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Member of EOTA
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European Technical Assessment

ETA 17/0006 of 07/03/2025

Technical Assessment Body issuing the ETA: Technical and Test Institute for Construction Prague	
Trade name of the construction product	Injection System VM-EA
Product family to which the construction product belongs	Product area code: 33 Injection anchors for use in masonry
Manufacturer	MKT Metall-Kunststoff-Technik GmbH & Co.KG Auf dem Immel 2 D-67685 Weilerbach Germany
Manufacturing plant(s)	Werk 1, D and Werk 2, D
This European Technical Assessment contains	53 pages including 50 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 330076-01-0604 Metal injection anchors for use in masonry
This version replaces	ETA 17/0006 issued on 05/01/2017

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

1. Technical description of the product

The Injection system VM-EA, VM-EA blue, VM-EA express, VM-EA low speed for masonry is bonded anchor consisting of a cartridge with injection mortar, a steel element and a plastic sleeve. The steel elements are threaded rod with hexagon nut and washer or an internally threaded rod. The steel elements are made of galvanized or zinc plated steel, stainless or high corrosion resistance steel.

The anchor is placed into a drilled hole filled with injection mortar. The steel element is anchored via the bond between metal part, injection mortar and masonry.

The illustration and the description of the product are given in Annex A.

2. Specification of the intended use in accordance with the applicable EAD

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

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic values for resistance	Annex C 2 to C 37
Displacements	Annex C 6 to C 37
Durability	Annex B 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1

3.3 Hygiene, health and environment (BWR 3)

No performance determined.

3.4 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B 1 are taken into account.

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

According to the Decision 97/177/EC of the European Commission[1] the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Injection anchors for use in masonry	For fixing and/or supporting to masonry, structural elements (which contributes to the stability of the construction works) or heavy units	-	1

[1] Official Journal of the European Communities L 073 of 14.03.1997

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

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technický a zkušební ústav stavební Praha, s.p.[2] The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

Issued in Prague on 07.03.2025

By

Ing. Jiří Studnička Ph.D.
Head of the Technical Assessment Body

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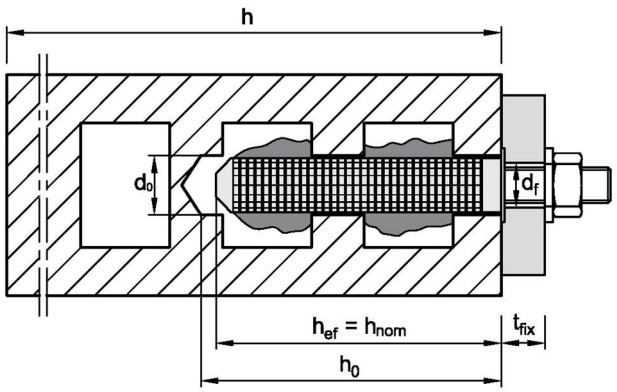
Subjekt pro technické posuzování

[2] The control plan is a confidential part of the documentation of the European Technical Assessment, but not published together with the ETA and only handed over to the approved body involved in the procedure of AVCP.

Installation in hollow brick

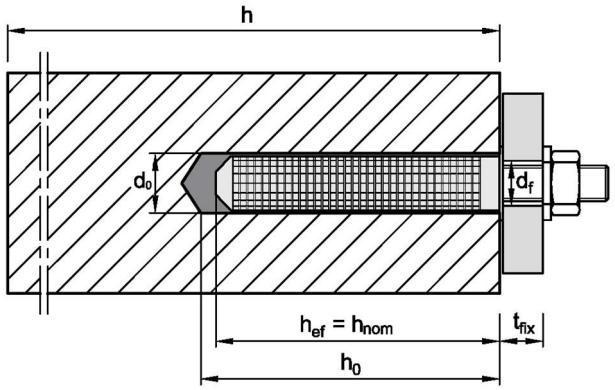


Threaded rod M8-M16 or

Internal threaded anchor rod IG-M6 – IG-M10

<u>with</u> sleeve

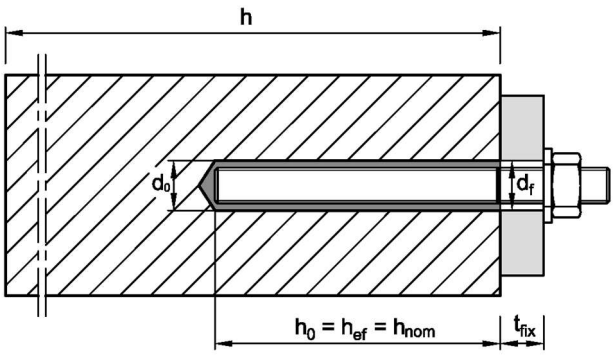
Installation in solid brick



Threaded rod M8-M16 or

Internal threaded anchor rod IG-M6 – IG-M10

<u>with</u> sleeve



Threaded rod M8-M16 or

Internally threaded anchor rod IG-M6 – IG-M10

<u>without</u> sleeve

d_0 = drill hole diameter
t_{fix} = thickness of fixture
h = thickness of masonry member
d_f = diameter of clearance hole in fixture
h_0 = depth of drill hole
h_{ef} = effective anchorage depth
h_{nom} = overall anchor embedment depth

Injection System VM-EA for masonry

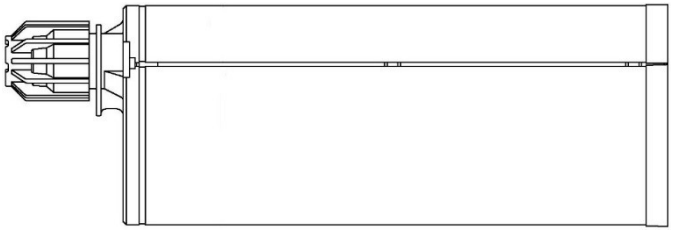
Product description
Installed condition

Annex A1

Cartridge: VM-EA, VM-EA blue, VM-EA express, VM-EA low speed

Coaxial cartridge
150 ml, 160ml, 280 ml,
300 ml to 330 ml,
380 ml to 420 ml

Side-by-side cartridge
235 ml,
345 ml to 360 ml,
825 ml

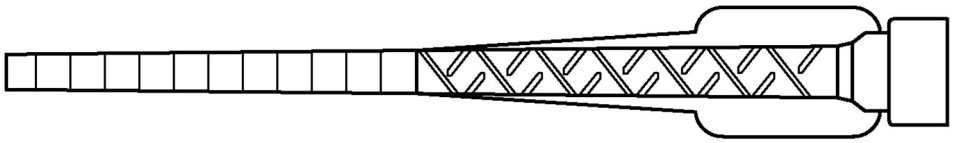


Foil tube cartridge
165 ml
300 ml

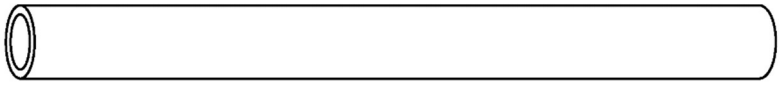
Cartridge imprint:
VM-EA, VM-EA express, VM-EA blue or VM-EA low speed
processing and safety instructions, shelf life, charge number, manufacturer's information, quantity information

Static mixer

VM-X



Mixer extension



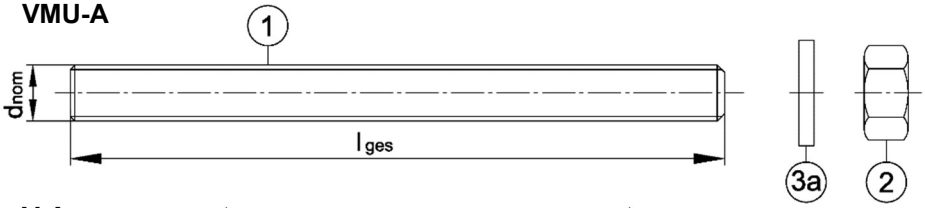
Injection System VM-EA for masonry	Annex A2
Product description Installed condition	

Threaded rods

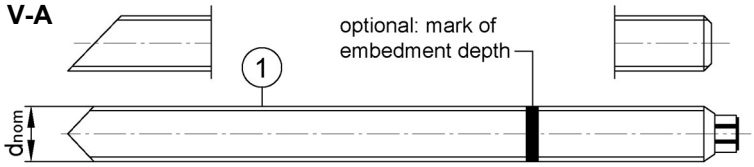
Threaded rod VMU-A and V-A

M8, M10, M12, M16 (zinc plated, A4, HCR)
with washer and hexagon nut

VMU-A



V-A



Marking e.g.: ◇ M10

◇	identifying mark of manufacturing plant
M10	size of thread

additional marking:

-8	strength class 8.8
A4	stainless steel
HC	high corrosion resistant steel

Threaded rod VM-A (material sold by the metre, to be cut at the required length)

M8, M10, M12, M16 (zinc plated, A2, A4, HCR)

- Materials, dimensions and mechanical properties see Table A1

Commercial standard threaded rod with:

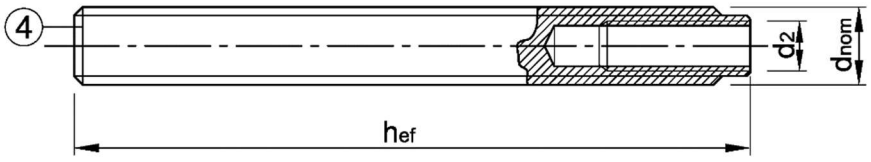
M8, M10, M12, M16 (zinc plated, A2, A4, HCR)

- Materials, dimensions and mechanical properties see Table A1
- Inspection certificate 3.1 acc. to EN 10204:2004 (documents must be retained)

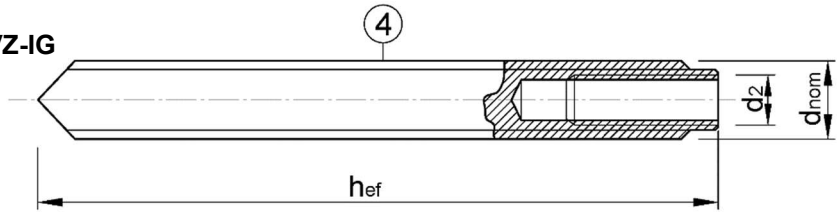
Internally threaded anchor rod VMU-IG and VZ-IG

IG M6, IG M8, IG M10
(zinc plated, A4, HCR)

VMU-IG



VZ-IG



Marking e.g.: ◇ M8

◇	identifying mark of manufacturing plant
I	internal thread (optional)
M8	size of internal thread

additional marking:

-8	strength class 8.8
A4	stainless steel
HCR	high corrosion resistant steel

Injection System VM-EA for masonry	**Annex A3**
Product description Threaded rod	

Table A1: Materials

Part	Designation	Material and mechanical properties						
Steel, zinc plated electroplated ≥ 5 µm acc. to EN ISO 4042:2022 or hot-dip galvanized ≥ 50 µm in average acc. to EN ISO 1461:2022, EN ISO 10684:2004+AC:2009 or sherardized ≥ 45 µm acc. to EN ISO 17668:2016								
1	Threaded rod	Property class	characteristic ultimate strength		characteristic yield strength		fracture elongation	EN ISO 683-4:2018, EN 10263:2017 Commercial standard threaded rod: EN ISO 898-1:2013
		4.6	f_{uk} [N/mm²]	400	f_{yk} [N/mm²]	240	A_5 > 8 %	
		4.8		400		320	A_5 > 8 %	
		5.6		500		300	A_5 > 8 %	
		5.8		500		400	A_5 > 8 %	
		8.8		800		640	A_5 > 8 %	
2	Hexagon nut	4	for class 4.6 or 4.8 rods					EN ISO 898-2:2022
		5	for class 4.6, 4.8, 5.6 or 5.8 rods					
		8	for class 4.6, 4.8, 5.6, 5.8 or 8.8 rods					
3	Washer		e.g.: EN ISO 7089:2000, EN ISO 7093:2000, EN ISO 7094:2000, EN ISO 887:2006					
4	Internally threaded anchor rod [3]	5.8	Steel, electroplated or sherardized				A_5 > 8%	EN ISO 683-4:2018
		8.8					A_5 > 8%	
Stainless steel A2 [1] **Stainless steel A4** **High corrosion resistant steel HCR**		**CRC II** (1.4301 / 1.4307 / 1.4311 / 1.4567 / 1.4541) **CRC III** (1.4401 / 1.4404 / 1.4571 / 1.4578) **CRC V** (1.4529 / 1.4565)						
1	Threaded rod	Property class	characteristic ultimate strength		characteristic yield strength		fracture elongation	EN 10088-1:2014 EN ISO 3506-1:2020
		50	f_{uk} [N/mm²]	500	f_{yk} [N/mm²]	210	A_5 > 8%	
		70		700		450 (560) [2]	A_5 > 8 %	
		80		800		600 (640) [2]	A_5 > 8 %	
2	Hexagon nut	50	for class 50 rods					EN 10088-1:2014 EN ISO 3506-2:2020
		70	for class 50 or 70 rods					
		80	for class 50, 70 or 80 rods					
3	Washer		e.g.: EN ISO 7089:2000, EN ISO 7093:2000, EN ISO 7094:2000; EN ISO 887:2006					EN 10088-1:2014
4	Internally threaded anchor rod [3]	70	stainless steel A4; high corrosion resistant steel HCR				A_5 > 8 %	EN 10088-1:2014
Perfo Sleeve VM-SH			Polypropylene (PP)					

[1] Property class 50 and 70
[2] Value in brackets for anchor rods VMU-A and V-A
[3] Using VMU-IG or VZ-IG, screws or threaded rods (incl. nut and washer) must at least correspond to the material and strength class of the internally threaded anchor rod used.

Injection System VM-EA for masonry

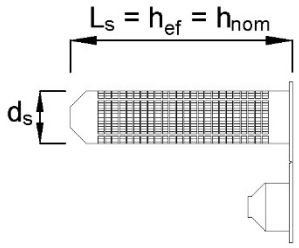
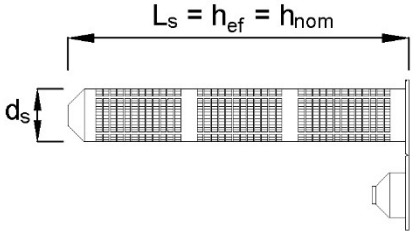
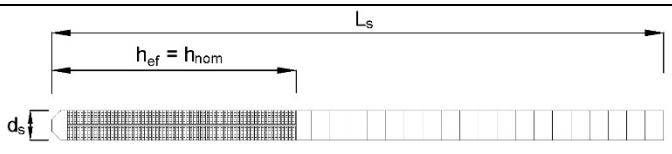
Product description
Materials

Annex A4

Table A2: Dimensions of threaded rods and internally threaded anchor rods

Threaded rod			**M8**	**M10**	**M12**	**M16**
Diameter	$d = d_{nom}$	[mm]	8	10	12	16
Total length	l_{ges}	[mm]	$h_{ef} + t_{fix} + 9,5$	$h_{ef} + t_{fix} + 11,5$	$h_{ef} + t_{fix} + 17,5$	$h_{ef} + t_{fix} + 20,0$
Internally threaded anchor rod			**-**	**IG M6**	**IG M8**	**IG M10**
Internal diameter	d_2	[mm]	-	6	8	10
Outer diameter	$d = d_{nom}$	[mm]	-	10	12	16
min. screw-in depth	$L_{IG,min}$	[mm]	-	8	10	10
Total length	l_{ges}	[mm]	-	with sleeve: h_{ef} – 5mm without sleeve: h_{ef}		

Table A3: Dimensions of sleeves VM-SH

Type	**Size**	**d_s** [mm]	**L_s** [mm]	**$h_{ef} = h_{nom}$** [mm]
	**VM-SH 12x80**	12	80	80
	VM-SH 16x85	16	85	85
	VM-SH 20x85	20	85	85
	**VM-SH 16x130**	16	130	130
	VM-SH 20x130	20	130	130
	VM-SH 20x200	20	200	200
 for installation through insulation up to a thickness of 20 cm or through-setting installation	**VM-SH 16x130/330**	16	330	130

Injection System VM-EA for masonry

Product description
Sleeves and steel parts

Annex A5

Specifications of intended use

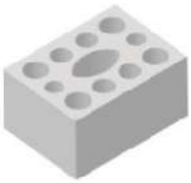
Anchorages subject to	Static and quasi-static loads **M8** to **M16** and **IG-M6** to **IG-M10** (with and without perforated sleeve)	
Base material	Masonry group b: Solid brick masonry	see Table B1
	Masonry group c: Hollow brick masonry	
	Masonry group d: Autoclaved Aerated Concrete	
	Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2016. For other bricks in solid masonry and in hollow masonry or in autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to EOTA TR 053, Edition July 2022 under consideration of the β-factor according to Annex C1, Table C1.	
Temperature Range	T_a: - 40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C) T_b: - 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)	
Hole drilling	See Annex C	
Use conditions (Environmental conditions):	Structures subject to dry internal conditions (all materials). For all other conditions acc. to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance classes Annex A (stainless steel and high corrosion resistant steel)	
Use category	Condition d/d: Installation and use in dry masonry Condition w/w: Installation and use in dry or wet masonry (incl. w/d installation in wet masonry and use in dry masonry)	

Note: The characteristic resistance for solid bricks and autoclaved aerated concrete are also valid for larger brick sizes and larger compressive strength of the masonry unit.

Design:
- Verifiable calculation notes and drawings are prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.
- The anchorages are designed in accordance with the EOTA TR 054, Edition July 2022 under the responsibility of an engineer experienced in anchorages and masonry work.

Installation:
- Anchor Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Table B1: Overview brick types and properties with corresponding fastening elements (threaded rods and sleeves)

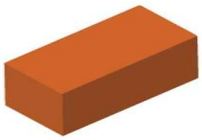
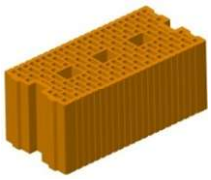
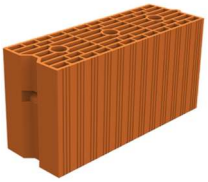
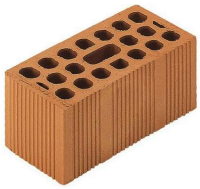
Designation **Density** [kg/dm³] **Dimension LxBxH** [mm]	**Picture**	**Perfo Sleeve VM-SH**	**Anchor rods**	**Annex**	**Designation** **Density** [kg/dm³] **Dimension LxBxH** [mm]	**Picture**	**Perfo Sleeve VM-SH**	**Anchor rods**	**Annex**
Autoclaved aerated concrete acc. to EN 771-4:2011+A1:2015									
AAC ρ = 0,35-0,60 ≥ 499x240x249		-	M8 - M16 IG M6 - IG M10	C6 – C8					
Light weight concrete brick acc. to EN 771-3:2011+A1:2015									
VBL ρ ≥ 0,63 240x300x113		-	M8 - M16 IG M6 - IG M10	C33	Leca Lex harkko RUH-200 Kulma ρ = 0,62 498x200x195		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C36 – C37
Hollow light weight concrete brick acc. to EN 771-3:2011+A1:2015									
Bloc creux B40 ρ = 0,8 494x200x190		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C31 – C32	Leca Lex harkko RUH-200 Kulma ρ = 0,62 498x200x195		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C34 – C35
Calcium silica bricks acc. to EN 771-2:2011+A1:2015									
KS-NF ρ = 2,0 240x115x71		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C9 – C10	KSL-3DF ρ = 1,4 240x175x113		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C11 – C12
KSL-12DF ρ = 1,4 498x175x238		12x80 16x85 16x130 20x130	M8 - M16 IG M6 - IG M10	C13 – C14					

Injection System VM-EA for masonry

Intended use
Brick types and properties with corresponding fastening elements

Annex B2

Table B1: Overview brick types and properties with corresponding fastening elements (threaded rods and sleeves) - Continued

Designation Density [kg/dm³] Dimension LxBxH [mm]	Picture	Perfo Sleeve VM-SH	Anchor rods	Annex	Designation Density [kg/dm³] Dimension LxBxH [mm]	Picture	Perfo Sleeve VM-SH	Anchor rods	Annex
Solid clay bricks acc. to EN 771-1:2011+A1:2015									
Mz-1DF ρ = 1,64 240x115x55		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C15 – C16					
Hollow clay bricks acc. to EN 771-1:2011+A1:2015									
HLz-16DF ρ = 0,83 497x240x238		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C17 – C18	Porotherm Homebric ρ = 0,68 500x200x299		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C19 – C20
BGV Thermo ρ = 0,62 500x200x314		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C21 – C22	Calibric Th ρ = 0,62 500x200x314		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C23 – C24
Urbanbrick ρ = 0,74 560x200x274		12x80 16x85 16x130 20x85 20x130	M8 - M16 IG M6 - IG M10	C25 – C26	Blocchi Leggeri ρ = 0,55 250x120x250		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C27 – C28
Doppio Uni ρ = 0,92 250x120x120		12x80 16x85 16x130 20x85 20x130 20x200	M8 - M16 IG M6 - IG M10	C29 – C30					

Injection System VM-EA for masonry

Intended use
Brick types and properties with corresponding fastening elements

Annex B3

Table B2: Installation parameters in Autoclaved Aerated Concrete AAC and solid masonry (without sleeve)

Threaded rod				**M8**	**M10 IG-M6**	**M12 IG-M8**	**M16 IG-M10**
Nominal drill hole diameter		d_0	[mm]	10	12	14	18
Drill hole depth		h_0	[mm]	80	90	100	100
Effective anchorage depth		h_{ef}	[mm]	80	90	100	100
Minimum wall thickness		h_{min}	[mm]	h_{ef} + 30			
Diameter of clearance hole in the fixture	pre-setting installation	$d_f \leq$	[mm]	9	12	14	18
	through-setting installation	$d_f \leq$	[mm]	12	14	16	20
Brush			[-]	RB 10	RB 12	RB 14	RB 18
Minimum diameter of steel brush		$d_{b,min}$	[mm]	10,5	12,5	14,5	18,5
Max. installation torque		T_{inst}	[Nm]	see parameters of brick Annex C			
Minimum spacing		s_{min}	[mm]				
Minimum edge distance		c_{min}	[mm]				

Table B3: Installation parameters in solid and hollow masonry (with sleeve)

Threaded rod				**M8**	**M8 M10 / IG-M6**			**M12 / IG-M8 M16 / IG-M10**		
Sleeve VM-SH				**12x80**	**16x85**	**16x130**	**16x130 / 330**	**20x85**	**20x130**	**20x200**
Nominal drill hole diameter		d_0	[mm]	12	16			20		
Drill hole depth		h_o	[mm]	85	90	135	135 +t_{fix}[1)]	90	135	205
Effective anchorage depth		h_{ef}	[mm]	80	85	130	130	85	130	200
Minimum wall thickness		h_{min}	[mm]	115	115	195	195	115	195	240
Diameter of clearance hole in the fixture	pre-setting installation	$d_f \leq$	[mm]	9	9 (M8) 12 (M10, IG-M6)			14 (M12, IG-M8) 18 (M16, IG-M10)		
	through-setting installation	$d_f \leq$	[mm]	14	18			22		
Brush			[-]	RB 12	RB 16			RB 20		
Minimum diameter of Steel brush		$d_{b,min}$	[mm]	12,5	16,5			20,5		
Max. installation torque		T_{inst}	[Nm]	See parameters of brick Annex C						
Minimum spacing		s_{min}	[mm]							
Minimum edge distance		c_{min}	[mm]							

[1)] t_{fix} < 200 mm

Injection System VM-EA for masonry

Intended use
Installation parameters

Annex B4

Cleaning and installation tools

Compressed air tool (min. 6 bar)

Blow out pump (Volume ≥ 750 ml)

Brush RB

Brush extension

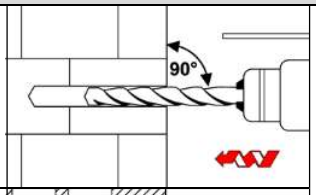
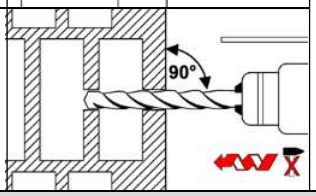
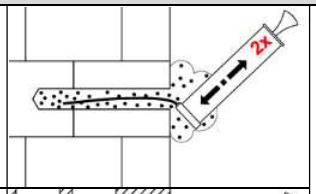
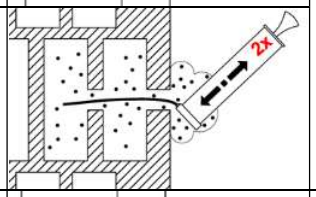
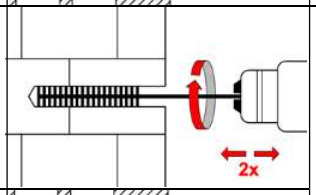
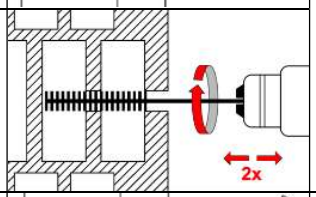
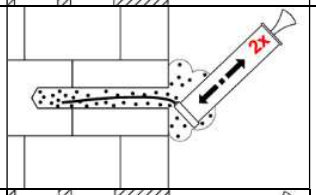
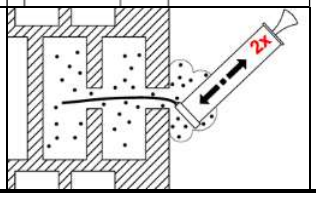
Table B4: Maximum working time and minimum curing time

Temperature in the base material	VM-EA low speed		VM-EA VM-EA blue [1)]		VM-EA express	
	Max. working time	Min. curing time	Max. working time	Min. curing time	Max. working time	Min. curing time
-10°C to -6°C	-	-	-	-	60 min	4 h
-5°C to -1°C	-	-	90 min	6 h	45 min	2 h
0°C to +4°C	-	-	45 min	3 h	25 min	80 min
+5 °C to +9°C	-	-	25 min	2 h	10 min	45 min
+10°C to +14°C	30 min	5 h	20 min	100 min	4 min	25 min
+15°C to +19°C	20 min	210 min	15 min	80 min	3 min	20 min
+20°C to +29°C	15 min	145 min	6 min	45 min	2 min	15 min
+30°C to +34°C	10 min	80 min	4 min	25 min	-	-
+35°C to +39°C	6 min	45 min	2 min	20 min	-	-
+40°C to +44°C	4 min	25 min	-	-	-	-
+45°C	2 min	20 min	-	-	-	-
Cartridge temperature	+5°C to +45°C		+5°C to +40°C		0°C to +30°C	

[1)] The VM-EA blue injection mortar has a curing time proof by changing the color from blue to gray after curing minimum time. The curing time proof is only valid for the standard version of the mortar.

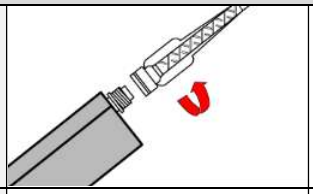
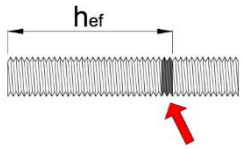
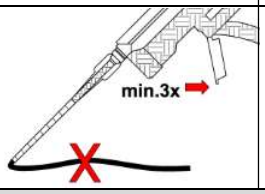
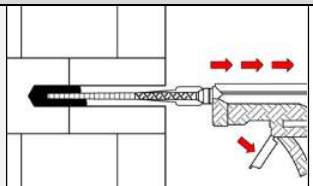
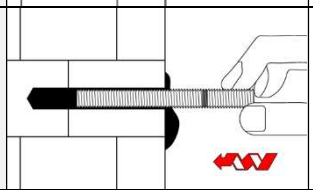
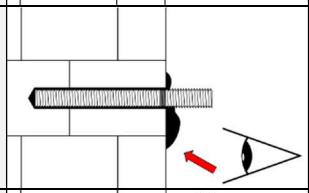
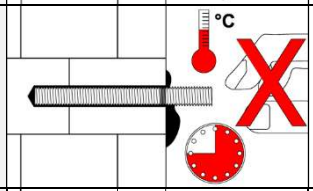
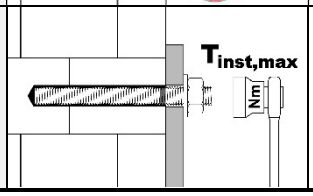
Injection System VM-EA for masonry	**Annex B5**
Intended use Cleaning and installation accessories, Working and curing time	

Installation instructions

Drilling of the drill hole in solid masonry and hollow masonry			
1	solid masonry		Drill the hole perpendicular to the surface of the base material using the drilling method according to Annex C, with the specified drill hole diameter and depth of drill hole corresponding to the anchor size and anchorage depth of the selected anchor.
	hollow masonry		
Cleaning in solid masonry and hollow masonry			
2a	solid masonry		Blow out from the bottom of the bore hole with the blow out pump (Annex B5) a minimum of **two** times.
	hollow masonry		
2b	solid masonry		Brush the hole with an appropriately sized wire brush ≥ $d_{b,min}$ Table B2 and B3 (check minimum brush diameter $d_{b,min}$) a minimum of **two** times using a drilling machine or battery screwdriver. If the drill hole ground is not reached, an appropriate brush extension must be used.
	hollow masonry		
2c	solid masonry		Finally starting from the bottom or back of the drill hole blow out the hole with the blow out pump again a minimum of **two** times.
	hollow masonry		

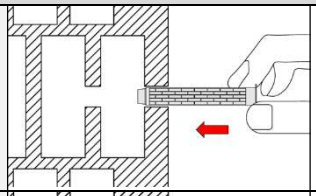
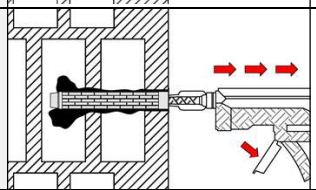
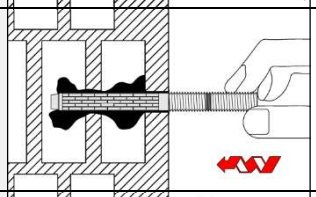
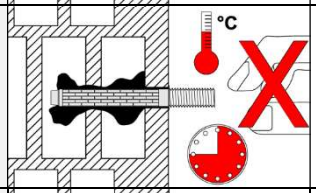
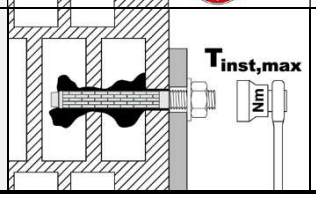
Injection System VM-EA for masonry	**Annex B6**
Intended use Installation instruction: drilling of drill hole / cleaning in solid and hollow masonry	

Installation instructions (continuation)

Preparation injection		
3		Remove the cap and attach the supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. In case of a foil tube cartridge, cut off the clip before use. For every working interruption longer than the recommended working time (Table B4) as well as for new cartridges, a new static-mixer shall be used.
4		Mark position of embedment depth on the threaded rod. The threaded rod shall be free of dirt, grease, oil or other foreign material.
5		Prior to dispensing into the drill hole, squeeze out separately (a minimum of three full strokes, for foil tube cartridges at least 6 full strokes) and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey or blue (VM-EA blue) color.
Installation <u>without</u> sleeve		
6		Starting at the bottom of the drill hole and fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid air pockets. Use mixer extension if necessary. Observe temperature dependent working time (Table B4).
7		Insert fastener while turning slightly up to the embedment mark.
8		Annular gap between threaded rod and base material must be completely filled with mortar. For through setting installation the annular gap between threaded rod and fixture must also be filled with mortar. Otherwise, the installation must be repeated starting from step 6 before the maximum working time has expired.
9		Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (Table B4).
10		Install the fixture using a torque wrench, observing the maximum installation torque T_{inst} according to Annex C.

Injection System VM-EA for masonry	**Annex B7**
Intended use Installation instruction: Preparation injection / Installation without sleeve	

Installation instructions (continuation)

Installation <u>with</u> sleeve		
6		Insert the perforated sleeve flush with the surface of the masonry. Only use sleeves that have the right length. Never cut the sleeve in the anchoring area. For through-setting installation with perforated sleeve VM-SH 16x130/330 through a non-load-bearing layer and/or add-on part, the clamping area may be shortened to the thickness of the non-load-bearing layer and/or attachment.
7		Fill the perforated sleeve with mortar from the bottom or back. Use mixer extension if necessary. Refer to the cartridge label or the installation instructions for the exact quantity of mortar. For through setting installation, the perforated sleeve must be completely filled with mortar up to the fixture. Observe the working and curing times given in Table B4.
8		To optimize the distribution of the mortar, insert the fastener with slight rotation to the defined embedment depth.
9		Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (Table B4).
10		Install the fixture using a torque wrench, observing the maximum installation torque T_{inst} according to Annex C.

Injection System VM-EA for masonry	**Annex B8**
Intended use Installation instruction: Installation with sleeve	

Table C1: β-factors for job-site testing under tension loading

Brick	Installation & use conditions	Anchor size	β-factor	
			T_a: 24°C / 40°C	T_b: 50°C / 80°C
AAC Annex C6 to Annex C8	d/d	M8	0,82	0,70
		M10 / IG-M6		
		M12 / IG-M8	0,70	0,60
		M16 / IG-M10		
	w/w	M8	0,82	0,70
		M10 / IG-M6	0,63	0,54
		M12 / IG-M8	0,48	0,41
		M16 / IG-M10		
All other bricks Annex C9 to Annex C37	d/d w/d w/w	all sizes	0,72	0,50

Table C2: Characteristic steel resistance under tension and shear load for threaded rods

Threaded rod				M 8	M 10	M 12	M 16
Steel failure							
Cross sectional area		A_s	[mm²]	36,6	58,0	84,3	157
Characteristic resistance under tension load [1)]							
steel, zinc plated	Property class 4.6 and 4.8	$N_{Rk,s}$	[kN]	15 (13)[1)]	23 (21)[1)]	34	63
	Property class 5.6 and 5.8	$N_{Rk,s}$	[kN]	18 (17)[1)]	29 (27)[1)]	42	79
	Property class 8.8	$N_{Rk,s}$	[kN]	29 (27)[1)]	46 (43)[1)]	67	126
stainless steel	Property class 50 (A2/A4/HCR)	$N_{Rk,s}$	[kN]	18	29	42	79
	Property class 70 (A2/A4/HCR)	$N_{Rk,s}$	[kN]	26	41	59	110
	Property class 80 (A4/HCR)	$N_{Rk,s}$	[kN]	29	46	67	126
Partial factors [2)]							
steel, zinc plated	Property class 4.6 and 5.6	$\gamma_{Ms,N}$	[-]	2,0			
	Property class 4.8, 5.8 and 8.8	$\gamma_{Ms,N}$	[-]	1,5			
stainless steel	Property class 50 (A2/A4/HCR)	$\gamma_{Ms,N}$	[-]	2,86			
	Property class 70 (A2/A4/HCR)	$\gamma_{Ms,N}$	[-]	1,87 (1,5)[3)]			
	Property class 80 (A4/HCR)	$\gamma_{Ms,N}$	[-]	1,6 (1,5)[3)]			
Characteristic resistance under shear load [1)]							
Steel failure <u>without</u> lever arm							
steel, zinc plated	Property class 4.6 and 4.8	$V^0_{Rk,s}$	[kN]	7 (6)[1)]	12 (10)[1)]	17	31
	Property class 5.6 and 5.8	$V^0_{Rk,s}$	[kN]	9 (8)[1)]	15 (13)[1)]	21	39
	Property class 8.8	$V^0_{Rk,s}$	[kN]	15 (13)[1)]	23 (21)[1)]	34	63
stainless steel	Property class 50 (A2/A4/HCR)	$V^0_{Rk,s}$	[kN]	9	15	21	39
	Property class 70 (A2/A4/HCR)	$V^0_{Rk,s}$	[kN]	13	20	30	55
	Property class 80 (A4/HCR)	$V^0_{Rk,s}$	[kN]	15	23	34	63
Steel failure <u>with</u> lever arm – characteristic bending moment							
steel, zinc plated	Property class 4.6 and 4.8	$M^0_{Rk,s}$	[Nm]	15 (13)[1)]	30 (27)[1)]	52	133
	Property class 5.6 and 5.8	$M^0_{Rk,s}$	[Nm]	19 (16)[1)]	37 (33)[1)]	65	166
	Property class 8.8	$M^0_{Rk,s}$	[Nm]	30 (26)[1)]	60 (53)[1)]	105	266
stainless steel	Property class 50 (A2/A4/HCR)	$M^0_{Rk,s}$	[Nm]	19	37	65	166
	Property class 70 (A2/A4/HCR)	$M^0_{Rk,s}$	[Nm]	26	52	92	233
	Property class 80 (A4/HCR)	$M^0_{Rk,s}$	[Nm]	30	60	105	266
Partial factors [2)]							
steel, zinc plated	Property class 4.6 and 5.6	$\gamma_{Ms,V}$	[-]	1,67			
	Property class 4.8, 5.8 and 8.8	$\gamma_{Ms,V}$	[-]	1,25			
stainless steel	Property class 50 (A2/A4/HCR)	$\gamma_{Ms,V}$	[-]	2,38			
	Property class 70 (A2/A4/HCR)	$\gamma_{Ms,V}$	[-]	1,56 (1,25)[3)]			
	Property class 80 (A4/HCR)	$\gamma_{Ms,V}$	[-]	1,33 (1,25)[3)]			

[1)] The characteristic resistances apply for all anchor rods with the cross-sectional area A_s specified here: VMU-A, V-A, VM-A. For commercial standard threaded rods with a smaller cross-sectional area (e.g. hot-dip galvanized threaded rods M8, M10 according to EN ISO 10684:2004 + AC:2009), the value in bracket is valid.

[2)] In absence of national regulation

[3)] Value in bracket only valid for anchor rod VMU-A or V-A

Table C3: Characteristic steel resistance under tension and shear load for internally threaded anchor rods

Internally threaded anchor rod				IG-M6	IG-M8	IG-M10
Steel failure [1]						
Characteristic resistance under tension load						
steel, zinc plated	Property class 5.8	$N_{Rk,s}$	[kN]	10	17	29
	Property class 8.8	$N_{Rk,s}$	[kN]	16	27	46
stainless steel	Property class 70 (A4/HCR)	$N_{Rk,s}$	[kN]	14	26	41
Partial factors [2]						
steel, zinc plated	Property class 5.8	$\gamma_{Ms,N}$	[-]	1,5		
	Property class 8.8	$\gamma_{Ms,N}$	[-]	1,5		
stainless steel	Property class 70 (A4/HCR)	$\gamma_{Ms,N}$	[-]	1,87		
Characteristic resistance under shear load						
Steel failure <u>without</u> lever arm						
steel, zinc plated	Property class 5.8	$V^0_{Rk,s}$	[kN]	5	9	15
	Property class 8.8	$V^0_{Rk,s}$	[kN]	8	14	23
stainless steel	Property class 70 (A4/HCR)	$V^0_{Rk,s}$	[kN]	7	13	20
Steel failure <u>with</u> lever arm – characteristic bending moment						
steel, zinc plated	Property class 5.8	$M^0_{Rk,s}$	[Nm]	8	19	37
	Property class 8.8	$M^0_{Rk,s}$	[Nm]	12	30	60
stainless steel	Property class 70 (A4/HCR)	$M^0_{Rk,s}$	[Nm]	11	26	52
Partial factors [2]						
steel, zinc plated	Property class 5.8	$\gamma_{Ms,V}$	[-]	1,25		
	Property class 8.8	$\gamma_{Ms,V}$	[-]	1,25		
stainless steel	Property class 70 (A4/HCR)	$\gamma_{Ms,V}$	[-]	1,56		

[1] Fastening screws or threaded rods (incl. nut and washer) must comply with the appropriate material and property class of the internally threaded anchor rod. The characteristic tension resistance for steel failure of the given strength class are valid for the internally threaded anchor rod and the fastening element.

[2] In absence of national regulation

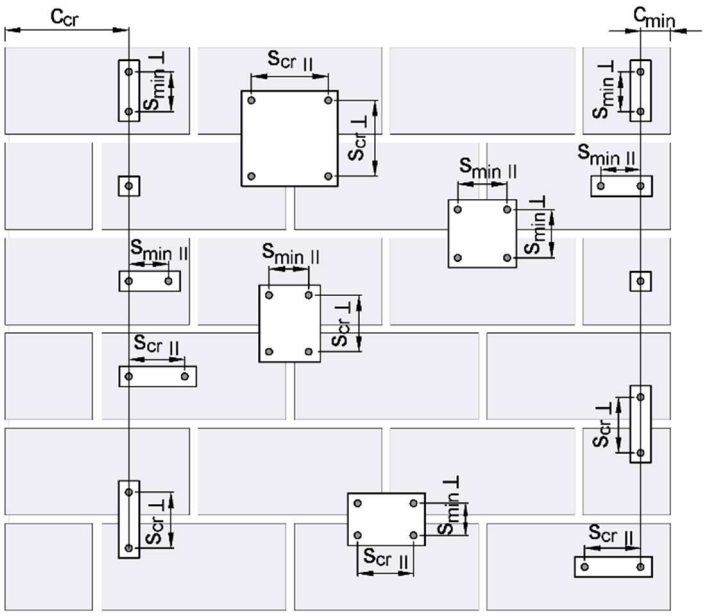
Edge distance and spacing

c_{cr} = Characteristic edge distance

c_{min} = Minimum edge distance

$s_{cr\,||}$ ($s_{min,||}$) = Characteristic (minimum) spacing for anchor placed parallel to horizontal joint

$s_{cr\,\perp}$ ($s_{min,\perp}$) = Characteristic (minimum) spacing for anchor placed perpendicular to horizontal joint



Definition of group factors

Load direction / Anchor position	Tension load	Shear load parallel to free edge $V_{||}$	Shear load perpendicular to free edge $V_{\perp}$
Anchors parallel to horizontal joint $s_{cr,||}$ ($s_{min,||}$)	$\alpha_{g\,||,N}$	$\alpha_{g\,||,V\,||}$	$\alpha_{g\,||,V\,\perp}$
Anchors vertical to horizontal joint $s_{cr,\perp}$ ($s_{min,\perp}$)	$\alpha_{g\,\perp,N}$	$\alpha_{g\,\perp,V\,||}$	$\alpha_{g\,\perp,V\perp}$

$\alpha_{g\,||,N}$ = Group factor for anchors parallel to horizontal joint under tension load

$\alpha_{g\,\perp,N}$ = Group factor for anchors perpendicular to horizontal joint under tension load

$\alpha_{g\,||,V\,||}$ = Group factor for anchors parallel to horizontal joint under shear load parallel to the free edge

$\alpha_{g\,\perp,V\,||}$ = Group factor for anchors perpendicular to horizontal joint under shear load parallel to the free edge

$\alpha_{g\,||,V\,\perp}$ = Group factor for anchors parallel to horizontal joint under shear load perpendicular to the free edge

$\alpha_{g\,\perp,V\perp}$ = Group factor for anchors perpendicular to hor. joint under shear load perpendicular to the free edge

Single anchor:	$N_{Rk,p} = N_{RK,b} = N_{Rk,p,c} = N_{Rk,b,c}$	(for $c \geq c_{cr}$)
	$V_{Rk,c}$ according to TR 054	(for $c \geq c_{cr}$)
Group of 2 anchors:	$N^{g}_{Rk} = \alpha_{g,N} * N_{RK,b}$	(for $c \geq c_{cr}$)
	$V^{g}_{Rk} = \alpha_{g,V} * V_{Rk,b}$	(for $c \geq c_{cr}$)
Group of 4 anchors:	$N^{g}_{Rk} = \alpha_{g\,||,N} * \alpha_{g\,\perp,N} * N_{RK,b}$	(for $c \geq c_{cr}$)
	$V^{g}_{Rk} = \alpha_{g,||,V} * \alpha_{g\,\perp,V} * V_{Rk,b}$	(for $c \geq c_{cr}$)

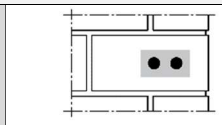
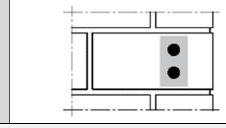
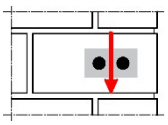
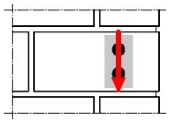
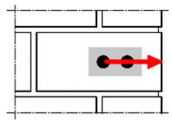
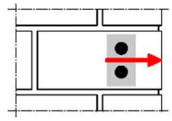
Equations depend on anchor position and load direction (see table above).

Injection System VM-EA for masonry

Performances
Definition of edge distances, spacings and group factors

Annex C4

Table C4: Group factor - valid for all brick types

Configuration		with c ≥	with s ≥			
Group factor for anchor group in case of tension loading						
II: Position parallel to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ II,N}$	[-]	2,0
⊥: Position perpendicular to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ \perp,N}$	[-]	2,0
Group factor for anchor group in case of shear loading parallel to free edge						
II: Position parallel to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ II,V\ II}$	[-]	2,0
⊥: Position perpendicular to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ \perp,V\ II}$	[-]	2,0
Group factor for anchor group in case of shear loading perpendicular to free edge						
II: Position parallel to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ II,V\perp}$	[-]	2,0
⊥: Position perpendicular to horizontal joint		c_{cr}	s_{cr}	$\alpha_{g\ \perp,V\perp}$	[-]	2,0

Brick type: Autoclaved Aerated Concrete – AAC2

Table C5: Description

Brick type	Autoclaved Aerated Concrete AAC2
Bulk density [kg/dm³]	0,35
Compressive strength [N/mm²]	2
Code	EN 771-4
Producer (country code)	e.g. Ytong (CZ)
Brick dimensions [mm]	599 x 375 x 249
Drilling method	Rotary drilling

Table C6: Installation parameter (Edge and spacing distances)

Anchor size	Effective anchorage depth	Edge distance	Spacing	Maximum installation torque
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,\parallel} = s_{min\,\perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10 / IG-M6	90	135	270	
M12 / IG-M8	100	150	300	
M16 / IG-M10	100	150	300	

Table C7: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,29	0,58	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,23	1,84
90		0,23	0,46		0,87	1,31
100		0,39	0,79		1,29	1,94

Table C8: Characteristic values of resistance under tension and shear loads

Anchor size	Effective anchorage depth	Characteristic resistance				
		Use category				
		d/d		w/d w/w		d/d w/d w/w
		40°C / 24°C	80°C / 50°C	40°C / 24°C	80°C / 50°C	all temperature ranges
	h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$				$V_{Rk,b}$
	[mm]	[kN]				
Normalized mean compressive strength $f_b \geq 2$ N/mm²						
M8	80	0,9	0,9	0,9	0,9	1,5
M10 / IG-M6	90	0,9	0,9	0,9	0,75	2,0
M12 / IG-M8	100	1,5	1,5	1,2	0,9	2,5
M16 / IG-M10	100	1,5	1,5	1,2	0,9	3,5

Brick type: Autoclaved Aerated Concrete AAC4

Table C9: Description

Brick type	Autoclaved Aerated Concrete AAC4
Bulk density [kg/dm³]	0,50
Compressive strength [N/mm²]	4
Code	EN 771-4
Producer (country code)	e.g. Ytong (CZ)
Brick dimensions [mm]	499 x 375 x 249
Drilling method	Rotary drilling

Table C10: Installation parameter (Edge and spacing distances)

Anchor size	Effective anchorage depth	Edge distance	Spacing	Maximum installation torque
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II} = s_{min\ \perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10 / IG-M6	90	135	270	
M12 / IG-M8	100	150	300	
M16 / IG-M10	100	150	300	

Table C11: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,23	0,47	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,23	1,84
90		0,58	1,17		0,87	1,31
100		0,10	0,21		1,29	1,94

Table C12: Characteristic values of resistance under tension and shear loads

Anchor size	Effective anchorage depth	Characteristic resistance				
		Use category				
		d/d		w/d w/w		d/d w/d w/w
		40°C / 24°C	80°C / 50°C	40°C / 24°C	80°C / 50°C	All temperature ranges
	h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$				$V_{Rk,b}$
	[mm]	[kN]				
Normalized mean compressive strength $f_b \geq 4$ N/mm²						
M8	80	0,9	0,9	0,9	0,9	1,5
M10 / IG-M6	90	2,5	2,0	1,5	1,5	2,0
M12 / IG-M8	100	2,5	2,0	2,0	1,5	2,5
M16 / IG-M10	100	3,5	3,0	2,0	2,0	3,5

Brick type: Autoclaved Aerated Concrete AAC6

Table C13: Description

Brick type	Autoclaved Aerated Concrete AAC6
Bulk density [kg/dm³]	0,60
Compressive strength [N/mm²]	6
Code	EN 771-4
Producer (country code)	e.g. Porit (DE)
Brick dimensions [mm]	499 x 240 x 249
Drilling method	Rotary drilling

Table C14: Installation parameter (Edge and spacing distances)

Anchor size	Effective anchorage depth	Edge distance	Spacing	Maximum installation torque
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II} = s_{min\ \perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10 / IG-M6	90	135	270	
M12 / IG-M8	100	150	300	
M16 / IG-M10	100	150	300	

Table C15: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,54	1,09	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,32	0,48
90		0,85	1,69		1,49	2,23
100		0,10	0,19		1,67	2,50

Table C16: Characteristic values of resistance under tension and shear loads

Anchor size	Effective anchorage depth	Characteristic resistance				
		Use category				
		d/d		w/d w/w		d/d w/d w/w
		40°C / 24°C	80°C / 50°C	40°C / 24°C	80°C / 50°C	All temperature ranges
	h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$				$V_{Rk,b}$
	[mm]	[kN]				
Normalized mean compressive strength $f_b \geq 6$ N/mm²						
M8	80	2,0	2,0	2,0	2,0	5,5
M10 / IG-M6	90	3,0	2,5	2,5	2,0	9,0
M12 / IG-M8	100	4,5	3,5	3,0	2,5	9,0
M16 / IG-M10	100	5,5	4,5	3,5	3,0	11,0

Injection System VM-EA for masonry

Performance Autoclaved Aerated Concrete – AAC6
Brick description / Installation parameters / Displacements /
Characteristic values of resistance under tension and shear load

Annex C8

Brick type: Calcium silicate solid brick KS-NF

Table C17: Description

Brick type	Calcium silicate solid brick KS-NF
Bulk density [kg/dm³]	2,0
Compressive strength [N/mm²]	10, 20 or 27
Code	EN 771-2
Producer (country code)	e.g. Wemding (DE)
Brick dimensions [mm]	240 x 115 x 71
Drilling method	Hammer drilling

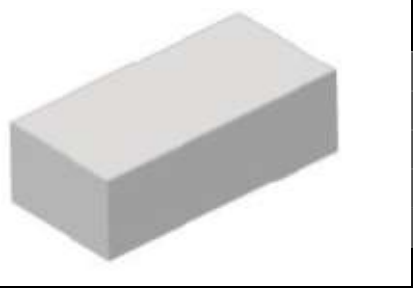


Table C18: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,\parallel} = s_{min\,\perp}$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	10
M10 / IG-M6	-	90	135	270	20
M12 / IG-M8 M16 / IG-M10	-	100	150	300	
M8	VM-SH 12x80	80	120	240	10
	VM-SH 16x85	85	127	255	
M10 / IG-M6	VM-SH 16x85	85	127	255	20
M8 M10 / IG-M6	VM-SH 16x130	130	195	390	
	VM-SH 16x130/330	130	195	390	
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	127	255	
	VM-SH 20x130	130	195	390	
	VM-SH 20x200	200	300	600	

Table C19: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,08	0,16	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	3,07	4,61
85		0,26	0,52		1,46	2,19
90		0,09	0,18		1,50	2,25
100		0,10	0,20		1,03	1,53
130 ; 200		0,22	0,44		1,16	1,74

Injection System VM-EA for masonry

Performance Calcium solid brick KS-NF
Brick description / Installation parameter / Displacements

Annex C9

Brick type: Calcium silicate solid brick KS-NF

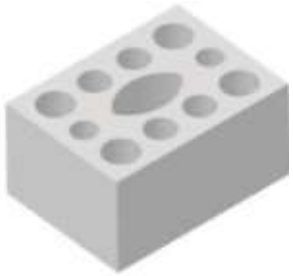
Table C20: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	-	80	3,0	2,0	3,0
M10 / IG-M6	-	90	3,0	2,0	3,0
M12 / IG-M8	-	100	4,0	2,5	3,5
M16 / IG-M10	-	100	3,0	2,0	3,5
M8	VM-SH 12x80	80	2,5	2,0	2,5
	VM-SH 16x85	85	2,5	2,0	3,0
	VM-SH16x130 / VM-SH16x130/330	130	4,0	2,5	4,0
M10 / IG-M6	VM-SH 16x85	85	2,5	2,0	3,0
	VM-SH16x130/330	130	4,5	3,0	4,0
M12 / IG-M8	VM-SH 20x85	85	2,5	2,0	3,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	4,5	2,5	4,0
Normalized mean compressive strength $f_b \geq 20$ N/mm²					
M8	-	80	4,5	3,0	4,5
M10 / IG-M6	-	90	4,5	3,0	4,5
M12 / IG-M8	-	100	5,5	3,5	5,0
M16 / IG-M10	-	100	4,5	3,0	5,0
M8	VM-SH 12x80	80	4,0	2,5	4,0
	VM-SH 16x85	85	4,0	2,5	4,5
	VM-SH16x130 / VM-SH16x130/330	130	6,0	3,5	5,5
M10 / IG-M6	VM-SH 16x85	85	4,0	2,5	4,5
	VM-SH 16x130/330	130	6,0	4,0	5,5
M12 / IG-M8	VM-SH 20x85	85	4,0	2,5	5,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	6,0	4,0	5,5
Normalized mean compressive strength $f_b \geq 27$ N/mm²					
M8	-	80	5,5	3,5	5,0
M10 / IG-M6	-	90	5,5	3,5	5,5
M12 / IG-M8	-	100	6,5	4,5	6,0
M16 / IG-M10	-	100	5,5	3,5	6,0
M8	VM-SH 12x80	80	4,5	3,0	4,5
	VM-SH 16x85	85	4,5	3,0	5,5
	VM-SH16x130 / VM-SH16x130/330	130	6,5	4,5	6,5
M10 / IG-M6	VM-SH 16x85	85	4,5	3,0	5,5
	VM-SH 16x130/330	130	6,5	4,5	6,5
M12 / IG-M8	VM-SH 20x85	85	4,5	3,0	5,5
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	6,5	4,5	6,5

Brick type: Calcium silicate hollow brick KSL-3DF

Table C21: Description

Brick type	Calcium silicate hollow brick KSL-3DF
Bulk density [kg/dm³]	1,4
Compressive strength [N/mm²]	8, 12 or 14
Code	EN 771-2
Producer (country code)	e.g. Wemding (DE)
Brick dimensions [mm]	240 x 175 x 113
Drilling method	Rotary drilling



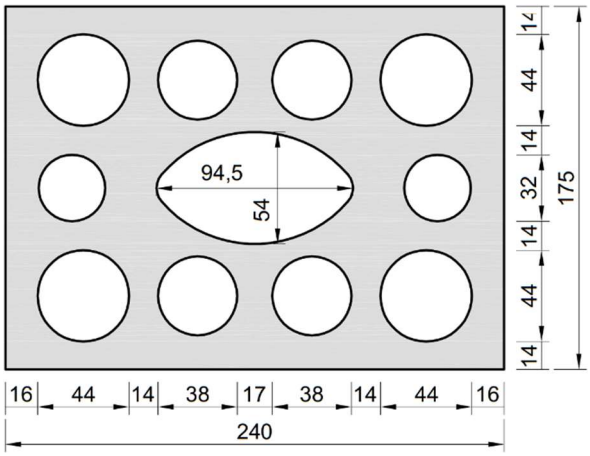


Table C22: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	240	113	8
M8 **M10 / IG-M6**	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				
	VM-SH 20x200	200				

Table C23: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,36	0,73	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,82	1,23
85		1,62	3,24		1,83	2,75
130 ; 200		1,70	3,40		1,98	2,98

Injection System VM-EA for masonry

Performance Calcium hollow brick KSL-3DF
Brick description / Installation parameters / Displacements

Annex C11

Brick type: Calcium silicate hollow brick KSL-3DF

Table C24: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 8$ N/mm²					
M8	VM-SH 12x80	80	1,5	0,9	2,0
	VM-SH 16x85	85	1,5	0,9	2,5
	VM-SH 16x130	130	2,5	1,5	3,0
	VM-SH 16x130/330	130	2,5	1,5	3,0
M10 / IG-M6	VM-SH 16x85	85	1,5	0,9	2,5
	VM-SH 16x130	130	2,5	1,5	3,0
	VM-SH 16x130/330	130	2,5	1,5	3,0
M12 / IG-M8	VM-SH 20x85	85	1,5	0,9	3,0
	VM-SH 20x130 / VM-SH 20x200	130 / 200	2,5	1,5	3,0
M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	3,0
	VM-SH 20x130 / VM-SH 20x200	130 / 200	2,5	1,5	4,0
Normalized mean compressive strength $f_b \geq 12$ N/mm²					
M8	VM-SH 12x80	80	2,0	1,2	2,5
	VM-SH 16x85	85	2,0	1,2	3,5
	VM-SH 16x130	130	3,5	2,0	4,5
	VM-SH 16x130/330	130	3,5	2,0	4,5
M10 / IG-M6	VM-SH 16x85	85	2,0	1,2	3,5
	VM-SH 16x130	130	3,5	2,0	4,5
	VM-SH 16x130/330	130	3,5	2,0	4,5
M12 / IG-M8	VM-SH 20x85	85	2,0	1,2	3,5
	VM-SH 20x130 / VM-SH 20x200	130 / 200	3,5	2,0	4,5
M16 / IG-M10	VM-SH 20x85	85	2,0	1,2	3,5
	VM-SH 20x130 / VM-SH 20x200	130 / 200	3,5	2,0	5,0
Normalized mean compressive strength $f_b \geq 14$ N/mm²					
M8	VM-SH 12x80	80	2,5	1,5	3,0
	VM-SH 16x85	85	2,5	1,5	4,0
	VM-SH 16x130	130	4,0	3,0	5,0
	VM-SH 16x130/330	130	4,0	3,0	5,0
M10 / IG-M6	VM-SH 16x85	85	2,5	1,5	4,0
	VM-SH 16x130	130	4,0	3,0	5,0
	VM-SH 16x130/330	130	4,0	3,0	5,0
M12 / IG-M8	VM-SH 20x85	85	2,5	1,5	4,5
	VM-SH 20x130 / VM-SH 20x200	130 / 200	4,0	3,0	5,0
M16 / IG-M10	VM-SH 20x85	85	2,5	1,5	4,5
	VM-SH 20x130 / VM-SH 20x200	130 / 200	4,0	3,0	6,0

Brick type: Calcium silicate hollow brick KSL-12DF

Table C25: Description

Brick type	Calcium silicate hollow brick KSL-12DF
Bulk density [kg/dm³]	1,40
Compressive strength [N/mm²]	10, 12 or 16
Code	EN 771-2
Producer (country code)	e.g. Wemding (DE)
Brick dimensions [mm]	498 x 175 x 238
Drilling method	Rotary drilling

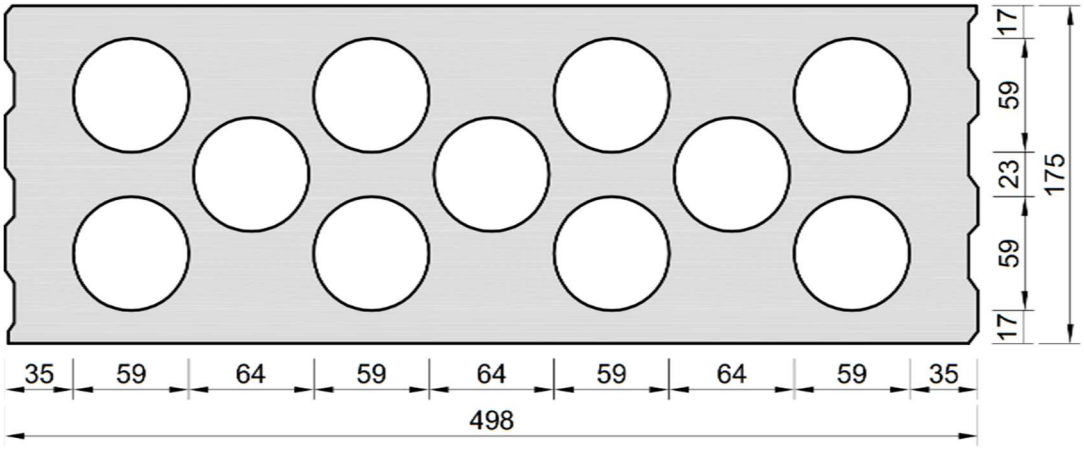


Table C26: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ ||}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	498	238	2
M8 **M10 / IG-M6**	VM-SH 16x85	85				4
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C27: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,21	0,42	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,77	2,66
85		0,13	0,26		3,89	5,83
130		0,22	0,44		4,35	6,52

Injection System VM-EA for masonry

Performance Calcium hollow brick KS L-12DF
Brick description / Installation parameters / Displacement

Annex C13

Brick type: Calcium silicate hollow brick KSL-12DF

Table C28: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	VM-SH 12x80	80	0,4	0,3	3,0
	VM-SH 16x85	85	1,2	0,9	6,0
	VM-SH 16x130	130	3,5	2,5	7,0
	VM-SH 16x130/330	130	3,5	2,5	7,0
M10 / IG-M6	VM-SH 16x85	85	1,2	0,9	6,0
	VM-SH 16x130	130	3,5	2,5	7,0
	VM-SH 16x130/330	130	3,5	2,5	7,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,2	0,9	6,0
	VM-SH 20x130	130	3,5	2,5	7,0
Normalized mean compressive strength $f_b \geq 12$ N/mm²					
M8	VM-SH 12x80	80	0,4	0,3	3,5
	VM-SH 16x85	85	1,5	0,9	7,0
	VM-SH 16x130	130	4,5	3,0	8,0
	VM-SH 16x130/330	130	4,5	3,0	8,0
M10 / IG-M6	VM-SH 16x85	85	1,5	0,9	7,0
	VM-SH 16x130	130	4,5	3,0	8,0
	VM-SH 16x130/330	130	4,5	3,0	8,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	7,0
	VM-SH 20x130	130	4,5	3,0	8,0
Normalized mean compressive strength $f_b \geq 16$ N/mm²					
M8	VM-SH 12x80	80	0,5	0,4	4,0
	VM-SH 16x85	85	2,0	1,2	9,0
	VM-SH 16x130	130	5,5	3,5	10,0
	VM-SH 16x130/330	130	5,5	3,5	10,0
M10 / IG-M6	VM-SH 16x85	85	2,0	1,2	9,0
	VM-SH 16x130	130	5,5	3,5	10,0
	VM-SH 16x130/330	130	5,5	3,5	10,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	2,0	1,2	8,5
	VM-SH 20x130	130	5,5	3,5	10,0

Brick type: Clay solid brick MZ-DF

Table C29: Description

Brick type	Clay solid brick MZ-DF
Bulk density [kg/dm³]	1,64
Compressive strength [N/mm²]	10, 20 or 28
Code	EN 771-1
Producer (country code)	e.g. Unipor (DE)
Brick dimensions [mm]	240 x 115 x 55
Drilling method	Hammer drilling

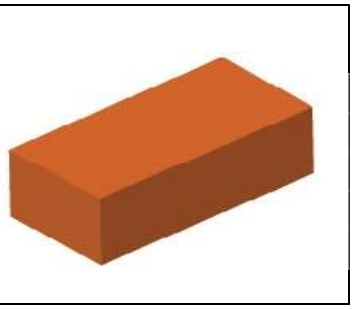


Table C30: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,\parallel} = s_{min\,\perp}$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	6
	VM-SH 12x80	80	120	240	
	VM-SH 16x85	85	127	255	
M10 / IG-M6	-	90	135	270	10
M12 / IG-M8 M16 / IG-M10	-	100	150	300	
M10 / IG-M6	VM-SH 16x85	85	127	255	8
	VM-SH 16x130	130	195	390	
	VM-SH 16x130/330	130	195	390	
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	127	255	
	VM-SH 20x130	130	195	390	
	VM-SH 20x200	200	300	600	

Table C31: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,12	0,24	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	2,27	3,41
85		0,13	0,26		1,22	1,83
90		0,06	0,13		0,71	1,06
100		0,18	0,35		0,43	0,64
130 ; 200		0,42	0,85		1,22	1,83

Brick type: Clay solid brick MZ-DF

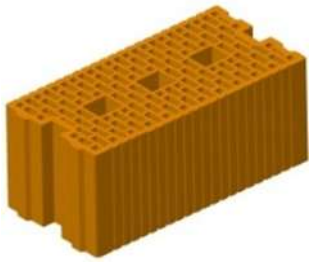
Table C32: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	-	80	1,5	1,2	3,0
M10 / IG-M6	-	90	1,5	1,2	3,5
M12 / IG-M8	-	100	1,5	0,9	5,0
M16 / IG-M10	-	100	2,5	1,5	5,0
M8	VM-SH 12x80	80	2,0	1,5	3,0
	VM-SH 16x85	85	2,0	1,5	3,0
	VM-SH 16x130 / VM-SH 16x130/330	130	3,0	2,0	3,0
M10 / IG-M6	VM-SH 16x85	85	2,0	1,5	3,5
	VM-SH 16x130 / VM-SH 16x130/330	130	3,0	2,0	3,5
M12 / IG-M8	VM-SH 20x85	85	2,0	1,5	3,5
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	3,0	2,0	3,5
Normalized mean compressive strength $f_b \geq 20$ N/mm²					
M8	-	80	2,5	1,5	4,5
M10 / IG-M6	-	90	2,5	1,5	5,5
M12 / IG-M8	-	100	2,0	1,5	7,5
M16 / IG-M10	-	100	3,5	2,5	7,5
M8	VM-SH 12x80	80	3,0	2,0	4,0
	VM-SH 16x85	85	3,0	2,0	4,5
	VM-SH 16x130 / VM-SH 16x130/330	130	4,0	2,5	4,5
M10 / IG-M6	VM-SH 16x85	85	3,0	2,0	5,0
	VM-SH 16x130 / VM-SH 16x130/330	130	4,5	3,0	5,0
M12 / IG-M8	VM-SH 20x85	85	3,0	2,0	5,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	4,5	3,0	5,0
Normalized mean compressive strength $f_b \geq 28$ N/mm²					
M8	-	80	3,0	2,0	5,5
M10 / IG-M6	-	90	3,0	2,0	6,5
M12 / IG-M8	-	100	2,5	1,5	9,0
M16 / IG-M10	-	100	4,5	3,0	9,0
M8	VM-SH 12x80	80	3,5	2,5	5,0
	VM-SH 16x85	85	3,5	2,5	5,0
	VM-SH 16x130 / VM-SH 16x130/330	130	5,0	3,5	5,0
M10 / IG-M6	VM-SH 16x85	85	3,5	2,5	6,0
	VM-SH 16x130 / VM-SH 16x130/330	130	5,0	3,5	6,0
M12 / IG-M8	VM-SH 20x85	85	3,5	2,5	6,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130 / 200	5,0	3,5	6,0

Brick type: Clay hollow brick HLz-16DF

Table C33: Description

Brick type	Clay hollow brick HLz-16DF
Bulk density [kg/dm³]	0,83
Compressive strength [N/mm²]	6, 9, 12 or 14
Code	EN 771-1
Producer (country code)	e.g. Unipor (DE)
Brick dimensions [mm]	497 x 238 x 240
Drilling method	Rotary drilling



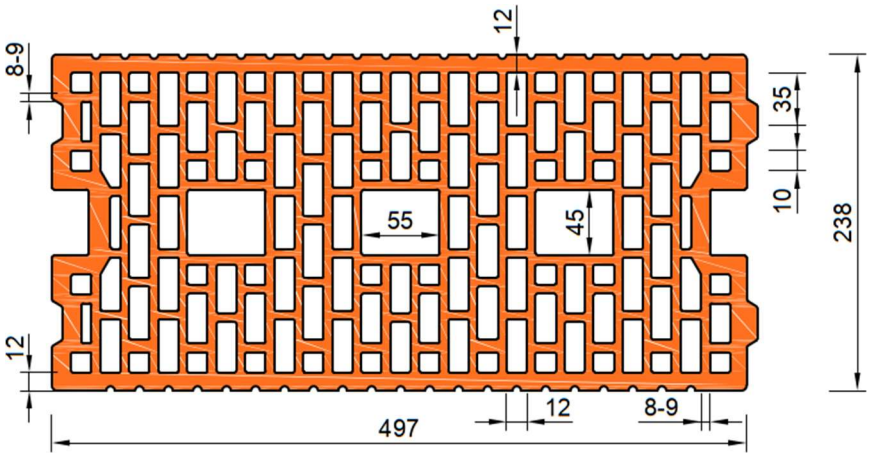


Table C34: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	497	238	6
M8 M10 / IG-M6	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	120			
	VM-SH 20x130	130				
	VM-SH 20x200	200				

Table C35: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,27	0,55	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,02	1,53
85		0,55	1,10		2,14	3,22
130 ; 200		0,19	0,38		2,26	3,39

Injection System VM-EA for masonry

Performance Clay hollow brick HLz-16DF
Brick description / Installation parameters / Displacements

Annex C17

Brick type: Clay hollow brick HLz-16DF

Table C36: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,75	2,5
	VM-SH 16x85	85	1,5	1,2	4,0
	VM-SH 16x130	130	2,5	1,5	4,0
	VM-SH 16x130/330	130	2,5	1,5	4,0
M10 / IG-M6	VM-SH 16x85	85	1,5	1,2	4,0
	VM-SH 16x130	130	2,5	1,5	6,0
	VM-SH 16x130/330	130	2,5	1,5	6,0
M12 / IG-M8	VM-SH 20x85	85	2,0	1,5	4,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130/ 200	2,5	1,5	6,0
Normalized mean compressive strength $f_b \geq 9$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,9	3,0
	VM-SH 16x85	85	2,0	1,5	4,5
	VM-SH 16x130	130	3,0	2,0	5,0
	VM-SH 16x130/330	130	3,0	2,0	5,0
M10 / IG-M6	VM-SH 16x85	85	2,0	1,5	5,0
	VM-SH 16x130	130	3,0	2,0	7,0
	VM-SH 16x130/330	130	3,0	2,0	7,0
M12 / IG-M8	VM-SH 20x85	85	2,5	2,0	5,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130/ 200	3,0	2,0	7,0
Normalized mean compressive strength $f_b \geq 12$ N/mm²					
M8	VM-SH 12x80	80	1,5	1,2	3,5
	VM-SH 16x85	85	2,5	1,5	5,5
	VM-SH 16x130	130	3,5	2,5	6,0
	VM-SH 16x130/330	130	3,5	2,5	6,0
M10 / IG-M6	VM-SH 16x85	85	2,5	1,5	6,0
	VM-SH 16x130	130	3,5	2,5	8,0
	VM-SH 16x130/330	130	3,5	2,5	8,0
M12 / IG-M8	VM-SH 20x85	85	3,5	2,0	6,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130/ 200	3,5	2,5	8,0
Normalized mean compressive strength $f_b \geq 14$ N/mm²					
M8	VM-SH 12x80	80	1,5	1,2	4,0
	VM-SH 16x85	85	2,5	2,0	6,0
	VM-SH 16x130	130	3,5	2,5	6,5
	VM-SH 16x130/330	130	3,5	2,5	6,5
M10 / IG-M6	VM-SH 16x85	85	2,5	2,0	6,0
	VM-SH 16x130	130	3,5	2,5	9,0
	VM-SH 16x130/330	130	3,5	2,5	9,0
M12 / IG-M8	VM-SH 20x85	85	3,5	2,0	6,0
M16 / IG-M10	VM-SH 20x130 / VM-SH 20x200	130/ 200	3,5	2,5	9,0

Injection System VM-EA for masonry

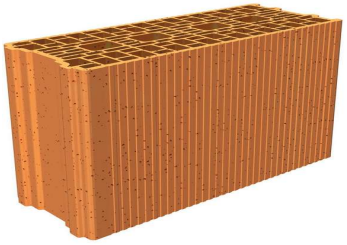
Performance Clay hollow brick HLz-16DF
Characteristic values of resistance under tension and shear load

Annex C18

Brick type: Clay hollow brick Porotherm Homebric

Table C37: Description

Brick type	Clay hollow brick Porotherm Homebric
Bulk density [kg/dm³]	0,68
Compressive strength [N/mm²]	6, 8 or 10
Code	EN 771-1
Producer (country code)	e.g. Wienerberger (FR)
Brick dimensions [mm]	500 x 200 x 299
Drilling method	Rotary drilling



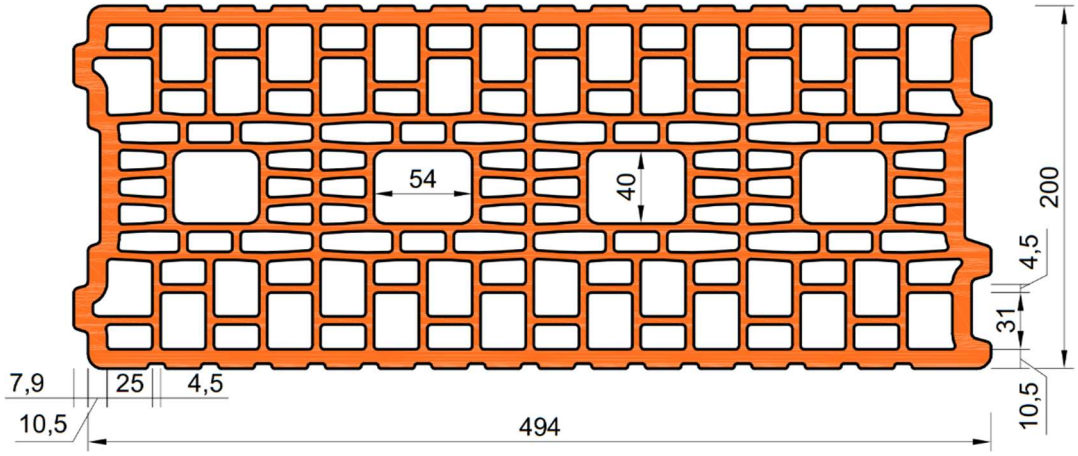


Table C38: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	500	299	2
M8 **M10 / IG-M6**	VM-SH 16x85	85				6
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C39: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,65	1,29	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,26	1,89
85		0,52	1,04		1,89	2,84
130		0,45	0,90		1,48	2,23

Injection System VM-EA for masonry

Performance Clay hollow brick Porotherm Homebric
Brick description / Installation parameters / Displacements

Annex C19

Brick type: Clay hollow brick Porotherm Homebric

Table C40: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,75	2,0
	VM-SH 16x85	85	1,2	0,75	2,0
	VM-SH 16x130	130	1,5	0,9	2,5
	VM-SH 16x130/330	130	1,5	0,9	2,5
M10 / IG-M6	VM-SH 16x85	85	1,2	0,75	2,0
	VM-SH 16x130	130	1,5	0,9	2,5
	VM-SH 16x130/330	130	1,5	0,9	2,5
M12 / IG-M8	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
M16 / IG-M10	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
Normalized mean compressive strength $f_b \geq 8$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,9	2,5
	VM-SH 16x85	85	1,2	0,9	2,5
	VM-SH 16x130	130	1,5	1,2	3,0
	VM-SH 16x130/330	130	1,5	1,2	3,0
M10 / IG-M6	VM-SH 16x85	85	1,2	0,9	2,5
	VM-SH 16x130	130	1,5	1,2	3,0
	VM-SH 16x130/330	130	1,5	1,2	3,0
M12 / IG-M8	VM-SH 20x85	85	1,2	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	3,5
M16 / IG-M10	VM-SH 20x85	85	1,2	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	3,5
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,9	3,0
	VM-SH 16x85	85	1,5	0,9	3,0
	VM-SH 16x130	130	2,0	1,2	3,5
	VM-SH 16x130/330	130	2,0	1,2	3,5
M10 / IG-M6	VM-SH 16x85	85	1,5	0,9	3,0
	VM-SH 16x130	130	2,0	1,2	3,5
	VM-SH 16x130/330	130	2,0	1,2	3,5
M12 / IG-M8	VM-SH 20x85	85	1,5	0,9	4,0
	VM-SH 20x130	130	2,0	1,2	4,0
M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	4,0
	VM-SH 20x130	130	2,0	1,2	4,0

Brick type: Clay hollow brick BGV Thermo

Table C41: Description

Brick type	Clay hollow brick BGV Thermo
Bulk density [kg/dm³]	0,62
Compressive strength [N/mm²]	4, 6 or 10
Code	EN 771-1
Producer (country code)	e.g. Leroux (FR)
Brick dimensions [mm]	500 x 200 x 314
Drilling method	Rotary drilling

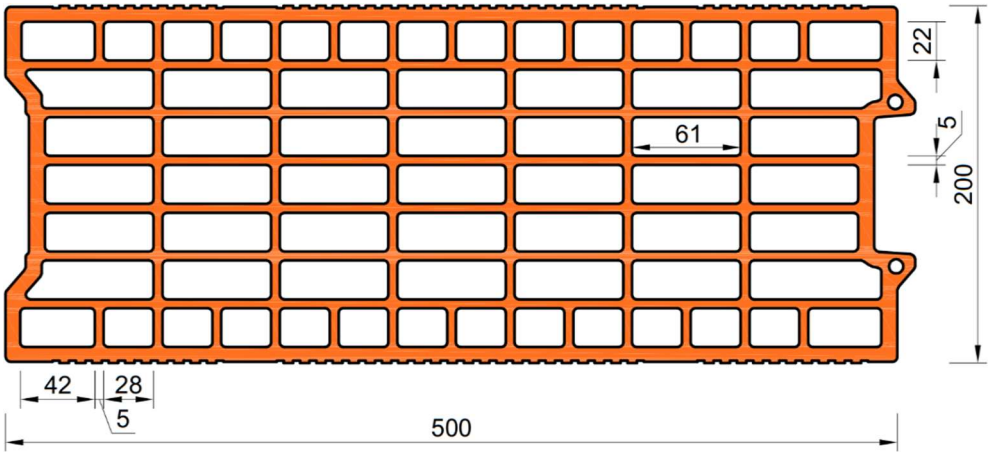


Table C42: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ ll}$	$s_{min} \perp$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	500	314	2
M8 **M10 / IG-M6**	VM-SH 16x85	85				4
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C43: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,27	0,54	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,21	1,81
85		0,39	0,77		2,00	3,01
130		0,16	0,32		1,60	2,39

Injection System VM-EA for masonry

Performance Clay hollow brick BGV Thermo
Brick description / Installation parameters / Displacements

Annex C21

Brick type: Clay hollow brick BGV Thermo

Table C44: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 4$ N/mm²					
M8	VM-SH 12x80	80	0,5	0,4	2,0
	VM-SH 16x85	85	0,75	0,5	2,0
	VM-SH 16x130	130	0,9	0,75	2,5
	VM-SH 16x130/330	130	0,9	0,75	2,5
M10 / IG-M6	VM-SH 16x85	85	0,75	0,5	2,0
	VM-SH 16x130	130	1,2	0,75	2,5
	VM-SH 16x130/330	130	1,2	0,75	2,5
M12 / IG-M8	VM-SH 20x85	85	0,75	0,5	2,0
	VM-SH 20x130	130	1,2	0,75	2,5
M16 / IG-M10	VM-SH 20x85	85	0,9	0,6	2,0
	VM-SH 20x130	130	1,2	0,75	2,5
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	0,6	0,5	2,0
	VM-SH 16x85	85	0,9	0,6	2,5
	VM-SH 16x130	130	1,2	0,9	3,0
	VM-SH 16x130/330	130	1,2	0,9	3,0
M10 / IG-M6	VM-SH 16x85	85	0,9	0,6	2,5
	VM-SH 16x130	130	1,5	0,9	3,0
	VM-SH 16x130/330	130	1,5	0,9	3,0
M12 / IG-M8	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
M16 / IG-M10	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,6	3,0
	VM-SH 16x85	85	1,2	0,9	3,5
	VM-SH 16x130	130	1,5	1,2	4,0
	VM-SH 16x130/330	130	1,5	1,2	4,0
M10 / IG-M6	VM-SH 16x85	85	1,2	0,9	3,5
	VM-SH 16x130	130	1,5	1,2	4,0
	VM-SH 16x130/330	130	1,5	1,2	4,0
M12 / IG-M8	VM-SH 20x85	85	1,2	0,75	3,5
	VM-SH 20x130	130	1,5	1,2	4,0
M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	4,0

Brick type: Clay hollow brick Calibric Th

Table C45: Description

Brick type	Clay hollow brick Calibric Th
Bulk density [kg/dm³]	0,62
Compressive strength [N/mm²]	6, 9 or 12
Code	EN 771-1
Producer (country code)	e.g. Terreal (FR)
Brick dimensions [mm]	500 x 200 x 314
Drilling method	Rotary drilling

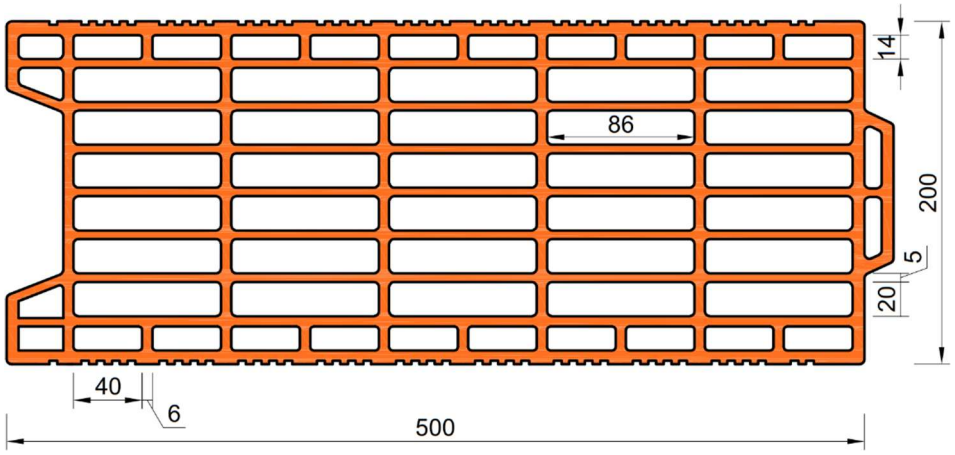


Table C46: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,\parallel}$	$s_{min\,\perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	500	314	2
M8 **M10 / IG-M6**	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C47: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,48	0,96	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,18	1,78
85		0,49	0,98		2,20	3,30
130		0,37	0,74		2,31	3,46

Injection System VM-EA for masonry

Performance Clay hollow brick Calibric Th
Brick description / Installation parameters / Displacements

Annex C23

Brick type: Clay hollow brick Calibric Th

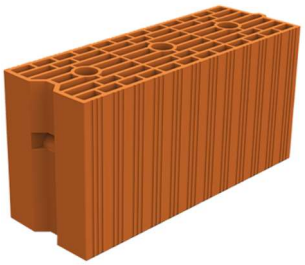
Table C48: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	0,75	0,5	2,5
	VM-SH 16x85	85	0,75	0,5	3,5
	VM-SH 16x130	130	0,9	0,6	3,5
	VM-SH 16x130/330	130	0,9	0,6	3,5
M10 / IG-M6	VM-SH 16x85	85	0,75	0,5	3,5
	VM-SH 16x130	130	0,9	0,6	3,5
	VM-SH 16x130/330	130	0,9	0,6	3,5
M12 / IG-M8	VM-SH 20x85	85	0,75	0,5	6,0
	VM-SH 20x130	130	0,9	0,6	6,0
M16 / IG-M10	VM-SH 20x85	85	1,2	0,75	6,0
	VM-SH 20x130	130	1,2	0,75	6,0
Normalized mean compressive strength $f_b \geq 9$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,6	3,5
	VM-SH 16x85	85	0,9	0,6	4,5
	VM-SH 16x130	130	1,2	0,75	4,5
	VM-SH 16x130/330	130	1,2	0,75	4,5
M10 / IG-M6	VM-SH 16x85	85	0,9	0,6	4,5
	VM-SH 16x130	130	1,2	0,9	4,5
	VM-SH 16x130/330	130	1,2	0,9	4,5
M12 / IG-M8	VM-SH 20x85	85	0,9	0,6	7,5
	VM-SH 20x130	130	1,2	0,9	7,5
M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	7,5
	VM-SH 20x130	130	1,5	0,9	7,5
Normalized mean compressive strength $f_b \geq 12$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,75	4,0
	VM-SH 16x85	85	0,9	0,75	5,5
	VM-SH 16x130	130	1,2	0,9	5,5
	VM-SH 16x130/330	130	1,2	0,9	5,5
M10 / IG-M6	VM-SH 16x85	85	0,9	0,75	5,5
	VM-SH 16x130	130	1,5	0,9	5,5
	VM-SH 16x130/330	130	1,5	0,9	5,5
M12 / IG-M8	VM-SH 20x85	85	0,9	0,75	8,5
	VM-SH 20x130	130	1,5	0,9	8,5
M16 / IG-M10	VM-SH 20x85	85	1,5	1,2	8,5
	VM-SH 20x130	130	1,5	1,2	8,5

Brick type: Clay hollow brick Urbanbric

Table C49: Description

Brick type	Clay hollow brick Urbanbric
Bulk density [kg/dm³]	0,74
Compressive strength [N/mm²]	6 or 9
Code	EN 771-1
Producer (country code)	e.g. Imerys (FR)
Brick dimensions [mm]	560 x 200 x 274
Drilling method	Rotary drilling



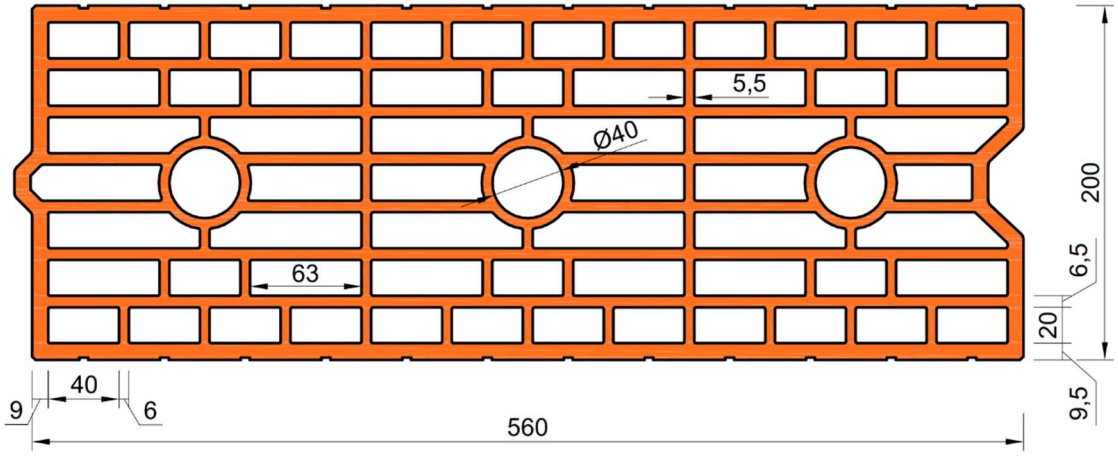


Table C50: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	560	274	2
M8 M10 / IG-M6	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C51: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,34	0,67	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,71	1,06
85		0,52	1,04		1,37	2,06
130		0,62	1,24		1,62	2,44

Injection System VM-EA for masonry

Performance Clay hollow brick Urbanbric
Brick description / Installation parameters / Displacements

Annex C 28

Brick type: Clay hollow brick Urbanbric

Table C52: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,75	3,0
M8 M10 / IG-M6	VM-SH 16x85	85	1,2	0,75	3,5
	VM-SH 16x130	130	1,5	1,2	3,5
	VM-SH 16x130/330	130	1,5	1,2	3,5
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,2	0,75	4,0
	VM-SH 20x130	130	1,5	1,2	4,0
Normalized mean compressive strength $f_b \geq 9$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,9	3,5
M8 M10 / IG-M6	VM-SH 16x85	85	1,5	0,9	4,0
	VM-SH 16x130	130	2,0	1,5	4,5
	VM-SH 16x130/330	130	2,0	1,5	4,5
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	5,0
	VM-SH 20x130	130	2,0	1,5	5,0

Brick type: Clay hollow brick Blocchi Leggeri

Table C53: Description

Brick type	Clay hollow brick Blocchi Leggeri
Bulk density [kg/dm³]	0,55
Compressive strength [N/mm²]	4, 6 or 8
Code	EN 771-1
Producer (country code)	e.g. Wienerberger (IT)
Brick dimensions [mm]	250 x 120 x 250
Drilling method	Rotary drilling

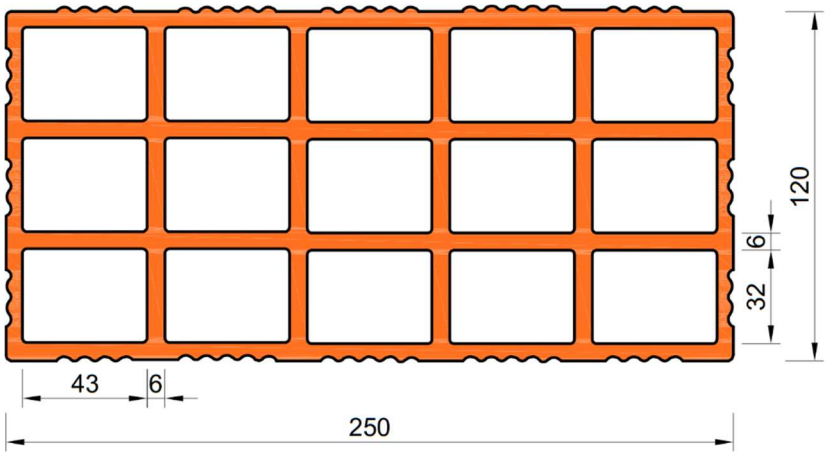


Table C54: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ ||}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	250	250	4
M8 M10 / IG-M6	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	120			
	VM-SH 20x130	130				
	VM-SH 20x200	200				

Table C55: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,32	0,64	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,16	1,74
85		0,26	0,53		2,52	3,78
130 ; 200		0,32	0,64		2,52	3,78

Injection System VM-EA for masonry

Performance Clay hollow brick Blocchi Leggeri
Brick description / Installation parameters / Displacements

Annex C27

Brick type: Clay hollow brick Blocchi Leggeri

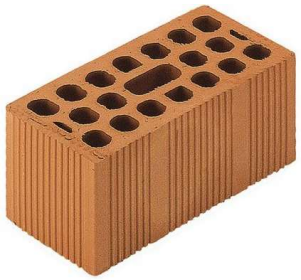
Table C56: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 4$ N/mm²					
M8	VM-SH 12x80	80	0,4	0,3	2,0
M8 M10 / IG-M6	VM-SH 16x85	85	0,4	0,3	2,0
	VM-SH 16x130	130	0,5	0,3	2,0
	VM-SH 16x130/330	130	0,5	0,3	2,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	0,4	0,3	2,0
	VM-SH 20x130	130	0,5	0,3	2,0
	VM-SH 20x200	200	0,5	0,3	2,0
Normalized mean compressive strength $f_b \geq 6$ N/mm²					
M8	VM-SH 12x80	80	0,5	0,3	2,0
M8 M10 / IG-M6	VM-SH 16x85	85	0,5	0,3	2,0
	VM-SH 16x130	130	0,6	0,4	2,0
	VM-SH 16x130/330	130	0,6	0,4	2,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	0,5	0,3	2,5
	VM-SH 20x130	130	0,6	0,4	2,5
	VM-SH 20x200	200	0,6	0,4	2,5
Normalized mean compressive strength $f_b \geq 8$ N/mm²					
M8	VM-SH 12x80	80	0,6	0,4	2,5
M8 M10 / IG-M6	VM-SH 16x85	85	0,6	0,4	2,5
	VM-SH 16x130	130	0,6	0,5	2,5
	VM-SH 16x130/330	130	0,6	0,5	2,5
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	0,6	0,4	3,0
	VM-SH 20x130	130	0,6	0,5	3,0
	VM-SH 20x200	200	0,6	0,5	3,0

Brick type: Clay hollow brick Doppio Uni

Table C57: Description

Brick type	Clay hollow brick Doppio Uni
Bulk density [kg/dm³]	0,92
Compressive strength [N/mm²]	10, 16, 20 or 28
Code	EN 771-1
Producer (country code)	e.g. Wienerberger (IT)
Brick dimensions [mm]	250 x 120 x 120
Drilling method	Rotary drilling



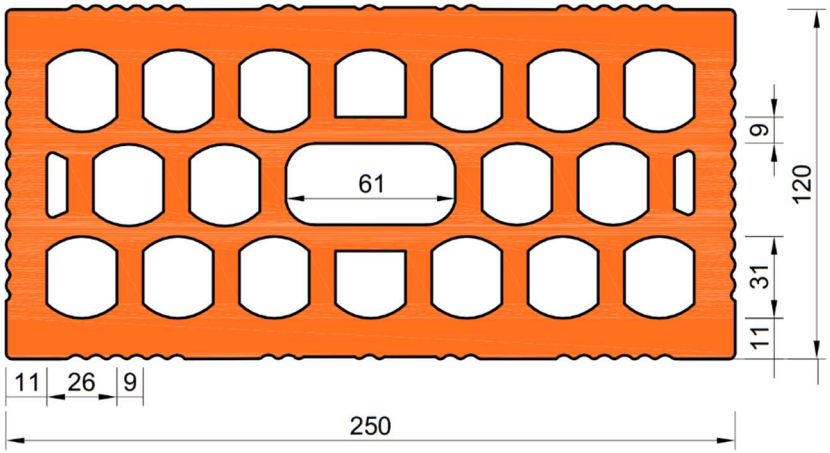


Table C58: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	250	120	4
M8 M10 / IG-M6	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	120			
	VM-SH 20x130	130				
	VM-SH 20x200	200				

Table C59: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,54	1,08	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,63	2,45
85		0,17	0,34		1,75	2,63
130 ; 200		0,54	1,08		1,75	2,63

Injection System VM-EA for masonry

Performance Clay hollow brick Doppio Uni
Brick description / Installation parameters / Displacements

Annex C29

Brick type: Clay hollow brick Doppio Uni

Table C60: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 10$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,6	2,0
M8 M10 / IG-M6	VM-SH 16x85	85	0,9	0,6	2,0
	VM-SH 16x130	130	0,9	0,6	2,0
	VM-SH 16x130/330	130	0,9	0,6	2,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,2	0,75	2,0
	VM-SH 20x130	130	1,2	0,75	2,0
	VM-SH 20x200	200	1,2	0,75	2,0
Normalized mean compressive strength $f_b \geq 16$ N/mm²					
M8	VM-SH 12x80	80	0,9	0,75	2,5
M8 M10 / IG-M6	VM-SH 16x85	85	1,2	0,9	2,5
	VM-SH 16x130	130	1,2	0,9	2,5
	VM-SH 16x130/330	130	1,2	0,9	2,5
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	2,5
	VM-SH 20x130	130	1,5	0,9	2,5
	VM-SH 20x200	200	1,5	0,9	2,5
Normalized mean compressive strength $f_b \geq 20$ N/mm²					
M8	VM-SH 12x80	80	1,2	0,75	3,0
M8 M10 / IG-M6	VM-SH 16x85	85	1,2	0,9	3,0
	VM-SH 16x130	130	1,5	0,9	3,0
	VM-SH 16x130/330	130	1,5	0,9	3,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	1,5	0,9	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
	VM-SH 20x200	200	1,5	0,9	3,0
Normalized mean compressive strength $f_b \geq 28$ N/mm²					
M8	VM-SH 12x80	80	1,5	0,9	3,5
M8 M10 / IG-M6	VM-SH 16x85	85	1,5	1,2	3,5
	VM-SH 16x130	130	1,5	1,2	3,5
	VM-SH 16x130/330	130	1,5	1,2	3,5
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	2,0	1,2	3,5
	VM-SH 20x130	130	2,0	1,2	3,5
	VM-SH 20x200	200	2,0	1,2	3,5

Brick type: Hollow Light weight concrete Bloc creux B40

Table C61: Description

Brick type	Hollow light weight concrete Bloc creux B40
Bulk density [kg/dm³]	0,8
Compressive strength [N/mm²]	4
Code	EN 771-3
Producer (country code)	e.g. Sepa (FR)
Brick dimensions [mm]	494 x 200 x 190
Drilling method	Rotary drilling

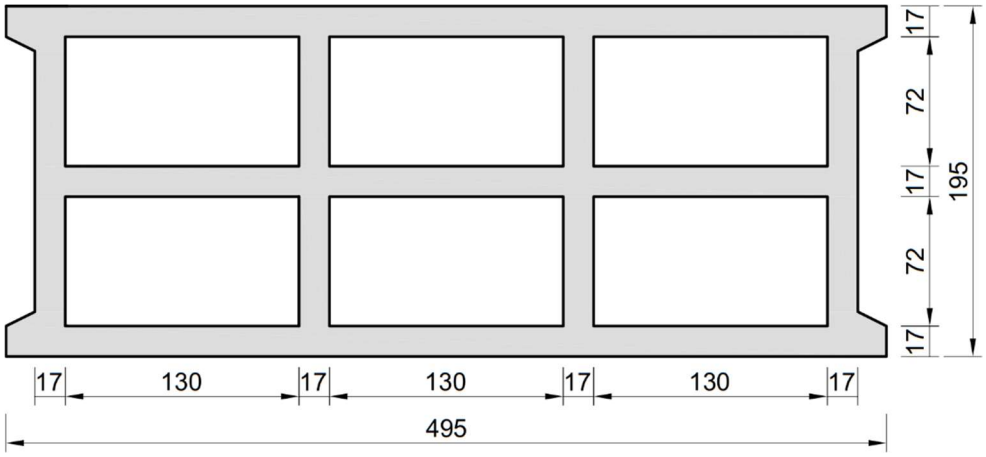


Table C62: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	100	494	190	2
M8 **M10 / IG-M6**	VM-SH 16x85	85				
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	120			
	VM-SH 20x130	130				

Table C63: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,14	0,29	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,25	0,37
85		0,45	0,90		0,98	1,47
130		0,61	1,22		1,10	1,65

Injection System VM-EA for masonry

Performance hollow light weight concrete Bloc creux B40
Brick description / Installation parameters / Displacements

Annex C31

Brick type: Hollow Light weight concrete Bloc creux B40

Table C64: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 4$ N/mm²					
M8	VM-SH 12x80	80	0,4	0,3	1,2
	VM-SH 16x85	85	0,6	0,5	3,0
	VM-SH 16x130	130	2,0	1,5	3,5
	VM-SH 16x130/330	130	2,0	1,5	3,5
M10 / IG-M6	VM-SH 16x85	85	0,6	0,5	3,0
	VM-SH 16x130	130	2,0	1,5	3,5
	VM-SH 16x130/330	130	2,0	1,5	3,5
M12 / IG-M8	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	2,0	1,5	3,5
M16 / IG-M10	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	2,0	1,5	3,5

Brick type: Solid light weight concrete brick

Table C65: Description

Brick type	Solid light weight concrete brick
Bulk density [kg/dm³]	0,63
Compressive strength [N/mm²]	2
Code	EN 771-3
Producer (country code)	e.g. Bisotherm (DE)
Brick dimensions [mm]	300 x 123 x 248
Drilling method	Rotary drilling

Table C66: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,II} = s_{min\,\perp}$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	6
M10 / IG-M6	-	90	135	270	
M12 / IG-M8	-	100	150	300	10
M16 / IG-M10	-	100	150	300	14

Table C67: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,64	1,28	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,50	0,75
90		0,70	1,41		0,68	1,03
100		0,21	0,42		0,54	0,81

Table C68: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 2$ N/mm²					
M8	-	80	2,0	1,5	3,0
M10 / IG-M6	-	90	2,0	1,5	3,5
M12 / IG-M8	-	100	2,0	1,5	4,0
M16 / IG-M10	-	100	2,0	1,5	4,0

Brick type: Hollow light weight concrete brick – Leca Lex harkko RUH-200

Table C69: Description

Brick type	Hollow light weight concrete Leca Lex harkko RUH-200
Bulk density [kg/dm³]	0,7
Compressive strength [N/mm²]	2,7
Code	EN 771-3
Producer (country code)	e.g. Saint-Gobain Weber (Fin)
Brick dimensions [mm]	498 x 200 x 195
Drilling method	Rotary drilling

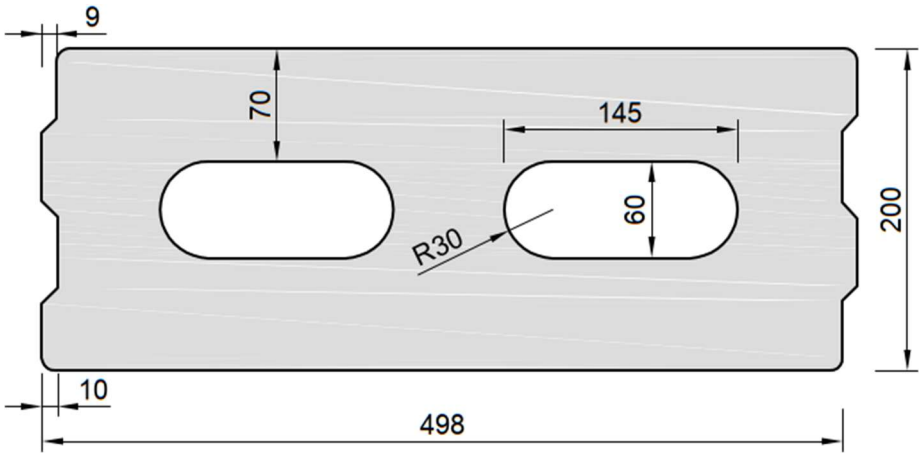


Table C70: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	VM-SH 12x80	80	120	498	195	8
M8 **M10 / IG-M6**	VM-SH 16x85	85	127			
	VM-SH 16x130	130	195			
	VM-SH 16x130/330	130	195			
M12 / IG-M8 **M16 / IG-M10**	VM-SH 20x85	85	127			
	VM-SH 20x130	130	195			

Table C71: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,11	0,22	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,47	0,70
85		0,11	0,23		0,38	0,57
130		0,10	0,20		0,56	0,85

Injection System VM-EA for masonry

Performance LECA LEX harkko RUH-200 Hollow
Brick description / Installation parameters / Displacements

Annex C34

Brick type: Hollow light weight concrete brick – Leca Lex harkko RUH-200

Table C72: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 2,7$ N/mm²					
M8	VM-SH 12x80	80	2,0	1,2	2,5
	VM-SH 16x85	85	2,0	1,2	3,5
	VM-SH 16x130	130	2,5	1,5	3,5
	VM-SH 16x130/330	130	2,5	1,5	3,5
M10 / IG-M6	VM-SH 16x85	85	2,0	1,5	3,5
	VM-SH 16x130	130	2,5	1,5	3,5
	VM-SH 16x130/330	130	2,5	1,5	3,5
M12 / IG-M8	VM-SH 20x85	85	2,5	1,5	3,5
	VM-SH 20x130	130	2,5	1,5	3,5
M16 / IG-M10	VM-SH 20x85	85	2,5	1,5	3,5
	VM-SH 20x130	130	2,5	1,5	3,5

Brick type: Solid light weight concrete brick – Leca Lex harkko RUH-200 kulma

Table C73: Description

Brick type	Solid light weight concrete Leca Lex harkko RUH-200 kulma
Bulk density [kg/dm³]	0,78
Compressive strength [N/mm²]	3
Code	EN 771-3
Producer (country code)	e.g. Saint-Gobain Weber (Fin)
Brick dimensions [mm]	498 x 200 x 195
Drilling method	Rotary drilling

Table C74: Installation parameter (Edge and spacing distances)

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,\parallel} = s_{min\,\perp}$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	6
M10 / IG-M6	-	90	135	270	12
M12 / IG-M8	-	100	150	300	14
M16 / IG-M10	-	100	150	300	16
M8	VM-SH 12x80	80	120	240	8
M8 M10 / IG-M6	VM-SH 16x85	85	127	255	
	VM-SH 16x130	130	195	390	16
	VM-SH 16x130/330	130	195	390	16
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	127	255	12
	VM-SH 20x130	130	195	390	16

Table C75: Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,09	0,18	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,48	0,72
85		0,07	0,15		0,77	1,15
90		0,13	0,26		0,26	0,39
100		0,13	0,23		0,36	0,54
130		0,10	0,21		0,68	1,01

Brick type: Solid light weight concrete brick – Leca Lex harkko RUH-200 Kulma

Table C76: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Embedment depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	All temperature ranges
		h_{ef}	$N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$		$V_{Rk,b}$
		[mm]	[kN]		
Normalized mean compressive strength $f_b \geq 3{,}0$ N/mm²					
M8	-	80	2,0	1,2	3,0
M10 / IG-M6	-	90	3,0	2,0	4,0
M12 / IG-M8	-	100	3,0	2,0	4,0
M16 / IG-M10	-	100	3,0	2,0	4,0
M8	VM-SH 12x80	80	2,0	1,2	3,0
	VM-SH 16x85	85	2,0	1,5	3,5
	VM-SH 16x130	130	3,0	2,0	4,0
	VM-SH 16x130/330	130	3,0	2,0	4,0
M8 M10 / IG-M6	VM-SH 16x85	85	2,0	1,5	3,5
	VM-SH 16x130	130	3,0	2,0	4,0
	VM-SH 16x130/330	130	3,0	2,0	4,0
M12 / IG-M8 M16 / IG-M10	VM-SH 20x85	85	2,0	1,5	4,5
	VM-SH 20x130	130	3,0	2,0	4,5