

**DECLARATION OF PERFORMANCE**  
HALFEN HB-B WEDGE ANCHOR

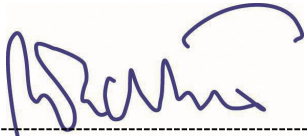
**CONF-DOP\_HB-B 05/18-E**  
No. H40-07/0247

1.	Unique identification code of the product-type	<b>HALFEN HB-B WEDGE ANCHOR</b>
2.	Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4)	<b>HALFEN HB-B WEDGE ANCHOR see ETA-07/0247 Annex A; Batch number: see packaging of the product</b>
3.	Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:	
	Generic type and use	Torque-controlled expansion anchor
	For use in	Non-cracked concrete C20/25 - C50/60 (EN 206)
	Base material / base material strength	Zinc-plated steel: dry internal conditions only covered sizes: M6, M8, M10, M12, M16, M20 Hot-dip galvanised steel: dry internal conditions only covered sizes: M8, M10, M12, M16, M20 Stainless steel (marking A4): internal and external use without particular aggressive conditions covered sizes: M6, M8, M10, M12, M16, M20 Highly corrosion resistant steel (marking HCR): internal and external use with particular aggressive conditions covered sizes: M6, M8, M10, M12, M16, M20
	Temperature range (if applicable)	-
4.	Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5)	HALFEN GmbH, Liebigstraße 14, 40764 Langenfeld, Germany
5.	Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2)	-
6.	System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V	System 1
7.	In case of the declaration of performance concerning a construction product covered by a harmonised standard	-
8.	In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued	Deutsches Institut für Bautechnik, Berlin issued ETA-07/0247 on the basis of ETAG 001. The notified body 0756-CPD performed under system 1: (i) initial inspection of the manufacturing plant and of factory production control; (ii) continuous surveillance, assessment and evaluation of factory production control.

Declared performance				
	Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
9.	to static and quasi-static loadingt	Te FprEN 1992-4 EOTA TR 055xt	ETA-Annex C1 bis C3	ETAG 001
	Displacements	FprEN 1992-4 EOTA TR 055	ETA-Annex C4	
	Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies		-	
10.	The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.			
This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.				

Langenfeld, 08.05.2018

Signed for and on behalf of the manufacturer by



Richard Wachter  
(Managing Director)



ppa. Dr.-Ing. Dirk Albartus  
(Manager Engineering)

Annex C1:

**Table C1:** Characteristic values for tension loads, steel zinc plated

Anchor size			M6	M8	M10	M12	M16	M20
Installation safety factor	$\gamma_{inst}$	[-]	1,0					
<b>Steel failure</b>								
Characteristic resistance	$N_{Rk,s}$	[kN]	8,7	15,3	26	35	65	107
Partial safety factor	$\gamma_{Ms}$	[-]	1,5				1,6	
<b>Pull-out</b>								
<b>Standard anchorage depth <math>h_{ef}</math></b>								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	9	12	16	1)	1)	1)
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 <sup>2)</sup>	1) <sup>2)</sup>	1)	1)	1)	1)
Increasing factor for $N_{Rk,p}$	$\psi_C$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$					
<b>Splitting</b>								
<b>Standard anchorage depth <math>h_{ef}</math></b>								
Spacing	$S_{cr,sp}$	[mm]	160	220	240	330	410	500
Edge distance	$C_{cr,sp}$	[mm]	80	110	120	165	205	250
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>								
Spacing	$S_{cr,sp}$	[mm]	180	210	230	240	320	400
Edge distance	$C_{cr,sp}$	[mm]	90	105	115	120	160	200
<b>Concrete cone failure</b>								
<b>Standard anchorage depth <math>h_{ef}</math></b>								
Effective anchorage depth	$h_{ef} \geq$	[mm]	40	44	48	65	82	100
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$					
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$					
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>								
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30 <sup>2)</sup>	35 <sup>2)</sup>	42	50	64	78
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef,red}$					
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef,red}$					
Factor for $k_1$	$k_{1cr,N}$	[-]	11,0					

<sup>1)</sup> Pullout failure is not decisive

<sup>2)</sup> Use restricted to anchorages of indeterminate structural components

Annex C2:

**Table C2: Characteristic values for tension loads, stainless steel A4/HCR**

Anchor size			M6	M8	M10	M12	M16	M20
Installation safety factor	$\gamma_{inst}$	(-)	1,0					
<b>Steel failure</b>								
Characteristic resistance	$N_{Rk,s}$	[kN]	10	18	30	44	88	134
Partial safety factor	$\gamma_{Ms}$	(-)	1,50					
<b>Pull-out</b>								
<b>Standard anchorage depth <math>h_{ef}</math></b>								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	7,5	12	16	25	<sup>1)</sup>	<sup>1)</sup>
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 <sup>2)</sup>	9 <sup>2)</sup>	12	<sup>1)</sup>	<sup>1)</sup>	<sup>1)</sup>
<b>Splitting</b>								
<b>Standard anchorage depth <math>h_{ef}</math></b>								
The higher one of the decisive resistances of Case 1 and Case 2 is applicable.								
<b>Case 1</b>								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6	9	12	20	30	40
Spacing	$S_{cr,sp}$	[mm]	3 $h_{ef}$					
Edge distance	$C_{cr,sp}$	[mm]	1,5 $h_{ef}$					
<b>Case 2</b>								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	7,5	12	16	25	<sup>1)</sup>	<sup>1)</sup>
Spacing	$S_{cr,sp}$	[mm]	160	220	240	340	410	560
Edge distance	$C_{cr,sp}$	[mm]	80	110	120	170	205	280
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6 <sup>2)</sup>	9 <sup>2)</sup>	12	<sup>1)</sup>	<sup>1)</sup>	<sup>1)</sup>
Spacing	$S_{cr,sp}$	[mm]	180	210	230	300	320	400
Edge distance	$C_{cr,sp}$	[mm]	90	105	115	150	160	200
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	$\psi_c$	(-)	$\left(\frac{f_{ck}}{20}\right)^{0,5}$					
<b>Concrete cone failure</b>								
<b>Standard anchorage depth</b>								
Effective anchorage depth	$h_{ef}$	[mm]	40	44	48	65	80	100
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$					
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$					
<b>Reduced anchorage depth</b>								
Effective anchorage depth	$h_{ef,red}$	[mm]	30 <sup>2)</sup>	35 <sup>2)</sup>	42	50	64	78
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$					
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$					
Factor for $k_1$	$k_{uer,N}$	(-)	11,0					

<sup>1)</sup> Pullout failure is not decisive.

<sup>2)</sup> Use restricted to anchorages of indeterminate structural components.

Annex C3:

**Table C3:** Characteristic values for **shear loads, steel zinc plated**

Anchor size			M6	M8	M10	M12	M16	M20
Installation safety factor	$\gamma_{inst}$	[-]	1,0					
<b>Steel failure without lever arm</b>								
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5	11	17	25	44	69
Factor for ductility	$k_T$	[-]	1,0					
<b>Steel failure with lever arm</b>								
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	9	23	45	78	186	363
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	$\gamma_{Ms}$	[-]	1,25				1,33	
<b>Concrete pry-out failure</b>								
Factor for $h_{ef}$	$k_B$	[-]	1,0	1,0	1,0	2,0	2,0	2,0
Factor for $h_{ef,red}$	$k_B$	[-]	1,0 <sup>1)</sup>	1,0 <sup>1)</sup>	1,0	1,0	2,0	2,0
<b>Concrete edge failure</b>								
Effective length of anchor in shear loading for $h_{ef}$	$l_f$	[mm]	40	44	48	65	82	100
Effective length of anchor in shear loading for $h_{ef,red}$	$l_{f,red}$	[mm]	30 <sup>1)</sup>	35 <sup>1)</sup>	42	50	64	78
Outside diameter of anchor	$d_{nom}$	[mm]	6	8	10	12	16	20

<sup>1)</sup> Use restricted to anchorages of indeterminate structural components

**Table C4:** Characteristic values for **shear loads, stainless steel A4/HCR**

Anchor Size			M6	M8	M10	M12	M16	M20
Installation safety factor	$\gamma_{inst}$	[-]	1,0					
<b>Steel failure without lever arm</b>								
Characteristic shear resistance	$V_{Rk,s}$	[kN]	7	12	19	27	50	86
Factor for ductility	$k_T$	[-]	1,0					
<b>Steel failure with lever arm</b>								
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	10	24	49	85	199	454
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	$\gamma_{Ms}$	[-]	1,25				1,4	
<b>Concrete pry-out failure</b>								
Factor for $h_{ef}$	$k_B$	[-]	1,0	1,0	1,0	2,0	2,0	2,0
Factor for $h_{ef,red}$	$k_B$	[-]	1,0 <sup>1)</sup>	1,0 <sup>1)</sup>	1,0	1,0	2,0	2,0
<b>Concrete edge failure</b>								
Effective length of anchor in shear loading with $h_{ef}$	$l_f$	[mm]	40	44	48	65	80	100
Effective length of anchor in shear loading with $h_{ef,red}$	$l_{f,red}$	[mm]	30 <sup>1)</sup>	35 <sup>1)</sup>	42	50	64	78
Outside diameter of anchor	$d_{nom}$	[mm]	6	8	10	12	16	20

<sup>1)</sup> Use restricted to anchorages of indeterminate structural components



Annex C4:

**Table C5:** Displacements under **tension loads, steel zinc plated**

Anchor size			M6	M8	M10	M12	M16	M20
<b>Standard anchorage depth</b>								
Tension load	N	[kN]	4,3	5,8	7,6	11,9	16,7	23,8
Displacement	$\delta_{N0}$	[mm]	0,4	0,5				
	$\delta_{Nz}$	[mm]	0,7	2,3				
<b>Reduced anchorage depth</b>								
Tension load	N	[kN]	2,9	5,0	6,5	8,5	12,3	16,6
Displacement	$\delta_{N0}$	[mm]	0,3	0,4				
	$\delta_{Nz}$	[mm]	0,6	1,8				

**Table C6:** Displacements under **tension loads, stainless steel A4/HCR**

Anchor size			M6	M8	M10	M12	M16	M20
<b>Standard anchorage depth</b>								
Tension load	N	[kN]	3,6	5,7	7,6	11,9	17,2	24,0
Displacement	$\delta_{N0}$	[mm]	0,7	0,9	0,5	0,6	0,9	2,1
	$\delta_{Nz}$	[mm]	1,8					4,2
<b>Reduced anchorage depth</b>								
Tension load	N	[kN]	2,9	4,3	5,7	8,5	12,3	16,6
Displacement	$\delta_{N0}$	[mm]	0,4	0,7	0,4	0,4	0,6	1,5
	$\delta_{Nz}$	[mm]	1,3					2,9

**Table C7:** Displacements under **shear loads, steel zinc plated**

Anchor size			M6	M8	M10	M12	M16	M20
Shear load	V	[kN]	2,9	6,3	9,7	14,3	23,6	37,0
Displacement	$\delta_{V0}$	[mm]	1,2	1,5	1,6	2,6	3,1	4,4
	$\delta_{Vz}$	[mm]	2,4	2,2	2,4	3,9	4,6	6,6

**Table C8:** Displacements under **shear loads, stainless steel A4/HCR**

Anchor Size			M6	M8	M10	M12	M16	M20
Shear load	V	[kN]	4,0	6,9	10,9	15,4	28,6	43,7
Displacement	$\delta_{V0}$	[mm]	1,1	2,0	1,2	2,0	2,2	2,1
	$\delta_{Vz}$	[mm]	1,7	3,0	1,8	3,0	3,3	3,2