Leviat®
A CRH COMPANY

HALFEN

HALFEN HB ANCHOR BOLT SYSTEMS
Technical Product Information

Leviat®
A CRH COMPANY

We are one team.
We are Leviat.

Leviat is the new name of CRH's construction accessories companies worldwide.

Under the Leviat brand, we are uniting the expertise, skills and resources of HALFEN and its sister companies to create a world leader in fixing, connecting and anchoring technology.

The products you know and trust, including the HALFEN HB Anchor Bolt Systems, will remain an integral part of Leviat's comprehensive brand and product portfolio. As Leviat, we can offer you an extended range of specialist products and services, greater technical expertise, a larger and more agile supply chain and better, faster innovation.

By bringing together CRH's construction accessories family as one global organisation, we are better equipped to meet the needs of our customers, and the demands of construction projects, of any scale, anywhere in the world.

This is an exciting change. Join us on our journey.

Read more about Leviat at Leviat.com

Our product brands include:

Ancon®

HALFEN

PLAKA

60 locations

sales in **30+** countries

3000 people worldwide

Imagine. Model. Make.

Leviat.com

HALFEN ANCHOR BOLT SYSTEMS

Contents

Singapore Power Transmission Cable Tunnel Project – HB-BZ

Overview

Overview

All Systems with (ETA) and CE marking	Non-cracked concrete	Cracked concrete	Masonry	Fire ① protection	Finish ② GV	Finish ② FV	Finish ② A4	Finish ② HCR ③	Page
Chemical anchor systems									
HB-VMZ Injection system 1 	●	●			●		●	●	5
HB-V Chemical anchor 2 	●				●	●	●		12
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Mechanical anchor systems									
HB-BZ Wedge anchor 4 	●	●		●	●		●	●	30
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① Fire protection according to DIN 4102-2,
Fire resistant classification F30, F60, F90 and F120

② GV=electroplated
FV=hot-dip galvanized

A4=A4 Stainless steel
③ On request
HCR=Stainless steel HCR, 1.4529

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001 www.dnvgl.com

Our Quality Management System meets the requirements of ISO 9001:2015.

Easy-to-use and free calculation software available

www.halfen.com ▻ Downloads ▻ Software/CAD

Seismic loads

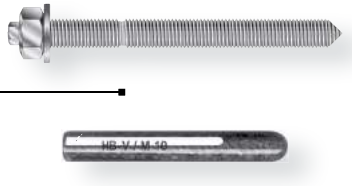
suitable for seismic loading

Chemical Anchor Bolt Systems

HALFEN ANCHOR BOLTS

HALFEN Anchor systems are an extensive range of top quality, state-of-the-art fixings for a wide range of applications. Competent, expert support is available for all systems and projects.

HB-VMZ Injection system
The strongest and most versatile of anchors, can be used for various anchorage depths. These anchors are suitable for heavy loads, even for minimal edge distances. Suitable for use in cracked and non-cracked concrete.
See page 5



HB-V Chemical bolt anchor
The classic chemical anchor provides a cost effective, easy to install solution for simple fixings in non-cracked concrete.
See page 12

HB-VMU plus
Can be used in cracked, non-cracked concrete, solid masonry and in perforated brick masonry. This versatile system is reliable and easy to use. A threaded rod is used as an effective anchorage element.
See page 16

Service

Our Customer Service and Technical Field Support Teams are available to provide comprehensive support for specific applications or to provide solutions for complete projects.

Design software
Page 45

HB-VMZ electroplated

Load range (tension): 6.1 kN – 105.7 kN
Concrete grade: C20/25 – C50/60

European Technical Assessment - Option 1
ETA-07/0256

HB-VMZ-A Anchor stud electroplated

HB-VMZ 420 Cartridge

HB-VMZ 280 Cartridge

Description

The HB-VMZ Injection system consists of an anchor rod with a conical expanding shaft and a 2-component injection mortar. These two characteristics allow transfer of high loads with minimal edge distance and axial spacings in thin concrete components. This system with European Technical Assessment combines the advantages of bonded and expansion anchors in one fixing system; suitable for cracked and non-cracked concrete.

Benefits

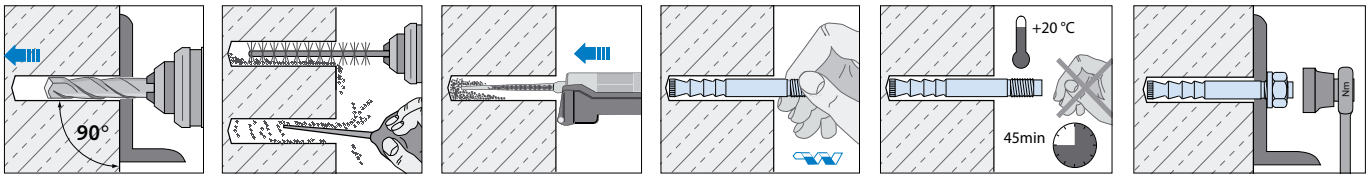
- suitable for use in thin concrete elements
- approved for use under seismic applications category C1 and C2 (M8–M24)
- select the suitable diameter and the optimal anchoring depth from a wide range of anchor bolts
- most economic fixing method with smaller dowels and minimal required drilling
- simply attach a new static mixer to continue using previously opened cartridges

Applications

Anchoring heavy loads in cracked and non-cracked concrete in dry interior environments: steel structures, brackets and consoles, handrails and banisters, framing structures, cable trays and ducts.

Easy-to-use and free calculation software available
www.halfen.com ⊳ Downloads ⊳ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-5°C	>-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:20	00:45	00:20	00:12	00:06	00:04	00:02	84 sec.	84 sec.
Curing time in hh:mm	Dry concrete	06:00	06:00	03:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	12:00	12:00	06:00	04:00	02:40	01:30	00:50	00:40	00:30

-5°C = approved minimum temperature in installation material

Installation parameters

Dimensions in mm

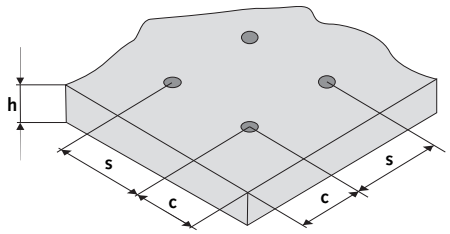
Installation specifications

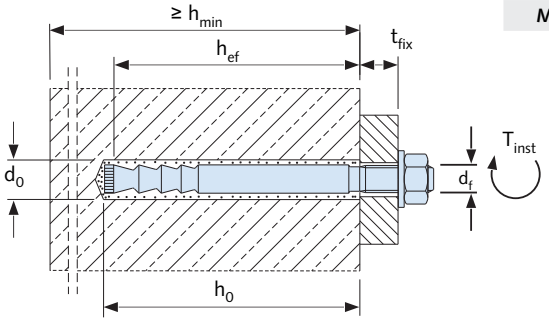
Anchor stud	[mm]	M8	M10	M12	M12	M12	M16	M16	M20	M24
Anchorage depth	h_{ef}	50	60	70	80	100	90	125	170	225
Drill hole diameter	d_o	10	12	14	14	14	18	18	24	26
Pre-positioned-setting	d_f	9	12	14	14	14	18	18	24 (22)①	26
Push-through-setting ②	d_f	-	14	16	16	16	20	20	26	28
Drill hole depth	h_o	55	65	75	85	105	98	133	180	240
Spanner/wrench size	SW	13	17	19	19	19	24	24	30	36

① Value in brackets for type LG (thread to the concrete surface)
② The clearance hole in the fixture must be completely grouted.

Installation torque

	Anchorage depth	T_{inst} [Nm]
M8	50	10
M10	60	15
M12	70	25
	80	
	100	30
M16	90	50
	125	
M20	170	80
M24	225	120





Spacing and edge distances

Anchor stud	[mm]	M8	M10	M10	M12	M12	M12	M16	M16	M20	M24
Effective anchorage depth	h_{ef}	50	60	70	80	100	125	90	125	170	225
Minimum thickness of building component	h_{min}	80	100	110	110	130	160	130	170/160①	230/220①	300/290①
		cracked concrete									
Minimum axial spacing	s_{min}	40	40	55	40	50	50	50	60	80	80
Minimum edge distance	c_{min}	40	40	55	50	50	50	50	60	80	80
		non-cracked concrete									
Minimum axial spacing	s_{min}	40	50	55	55	80②	80②	50	60	80	105
Minimum edge distance	c_{min}	40	50	55	55	55②	55②	50	60	80	105

① After drilling the hole for the anchor, check the reverse side of the concrete element for damage (through penetration).
Damage caused by penetrating the concrete must be repaired using high-strength mortar.
Any mortar loss must be compensated for to ensure full anchorage depth h_{ef} is maintained.
② For edge spacing c > 80 mm, axial spacing s_{min} = 55 mm

Ordering example

HB-VMZ-A	50	8 –	30/95	GV

HALFEN Anchor type
Anchoring depth
Diameter / thread [mm]
Max. fixture thickness / total length [mm]
Finish

Anchor selection / installation parameters, extract from ETA-07/0256

Dimensions in mm

HB-VMZ-A Anchor studs GV electroplated

Anchor diameter Ø	Article name	Drill hole Ø × depth	Setting depth	Anchorage depth h_{ef}	Max.fixture thickness t_{fix}	Anchor length	Thread
M8	HB-VMZ-A 50 8-30/95	10×55	52	50	30	95	M8×31
	HB-VMZ-A 50 8-45/110				45	110	M8×31
M10	HB-VMZ-A 60 10-30/105	12×65	63	60	30	105	M10×27
	HB-VMZ-A 60 10-60/135				60	135	M10×47
	HB-VMZ-A 60 10-100/175				100	175	M10×57
M12	HB-VMZ-A 70 12-25/115	14×75	74	70	25	115	M12×36
	HB-VMZ-A 80 12-50/150	14×85	84	80	50	150	M12×46
	HB-VMZ-A 100 12-60/180	14×105	104	100	60	180	M12×56
	HB-VMZ-A 125 12-25/170	14×130	129	125	25	170	M12×36
M16	HB-VMZ-A 90 16-30/145	18×98	94	90	30	145	M16×44
	HB-VMZ-A 125 16-60/210			125	60	210	M16×55
M20	HB-VMZ-A 170 20-25/230	24×180	180	170	25	230	M20×33
	HB-VMZ-A 170 20-50/255				50	255	M20×46
	HB-VMZ-A 170 20-100/305				100	305	M20×71
M24	HB-VMZ-A 225 24-50/315	26×240	237	225	50	315	M24×50

Other sizes and thread lengths on request

Installation parameters, extract from ETA-07/0256

European Technical Assessment · Option 1
ETA-07/0256

Approved loads for anchors without influence of axial spacing and edge distance
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications HB-VMZ Injection system A4			M8	M10	M12	M12	M12	M12	M16	M16	① M20/ M20 LG	M24
Anchorage depth			**50**	**60**	**70**	**80**	**100**	**125**	**90**	**125**	**170**	**225**
	cracked concrete											
Approved tension load	C20/25	App. N [kN]	6.1	8.0	10.0	12.3	17.1	24.0	14.6	24.0	38.0	57.9
	C25/30	App. N [kN]	6.6	8.7	11.0	13.4	18.8	26.2	16.0	26.2	41.6	63.4
	C30/37	App. N [kN]	7.4	9.7	12.2	14.9	20.9	27.1	17.8	29.1	46.2	70.4
	C40/50	App. N [kN]	8.6	11.3	14.2	17.3	24.2	27.1	20.7	33.9	53.7	81.8
	C50/60	App. N [kN]	8.6	11.9	15.6	19.0	26.6	27.1	22.7	37.1	58.9	89.6
	non-cracked concrete											
Approved tension load	C20/25	App. N [kN]	8.5	11.2	14.1	17.2	24.0	23.8	20.5	33.5	53.2	81.0
	C25/30	App. N [kN]	8.6	11.9	15.4	18.9	26.3	26.1	22.4	36.7	58.3	88.7
	C30/37	App. N [kN]	8.6	11.9	17.1	20.9	27.1	27.1	24.9	40.8	64.7	98.5
	C40/50	App. N [kN]	8.6	11.9	19.9	24.3	27.1	27.1	29.0	47.4	75.2	105.7
	C50/60	App. N [kN]	8.6	11.9	21.8	25.7	27.1	27.1	31.7	52.0	82.4	105.7
	cracked and non-cracked concrete											
Approved shear load	C20/25	App. V [kN]	8.0	12.0	19.4	19.4	19.4	19.4	29.3	36.0	76.0	101.7
App. shear load Version LG ①	C20/25	App. V [kN]	8.0	12.0	19.4	19.4	19.4	19.4	29.3	36.0	56.0	80.6
App. bending moment	–	App. M [Nm]	17.1	34.3	60.0	60.0	60.0	60.0	152.0	152.0	296.6	512.0

① = Value for type LG (thread to the concrete surface)

HB-VMZ A4

Load range (tension):	6.1 kN – 92.4 kN
Concrete grade:	C20/25 – C50/60

European Technical Assessment - Option 1
ETA-07/0256

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STAINLESS STEEL

HB-VMZ-A A4 Anchor stud

HB-VMZ 420 Cartridge

HB-VMZ 280 Cartridge

Description

The **HB -VMZ** Injection system consists of an anchor stud with a conical expanding shaft and a 2-component injection mortar. These two characteristics allow transfer of high loads into the concrete with minimal edge distance and axial spacings. This system with European Technical Assessment combines the advantages of bonded and expansion anchors in one fixing system; suitable for cracked and non-cracked concrete.

Benefits

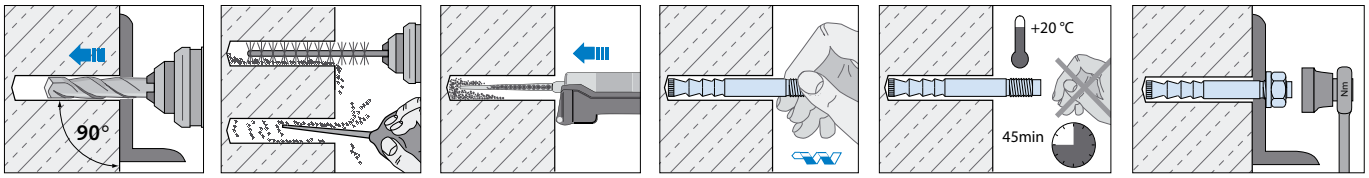
- suitable for use in thin concrete elements
- approved for use under seismic applications category C1 and C2 (M10–M24)
- select the suitable diameter and the optimal anchoring depth from a wide range of anchor bolts
- most economic fixing with smaller dowels and minimal required drilling
- simply attach a new static mixer to continue using previously opened cartridges

Applications

Anchoring heavy loads in cracked and non-cracked concrete in interior and exterior environments or in wet rooms (non-aggressive environments): Steel structures, brackets and consoles, handrails and banisters, façade supports, corbel anchorage, cable trays and ducts.

Easy-to-use and free calculation software available
www.halfen.com ⊳ Downloads ⊳ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-5°C	>-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:30	00:45	00:20	00:12	00:06	00:04	00:02	84 sec.	84 sec.
Curing time in hh:mm	Dry concrete	06:00	06:00	03:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	12:00	12:00	06:00	04:00	02:40	01:30	00:50	00:40	00:30

-5 °C = approved minimum temperature in installation material

Installation

Dimensions in mm

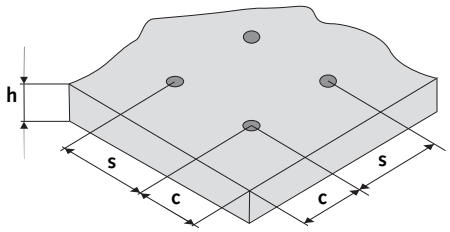
Installation specifications

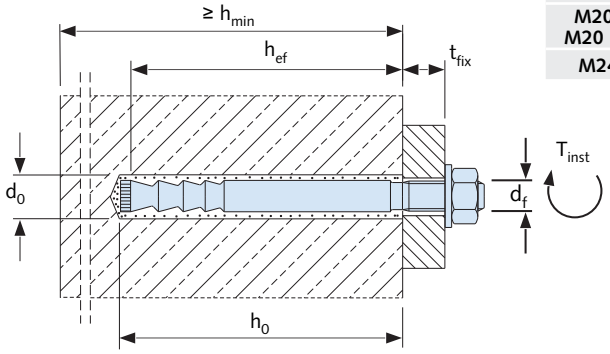
Anchor stud		M8	M10	M10	M12	M12	M12	M16	M16	M20	M20/ M20 LG	M24
Anchorage depth	h_{ef}	50	60	75	80	100	125	105	125	115	170	200
Drill hole diameter	d_o	10	12	12	14	14	14	18	18	22	24	26
Pre-positioned-setting	d_f	9	12	12	14	14	14	18	18	22	24 (22)①	26
Push-through-setting ②	d_f	-	14	14	16	16	16	20	20	26	26	28
Drill hole depth	h_o	55	65	80	85	105	130	113	133	120	180	215
Spanner/wrench size	SW	13	17	17	19	19	19	24	24	30	30	36

① Value in brackets for type LG (with thread to the concrete surface)
② The clearance hole in the fixture must be completely grouted.

Installation torque

	Anchoring depth	T_{inst} [Nm]
M8	50	10
M10	60	15
	75	
M12	80	25
	100	30
	125	
M16	105	50
	125	
M20	115	80
M20/ M20 LG	170	
M24	200	120





Spacing and edge distances

Anchor stud		M8	M10	M10	M12	M12	M12	M16	M16	M20	M20/ 20 LG	M24
Effective anchorage depth	h_{ef}	50	60	75	80	100	125	105	125	115	170	200
Min. building component thickness	h_{min}	80	100	110/100①	110	130	160	150	170/160①	160	230/220①	270/260①
		cracked concrete										
Min. axial spacing	s_{min}	40	40	40	40	50	50	50	60	80	80	80
Min. edge distance	c_{min}	40	40	40	50	50	50	50	60	80	80	80
		non-cracked concrete										
Min. axial spacing	s_{min}	40	50	50	55	80②	80②	60	60	80	80	105
Min. edge distance	c_{min}	40	50	50	55	55②	55②	60	60	80	80	105

① After drilling the hole for the anchor, check the reverse side of the concrete element for damage (through penetration).
Damage caused by penetrating the concrete must be repaired using high-strength mortar.
Any mortar loss must be compensated for to ensure full anchorage depth h_{ef} is maintained.
② For edge spacing c > 80 mm, axial spacing s_{min} = 55 mm

Ordering example

HB-VMZ-A | 50 | 8- | 15/80 | A4

- HALFEN Anchor type
- Anchorage depth
- Diameter / thread [mm]
- Max. fixture thickness / total length [mm]
- Finish

Selection anchors – HB-VMZ-A A4 Stainless steel / extract from ETA-07/0256

Dimensions in mm

HB-VMZ-A Anchor stud, A4 Stainless steel

H = Preferred anchor for HALFEN Applications = Suitable for fixing HALFEN Support brackets

Anchor Ø	Article name	Drill hole Ø × depth	Setting depth	Anchorage depth h_{ef}	Max. fixture thickness t_{fix}	Anchor length	Thread
M8	HB-VMZ-A 50 8-15/80	10×55	52	50	15	80	M8×22
	HB-VMZ-A 50 8-30/95 H			50	30	95	M8×31
M10	HB-VMZ-A 60 10-10/85	12×65	63	60	10	85	M10×18
	HB-VMZ-A 60 10-20/95 H			60	20	95	M10×27
	HB-VMZ-A 60 10-30/105			60	30	105	M10×27
	HB-VMZ-A 60 10-60/135 H			60	60	135	M10×47
	HB-VMZ-A 60 10-100/175			60	100	175	M10×57
	HB-VMZ-A 75 10-40/130	12×80	78	75	40	130	M10×47
M12	HB-VMZ-A 80 12-25/125 H	14×85	84	80	25	125	M12×36
	HB-VMZ-A 80 12-50/150 H			80	50	150	M12×46
	HB-VMZ-A 80 12-60/160 H			80	60	160	M12×56
	HB-VMZ-A 80 12-100/200			80	100	200	M12×71
	HB-VMZ-A 100 12-60/180 H	14×105	104	100	60	180	M12×56
	HB-VMZ-A 125 12-60/205 H	14×130	129	125	60	205	M12×56
M16	HB-VMZ-A 105 16-30/160	18×113	109	105	30	160	M16×44
	HB-VMZ-A 105 16-60/190 H			105	60	190	M16×50
	HB-VMZ-A 125 16-30/180 H	18×133	130	125	30	180	M16×44
	HB-VMZ-A 125 16-60/210 H			125	60	210	M16×55
	HB-VMZ-A 125 16-100/250			125	100	250	M16×65
M20	HB-VMZ-A 115 20-30/175	22×120	120	115	30	175	M20×46
	HB-VMZ-A 170 20-20/225 LG ①	24×180	180	170	20	225	M20×41
	HB-VMZ-A 170 20-50/255			170	50	255	M20×46
M24	HB-VMZ-A 200 24-50/290	26×215	212	200	50	290	M24×50

① Value for LG version (with thread to the concrete surface) Other dimensions and thread lengths on request

Extract from the application provisions in ETA-07/0256

European Technical Assessment - Option 1
ETA-07/0256

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications HB-VMZ Injection system A4			M8	M10	M10	M12	M12	M12	M16	M16	M20	M20/ M20 LG	M24
Anchorage depth		h_{ef}	50	60	75	80	100	125	105	125	115	170	200
	cracked concrete												
Approved tension loads	C20/25	App. N [kN]	6.1	8.0	11.1	12.3	17.1	24.0	18.4	24.0	21.1	38.0	48.5
	C25/30	App. N [kN]	6.6	8.8	11.9	13.4	18.8	26.2	20.2	26.2	23.2	41.6	53.1
	C30/37	App. N [kN]	7.4	9.7	11.9	14.9	20.9	27.1	22.4	29.1	25.7	46.2	59.0
	C40/50	App. N [kN]	8.6	11.3	11.9	17.3	24.2	27.1	26.1	33.9	29.9	53.7	68.6
	C50/60	App. N [kN]	8.6	11.9	11.9	19.0	26.6	27.1	28.6	37.1	32.8	58.9	75.1
	non-cracked concrete												
Approved tension loads	C20/25	App. N [kN]	8.5	11.2	11.9	17.2	24.0	23.8	25.8	33.5	29.6	53.2	67.9
	C25/30	App. N [kN]	8.6	11.9	11.9	18.8	26.3	26.1	28.3	36.7	32.4	58.3	74.4
	C30/37	App. N [kN]	8.6	11.9	11.9	20.9	27.1	27.1	31.4	40.8	36.0	64.7	82.6
	C40/50	App. N [kN]	8.6	11.9	11.9	24.3	27.1	27.1	36.5	47.4	41.9	75.2	92.4
	C50/60	App. N [kN]	8.6	11.9	11.9	25.7	27.1	27.1	40.0	52.0	45.9	78.6	92.4
	cracked and non-cracked concrete												
Approved shear loads	C20/25	App. V [kN]	8.6	13.1	13.1	19.4	19.4	19.4	36.0	36.0	42.3	74.9	89.1
App. shear loads LG version	C20/25	App. V [kN]	8.6	13.1	13.1	19.4	19.4	19.4	36.0	36.0	42.3	49.1	70.3
App. bending moments	–	App. M [Nm]	17.1	34.3	34.3	60.0	60.0	60.0	152.0	152.0	231.6	259.4	448.0

HB-VMZ Wedge anchor HCR

Load range (tension):	6.1 kN – 92.4 kN
Concrete grade:	C20/25 – C50/60

European Technical Assessment · Option 1
ETA-07/0256

EDELSTAHL Rostfrei
STAINLESS STEEL

On request

HB-VMZ-A Wedge anchor HCR

HB-VMZ 420 Cartridge

HB-VMZ 280 Cartridge

Description

The HB -VMZ Injection system consists of an anchor stud with a conical indented shaft and a 2-component bonding agent. This allows high loads to be transferred into the substrate with minimal edge distance and axial spacings. This system with European Technical Assessment combines the advantages of bonded and expansion anchors in one fixing system for cracked and non-cracked concrete.

Benefits

- suitable for use in thin concrete elements
- approved for use under seismic applications category C1 and C2 (M10–M24)
- select the suitable diameter and the optimal anchoring depth from the wide range of anchor bolts
- most economic fixing with smaller dowels and minimal required drilling
- use a new static mixer to continue using previously opened cartridges
- tested in accordance with the ZTV* tunnel standard time temperature curve (M10-M24 HCR)

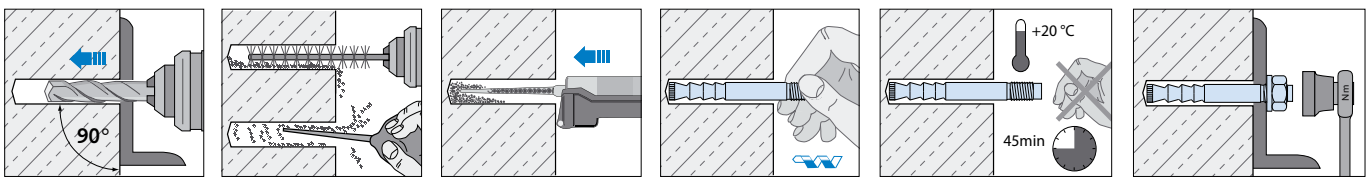
(* Zusätzlichen Technischen Vertragsbedingungen)
Additional Technical Terms and Conditions

Applications

Anchorage of heavy loads in cracked and non-cracked concrete in wet rooms or in especially aggressive environments; continual immersion in seawater, intermittent seawater spray, chlorinated atmosphere in swimming pools, extreme chemical exposure, or in road tunnels where de-icing agents are used.

Easy-to-use and free calculation software available
www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-5°C	>-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:30	00:45	00:20	00:12	00:06	00:04	00:02	84 sec.	84 sec.
Curing time in hh:mm	Dry concrete	06:00	06:00	03:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	12:00	12:00	06:00	04:00	02:40	01:30	00:50	00:40	00:30

-5°C = approved minimum temperature in installation material

CHEMICAL ANCHOR BOLT SYSTEMS

HB-V Chemical Anchor, Electroplated, Hot-dip Galvanized and A4 — for Non-cracked Concrete

HB-V galvanized and A4 Stainless steel for non-cracked concrete

HB-V-A Chemical anchor galvanized

Load range (tension):	3.0 kN – 35.7 kN
Concrete grade:	C20/25 – C50/60

ETA-07/0257

HB-V-A Anchor bolt, steel, hot-dip galvanized

HB-V-A Chemical anchor, steel, hot-dip galvanized

HB-V-P Adhesive capsule

HB-V-A Chemical anchor stainless steel

Load range (tension):	3.0 kN – 80.6 kN
Concrete grade:	C20/25 – C50/60

EDELSTAHL Rost frei STAINLESS STEEL

HB-V-A Chemical anchor, A4 Stainless steel

Application

Anchorage of heavy loads in non-cracked concrete in dry interior environments: columns, base and facing plates, industrial framing systems and highrack storage systems.

Benefits

The HB-V Injection system with ETA assessment consists of the HB-V-A Chemical anchor rod and a glass cartridge filled with synthetic resin, hardener and additives. When the anchor rod is driven into the hole containing the capsule, the capsule breaks and the contained components mix to a quick hardening synthetic resin mortar. This tried-and-tested anchor system is expansion pressure free and therefore allows heavy loads to be attached even with small edge distances and axial spacings. The drill hole is sealed by the synthetic resin.

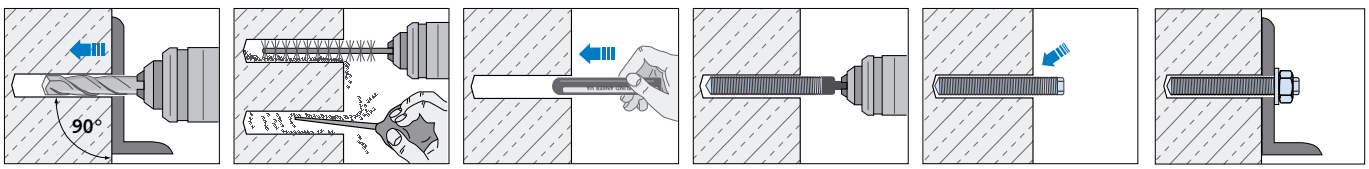
Application

Anchorage of heavy loads in non-cracked concrete in interior, or exterior environments and in wet rooms (non-aggressive environments) columns, base and facing plates,consoles, façade supports, crash barriers handrails and banisters, motorway noise barriers.

Easy-to-use and free calculation software available

www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C
Curing time in hh:mm	Dry concrete	05:00	05:00	01:00	01:00	00:20	00:10	00:10
	Wet concrete	10:00	10:00	02:00	02:00	00:40	00:20	00:20

Installation – electroplated and A4

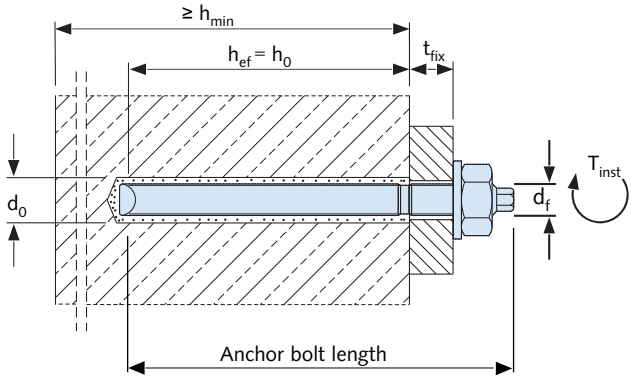
Dimensions in mm

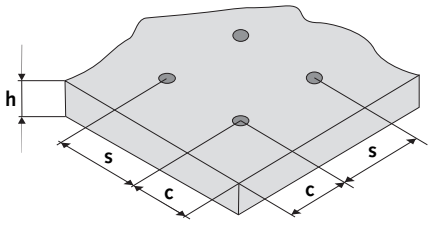
Installation specifications

Anchor stud		M8	M10	M12	M16	M20	M24
Anchorage depth	h_{ef}	80	90	110	125	170	210
Drill hole diameter	d_o	10	12	14	18	25	28
Diameter of clearance hole in the fixture	d_f	9	12	14	18	22	26
Drill hole depth	h_o	80	90	110	125	170	210
Spanner/wrench size	SW	13	17	19	24	30	36

Installation torque

	Anchoring depth	T_{inst} [Nm]
M8	80	10
M10	90	20
M12	110	40
M16	125	80
M20	170	120
M24	210	180





Axial spacing and edge distance

Anchor stud		M8	M10	M12	M16	M20	M24
Anchorage depth	h_{ef}	80	90	110	125	170	210
	non-cracked concrete						
Minimal building component thickness	h_{min}	110	120	140	160	220	260
Minimal axial spacing	s_{min}	40	45	55	65	85	105
Minimal edge distance	c_{min}	40	45	55	65	85	105
Axial spacing	$S_{cr,N}$	240	180	220	250	340	420
Edge distance	$C_{cr,N}$	120	90	110	125	170	210

Installation parameters, extract from ETA-07/0257

ETA-07/0257

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications for non-cracked concrete			M8	M10	M12	M16	M20	M24②
HB-V Chemical anchor, electroplated and stainless steel								
Approved tension loads	C12/15①	Recomm. N [kN]	3.0	5.0	7.0	10.0	19.0	26.0
	C20/25	App. N [kN]	7.9	11.9	15.9	19.8	29.8	35.7
HB-V Chemical anchor, electroplated								
Approved shear loads (steel, grade 5.8)	C12/15①	Recomm. V [kN]	3.0	5.0	7.0	10.0	19.0	–
	C20/25	App. V [kN]	5.1	8.0	12.0	22.3	34.9	–
Approved shear loads (steel, grade 8.8)	C20/25	App. V [kN]	8.6	13.1	18.9	36.0	56.0	–
Approved bending moment (steel, grade 5.8)	–	App. M [Nm]	10.9	21.1	37.1	94.9	185.7	–
Approved bending moment (steel, grade 8.8)	–	App. M [Nm]	17.1	34.3	60.0	152.0	296.6	–
HB-V Chemical anchor, A4 Stainless steel								
Approved shear loads	C12/15①	Recomm. V [kN]	3.0	5.0	7.0	10.0	19.0	26.0
	C20/25	App. V [kN]	6.0	9.2	13.3	25.2	39.4	56.8
Approved bending moment	–	App. M [Nm]	11.9	23.8	42.1	106.7	207.9	395.4

① Recommended loads in concrete C12/15, not included in the assessment. ② Only valid for stainless steel anchor bolts.

HB-V Chemical Anchor – Electroplated, Hot-dip Galvanized and A4 — for Non-cracked Concrete

HB-V-A Chemical anchor selection – galvanized

- Dimensions in mm

HB-V-A Chemical anchor – GV electroplated

- With nut and washer, electroplated
- Approved for non-cracked concrete

[H] = Preferred anchor for HALFEN Applications

Anchor Ø	Article name	Drill hole Ø × depth	Anchorage depth h_{ef}	Max.fixture thickness t_{fix}	Anchor length
M10	HB-V-A 10-15/115	12 × 90	90	15	115
	HB-V-A 10-30/130			30	130
	HB-V-A 10-65/165			65	165
	HB-V-A 10-90/190 [H]			90	190
M12	HB-V-A 12-10/135	14 × 110	110	10	135
	HB-V-A 12-35/160 [H]			35	160
	HB-V-A 12-85/210			85	210
	HB-V-A 12-125/250			125	250
	HB-V-A 12-175/300			175	300
M16	HB-V-A 16-20/165	18 × 125	125	20	165
	HB-V-A 16-45/190 [H]			45	190
	HB-V-A 16-85/230			85	230
	HB-V-A 16-105/250			105	250

Anchor with hexangonal-bolt head Further lengths on request

HB-V-A Chemical anchor - FV Steel hot-dip galvanized

- With nut and washer, electroplated
- Approved for non-cracked concrete

Anchor Ø	Article name	Drill hole Ø × depth	Anchorage depth h_{ef}	Max. fixture thickness t_{fix}	Anchor length
M10	HB-V-A 10-30/130	12 × 90	90	30	130
	HB-V-A 10-90/190			90	190
M12	HB-V-A 12-35/160	14 × 110	110	35	160
	HB-V-A 12-95/220			95	220
M16	HB-V-A 16-45/190	18 × 125	125	45	190
	HB-V-A 16-65/210			65	210
M20	HB-V-A 20-20/220	25 × 170	170	20	220
	HB-V-A 20-60/260			60	260

Anchor with hexangonal-bolt head Further lengths on request

HB-V-P Adhesive capsule

	Number of capsules in each box	Package weight kg
HB-V-P 8	10	0.13
HB-V-P 10	10	0.16
HB-V-P 12	10	0.25
HB-V-P 16	10	0.36
HB-V-P 22	10	1.20
HB-V-P 24	5	0.87

min. application temperature of capsule = +5°C

HB-V-A Anchor bolt selection – A4 Stainless steel

- Dimensions in mm

HB-V-A Chemical anchor – A4

- With nut and washer, steel, electroplated
- Approved for non-cracked concrete

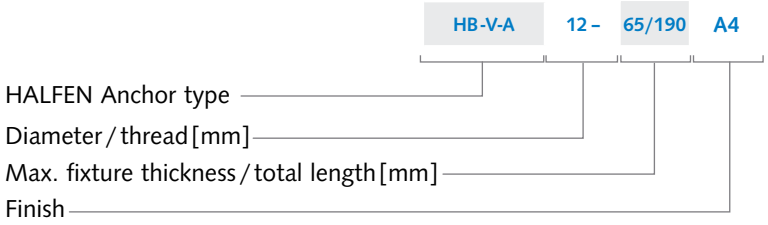
[H] = Preferred anchor for HALFEN Applications

= Suitable for fixing HALFEN Support brackets

Anchor Ø	Article name	Drill hole Ø × depth	Anchorage depth h_{ef}	Max. fixture thickness t_{fix}	Anchor length
M8	HB-V-A 8-20/110 [H]	10 × 80	80	20	110
M10	HB-V-A 10-15/115 [H]	12 × 90	90	15	115
	HB-V-A 10-30/130 [H]			30	130
	HB-V-A 10-65/165 [H]			65	165
	HB-V-A 10-90/190			90	190
M12	HB-V-A 12-10/135 [H]	14 × 110	110	10	135
	HB-V-A 12-35/160			35	160
	HB-V-A 12-55/180 [H]			55	180
	HB-V-A 12-65/190 [H]			65	190
	HB-V-A 12-95/220			95	220
M16	HB-V-A 16-20/165 [H]	18 × 125	125	20	165
	HB-V-A 16-45/190			45	190
	HB-V-A 16-65/210 [H]			65	210
	HB-V-A 16-85/230			85	130
	HB-V-A 16-105/250			105	250
M20	HB-V-A 20-20/220 [H]	25 × 170	170	20	220
	HB-V-A 20-60/260			60	260
M24	HB-V-A 24-55/300	28 × 210	210	55	300

Anchor with hexangonal-bolt head Further lengths on request

Ordering example



HB-V VMU plus – electroplated

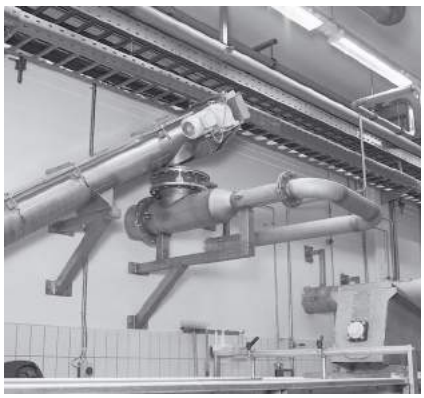
Load range (tension):	2.9 kN – 59.5 kN
Concrete grade:	C20/25 – C50/60

European Technical Assessment - Option 1
ETA-16/0691

HB-VMU-A Drilled anchor (electroplated)

HB-VMU plus 410 Cartridge

HB-VMU plus 280 Cartridge



Description

The HB-VMU plus injection system is a universal injection system for nearly all applications and building materials.

Benefits

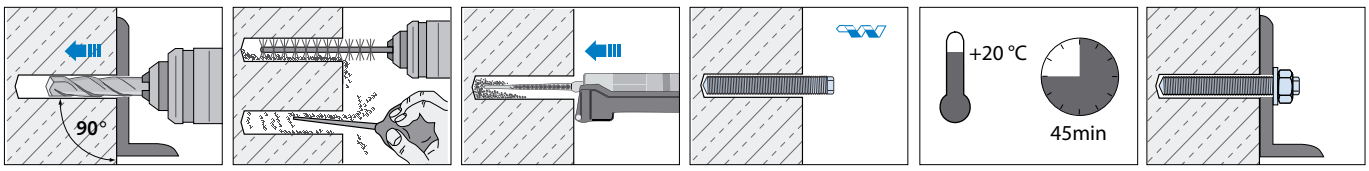
- an injection mortar for almost all applications; more versatile, less storage space required, more reliable in application
- approval for cracked and non-cracked concrete (M8–M30)
- more versatile with variable anchorage depths
- use a new static mixer to continue using previously opened cartridges
- styrene-free 2-component vinyl ester based mortar—approved for use in seismic load category C1

Applications

Used for anchorage in non-cracked concrete in dry interior environment for base plates, brackets and consoles, pipe supports, cable trays and ducts and framing systems.

Easy-to-use and free calculation software available
www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-10°C	≥-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:30	01:30	00:45	00:25	00:15	00:06	00:04	00:02	90 sec.
Curing time in hh:mm	Dry concrete	24:00	14:00	07:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	48:00	28:00	14:00	04:00	02:40	01:30	00:50	00:40	00:30

-5°C to +40°C = approved minimum temperature in installation material

-40°C bis+120°C = Ambient temperature after the mortar has set (concrete)

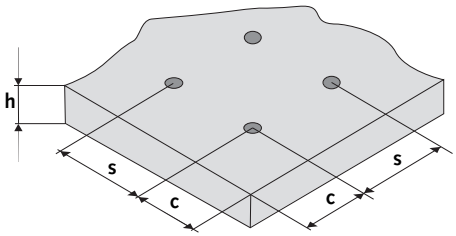
+15°C = minimum cartridge temperature

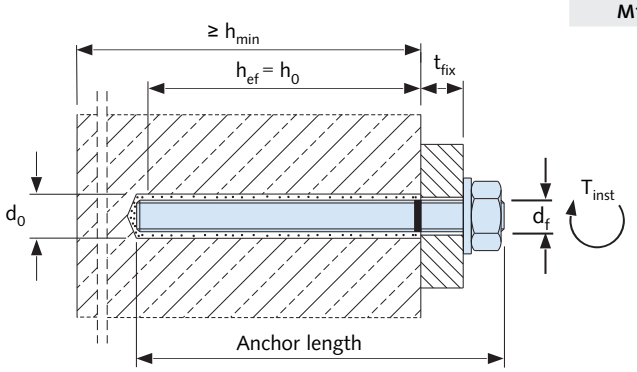
Installation

Dimensions in mm

Installation specifications					
Anchor stud		**M8**	**M10**	**M12**	**M16**
Drill hole diameter	d_o	10	12	14	18
Diameter of clearance hole in the fixture	d_f	9	12	14	18
Spanner/wrench size	SW	13	17	19	24

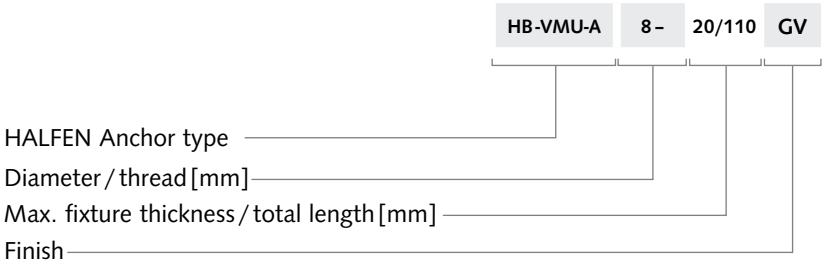
Installation torque	
	T_{inst} [Nm]
M8	10
M10	20
M12	40
M16	80





Axial spacing and edge distances					
Anchor stud		**M8**	**M10**	**M12**	**M16**
Anchorage depth range	$h_{ef,min}$	60	60	70	80
	$h_{ef,max}$	160	200	240	320
Minimal building component thickness for $h_{ef,min}$	h_{min}	100	100	100	116
Minimal building component thickness for $h_{ef,max}$	h_{min}	190	230	270	356
Minimum axial spacing	s_{min}	40	50	60	80
Minimum edge distance	c_{min}	40	50	60	80

Ordering example



Anchor selection – HB-VMU-A/ Installation parameters, extract from ETA-16/0916

▸ Dimensions in mm

HB-VMU-A Drilled anchor – GV electroplated

Anchor Ø	Article name	Drill hole Ø × depth	Max.fixture thickness t_{fix}	Anchorage depth $h_{ef,min}$	Anchor length
M8	HB-VMU-A 8-20/110	10×80	20	60	110
	HB-VMU-A 8-40/130		40		130
	HB-VMU-A 8-115/205		115		205
M10	HB-VMU-A 10-50/150	12×90	50	60	150
	HB-VMU-A 10-160/260		160		260
M12	HB-VMU-A 12-15/120	14×98	15	70	120
	HB-VMU-A 12-125/250	14×110	125		250
M16	HB-VMU-A 16-30/175	18×125	30	80	175

Hot-dip galvanized steel on request
Other dimensions on request
Also approved for use with HALFEN HB-V-A Anchor studs (page 14)

Installation parameters, extract from ETA-16/0691

European Technical Assessment - Option 1
ETA-16/0691

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications	HB-VMU Injection system			M8		M10		M12		M16	
Anchorage depth range			$h_{ef,min}$ [mm]	60	–	60	–	70	–	80	–
			$h_{ef,max}$ [mm]	–	160	–	200	–	240	–	320
	cracked concrete C20/25 ②										
Approved tension loads for $h_{ef,min}$ - $h_{ef,max}$	Steel grade 5.8	24°C/40°C①	App. N [kN]	2.9	7.7	3.7	12.5	5.8	19.7	8.8	35.1
		50°C/80°C①	App. N [kN]	1.8	4.8	2.6	8.7	4.2	14.4	6.4	25.5
	Steel grade 8.8	24°C/40°C①	App. N [kN]	–		–		5.8	19.7	8.8	35.1
		50°C/80°C①	App. N [kN]	–		–		4.2	14.4	6.4	25.5
	non-cracked concrete C20/25 ②										
	Steel grade 5.8	24°C/40°C①	App. N [kN]	7.2	8.7	9.0	13.8	11.7	20.1	14.3	37.4
		50°C/80°C①	App. N [kN]	5.4	8.7	6.7	13.8	9.4	20.1	14.3	37.4
	Steel grade 8.8	24°C/40°C①	App. N [kN]	7.2	13.8	9.0	21.9	11.7	31.9	14.3	59.5
		50°C/80°C①	App. N [kN]	5.4	13.8	6.7	21.9	9.4	31.9	14.3	57.4
Approved shear loads for $h_{ef,min}$ - $h_{ef,max}$	cracked concrete C20/25 ②										
	Steel grade 5.8	24°C/40°C①	App. V [kN]	5.2		8.3		12.0		21.1	22.4
		50°C/80°C①	App. V [kN]	3.6	5.2	6.3	8.3	10.1	12.0	15.3	22.4
	Steel grade 8.8	24°C/40°C①	App. V [kN]	–		–		13.8	19.4	21.1	36.0
		50°C/80°C①	App. V [kN]	–		–		10.1	19.4	15.3	36.0
	non-cracked concrete C20/25 ②										
	Steel grade 5.8	24°C/40°C①	App. V [kN]	5.2		8.3		12.0		22.4	
		50°C/80°C①	App. V [kN]	5.2		8.3		12.0		22.4	
	Steel grade 8.8	24°C/40°C①	App. V [kN]	8.6		13.1		19.4		34.3	36.0
		50°C/80°C①	App. V [kN]	8.6		13.1		19.4		34.3	36.0

① Max. long term temperature /max. short term temperature
② Higher concrete strengths can result in higher approved loads. See the assessment for further information.

HB-V VMU plus A4

Load range (tension):	2.9 kN – 42.1 kN
Concrete grade:	C20/25 – C50/60

European Technical Assessment - Option 1
ETA-16/0691

EDELSTAHL Rostfrei
STAINLESS STEEL

HB-VMU-A A4 Drilled anchor

HB-VMU plus 410 Cartridge

HB-VMU plus 280 Cartridge

Description

The HB-VMU plus injection system is a general fixing system for almost all applications and building materials.

Benefits

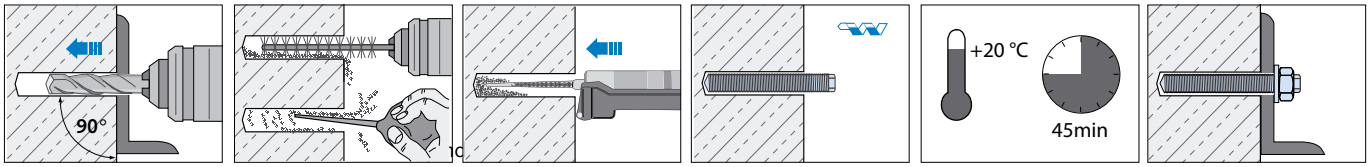
- an injection mortar for almost all applications; less storage space required, more versatile, and more reliable in application
- approved for cracked and non-cracked concrete
- more versatile with variable anchorage depths
- use a new static mixer to continue using previously opened cartridges
- styrene-free 2-component vinyl ester based mortar — approved for use in seismic applications (category C1)

Applications

Used for anchorage in non-cracked concrete in dry interior or also in exterior (non-aggressive) environments for base plates, fixings to walls and columns, fixings of expansion joint systems.

Easy-to-use and free calculation software available
www.halfen.com ▷ Downloads ▷ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-10°C	≥-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:30	01:30	00:45	00:25	00:15	00:06	00:04	00:02	90 sec.
Curing time in hh:mm	Dry concrete	24:00	14:00	07:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	48:00	28:00	14:00	04:00	02:40	01:30	00:50	00:40	00:30

-10°C to +40°C = approved minimum temperature in installation material (concrete)

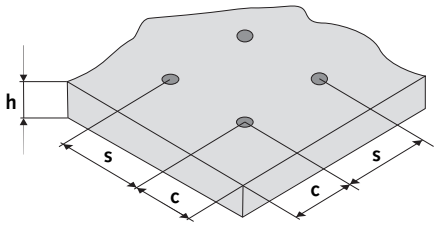
-40°C bis+120°C = Ambient temperature after the mortar has set (concrete)

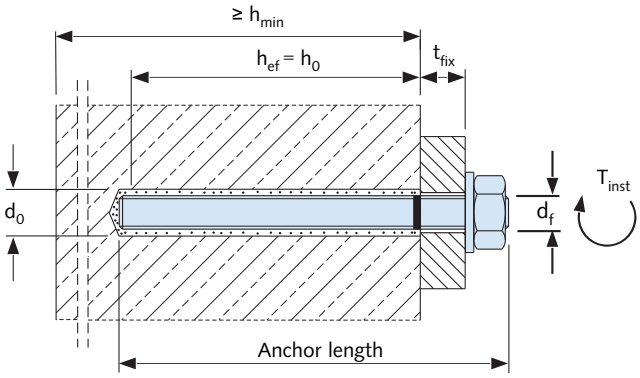
Installation

Dimensions in mm

Installation specifications					
Anchor stud		**M8**	**M10**	**M12**	**M16**
Drill hole diameter	d_o	10	12	14	18
Diameter of clearance hole in the fixture	d_f	9	12	14	18
Spanner/wrench size	SW	13	17	19	24

Installation torque	
	T_{inst} [Nm]
M8	10
M10	20
M12	40
M16	80





Axial spacing and edge distances					
Anchor stud		**M8**	**M10**	**M12**	**M16**
Anchorage depth range	$h_{ef,min}$	60	60	70	80
	$h_{ef,max}$	160	200	240	320
Minimal building component thickness for $h_{ef,min}$	h_{min}	100	100	100	116
Minimal building component thickness for $h_{ef,max}$	h_{min}	190	230	270	356
Minimum axial spacing	s_{min}	40	50	60	80
Minimum edge distance	c_{min}	40	50	60	80

Ordering example

HB-VMU-A | 8 – | 20/110 | A4

- HALFEN Anchor type
- Diameter / thread [mm]
- Max. fixture thickness / total length [mm]
- Finish

Anchor selection – HB-VMZ-A A4 Stainless steel / Installation parameters, extract from ETA-16/0691

Dimensions in mm

HB-VMU-A Drilled anchor – A4 Stainless steel (HCR on request)

Anchor Ø	Article name	Drill hole Ø × depth	Anchorage depth $h_{ef,min}$	Max. fixture thickness t_{fix}	Anchor length
M8	HB-VMU-A 8-20/110	10×80	60	20	110
	HB-VMU-A 8-40/130			40	130
	HB-VMU-A 8-70/160			70	160
M10	HB-VMU-A 10-30/130	12×90	60	30	130
	HB-VMU-A 10-50/165			50	165
	HB-VMU-A 10-65/165			65	165
	HB-VMU-A 10-90/190			90	190
M12	HB-VMU-A 12-15/120	14×98	70	15	120
	HB-VMU-A 12-50/175	14×110		50	175
	HB-VMU-A 12-85/210			85	210
	HB-VMU-A 12-125/250			125	250
M16	HB-VMU-A 16-15/160	18×125	80	15	160
	HB-VMU-A 16-60/210			60	210

Also approved for use with HALFEN HB-V-A Anchor studs (see page 17)

Installation parameters, extract from ETA-16/0691

European Technical Assessment - Option 1
ETA-16/0691

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications			M8		M10		M12		M16	
Anchorage depth range	$h_{ef,min}$ [mm]		60	–	60	–	70	–	80	–
	$h_{ef,max}$ [mm]		–	160	–	200	–	240	–	320
	cracked concrete C20/25 ②									
Approved tension loads for $h_{ef,min}$ - $h_{ef,max}$	24°C/40°C①	App. N [kN]	2.9	7.7	3.7	12.5	5.8	19.7	8.8	35.1
	50°C/80°C①	App. N [kN]	1.8	4.8	2.6	8.7	4.2	14.4	6.4	25.5
	non-cracked concrete C20/25 ②									
	24°C/40°C①	App. N [kN]	7.2	9.8	9.0	15.5	11.7	22.6	14.3	42.1
	50°C/80°C①	App. N [kN]	5.4	9.8	6.7	15.5	9.4	22.6	14.3	42.1
Approved shear loads for $h_{ef,min}$ - $h_{ef,max}$	**cracked concrete** C20/25 ②									
	24°C/40°C①	App. V [kN]	5.7	5.9	9.0	9.3	13.5		21.1	25.2
	50°C/80°C①	App. V [kN]	3.6	5.9	6.3	9.3	10.1	13.5	15.3	25.2
	non-cracked concrete C20/25 ②									
	24°C/40°C①	App. V [kN]	5.9		9.3		13.5		25.2	
	50°C/80°C①	App. V [kN]	5.9		9.3		13.5		25.2	

① Max. long term temperature /max. short term temperature
② Higher concrete strengths may result in higher approved loads. Refer to assessment ETA-16/0691 for more information.

HB-V VMU plus — electroplated and A4

Load range (tension): 0.17 kN – 2.32 kN

ETA-17/0196

STAINLESS STEEL

HB-VMU-A Drilled anchor electroplated or A4

HB-VM-SH Perfo sleeve

HB-VMU plus 410 Cartridge

HB-VMU plus 280 Cartridge

Description

The HB -VMZ Injection system is an expansion pressure free anchorage for monolithic and perforated masonry. The system consists of a styrene-free vinyl ester resin and a hardener component as bonding agent in a cartridge and a threaded rod as anchoring element. Using a HB-VM-P Silicone gun with attached HB -VM-X Static mixer, the bonding agent is pressed into the drill hole with an inserted perfo sleeve for perforated brick or without a sleeve for monolithic brick. The threaded rod is inserted in the hole by hand.
The anchor element is securely fixed after the bonding agent has hardened.

Benefits

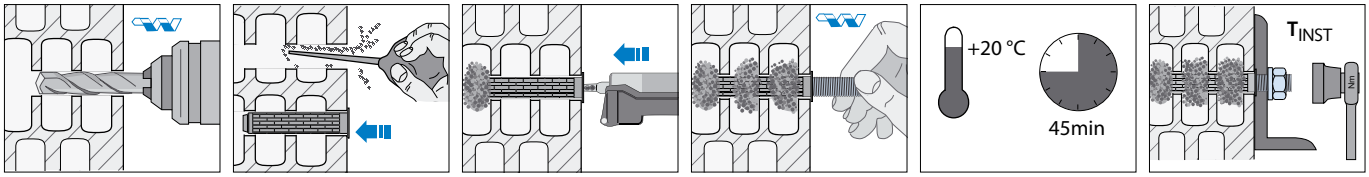
- an injection mortar for almost all applications; more flexibility, less required storage space, more reliable in application
- widely approved for cracked and non-cracked concrete, and also for masonry.

Applications

Anchorage in masonry in dry interior walls. A4 stainless steel anchors can also be used in outdoor environments or in wet rooms (non-aggressive environments): door canopies, door and window frames, support structures for façades, or other timber or wood ancillary constructions.

Easy-to-use and free calculation software available
www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



Processing and curing times

Temperature (°C) in the drill hole		≥-10°C	≥-5°C	≥ 0°C	≥+5°C	≥+10°C	≥+20°C	≥+30°C	≥+35°C	≥+40°C
Processing time in hh:mm		01:30	01:30	00:45	00:25	00:15	00:06	00:04	00:02	90 sec.
Curing time in hh:mm	Dry concrete	24:00	14:00	07:00	02:00	01:20	00:45	00:25	00:20	00:15
	Wet concrete	48:00	28:00	14:00	04:00	02:40	01:30	00:50	00:40	00:30

-5°C = approved minimum temperature in installation material (concrete)

-40°C bis+120°C = Ambient temperature after the mortar has set (concrete)

Installation specifications

Dimensions in mm

Installation specifications

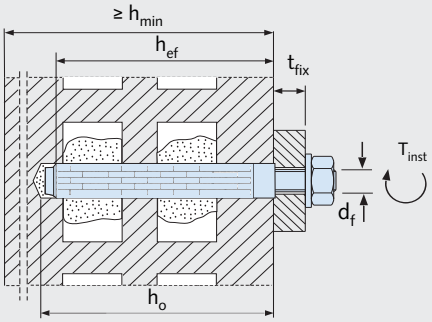
Anchor stud		HB-VMU-A			
		M8	M10	M12	M16
Drill hole diameter with perfo sleeve	d_o	12	16	20	20
Drill hole diameter, no perfo sleeve (monolithic brick)	d_o	10	12	14	18
Diameter of clearance hole in the fixture	d_f	9	12	14	18
Drill hole diameter with perfo sleeve	h_0	85	90	90	135
Drill hole diameter, no perfo sleeve (monolithic brick)	h_0	80	90	100	100
Diameter cleaning brush with/without perfo sleeve	d_B	10/12	12/16	14/20	18/20

Installation torque

HB-VMU-A	T_{inst} [Nm]
M8	2 (14 Nm for masonry brick Mz-DF)
M10	
M12	
M16	

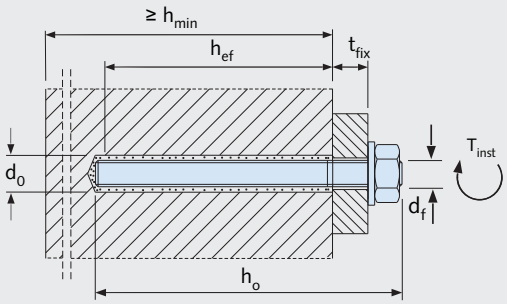
Installation in perforated bricks with perfo sleeve

Anchor stud	suitable perfo sleeve
HB-VMU-A M8	HB-VM-SH 12
HB-VMU-A M10	HB-VM-SH 16
HB-VMU-A M12	HB-VM-SH 20
HB-VMU-A M16	HB-VM-SH 20



Installation in monolithic bricks without perfo sleeve

Anchor stud
HB-VMU-A M8
HB-VMU-A M10
HB-VMU-A M12
HB-VMU-A M16



Load capacities and spacings

Anchor stud

Steel: ≥ strength class. 5.8, A4

Installation parameters, extract from ETA-17/0196
Approved loads, not including the influence of axis spacing and edge distances from the component edges. Butt and bed joints are mortar filled.
Total safety factor according to ETAG is included (γ_M and γ_F)
(Temperature range +24°C/+40°C — Application category dry/dry)

Clay solid brick Mz-DF according to EN 771-1, brick density ρ: 1.6 kg/dm³, min. brick dimensions: 240×115×55 mm (e.g. Unipor)					
Anchor stud ①	**[mm]**	**M8**	**M10**	**M12**	**M16**
Anchorage depth	h_{ef}	80	90	100	100
Axial spacing	s_{cr}	240	270	300	300
Minimal axial spacing	s_{min}	120	120	120	120
Edge distance	c_{cr}	120	135	150	150
Minimal edge distance	c_{min}	60	60	60	60
Minimal component thickness (masonry)	h_{min}	110	120	130	130
Approved tension load for brick compressive strength					
fb=10N/mm²	App. N [kN]	1.00	1.00	1.14	1.14
fb=20N/mm²	App. N [kN]	1.29	1.57	1.71	1.71
fb=28N/mm²	App. N [kN]	1.57	1.71	1.94	1.94
Approved shear load for brick compressive strength					
fb=10N/mm²	App. V [kN]	1.00	1.00	1.00	1.57
fb=20N/mm²	App. V [kN]	1.43	1.43	1.43	2.29
fb=28N/mm²	App. V [kN]	1.57	1.57	1.57	2.57
Drilling method; hammer drilling					

Calcium silicate solid brick KS-NF according to EN 771-2, brick density ρ: 2.0 kg/dm³, min. brick dimensions: 240×115×71 mm (e.g. Wemding)					
Anchor stud ①	**[mm]**	**M8**	**M10**	**M12**	**M16**
Anchorage depth	h_{ef}	80	90	100	100
Axial spacing	s_{cr}	240	270	300	300
Minimal axial spacing	s_{min}	120	120	120	120
Edge distance	c_{cr}	120	135	150	150
Minimal edge distance	c_{min}	60	60	60	60
Minimal component thickness (masonry)	h_{min}	110	120	130	130
Approved tension load for brick compressive strength					
fb=10N/mm²	App. N [kN]	1.29	1.29	1.29	1.00
fb=20N/mm²	App. N [kN]	1.71	1.71	1.71	1.43
fb=27N/mm²	App. N [kN]	2.00	2.00	2.00	1.71
Approved shear load for brick compressive strength					
fb=10N/mm²	App. V [kN]	0.71	0.86	0.71	0.71
fb=20N/mm²	App. V [kN]	1.14	1.29	1.14	1.14
fb=27N/mm²	App. V [kN]	1.29	1.57	1.29	1.29
Drilling method; hammer drilling					

Load capacities and spacings

Solid lightweight concrete LAC acc. to EN 771-3, brick density ρ: 0.6 kg/dm³, min. brick dimensions: 300×123×248 mm (e.g. Bisotherm)					
Anchor stud ①		**M8**	**M10**	**M12**	**M16**
Anchorage depth	h_{ef}	80	90	100	100
Axial spacing	s_{cr}	240	270	300	300
Minimal axial spacing	s_{min}	120	120	120	120
Edge distance	c_{cr}	120	135	150	150
Minimal edge distance	c_{min}	60	60	60	60
Minimal component thickness (masonry)	h_{min}	110	120	130	130
Approved tension load for brick compressive strength					
fb=6N/mm2	App. N [kN]	0.86	0.86	1.00	0.86
Approved shear load for brick compressive strength					
fb=6N/mm2	App. V [kN]	0.86	0.86	0.86	0.86
Drilling method; hammer drilling					

Autoclaved Aerated concrete AAC6 acc. to EN 771-4, brick density ρ: 0.6 kg/dm³, min. brick dimensions: 499×240×249 mm (e.g. Porit)					
Anchor stud ①		**M8**	**M10**	**M12**	**M16**
Anchorage depth	h_{ef}	80	90	100	100
Axial spacing	s_{cr}	240	270	300	300
Minimal axial spacing	s_{min}	100	100	100	100
Edge distance	c_{cr}	120	135	150	150
Minimal edge distance					
	$c_{min,N}$	75	75	75	75
	$c_{min,v,II}$ ②	75	75	75	75
	$c_{min,v,\perp}$ ③	120	135	150	150
Minimal component thickness (masonry)	h_{min}	110	120	130	130
Approved tension load for brick compressive strength					
fb=2N/mm²	App. N [kN]	0.89	1.43	1.79	2.32
Approved shear load for brick compressive strength					
fb=2N/mm²	App. V [kN]	2.14	3.57	3.57	3.57
Drilling method; rotary drilling					

Clay hollow brick, Porotherm Homebric acc. to EN 771-1, brick density ρ: 0.7 kg/dm³, min. brick dimensions: 500×200×299 mm (e.g. Wienerberger)				
		M8/ M10	**M12**	**M16**
Perfo sleeve	VM-SH	16×85	20×85	20×130
Anchorage depth	h_{ef}	85	85	130
Axial spacing parallel to the bed joint	$s_{cr,II}$	500	500	500
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	300	300	300
Minimal axial spacing	s_{min}	100	100	100
Edge distance	c_{cr}	100	120	120
Minimal edge distance	c_{min} ④	100	120	120
Minimal component thickness (masonry)	h_{min}	115	115	175
Approved tension load for brick compressive strength				
fb=4N/mm²	App. N [kN]	0.26	0.26	0.34
fb=6N/mm²	App. N [kN]	0.26	0.26	0.34
fb=10N/mm²	App. N [kN]	0.34	0.34	0.43
Approved shear load for brick compressive strength				
fb=4N/mm²	App. V [kN]	0.57	0.71	0.71
fb=6N/mm²	App. V [kN]	0.71	0.86	0.86
fb=10N/mm²	App. V [kN]	0.86	1.14	1.14

① Can also be installed with perfo sleeve; see ETA-17/0196 for technical specifications
② Minimum edge distance $C_{min,v,II}$ for shear loads parallel to the free edge
③ Minimum edge distance $C_{min,v,\perp}$ for shear loads parallel to the free edge
④ For $V_{Rk,c}$: c_{min} according to ETAG029, annex C

Load capacities and spacings

Clay hollow brick, HLz-16-DF according to EN 771-1, brick density ρ: 0.8 kg/dm³, min. brick dimensions: 497×240×238 mm (e.g. Unipor)					
		M8/ M10	M12/M16		
VM-SH Perfo sleeve	[mm]	16×85	20×85	20×130	20×200
Anchorage depth	h_{ef}	85	85	130	200
Axial spacing parallel to the bed joint	$s_{cr,II}$	497	497	497	497
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	238	238	238	238
Minimal axial spacing	s_{min}	100	100	100	100
Edge distance	c_{cr}	100	120	120	120
Minimal edge distance	c_{min}①	100	120	120	120
Minimal component thickness (masonry)	h_{min}	115	115	175	240
Approved tension load for brick compressive strength					
fb=6N/mm²	App. N [kN]	0.71	0.71	1.00	1.00
fb=8N/mm²	App. N [kN]	0.86	0.86	1.29	1.29
fb=12N/mm²	App. N [kN]	1.00	1.00	1.43	1.43
fb=14N/mm²	App. N [kN]	1.14	1.14	1.57	–
Approved shear load for brick compressive strength					
fb=6N/mm²	App. V [kN]	1.29	1.43	1.71	1.71
fb=8N/mm²	App. V [kN]	1.57	1.71	2.00	2.00
fb=12N/mm²	App. V [kN]	1.86	2.00	2.57	2.57
fb=14N/mm²	App. V [kN]	1.86	2.00	2.57	2.57

Clay hollow brick (Doppio Uni) according to EN 771-1, brick density ρ: 0.9 kg/dm³, min. brick dimensions: 250×120×120 mm (e.g. Wienerberger)					
		M8/ M10	M12/M16		
VM-SH Perfo sleeve	[mm]	16×85	20×85	20×130	20×200
Anchorage depth	h_{ef}	85	85	130	200
Axial spacing parallel to the bed joint	$s_{cr,II}$	250	250	250	250
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	120	120	120	120
min. axial spacing parallel to the bed joint	$s_{min,I}$	100	100	100	100
Minimal axial spacing	s_{min}	120	120	120	120
Edge distance	c_{cr}	100	120	120	120
Minimal edge distance	c_{min}①	60	60	60	60
Minimal component thickness (masonry)	h_{min}	115	115	175	240
Approved tension load for brick compressive strength					
fb=10N/mm²	App. N [kN]	0.17	0.17	0.17	0.17
fb=16N/mm²	App. N [kN]	0.21	0.21	0.21	0.21
fb=20N/mm²	App. N [kN]	0.26	0.26	0.26	0.26
fb=28N/mm²	App. N [kN]	0.34	0.34	0.34	0.34
Approved shear load for brick compressive strength					
fb=10N/mm²	App. V [kN]	0.43	0.43	0.43	0.43
fb=16N/mm²	App. V [kN]	0.57	0.57	0.57	0.57
fb=20N/mm²	App. V [kN]	0.57	0.57	0.57	0.57
fb=28N/mm²	App. V [kN]	0.71	0.71	0.71	0.71

① For $V_{Rk,c}$: c_{min} according to ETAG029, annex C

Load capacities and spacings

Calcium silicate hollow brick KSL-3DF acc. to EN 771-2, brick density ρ: 1.4 kg/dm³, min. brick dimensions: 240×175×113 mm (e.g. Wemding)					
		M8/ M10	M12/M16		
VM-SH Perfo sleeve	[mm]	16×85	20×85	20×130	20×200
Anchorage depth	h_{ef}	85	85	130	200
Axial spacing parallel to the bed joint	$s_{cr,II}$	240	240	240	240
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	120	120	120	120
min. axial spacing	s_{min}	120	120	120	120
Edge distance	c_{cr}	100	120	120	120
Minimal edge distance	c_{min}	60	60	60	60
Minimal component thickness (masonry)	h_{min}	115	115	175	240
Approved tension load for brick compressive strength					
fb=8N/mm²	App. N [kN]	0.43	1.29	1.29	1.29
fb=12N/mm²	App. N [kN]	0.57	1.71	1.71	1.71
fb=14N/mm²	App. N [kN]	0.71	1.86	1.86	1.86
Approved shear load for brick compressive strength					
fb=8N/mm²	App. V [kN]	1.14	1.14	1.14	1.14
fb=12N/mm²	App. V [kN]	1.29	1.29	1.29	1.29
fb=14N/mm²	App. V [kN]	1.71	1.71	1.71	1.71

Calcium silicate hollow brick KSL-12DF acc. to EN 771-2, brick density ρ: 1.4 kg/dm³, min. brick dimensions: 498×175×238 mm (e.g. Wemding)				
		M8/ M10	M12/M16	
VM-SH Perfo sleeve	[mm]	16×85	20×85	20×130
Anchorage depth	h_{ef}	85	85	130
Axial spacing parallel to the bed joint	$s_{cr,II}$	498	498	498
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	238	238	238
min. axial spacing	s_{min}	120	120	120
Edge distance	c_{cr}	100	120	120
Minimal edge distance	c_{min}	100	120	120
Minimal component thickness (masonry)	h_{min}	115	115	175
Approved tension load for brick compressive strength				
fb=10N/mm²	App. N [kN]	0.17	0.43	0.71
fb=12N/mm²	App. N [kN]	0.21	0.43	0.86
fb=16N/mm²	App. N [kN]	0.26	0.57	1.14
Approved shear load for brick compressive strength				
fb=10N/mm²	App. V [kN]	1.57	1.57	1.57
fb=12N/mm²	App. V [kN]	1.86	1.86	1.86
fb=16N/mm²	App. V [kN]	2.29	2.29	2.29

Hollow lightweight concrete block (Bloc creux) B40 acc. to EN 771-3, brick density ρ: 0.8 kg/dm³, min. brick dimensions: 494×200×190 mm (e.g. Sepa)				
		M8/ M10	M12/M16	
VM-SH Perfo sleeve	[mm]	16×85	20×85	20×130
Anchorage depth	h_{ef}	85	85	130
Axial spacing parallel to the bed joint	$s_{cr,II}$	494	494	494
Axial spacing perpendicular to the bed joint	$s_{cr,\perp}$	190	190	190
min. axial spacing	s_{min}	100	100	100
Edge distance	c_{cr}	100	120	120
Minimal edge distance	c_{min}	100	120	120
Minimal component thickness (masonry)	h_{min}	115	115	175
Approved tension load for brick compressive strength				
fb=4N/mm²	App. N [kN]	0.34	0.34	0.34
Approved shear load for brick compressive strength				
fb=4N/mm²	App. V [kN]	0.86	0.86	0.86

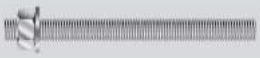
Anchor selection – HB -VMU-A A4 /electroplated

Dimensions in mm

HB-VMU-A Drilled anchor – GV

Anchor Ø	Article name	Drill hole Ø × depth	② Anchorage depth $h_{ef,min}$	fixture thickness $t_{fix,}$	Anchor length
M8	HB-VMU-A 8-20/110	10×80	60	20	110
	HB-VMU-A 8-40/130			40	130
	HB-VMU-A 8-115/205			115	205
M10	HB-VMU-A 10-50/150	12×90	60	50	150
	HB-VMU-A 10-160/260			160	260
M12	HB-VMU-A 12-15/120 ①	14×98	70	15	120
	HB-VMU-A 12-125/250	14×110		125	250
M16	HB-VMU-A 16-30/175	18×125	80	30	175

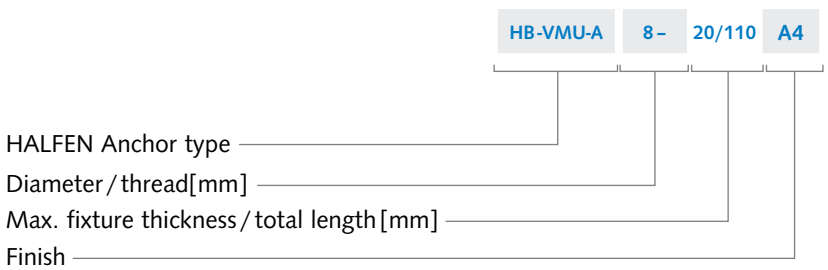
HB-VMU-A Drilled anchor – A4



Anchor Ø	Article name	Drill hole Ø × depth	② Anchorage depth $h_{ef,min}$	fixture thickness $t_{fix,}$	Anchor length
M8	HB-VMU-A 8-20/110	10×80	60	20	110
	HB-VMU-A 8-40/130			40	130
	HB-VMU-A 8-70/160			70	160
M10	HB-VMU-A 10-30/130	12×90	60	30	130
	HB-VMU-A 10-50/150			50	150
	HB-VMU-A 10-90/190			90	190
M12	HB-VMU-A 12-15/120 ①	14×98	70	15	120
	HB-VMU-A 12-50/175 ①	14×110		50	175
	HB-VMU-A 12-85/210			85	210
	HB-VMU-A 12-125/250			125	250
M16	HB-VMU-A 16-15/160	18×125	80	15	160

① HB-VMU-A 12 for application in monolithic masonry without perfo sleeve (page 23)
② Not including the perfo sleeve

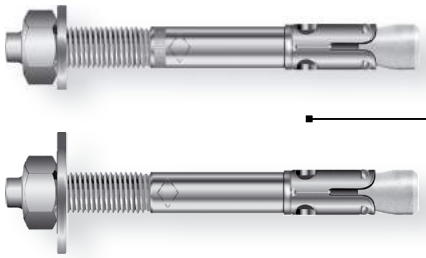
Ordering example



Mechanical Anchor Systems

HALFEN Anchor bolts

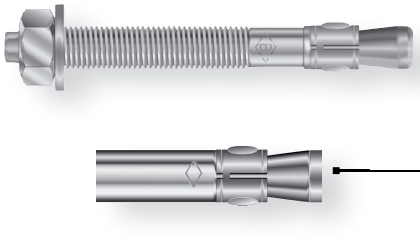
The performance of the HALFEN range of Mechanical Anchor Systems has been further inproved.



HB-BZ Wedge anchor
The HB-BZ Wedge Anchor can be used in a variety of applications, in non-cracked as well as cracked concrete. The anchor ensures ample friction and therefore reliable anchoring, even in cracked concrete.
See page 30

HB-BZ-IG Bolt anchor
on request

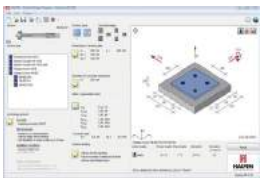
HB-B Wedge anchor
The HB-B Wedge anchor is a very economical anchor for simple and fast installation in non-cracked concrete. Mainly used for standard applications.
See page 37



HB-B-IG Bolt anchor
on request

Service
Our Customer Service and Technical Field Support Teams are available to provide comprehensive support for specific applications or to provide solutions for complete projects.

Design software
Page 45



Fire resistance table
HB-BZ Bolt anchor
Page 46

Fire tested

HB-BZ Wedge anchor – electroplated

Load range (tension):	**2.4 kN – 45.9 kN**
Concrete grade:	**C20/25 – C50/60**

European Technical Assessment - Option 1
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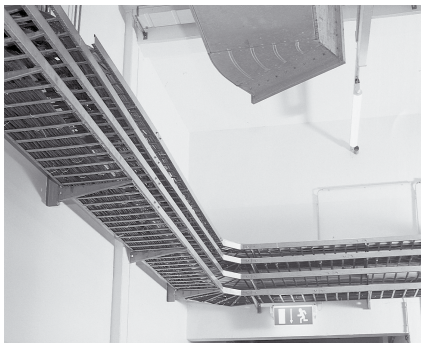
Fire tested



HB-BZ Wedge Anchor

HB-BZ-U Wedge Anchor

Description

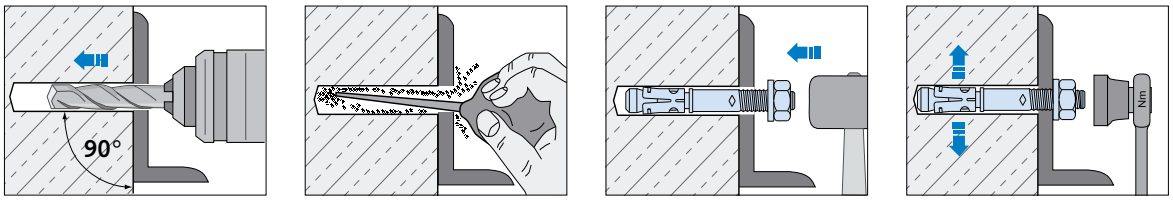
The HB-BZ Wedge anchor's performance and application have been further improved. Another new feature is the approval for application in category C1 and C2 seismic zones.

Applications

Anchorage of medium to heavy loads in cracked and non-cracked concrete in dry interior environments: Columns, steel supports, handrail and banister fixing, cable ducts and trays, timber structures, consoles.
Also suitable for application in earthquake zones.

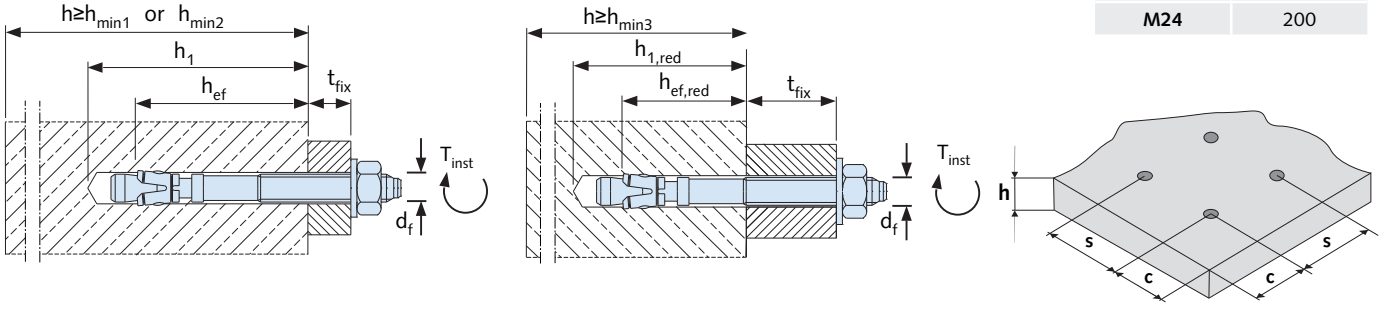
Easy-to-use and free calculation software available
www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



Installation specifications							
Anchor bolts		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Drill hole diameter	d_o	8	10	12	16	20	24
Diameter of clearance hole in the fixture	d_f	9	12	14	18	22	26
Drill hole depth	h_1	60	75	90	110	125	145
Spanner/wrench size	SW	13	17	19	24	30	36

Installation torque	
	T_{inst} [Nm]
M8	20
M10	25
M12	45
M16	90
M20	160
M24	200



HB-BZ Wedge Anchor Electroplated — for Cracked and Non-cracked Concrete

Installation

Dimensions in mm

Axial and edge distance for standard thickness building components

Anchor bolts	[mm]	M8	M10	M12	M16	M20	M24
Anchorage depth	h_{ef}	46	60	70	85	100	115
Min. thickness building component	$h_{min,1}$	100	120	140	170	200	230
		cracked concrete					
Min. axial spacing / for edge distance c	s_{min} / c	40 / 70	45/70	60 / 100	60 / 100	95 / 150	100/180
Min. edge distance / for axial spacing s	c_{min} / s	40 / 80	45/90	60 / 140	60 / 180	95 / 200	100/220
		non-cracked concrete					
Min. axial spacing / for edge distance c	s_{min} / c	40 / 80	45/70	60 / 120	65 / 120	90 / 180	100/180
Min. edge distance / for axial spacing s	c_{min} / s	50 / 100	50/100	75 / 150	80 / 150	130 / 240	100/220

Axial and edge distance for reduced min. thickness building components

Anchor bolts	[mm]	M8	M10	M12	M16	M20	M24
Min. thickness building component	$h_{min,2}$	80	100	120	140	-	-
		cracked concrete					
Min. axial spacing / for edge distance c	s_{min} / c	40 / 70	45 / 90	60 / 100	70 / 160	-	-
Min. edge distance / for axial spacing s	c_{min} / s	40 / 80	50 / 115	60 / 140	80 / 180	-	-
		non-cracked concrete					
Min. axial spacing / for edge distance c	c_{min} / c	40 / 80	60 / 140	60 / 120	80 / 180	-	-
Min. edge distance / for axial spacing s	c_{min} / s	50 / 100	90 / 140	75 / 150	90 / 200	-	-

Reduced anchorage depths

Anchor bolts	[mm]	M8	M10	M12	M16	M20	M24
Min. thickness building component	$h_{min,3}$	80	80	100	140	-	-
Drill hole depth	h_{1red}	49	55	70	90	-	-
Reduced effective anchorage depth	$h_{ef,red}$	35	40	50	65	-	-
		cracked concrete					
Min. axial spacing / for edge distance c	s_{min} / c	50/60	50/100	50/160	65/170	-	-
Min. edge distance / for axial spacing s	c_{min} / s	40/185	65/180	65/250	100/250	-	-
		non-cracked concrete					
Min. axial spacing / for edge distance c	s_{min} / c	50 / 60	50 / 100	50 / 160	65 / 170	-	-
Min. edge distance / for axial spacing s	c_{min} / s	40 / 185	65 / 180	100 / 185	170 / 65	-	-

Installation parameters, extract from ETA-07/0249

European Technical Assessment - Option 1
ETA-07/0249

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications – HB-BZ Bolt anchor			M8		M10		M12		M16		M20	M24
Standard anchorage depth h_{ef}		[mm]	–	46	–	60	–	70	–	85	100	115
Reduced anchorage depth $h_{ef,\ red}$		[mm]	35	–	40	–	50	–	65	–	–	–
	cracked concrete											
Approved tension load	C20/25	App. N [kN]	2.4	2.4	3.6	4.3	6.1	7.6	9.0	11.9	17.1	21.1
	C25/30	App. N [kN]	2.6	2.6	3.9	4.7	6.6	8.3	9.8	13.0	18.8	23.2
	C30/37	App. N [kN]	2.9	2.9	4.3	5.2	7.4	9.3	10.9	14.5	20.9	25.7
	C40/50	App. N [kN]	3.4	3.4	5.1	6.1	8.6	10.8	12.7	16.8	24.2	29.9
	C50/60	App. N [kN]	3.7	3.7	5.5	6.6	9.4	11.8	13.9	18.4	26.6	32.8
	non-cracked concrete											
Approved tension load	C20/25	App. N [kN]	3.6	5.7	4.3	7.6	8.5	11.9	12.6	16.7	24.0	29.7
	C25/30	App. N [kN]	3.9	6.3	4.7	8.3	9.3	13.0	13.8	18.3	26.3	32.5
	C30/37	App. N [kN]	4.3	7.0	5.2	9.3	10.3	14.5	15.3	20.3	29.3	36.1
	C40/50	App. N [kN]	5.1	7.5	6.1	10.8	12.0	16.8	17.8	23.6	34.0	41.9
	C50/60	App. N [kN]	5.5	7.5	6.6	11.8	13.2	18.4	19.5	25.8	37.3	45.9
	cracked concrete / non-cracked concrete											
Approved shear load	C20/25	App. V [kN]	7.0	7.0	10.4/11.5	11.5	14.5/17.1	17.1	21.6/30.2	31.4	37.1	59.2/65.1
	C25/30	App. V [kN]	7.0	7.0	11.4/11.5	11.5	15.9/17.1	17.1	23.6/31.4	31.4	37.1	64.8/65.1
Approved bending moment	–	App. M [Nm]	13.1	13.1	26.9	26.9	46.9	46.9	123.4	123.4	195.0	513.1

Selection wedge anchors

Dimensions in mm

HB-BZ Wedge anchor — GV electroplated

H = Preferred anchor for HALFEN Applications

Anchor Ø	Article name	Standard anchorage depth				Reduced anchorage depth ①				① Anchor length	Thread
		Fixture thickness t_{fix}	Drill hole Ø×depth	Setting depth h_{nom}	Anchorage depth h_{ef}	Fixture thickness $t_{fix,red}$	Drill hole Ø×depth	Setting depth $h_{nom,red}$	Anchorage depth $h_{ef,red}$		
M8	HB-BZ 8-10-21/75	10	8×60	52	46	21	8×49	41	35	75	M8×32
	HB-BZ 8-15-26/80	15				26				80	M8×37
	HB-BZ 8-30-41/95	30				41				95	M8×52
	HB-BZ 8-50-61/115	50				61				115	M8×72
M10	HB-BZ 10-10-30/90 H	10	10×75	68	60	30	10×55	48	40	90	M10×42
	HB-BZ 10-15-35/95	15				35				95	M10×47
	HB-BZ 10-20-40/100	20				40				100	M10×52
	HB-BZ 10-30-50/110	30				50				110	M10×62
	HB-BZ 10-50-70/130 H	50				70				130	M10×82
M12	HB-BZ 12-15-35/110 H	15	12×90	80	70	35	12×70	60	50	110	M12×51
	HB-BZ 12-30-50/125	30				50				125	M12×66
	HB-BZ 12-50-70/145	50				70				145	M12×86
	HB-BZ 12-65-85/160	65				85				160	M12×101
	HB-BZ 12-85-105/180	85				105				180	M12×121
	HB-BZ 12-105-125/200	105				125				200	M12×141
M16	HB-BZ 16-15-35/135	15	16×110	97	85	35	16×90	77	65	135	M16×56
	HB-BZ 16-25-45/145	25				45				145	M16×66
	HB-BZ 16-50-70/170	50				70				170	M16×91
	HB-BZ 16-80-100/200	80				100				200	M16×91
M20	HB-BZ 20-60/195 H	60	20×125	114	100	–	–	–	–	195	M20×70
M24	HB-BZ 24-30/190	30	24×145	133	115	–	–	–	–	190	M24×55
	HB-BZ 24-60/220	60				–	–	–	–	220	M24×85

HB-BZ-U Bolt anchor GV

⚠ Not included in the assessment

H = Preferred anchor for HALFEN Applications

With large washer, see EN ISO 7093 (DIN 9021)

Anchor Ø	Article name	Standard anchorage depth				Reduced anchorage depth ①				① Anchor length	Ø U-washer	Thread
		Fixture thickness t_{fix}	Drill hole Ø×depth	Setting depth	Anchorage depth h_{ef}	Fixture thickness $t_{fix,red}$	Drill hole Ø×depth	Setting depth $h_{nom,red}$	Anchorage depth $h_{ef,red}$			
M8	HB-BZ-U 8-15-26/80 H	15	8×60	52	46	26	8×49	41	35	80	24	M8×37
	HB-BZ-U 8-30-41/95	30				41				95		M8×52
M10	HB-BZ-U 10-15-35/95 H	15	10×75	68	60	35	10×55	48	40	95	30	M10×47
	HB-BZ-U 10-30-50/110	30	10×75	68	60	50	10×55	48	40	110	30	M10×62
M12	HB-BZ-U 12-15-35/110 H	15	12×90	80	70	35	12×70	60	50	110	37	M12×51
	HB-BZ-U 12-30-50/125	30				50				125		M12×66
	HB-BZ-U 12-50-70/145	50				70				145		M12×86

① Please observe lower load capacities when using reduced anchorage depths. Further lengths on request.

HB-BZ Wedge anchor — A4 Stainless steel

Load range (tension):	**2.4 kN – 37.2 kN**
Concrete grade:	**C20/25 – C50/60**

European Technical Assessment - Option 1
ETA-07/0249

Fire tested

STAINLESS STEEL

HB-BZ Wedge Anchor A4

HB-BZ-U Wedge Anchor A4

Description

The HB-BZ Wedge anchor's performance and application have been further improved. A new feature is the approval for application in category C1 and C2 seismic zones.

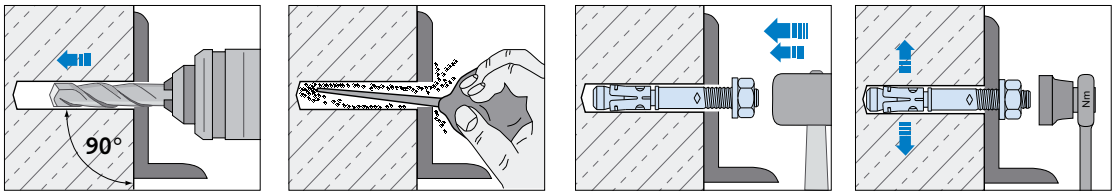
Easy-to-use and free calculation software available

www.halfen.com ⊳ Downloads ⊳ Software/CAD

Applications

Suitable for anchorage of medium to heavy loads in cracked and non-cracked concrete in dry interior or in exterior (non-aggressive) environments. Can be used in cracked and non-cracked concrete: Columns, steel supports, consoles, access gates, fixings for stadium seating and support structures for façades. Suitable for application in earthquake zones.

Installation

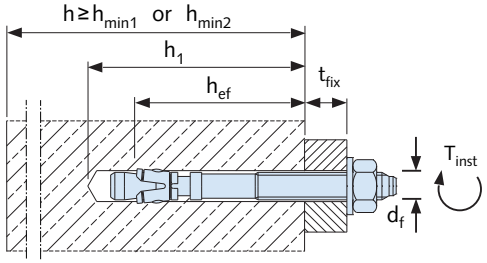


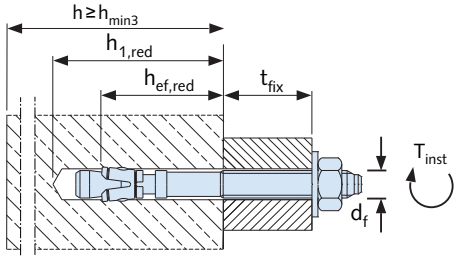
Installation specifications

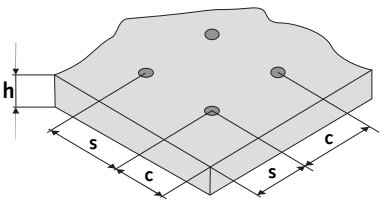
Anchor bolts		M8	M10	M12	M16	M20
Drill hole diameter	d_o	8	10	12	16	20
Diameter of clearance hole in the fixture	d_f	9	12	14	18	22
Drill hole depth	h_1	60	75	90	110	125
Spanner/wrench size	SW	13	17	19	24	30

Installation torque

	T_{inst} [Nm]
M8	20
M10	35
M12	50
M16	110
M20	200







HB-BZ Wedge Anchor A4 Stainless Steel — for Cracked and Non-cracked Concrete

Installation specifications (contin.) — Extract from assessment ETA-07/0249

Dimensions in mm

Axial and edge distance for standard thickness building components

Anchor bolts		M8	M10	M12	M16	M20
Anchorage depth	h_{ef}	46	60	70	85	100
Min. thickness building component	$h_{min,1}$	100	120	140	160	200
		cracked concrete				
Min. axial spacing / for edge distance c	s_{min} / c	40 / 70	50 / 75	60 / 100	60 / 100	95 / 150
Min. edge distance / for axial spacing s	c_{min} / s	40 / 80	55 / 90	60 / 140	60 / 180	95 / 200
		non-cracked concrete				
Min. axial spacing / for edge distance c	s_{min} / c	40 / 80	50 / 75	60 / 120	65 / 120	90 / 180
Min. edge distance / for axial spacing s	c_{min} / s	50 / 100	60/ 120	75 / 150	80 / 150	130 / 240

Axial and edge distance for reduced min. thickness building components

Anchor bolts		M8	M10	M12	M16	M20
Min. thickness building component	$h_{min,2}$	80	100	120	140	–
		cracked concrete				
Min. axial spacing / for edge distance c	s_{min} / c	40 / 70	45 / 90	60 / 100	70 / 160	–
Min. edge distance / for axial spacing s	c_{min} / s	40 / 80	50 / 115	60 / 140	80 / 180	–
		non-cracked concrete				
Min. axial spacing / for edge distance c	c_{min} / c	40 / 80	60 / 140	60 / 120	80 / 180	–
Min. edge distance / for axial spacing s	c_{min} / s	50 / 100	90 / 140	75 / 150	90 / 200	–

Reduced anchorage depth

Anchor bolts		M8	M10	M12	M16	M20
Min. thickness building component	$h_{min,3}$	80	80	100	140	–
Drill hole depth	h_{1red}	49	55	70	90	–
Reduced effective anchorage depth	$h_{ef,red}$	35	40	50	65	–
		cracked concrete				
Min. axial spacing / for edge distance c	s_{min} / c	50 / 60	50 / 100	50 / 160	65 / 170	–
Min. edge distance / for axial spacing s	c_{min} / s	40 / 185	65 / 180	65 / 250	100 / 250	–
		non-cracked concrete				
Min. axial spacing / for edge distance c	s_{min} / c	50 / 60	50 / 100	50 / 160	65 / 170	–
Min. edge distance / for axial spacing s	c_{min} / s	40 / 185	65 / 180	100 / 185	170 / 65	–

Installation parameters, extract from assessment ETA-07/0249

European Technical Assessment - Option 1
ETA-07/0249

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications — HB-BZ Wedge anchor (A4)			M8		M10		M12		M16		M20
Standard anchorage depth h_{ef}		[mm]	46	–	60	–	70	–	85	–	100
Reduced anchorage depth $h_{ef,\,red}$		[mm]	–	35	–	40	–	50	–	65	–
			cracked concrete								
Approved tension loads	C20/25	App. N [kN]	2.4	2.4	4.3	3.6	7.6	6.1	11.9	9.0	17.1
	C25/30	App. N [kN]	2.6	2.6	4.7	3.9	8.3	6.6	13.0	9.8	18.8
	C30/37	App. N [kN]	2.9	2.9	5.2	4.3	9.3	7.4	14.5	10.9	20.9
	C40/50	App. N [kN]	3.4	3.4	6.1	5.1	10.8	8.6	16.8	12.7	24.2
	C50/60	App. N [kN]	3.7	3.7	6.6	5.5	11.8	9.4	18.4	13.9	26.6
			non-cracked concrete								
Approved tension loads	C20/25	App. N [kN]	5.7	3.6	7.6	4.3	11.9	8.5	16.7	12.6	24.0
	C25/30	App. N [kN]	6.3	3.9	8.3	4.7	13.0	9.3	18.3	13.8	26.3
	C30/37	App. N [kN]	7.0	4.3	9.3	5.2	14.5	10.3	20.3	15.3	29.3
	C40/50	App. N [kN]	7.6	5.1	10.8	6.1	16.8	12.0	23.6	17.8	34.0
	C50/60	App. N [kN]	7.6	5.5	11.8	6.6	18.4	13.2	25.8	19.5	37.3
			cracked concrete / non-cracked concrete								
Approved shear loads	C20/25	App. V [kN]	7.4	7.4	11.4	10.4/11.4	17.1	14.5/17.1	31.4	21.6/30.2	43.9
	C25/30	App. V [kN]	7.4	7.4	11.4	11.4	17.1	15.9/17.1	31.4	23.6/31.4	43.9
Approved bending moment	–	App. M [Nm]	14.9	14.9	29.7	29.7	52.6	-	114.3	-	231.6

Selection anchor studs

Dimensions in mm

HB-BZ Wedge anchor—A4 Stainless steel

H = Preferred anchor for HALFEN Applications

Anchor Ø	Article name	Standard anchorage depth				Reduced anchorage depth				Anchor length	Thread
		Fixture thickness t_{fix}	Drill hole Ø×depth	Setting depth h_{nom}	Anchoring depth h_{ef}	Fixture thickness $t_{fix,red}$	Drill hole Ø×depth	Setting depth $h_{nom,red}$	Anchoring depth $h_{ef,red}$		
M8	HB-BZ 8-10-21/75 H	10	8×60	52	46	21	8×49	41	35	75	M8×20
	HB-BZ 8-15-26/80	15				26				80	M8×25
	HB-BZ 8-30-41/95	30				41				95	M8×40
	HB-BZ 8-50-61/115 H	50				61				115	M8×60
M10	HB-BZ 10-10-30/90 H	10	10×75	67	60	30	10×55	48	40	90	M10×20
	HB-BZ 10-15-35/95	15				35				95	M10×25
	HB-BZ 10-30-50/110 H	30				50				110	M10×40
	HB-BZ 10-50-70/130 H	50				70				130	M10×60
M12	HB-BZ 12-15-35/110 H	15	12×90	80	70	35	12×70	60	50	110	M12×30
	HB-BZ 12-20-40/115	20				40				115	M12×35
	HB-BZ 12-30-50/125	30				50				125	M12×45
	HB-BZ 12-50-70/145 H	50				70				145	M12×65
	HB-BZ 12-85-105/180 H	85				105				180	M12×80
	HB-BZ 12-125/220 H	125				–	–	–	–	220	M12×80
M16	HB-BZ 16-25-45/145 H	25	16×110	97	85	45	16×90	77	65	145	M16×45
	HB-BZ 16-50-70/170 H	50				70				170	M16×70
	HB-BZ 16-65-85/185 H	65				85				185	M16×85
M20	HB-BZ 20-100/235	100	20×125	114	100	–	–	–	–	235	M20×80

HB-BZ-U Wedge anchor—A4

Not included in the assessment

H = Preferred anchor for HALFEN Applications

With large washer, see EN ISO 7093 (DIN 9021)

Anchor Ø	Article name	Standard anchorage depth				Reduced anchorage depth				Anchor length	Ø U-washer	Thread
		Fixture thickness $t_{fix,}$	Drill hole Ø×depth	Setting depth h_{nom}	Anchoring depth h_{ef}	Fixture thickness $t_{fix,red}$	Drill hole Ø×depth	Setting depth $h_{nom,red}$	Anchoring depth $h_{ef,red}$			
M8	HB-BZ-U 8-15-26/80 H	15	8×60	52	46	26	8×49	41	35	80	24	M8×37
	HB-BZ-U 8-30-41/95	30				41				95		M8×52
	HB-BZ-U 8-50-61/115	50				61				115		M8×72
M10	HB-BZ-U 10-30-50/110	30	10×75	67	60	50	10×55	48	40	110	30	M10×62
	HB-BZ-U 10-50-70/130	50				70	10×55			130		M10×82
M12	HB-BZ-U 12-15-35/110	15	12×90	80	70	35	12×70	60	50	110	37	M12×51
	HB-BZ-U 12-50-70/145	50				70				145		M12×86
M16	HB-BZ-U 16-25-45/145	25	16×110	100	85	45	16×90	77	65	145	50	M16×66

① Further lengths on request

HB-BZ Wedge Anchor HCR Stainless steel

Load range (tension):	5.0 kN – 36.9 kN
Concrete grade:	C20/25 – C50/60

ETA-07/0249

Fire tested

EDELSTAHL Rost frei
STAINLESS STEEL

On request

High corrosion resistant stainless steel, grade 1.4529 (HCR)

HB-BZ HCR Wedge anchor

Description

The HB-BZ HCR Wedge Anchor allows heavy approved loads with minimal axial spacings and edge distances. The expansion shaft is coated with a durable, heat-resistant anti-friction material to prevent direct contact between the cone and spreader sleeve. This ensures the anchor can expand in the event of cracks forming in the concrete.

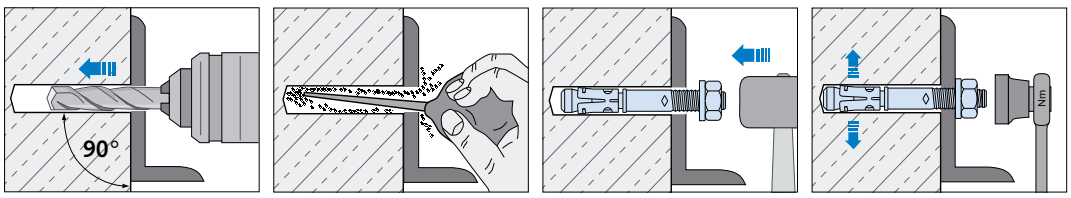
Applications

For fixing medium to heavy loads in wet rooms or in particularly aggressive environments; continual immersion in seawater, intermittent seawater spray, chlorine atmospheres in indoor swimming-pools, extreme chemical exposure, or in road tunnels, where de-icing agents are used.

Easy-to-use and free calculation software available

www.halfen.com ▻ Downloads ▻ Software/CAD

Installation



HB-B Wedge Anchor electroplated

Load range (tension):	5.0 kN – 36.9 kN
Concrete grade:	C20/25 – C50/60

European Technical Assessment - Option 8
ETA-07/0247

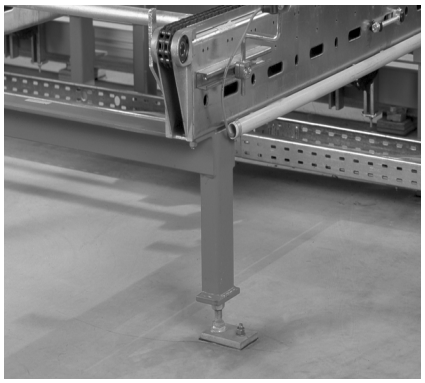
HB-B Wedge Anchor

Description

The HB-B Wedge Anchor is a highly efficient throughbolt for fixing suspended ceilings and similar fixtures in non-cracked concrete. It combines high load-bearing capabilities with minimal anchor spacings and edge distances. There are 150 different sizes and models for a wide range of uses in medium to heavy-duty applications. Approved sizes with stainless steel expansion sleeve.

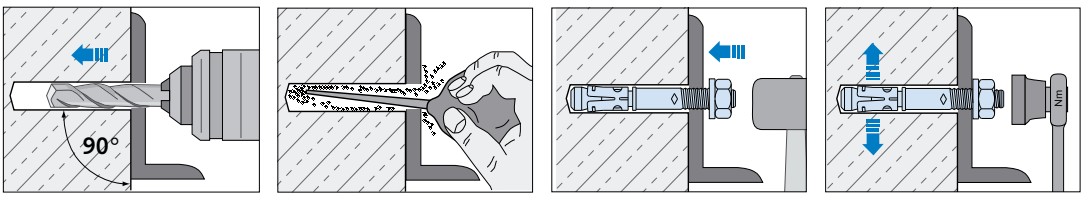
Applications

The HB-B Wedge Anchor is used for anchoring the following in non -cracked concrete in dry interior rooms: timber and steel structures, supports, handrails, cable trays, shelf supports, girders and consoles.



Easy-to-use and free calculation software available
www.halfen.com ⊳ Downloads ⊳ Software/CAD

Installation

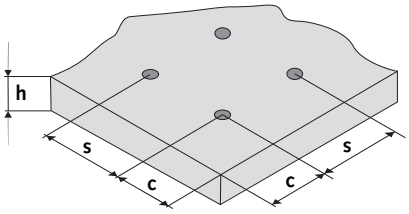


Installation specifications

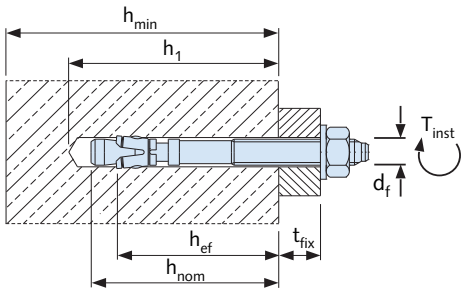
Dimensions in mm

Installation specifications						
Anchor bolts		**M8**	**M10**	**M12**	**M16**	**M20**
Drill hole diameter	d_o	8	10	12	16	20
Diameter of clearance hole in the fixture	d_f	9	12	14	18	22
Drill hole depth [reduced]	h_1	65 [55]	70 [65]	90 [75]	110 [95]	130 [110]
Spanner/Wrench size	SW	13	17	19	24	30

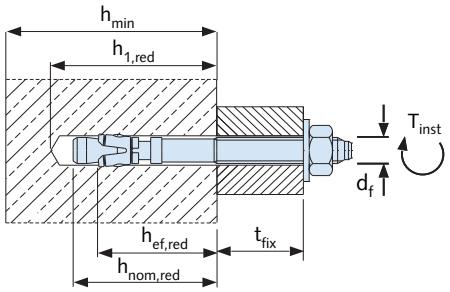
Installation torque		
	T_{inst} [Nm]	
	GV	FV
M8	15	15
M10	30	30
M12	50	40
M16	100	90
M20	200	120



Standard anchoring depth



Reduced anchoring depth



Installation specifications						
Anchor bolts				electroplated steel		
		M8	**M10**	**M12**	**M16**	**M20**
Standard anchorage depth h_{ef}						
Drill hole depth	$h_1 \geq$	65	70	90	110	130
Setting depth	$h_{nom} \geq$	56	62	82	102	121
Anchorage depth	$h_{ef} \geq$	44	48	65	82	100
Characteristic axial spacing	$s_{cr,N} \geq$	132	144	195	246	300
Characteristic edge distance	$c_{cr,N} \geq$	66	72	97.5	123	150
Reduced anchorage depth $h_{ef,red}$						
Drill hole depth	$h_{1,red} \geq$	55	65	75	95	110
Setting depth	$h_{nom,red} \geq$	47	56	67	84	99
Anchorage depth	$h_{ef,red} \geq$	35	42	50	64	78
Characteristic axial spacing	$s_{cr,N} \geq$	105	126	150	192	234
Characteristic edge distance	$c_{cr,N} \geq$	52.5	63	75	96	117

Minimal thickness building component axial spacing and edge distance						
Anchor bolts				electroplated steel		
		M8	**M10**	**M12**	**M16**	**M20**
Min. thickness building component Standard anchorage depth h_{ef}						
Min. thickness building component	h_{min}	100	100	130	170	200
Min. axial spacing	s_{min}	40	55	75	90	105
Min. edge distance	c_{min}	45	65	90	105	125
Min. thickness building component reduced anchorage depth $h_{ef,red}$						
Min. thickness building component	h_{min}	80	100	100	130	160
Characteristic axial spacing	s_{min}	40	55	100	100	140
Characteristic edge distance	c_{min}	45	65	100	100	140

Selection wedge anchor

Dimensions in mm

HB-B GV Wedge anchor – electroplated

H = Preferred anchor for HALFEN Applications

Anchor Ø	Article name	Standard anchorage depth: Fixture thickness t_{fix}	Standard anchorage depth: Drill hole Ø×depth	Standard anchorage depth: Setting depth h_{nom}	Standard anchorage depth: Anchoring depth h_{ef}	Reduced anchorage depth ①: Fixture thickness $t_{fix,red}$	Reduced anchorage depth ①: Drill hole Ø×depth	Reduced anchorage depth ①: Setting depth $h_{nom,red}$	Reduced anchorage depth ①: Anchoring depth $h_{ef,red}$	Anchor length	Thread
M8	HB-B 8-10-19/75	10	8×65	56	44	19	8×45	47	35	75	M8×40
	HB-B 8-15-24/80	15				24				80	M8×45
	HB-B 8-25-34/90	25				34				90	M8×55
	HB-B 8-35-44/100	35				44				100	M8×65
M10	HB-B 10-10-16/85	10	10×70	62	48	16	10×65	56	42	85	M10×40
	HB-B 10-15-21/90	15				21				90	M10×45
	HB-B 10-20-26/95	20				26				95	M10×50
	HB-B 10-30-36/105	30				36				105	M10×60
	HB-B 10-45-51/120	45				51				120	M10×75
	HB-B 10-50-56/125	50				56				125	M10×80
	HB-B 10-70-76/145	70				76				145	M10×80
M12	HB-B 12-10-25/105	10	12×90	82	65	25	12×75	67	50	105	M12×60
	HB-B 12-15-30/110	15				30				110	M12×65
	HB-B 12-30-45/125	30				45				125	M12×70
	HB-B 12-50-65/145	50				65				145	M12×100
	HB-B 12-65-80/160	65				80				160	M12×100
	HB-B 12-85-100/180	85				100				180	M12×100
	HB-B 12-105-120/200	105				120				200	M12×100
	HB-B 12-125-140/220	125				140				220	M12×80
M16	HB-B 16-10-28/130	10	16×110	102	82	28	16×95	84	64	130	M16×70
	HB-B 16-30-48/150	30				48				150	M16×90
	HB-B 16-60-78/180 H	60				78				180	M16×110
M20	HB-B 20-5-27/150	5	20×130	121	100	27	20×110	99	78	150	M20×70
	HB-B 20-20-42/165	20				42				165	M20×70

① Please observe the lower load capacities when using reduced anchorage depths.

Installation parameters, extract from ETA-07/0247

European Technical Assessment – Option 7
ETA-07/0247

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications – HB-B GV Wedge anchor			M8		M10		M12		M16		M20	
Standard anchorage depth h_{ef}		[mm]	-	44	-	48	-	65	-	82	-	100
Reduced anchorage depth $h_{ef,\,red}$		[mm]	35 ①	-	42	-	50	-	64	-	78	-
	non-cracked concrete											
Approved tension loads	C20/25	App. N [kN]	5.0	5.7	6.5	7.6	8.5	12.6	12.3	17.8	16.5	24.0
	C25/30	App. N [kN]	5.5	6.3	7.2	8.4	9.3	13.8	13.5	19.6	18.2	26.4
	C30/37	App. N [kN]	6.1	7.0	8.0	9.3	10.4	15.3	15.0	21.7	20.2	29.3
	C40/50	App. N [kN]	7.0	7.3	9.2	10.7	12.0	16.7	17.3	25.1	23.3	33.8
	C50/60	App. N [kN]	7.3	7.3	10.1	11.8	13.2	16.7	19.0	27.6	25.6	37.2
Approved shear loads	C20/25	App. V [kN]	5.0	6.3	6.5	8.0	8.5	14.3	23.6	23.6	33.1	37.1
	≥C25/30	App. V [kN]	5.5	6.3	7.2	8.8	9.3	14.3	23.6	23.6	36.4	37.1
Approved bending moment		App. M [Nm]	13.1	13.1	25.7	25.7	44.6	44.6	99.9	99.9	195.0	195.0

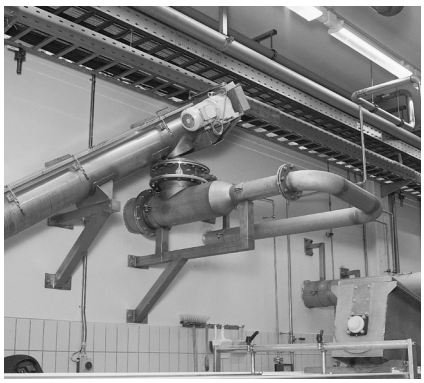
① For anchorage of statically indeterminate systems according to ETA-07/0247

HB-B Wedge anchor A4

Load range (tension):	4.3 kN – 37.2 kN
Concrete grade:	C20/25 – C50/60

ETA-07/0247

HB-B Wedge anchor A4



Description

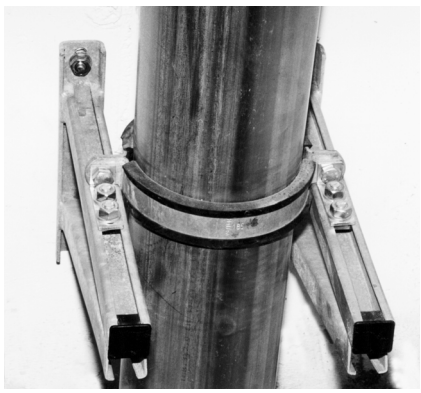
This anchor with ETA is the stainless steel version of the tried and tested HB-B Wedge Anchor.

Applications

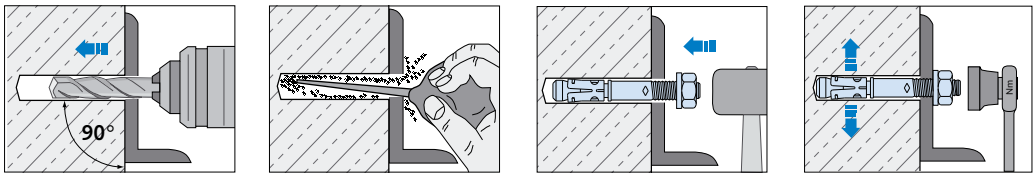
Medium to heavy fixings for interior and exterior applications: For use with timber and metal structures, columns, brackets, handrail and banister fixings, cable trays and cable ducts.

Easy-to-use and free calculation software available

www.halfen.com ⊳ Downloads ⊳ Software/CAD



Installation

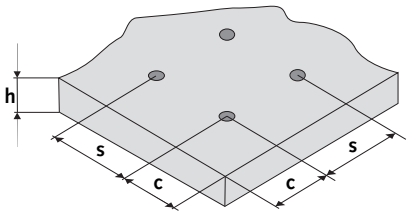


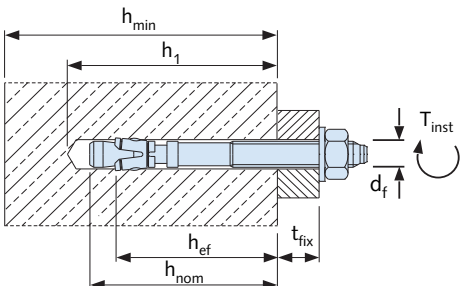
Installation torque

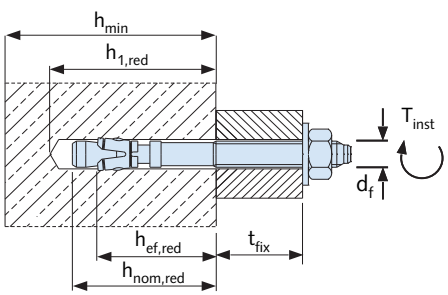
	T_{inst} [Nm]
M8	15
M10	25
M12	50
M16	100
M20	160

Installation specifications

Anchor bolts		M8	M10	M12	M16	M20
Drill hole diameter	d_o	8	10	12	16	20
Diameter of clearance hole in the fixture	d_f	9	12	14	18	22
Drill hole depth [reduced]	$h_1[h_{1,red}]$	65 [55]	70 [65]	90 [75]	110 [95]	130 [110]
Spanner/wrench size	SW	13	17	19	24	30







Installation specifications — HB-B A4 Stainless steel/ Extract from the assessment

Dimensions in mm

Installation						
Anchor bolts		**M8**	**M10**	**M12**	**M16**	**M20**
Standard anchorage depth h_{ef}						
Drill hole depth	$h_1 \geq$	65	70	90	110	130
Setting depth	$h_{nom} \geq$	56	62	81	99	121
anchorage depth	$h_{ef} \geq$	44	48	65	80	100
Reduced anchorage depth $h_{ef,red}$						
Drill hole depth	$h_{1,red} \geq$	55	65	75	95	110
Setting depth	$h_{nom,red} \geq$	47	56	66	83	99
Anchorage depth	$h_{ef,red} \geq$	35	42	50	64	78

Min. thickness building component, axial spacing and edge distance (Standard anchorage depth)						
Anchor bolts		**M8**	**M10**	**M12**	**M16**	**M20**
Min. thickness building component standard anchorage depth h_{ef}						
Min. thickness building component	h_{min}	100	100	130	160	200
Min. axial spacing	s_{min}	35	45	60	80	100
Respective edge distance	Resp. c	65	70	100	120	150
Min. edge distance	c_{min}	45	55	70	80	100
Respective axial spacing	Resp. s	110	80	100	140	180
Min. thickness building component reduced anchorage depth $h_{ef,red}$						
Min. thickness building component	h_{min}	80	100	100	130	160
Characteristic axial spacing	s_{min}	60	55	100	110	140
Characteristic edge distance	c_{min}	60	65	100	110	140

Axial spacing and edge distance (Standard anchorage depth)						
Anchor bolts		**M8**	**M10**	**M12**	**M16**	**M20**
Anchorage depth	h_{ef}	44	48	65	80	100
Characteristic axial spacing	$s_{cr,N}$	132	144	195	240	300
Characteristic edge distance	$c_{cr,N}$	66	72	97.5	120	150

Axial spacing and edge distance (Reduced anchorage depth)					
	M8	**M10**	**M12**	**M16**	**M20**
$h_{ef,red}$	35	42	50	64	78
$s_{cr,N}$	105	126	150	192	234
$c_{cr,N}$	52.5	63	75	96	117

Installation parameters, extract from ETA-07/0247

European Technical Assessment - Option 7
ETA-07/0247

Approved loads for anchors without influence of axial spacing and edge distance.
Total safety factor according to ETAG is included (γ_M and γ_F)

Loads and specifications – HB-B Wedge anchor A4/HCR			**M8**		**M10**		**M12**		**M16**		**M20**	
Standard anchorage depth h_{ef}		**[mm]**	-	44	-	48	-	65	-	80	-	100
Reduced anchorage depth $h_{ef,red}$		**[mm]**	35 ①	-	42	-	50	-	64	-	78	-
			non-cracked concrete									
Approved tension load	C20/25	App. N [kN]	4.3	5.7	5.7	8.4	8.5	11.9	12.3	17.2	16.5	24.0
	C25/30	App. N [kN]	4.7	6.3	6.3	9.3	9.3	13.1	13.5	18.9	18.2	26.4
	C30/37	App. N [kN]	5.2	7.0	7.0	10.7	10.4	14.5	15.0	21.0	20.2	29.3
	C40/50	App. N [kN]	6.0	8.1	8.1	11.8	12.0	16.8	17.3	24.2	23.3	33.8
	C50/60	App. N [kN]	6.6	8.6	8.9	8.0	13.2	18.5	19.0	26.6	25.6	37.2
Approved shear load	C20/25	App. V [kN]	5.0	6.9	6.5	8.8	8.5	15.4	24.6	28.6	33.1	43.9
	≥ C25/30	App. V [kN]	5.5	6.9	7.2	28.0	9.3	15.4	27.0	28.6	36.4	43.9
Approved bending moment		App. M [Nm]	13.7	13.7	28.0	28.0	48.6	48.6	113.7	113.7	231.6	231.6

HB-B Wedge Anchor A4 — for Non-cracked Concrete

Selection of available wedge anchors

Dimensions in mm

HB-B Wedge anchor – A4 Stainless steel

[H] = Preferred anchor for HALFEN Applications

Anchor Ø	Article name	Standard anchorage depth				Reduced anchorage depth ①				Anchor length	Thread
		Fixture thickness t_{fix}	Drill hole Ø×depth	Setting depth h_{nom}	Anchoring depth h_{ef}	Fixture thickness $t_{fix,red}$	Drill hole Ø×depth	Setting depth $h_{nom,red}$	Anchoring depth $h_{ef,red}$		
M8	HB-B 8-10-19/75	10	8×65	56	44	19	8×55	47	35	75	M8×40
	HB-B 8-15-24/80 [H]	15				24				80	M8×45
	HB-B 8-20-29/85	20				29				85	M8×50
	HB-B 8-30-39/95	30				39				95	M8×60
	HB-B 8-45-54/110 [H]	45				54				110	M8×75
	HB-B 8-55-64/120	55				64				120	M8×85
M10	HB-B 10-10-16/85	10	10×70	62	48	16	10×65	56	42	85	M10×40
	HB-B 10-15-21/90	15				21				90	M10×45
	HB-B 10-20-26/95 [H]	20				26				95	M10×50
	HB-B 10-30-36/105	30				36				105	M10×60
	HB-B 10-45-51/120 [H]	45				51				120	M10×75
	HB-B 10-50-56/125	50				56				125	M10×80
	HB-B 10-70-76/145	70				76				145	M10×80
M12	HB-B 12-10/95	10	12×80	–	–	–	–	–	–	95	M12×50
	HB-B 12-10-25/105	10	12×90	81	65	25	12×75	66	50	105	M12×60
	HB-B 12-15-30/110	15				30				110	M12×65
	HB-B 12-20-35/115	20				35				115	M12×70
	HB-B 12-30-45/125 [H]	30				45				125	M12×80
	HB-B 12-50-65/145 [H]	50				65				145	M12×100
	HB-B 12-65-80/160	65				80				160	M12×100
	HB-B 12-85-100/180	85				100				180	M12×100
M16	HB-B 16-10-28-/130	10	16×110	99	80	26	16×95	83	64	130	M16×70
	HB-B 16-30-48/150	30				46				150	M16×70
	HB-B 16-80-98/200	80				96				200	M16×110
	HB-B 16-100-118/220	100				116				220	M16×80
M20	HB-B 20-5-27/150	5	20×130	121	100	27	20×110	99	78	150	M20×70
	HB-B 20-35-57/180	35				57				180	M20×70
	HB-B 20-60-82/205 [H]	60				82				205	M20×70

① Please observe the lower load capacities when using reduced anchorage depths.

HB-B-IG Bolt anchor – A4 Stainless steel

⚠ Not included in the assessment

Anchor Ø	Article name	Standard anchorage depth				Anchor length	Thread
		Bolt length	Drill hole Ø×depth	Setting depth h_{nom}	Anchoring depth h_{ef}		
M8	HB-B-IG 8-50	12	10×65	57	43	50	M8×15
M10	HB-B-IG 10-60	15	12×75	71	52	60	M10×20
M12	HB-B-IG 12-75	20	16×95	84	64	75	M12×26

Accessories

HB-RB – Cleaning brush		
Article name	**Drill hole Ø mm**	**Suitable for HB-**
HB-RB 10	10	VMZ, V, VMU M8
HB-RB 12	12	VMZ, V, VMU M10
HB-RB 14	14	VMZ, V, VMU M12
HB-RB 18	18	VMZ, V, VMU M16
HB-RB 22	22	VMZ 115, M20
HB-RB 24	24	VMZ, VMU M20
HB-RB 26	26	V M20, VMZ, VMU M24
HB-RB 28	28	V M24

HB-RB-H – Cleaning brush with wood handle		
Article name	**Brush Ø mm**	**Suitable for drill hole Ø mm**
HB-RB-H 18	18	10-16

Air gun / Blow-out pump	
Article name	**Suitable for drill holes Ø [mm]**
HB-VM-ABP	22-26
HB-VM-AP 360	8-35

HB-VM-SH Prefo sleeve			
Article name	**Ø mm**	**Suitable for [mm]**	**Setting depth [mm]**
HB-VM-SH	16×85	M8/M10	80
HB-VM-SH	20×85	M12/M16	80
HB-VM-SH	20×130	M12/M16	130

HB-VM-(Profi) Dispenser	
Article name	
HB-VM-P 345 Dispenser	suitable for standard silicone cartridges
HB-VM-P 345 Profi dispenser	
HB-VM-P 420 Profi dispenser	suitable for 410 ml and 420 ml cartridges

HB-VMU/ VMZ – Injection system		
Article name	**Contents [ml]**	**① Number of cartridges in standard delivery**
Cartridges		
HB-VMZ 280 ②	280	12
HB-VMZ 420 ③	420	12
HB-VMU plus 280 ②	280	12
HB-VMU plus 410 ③	410	12
Nozzles, screw-on mixer nozzles		

① Single cartridges are also available.
② 280 ml cartridge can be used with standard dispensers; two mixer nozzles are supplied with each 280 ml cartridge.
③ One nozzle is supplied with these cartridges.

- Accessories for cleaning drill holes

- Cleaning brush

- Cleaning brush with wood handle

- Blowout pump

- Airgun

- HB-VM-SH Prefo sleeve

- HB-VM Dispenser

- HB-VMU plus / HB-VMZ Injections system

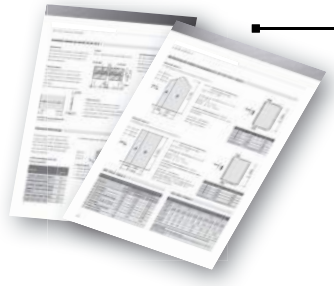
Service

HALFEN ANCHOR SYSTEMS

We offer a comprehensive customer service.
Please contact us directly for competent technical support for all your projects; no project is too small, no project is too large!

Support
We provide telephone support.
The our support team is available to help you in project details or to provide comprehensive project support.
See page 49 for contact information

Calculation software
Used for quick verification of load-bearing capacities of various standard anchor layouts.
See page 45



Design
We design and calculate fixing solutions for complete projects; for brickwork cladding or natural stone façades

Fire Resistance Tables
HALFEN HB-BZ Anchor bolts are fire resistance tested. Complete test reports can be provided on request.
See page 46

HALFEN HB Calculation program

The HALFEN Calculation program for HB Anchor systems provides the user with an easy-to-use and powerful tool to calculate anchor dowel applications.

Splash screen: HALFEN HB Software

Verification

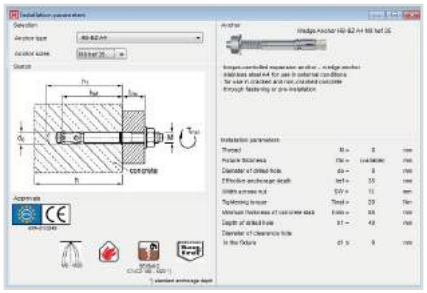
- simple and clear input
- detailed results
- installation close to the component edge for single anchors or multiple anchors
- verification of round or square anchor plates
- stand-off installation
- verifiable printout
- static verification according to European design methods as in EU guidelines
- guidelines for European Technical Assessment, ETAG 001, annex C
- Technical Report TR020 (verification of fire resistance)
- Technical Report TR029 (verification of chemical anchors)
- Technical Report TR045 (verification under seismic loads)

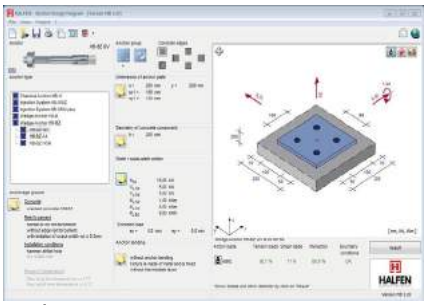
Input

Interactive input of loads and dimensions. The entries are displayed directly on input in a 3D visualization.

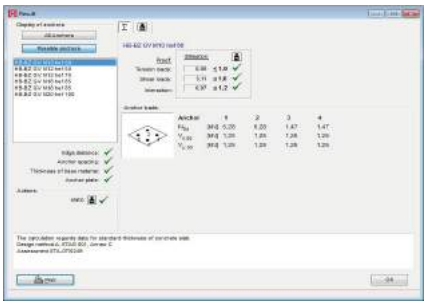
Results

After calculation, the results for the selected anchor types are displayed and listed in detail in the printout.


HB Selection menu



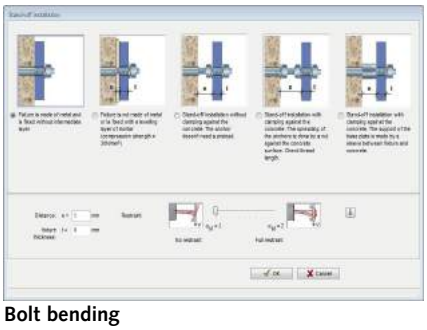
Load input


Dowel selection menu

HALFEN Calculation software for Windows; simple and efficient static verification.

Minimal computer requirements:

- Windows 10 / Windows 8.x / Windows 7 / Vista / XP


Bolt bending

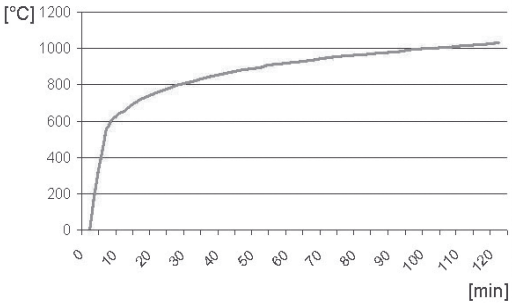
HALFEN Calculation software

The program can be found under:
www.halfen.com ⊳ Downloads ⊳ Software/CAD
or simply scan the QR-Code.

Fire resistant fixings

Fire tested

Fire tested in accordance with the Standard time temperature curve (ISO 834, DIN EN 1363-1: 1999-10, DIN 4102-2: 1977-09) in the cracked tension zone (concrete), exposed to open flames, without insulation or protective coatings.



Anchor systems	IBMB* report	Bolt size	Maximum tension load [kN] when subjected to fire according to DIN 4102-2 for fire resistant class.			
			F 30	F 60	F 90	F 120
HB-BZ Wedge anchor galvanized steel						
	ETA-99/0010	**M8** $h_{ef,red}/h_{ef,std}$	1.25/1.25	1.10/1.10	0.80/0.80	0.60/0.70
		M10 $h_{ef,red}/h_{ef,std}$	1.82/2.25	1.82/1.90	1.30/1.40	1.00/1.20
		M12 $h_{ef,red}/h_{ef,std}$	3.18/4.00	3.00/3.00	1.90/2.40	1.30/2.20
		M16 $h_{ef,red}/h_{ef,std}$	4.72/6.25	4.72/5.60	3.50/4.40	2.50/4.00
		M20 $h_{ef,std}$	9.00	8.20	6.90	6.30
		M24 $h_{ef,std}$	11.10	11.10	10.00	8.88
HB-BZ Wedge anchor A4 Stainless steel/ HCR Stainless steel grade 1.4529						
	ETA-99/0010	**M8** $h_{ef,red}/h_{ef,std}$	1.25/1.25	1.25/1.25	1.25/1.25	1.00/1.00
		M10 $h_{ef,red}/h_{ef,std}$	1.82/2.25	1.82/2.25	1.82/2.25	1.46/1.80
		M12 $h_{ef,red}/h_{ef,std}$	3.18/4.00	3.18/4.00	3.18/4.00	2.55/3.20
		M16 $h_{ef,red}/h_{ef,std}$	4.72/6.25	4.72/6.25	4.72/6.25	3.77/5.00
		M20 $h_{ef,std}$	9.00	9.00	9.00	7.20

*IBMB = (German) Institute of Building Materials, Concrete Construction and Fire Safety

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