdot h_{ef}$
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm. The anchorage depth must be increased for wet concrete by at least 30 mm compared to the given value						

¹⁾ In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{m,fi} = 1,0$ is recommended.

Hilti nail anchor HFB

Performance

Characteristic values of resistance under fire exposure

