

DECLARATION OF PERFORMANCE  
DoP No. MKT- 650 - en

1. Unique identification code of the product-type: **MKT Injection System VM-EA**
2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):

**ETA-17/0006, Annex A2 and A3**  
**Batch number: see packaging of the product.**

3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:

<b>generic type</b>	Injection anchors
<b>for use in</b>	masonry
<b>option</b>	b, c and d
<b>loading</b>	static or quasi-static
<b>material</b>	<p><u>hot-dip galvanized steel:</u> dry internal conditions only covered sizes: M8, M10, M12, M16</p> <p><u>zinc-plated steel:</u> dry internal conditions only covered sizes: M8, M10, M12, M16</p> <p><u>stainless steel (marking A4):</u> internal and external use without particular aggressive conditions covered sizes: M8, M10, M12, M16</p> <p><u>high corrosion resistant steel (marking HCR):</u> internal and external use with particular aggressive conditions covered sizes: M8, M10, M12, M16</p>
<b>temperature range</b> (if applicable)	Range I: -40 °C to +40 °C Range II: -40 °C to +80 °C

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

**MKT Metall-Kunststoff-Technik GmbH & Co. KG**  
**Auf dem Immel 2**  
**D - 67685 Weilerbach**

5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2): --
6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V: **System 1**
7. In case of the declaration of performance concerning a construction product covered by a harmonised standard: --

8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

issued **Deutsches Institut für Bautechnik, Berlin**  
 on the basis of **ETA-17/0006**  
**ETAG 001-5**

The notified body 1343-CPR performed under system 1:

- (i) determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product;
- (ii) initial inspection of the manufacturing plant and of factory production control;
- (iii) continuous surveillance, assessment and evaluation of factory production control.

and issued: Certificate of constancy of performance 1343-CPR-M 550-16/08.14

9. Declared performance:

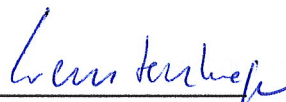
Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
characteristic resistance for tension	TR 029	Annex C2 – C39	ETAG 001
characteristic resistance for shear	TR 029	Annex C2 – C39	
displacement for serviceability limit state	TR 029	Annex C4 – C38	

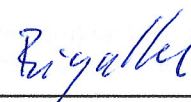
Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies: --

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

  
**Stefan Weustenhagen**  
 (General Manager)  
 Weilerbach, 05.01.2017

i.V.   
**Dipl.-Ing. Detlef Bigalke**  
 (Head of product development)



**Table C1:  $\beta$ -factors for job-site testing under tension loading**

Brick-Nr.	Installation & Use category	Anchor size	$\beta$ -factor	
			T <sub>a</sub> : 24°C / 40°C	T <sub>b</sub> : 50°C / 80°C
1-3	d/d	M8	0,82	0,70
		M10		
		M12	0,70	0,60
		M16		
	w/d w/w	M8	0,82	0,70
		M10	0,63	0,54
		M12	0,48	0,41
		M16		
4-18	d/d w/d w/w	For all anchor	0,72	0,50

**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performances**  
 $\beta$ -factors for job site testing under tension load

**Annex C 1**

**Table C2: Characteristic tension, shear resistance and bending moment of threaded rod**

Size			M8	M10	M12	M16
<b>Characteristic tension resistance</b>						
steel, property class 4.6	$N_{RK,s}$	[kN]	15	23	34	63
	$\gamma_{Ms}^{1)}$	[-]	2,0			
steel, property class 4.8	$N_{RK,s}$	[kN]	15	23	34	63
	$\gamma_{Ms}^{1)}$	[-]	1,5			
steel, property class 5.6	$N_{RK,s}$	[kN]	18	29	42	79
	$\gamma_{Ms}^{1)}$	[-]	2,0			
steel, property class 5.8	$N_{RK,s}$	[kN]	18	29	42	79
	$\gamma_{Ms}^{1)}$	[-]	1,5			
steel, property class 8.8	$N_{RK,s}$	[kN]	29	46	67	126
	$\gamma_{Ms}^{1)}$	[-]	1,5			
Stainless steel A4 / HCR, property class 70	$N_{RK,s}$	[kN]	26	41	59	110
	$\gamma_{Ms}^{1)}$	[-]	1,87			
Stainless steel A4 / HCR, property class 80	$N_{RK,s}$	[kN]	29	46	67	126
	$\gamma_{Ms}^{1)}$	[-]	1,6			
<b>Characteristic shear resistance</b>						
steel, property class 4.6	$V_{RK,s}$	[kN]	7	12	17	31
	$\gamma_{Ms}^{1)}$	[-]	1,67			
steel, property class 4.8	$V_{RK,s}$	[kN]	7	12	17	31
	$\gamma_{Ms}^{1)}$	[-]	1,25			
steel, property class 5.6	$V_{RK,s}$	[kN]	9	15	21	39
	$\gamma_{Ms}^{1)}$	[-]	1,67			
steel, property class 5.8	$V_{RK,s}$	[kN]	9	15	21	39
	$\gamma_{Ms}^{1)}$	[-]	1,25			
steel, property class 8.8	$V_{RK,s}$	[kN]	15	23	34	63
	$\gamma_{Ms}^{1)}$	[-]	1,25			
Stainless steel A4 / HCR, property class 70	$V_{RK,s}$	[kN]	13	20	30	55
	$\gamma_{Ms}^{1)}$	[-]	1,56			
Stainless steel A4 / HCR, property class 80	$V_{RK,s}$	[kN]	15	23	34	63
	$\gamma_{Ms}^{1)}$	[-]	1,33			
<b>Characteristic bending moment</b>						
steel, property class 4.6	$M_{RK,s}$	[Nm]	15	30	52	133
	$\gamma_{Ms}^{1)}$	[-]	1,67			
steel, property class 4.8	$M_{RK,s}$	[Nm]	15	30	52	133
	$\gamma_{Ms}^{1)}$	[-]	1,25			
steel, property class 5.6	$M_{RK,s}$	[Nm]	19	37	65	166
	$\gamma_{Ms}^{1)}$	[-]	1,67			
steel, property class 5.8	$M_{RK,s}$	[Nm]	19	37	65	166
	$\gamma_{Ms}^{1)}$	[-]	1,25			
steel, property class 8.8	$M_{RK,s}$	[Nm]	30	60	105	266
	$\gamma_{Ms}^{1)}$	[-]	1,25			
Stainless steel A4 / HCR, property class 70	$M_{RK,s}$	[Nm]	26	52	92	232
	$\gamma_{Ms}^{1)}$	[-]	1,56			
Stainless steel A4 / HCR, property class 80	$M_{RK,s}$	[Nm]	30	60	105	266
	$\gamma_{Ms}^{1)}$	[-]	1,33			

<sup>1)</sup> In absence of national regulations

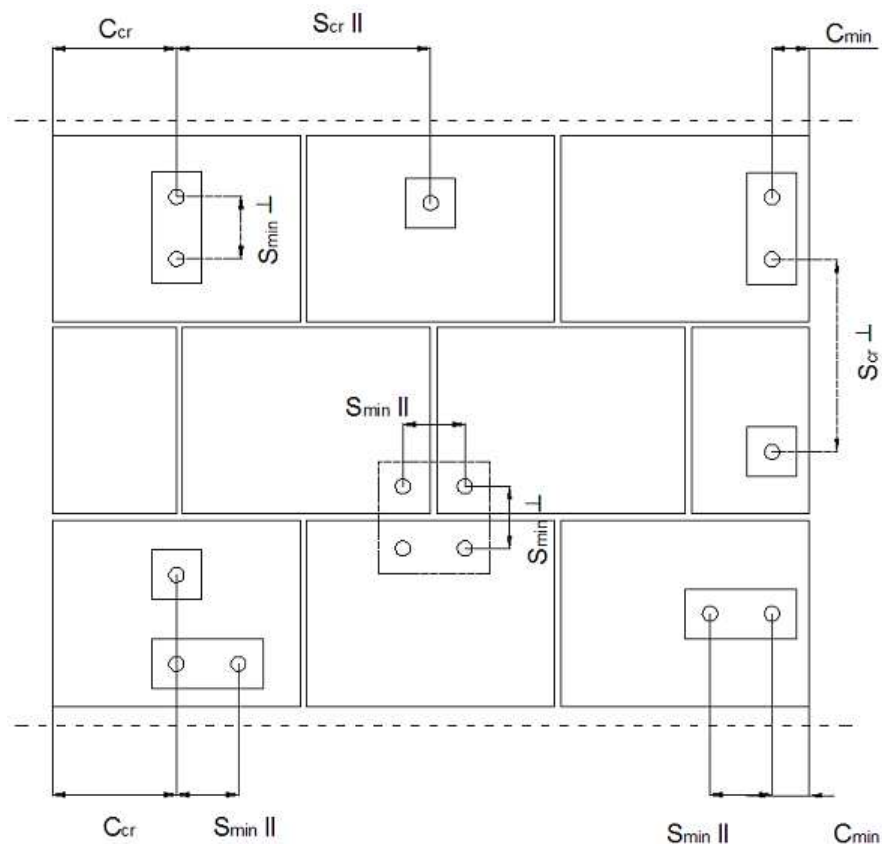
**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performances**

Characteristic tension, shear resistance and bending moment of threaded rod

**Annex C 2**

## Spacing and edge distances



- $C_{cr}$  = Characteristic edge distance
- $S_{cr II}$  = Characteristic spacing parallel to the bed joint
- $S_{cr \perp}$  = Characteristic spacing perpendicular to the bed joint
- $C_{min}$  = Minimum edge distance
- $S_{min II}$  = Minimum spacing parallel to the bed joint
- $S_{min \perp}$  = Minimum spacing perpendicular to the bed joint


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performances**  
Edge distance and anchor spacing

**Annex C 3**

## Brick type: Autoclaved Aerated Concrete – AAC2

### Table C3: Description

Brick type	Autoclaved Aerated Concrete AAC2	
Bulk density [kg/dm <sup>3</sup> ]	0,35	
Compressive strength [N/mm <sup>2</sup> ]	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 C4: Installation parameter (Edge and spacing distances)

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

### Table C5: Displacement

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

Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

Performance Autoclaved Aerated Concrete – AAC2  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 4**

**Brick type: Autoclaved Aerated Concrete AAC2**

**Table C6: 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	For all temperature range
		$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$
$h_{ef}$	[kN]					
[mm]	[kN]					
<b>Compressive strength <math>f_b \geq 2 \text{ N/mm}^2</math></b>						
<b>M8</b>	80	0,9	0,9	0,9	0,9	1,5
<b>M10</b>	90	0,9	0,9	0,9	0,75	2,0
<b>M12</b>	100	1,5	1,5	1,2	0,9	2,5
<b>M16</b>	100	1,5	1,5	1,2	0,9	3,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance Autoclaved Aerated Concrete – AAC2**  
Characteristic values of resistance under tension and shear load

**Annex C 5**

## Brick type: Autoclaved Aerated Concrete AAC4

### Table C7: Description

Brick type	Autoclaved Aerated Concrete AAC4	
Bulk density [kg/dm <sup>3</sup> ]	0,50	
Compressive strength [N/mm <sup>2</sup> ]	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 C8: Installation parameter (Edge and spacing distances)

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

### Table C9: Displacement

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

Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

Performance Autoclaved Aerated Concrete – AAC4  
Brick description, drawing,  
Installation parameters, Displacement

**Annex C 6**



**Brick type: Autoclaved Aerated Concrete AAC4**

**Table C10: 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	For all temperature range
		$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$
$h_{ef}$ [mm]	[kN]					
<b>Compressive strength <math>f_b \geq 4 \text{ N/mm}^2</math></b>						
<b>M8</b>	80	0,9	0,9	0,9	0,9	1,5
<b>M10</b>	90	2,5	2,0	1,5	1,5	2,0
<b>M12</b>	100	2,5	2,0	2,0	1,5	2,5
<b>M16</b>	100	3,5	3,0	2,0	2,0	3,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance Autoclaved Aerated Concrete – AAC4**  
Characteristic values of resistance under tension and shear load

**Annex C 7**

## Brick type: Autoclaved Aerated Concrete AAC6

### Table C11: Description

Brick type	Autoclaved Aerated Concrete AAC6	
Bulk density [kg/dm <sup>3</sup> ]	0,60	
Compressive strength [N/mm <sup>2</sup> ]	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 C12: Installation parameter (Edge and spacing distances)

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

### Table C13: Displacement

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

Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

Performance Autoclaved Aerated Concrete – AAC6  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 8**

**Brick type: Autoclaved Aerated Concrete AAC6**

**Table C14: 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	For all temperature range
		$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$
$h_{ef}$ [mm]	[kN]					
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>						
<b>M8</b>	80	2,0	2,0	2,0	2,0	5,5
<b>M10</b>	90	3,0	2,5	2,5	2,0	9,0
<b>M12</b>	100	4,5	3,5	3,0	2,5	9,0
<b>M16</b>	100	5,5	4,5	3,5	3,0	11,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

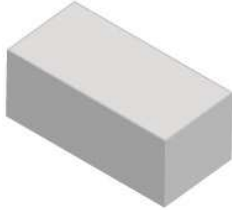
**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance Autoclaved Aerated Concrete – AAC6**  
Characteristic values of resistance under tension and shear load

**Annex C 9**

**Brick type: Calcium silicate solid brick KS-NF**

**Table C15: Description**

Brick type	Calcium silicate solid brick KS-NF	
Bulk density [kg/dm <sup>3</sup> ]	2,0	
Compressive strength [N/mm <sup>2</sup> ]	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 C16: Installation parameter (Edge and spacing distances)**

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

**Table C17: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,08	0,16	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Calcium solid brick KS-NF**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 10**

**Brick type: Calcium silicate solid brick KS-NF**

**Table C18: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category d/d; w/d; w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
			$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$
		[mm]	[kN]		
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	3,0	2,0	3,0
<b>M10</b>	-	90	3,0	2,0	3,0
<b>M12</b>	-	100	4,0	2,5	3,5
<b>M16</b>	-	100	3,0	2,0	3,5
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	2,5	2,0	3,0
	VM-SH16x130/330	130	4,5	3,0	4,0
<b>M12 / M16</b>	VM-SH 20x85	85	2,5	2,0	3,0
	VM-SH20x130/VM-SH20x200	130 / 200	4,5	2,5	4,0
<b>Compressive strength <math>f_b \geq 20 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	4,5	3,0	4,5
<b>M10</b>	-	90	4,5	3,0	4,5
<b>M12</b>	-	100	5,5	3,5	5,0
<b>M16</b>	-	100	4,5	3,0	5,0
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	4,0	2,5	4,5
	VM-SH 16x130/330	130	6,0	4,0	5,5
<b>M12 / M16</b>	VM-SH 20x85	85	4,0	2,5	5,0
	VM-SH20x130/VM-SH20x200	130 / 200	6,0	4,0	5,5
<b>Compressive strength <math>f_b \geq 27 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	5,5	3,5	5,0
<b>M10</b>	-	90	5,5	3,5	5,5
<b>M12</b>	-	100	6,5	4,5	6,0
<b>M16</b>	-	100	5,5	3,5	6,0
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	4,5	3,0	5,5
	VM-SH 16x130/330	130	6,5	4,5	6,5
<b>M12 / M16</b>	VM-SH 20x85	85	4,5	3,0	5,5
	VM-SH20x130/VM-SH20x200	130 / 200	6,5	4,5	6,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

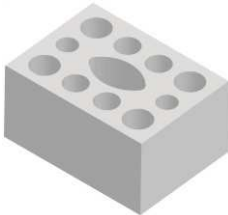
**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

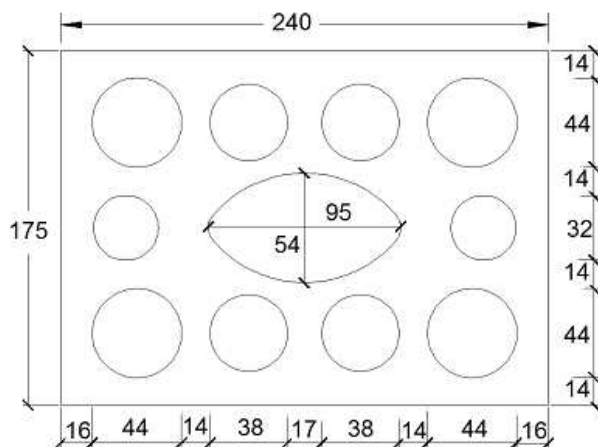
**Performance Calcium solid brick KS-NF**  
Characteristic values of resistance under tension and shear load

**Annex C 11**

**Brick type: Calcium silicate hollow brick KS L-3DF**

**Table C19: Description**

Brick type	Calcium silicate hollow brick KS L-3DF	
Bulk density [kg/dm <sup>3</sup> ]	1,4	
Compressive strength [N/mm <sup>2</sup> ]	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 C20: Installation parameter (Edge and spacing distances)**

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

**Table C21: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,36	0,73	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Calcium hollow brick KS L-3DF**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 12**

**Brick type: Calcium silicate hollow brick KS L-3DF**

**Table C22: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 8 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	1,5	0,9	3,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	2,5	1,5	3,0
<b>M16</b>	VM-SH 20x85	85	1,5	0,9	3,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	2,5	1,5	4,0
<b>Compressive strength <math>f_b \geq 12 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	2,0	1,2	3,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	3,5	2,0	4,5
<b>M16</b>	VM-SH 20x85	85	2,0	1,2	3,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	3,5	2,0	5,0
<b>Compressive strength <math>f_b \geq 14 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	2,5	1,5	4,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	4,0	3,0	5,0
<b>M16</b>	VM-SH 20x85	85	2,5	1,5	4,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	4,0	3,0	6,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

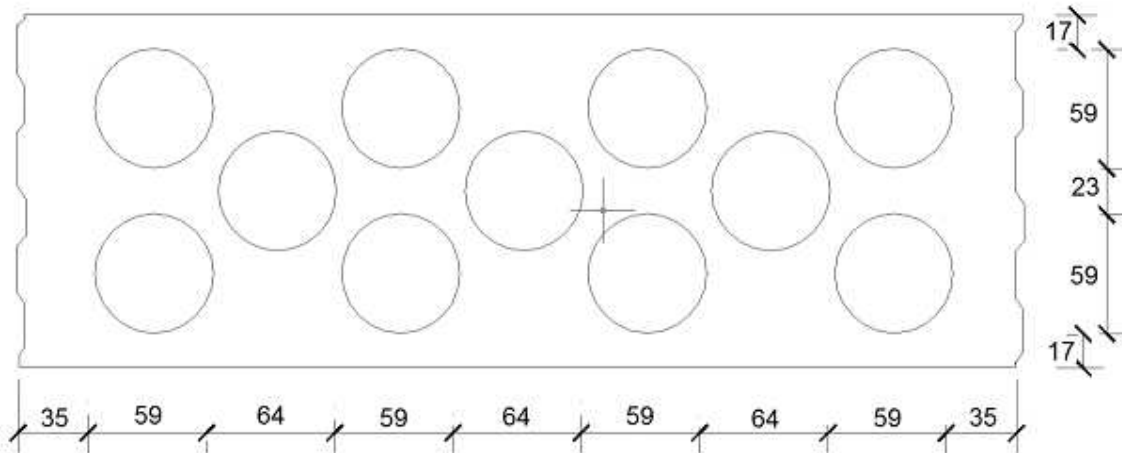
**Performance Calcium hollow brick KS L-3DF**  
Characteristic values of resistance under tension and shear load

**Annex C 13**

**Brick type: Calcium silicate hollow brick KS L-12DF**

**Table C23: Description**

Brick type	Calcium silicate hollow brick KS L-12DF	
Bulk density [kg/dm <sup>3</sup> ]	1,40	
Compressive strength [N/mm <sup>2</sup> ]	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 C24: Installation parameter (Edge and spacing distances)**

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
				$S_{cr} = S_{min \parallel}$	$S_{min \perp}$	
			$C_{min} = C_{cr}$	[mm]		$T_{inst,max}$
						[Nm]
<b>M8</b>	VM-SH 12x80	80	100	498	238	2
<b>M8 / M10</b>	VM-SH 16x85	85				4
	VM-SH 16x130	130				
	VM-SH 16x130/330	130				
<b>M12 / M16</b>	VM-SH 20x85	85	120	498	238	4
	VM-SH 20x130	130				

**Table C25: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,21	0,42	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Calcium hollow brick KS L-12DF**  
Brick description, drawing,  
Installation parameters, Displacement

**Annex C 14**



**Brick type: Calcium silicate hollow brick KS L-12DF**

**Table C26: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$ [mm]	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[kN]					
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	1,2	0,9	6,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	3,5	2,5	7,0
<b>Compressive strength <math>f_b \geq 12 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	1,5	0,9	7,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	4,5	3,0	8,0
<b>Compressive strength <math>f_b \geq 16 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	2,0	1,2	8,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	5,5	3,5	10,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

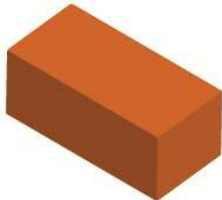
**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance Calcium hollow brick KS L-12DF**  
Characteristic values of resistance under tension and shear load

**Annex C 15**

## Brick type: Clay solid brick Mz-DF

### Table C27: 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 C28: Installation parameter (Edge and spacing distances)

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

### Table C29: Displacement

Effective anchorage depth $h_{ef}$	<b>N</b>	$\delta_{N0}$	$\delta_{N\infty}$	<b>V</b>	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,12	0,24	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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

Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

Performance Clay solid brick Mz-DF  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 16**

Brick type: Clay solid brick Mz-DF

Table C30: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d; w/d; w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	1,5	1,2	3,0
<b>M10</b>	-	90	1,5	1,2	3,5
<b>M12</b>	-	100	1,5	0,9	5,0
<b>M16</b>	-	100	2,5	1,5	5,0
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	2,0	1,5	3,5
	VM-SH 16x130 / VM-SH 16x130/330	130	3,0	2,0	3,5
<b>M12 / M16</b>	VM-SH 20x85	85	2,0	1,5	3,5
	VM-SH 20x130/VM-SH 20x200	130 / 200	3,0	2,0	3,5
<b>Compressive strength <math>f_b \geq 20 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	2,5	1,5	4,5
<b>M10</b>	-	90	2,5	1,5	5,5
<b>M12</b>	-	100	2,0	1,5	7,5
<b>M16</b>	-	100	3,5	2,5	7,5
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	3,0	2,0	5,0
	VM-SH 16x130 / VM-SH 16x130/330	130	4,5	3,0	5,0
<b>M12 / M16</b>	VM-SH 20x85	85	3,0	2,0	5,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	4,5	3,0	5,0
<b>Compressive strength <math>f_b \geq 28 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	3,0	2,0	5,5
<b>M10</b>	-	90	3,0	2,0	6,5
<b>M12</b>	-	100	2,5	1,5	9,0
<b>M16</b>	-	100	4,5	3,0	9,0
<b>M8</b>	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
<b>M10</b>	VM-SH 16x85	85	3,5	2,5	6,0
	VM-SH 16x130 / VM-SH 16x130/330	130	5,0	3,5	6,0
<b>M12 / M16</b>	VM-SH 20x85	85	3,5	2,5	6,0
	VM-SH 20x130/VM-SH 20x200	130 / 200	5,0	3,5	6,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

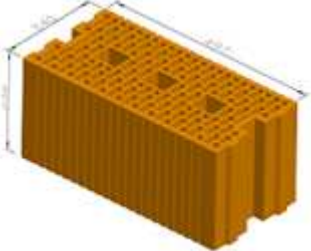
Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

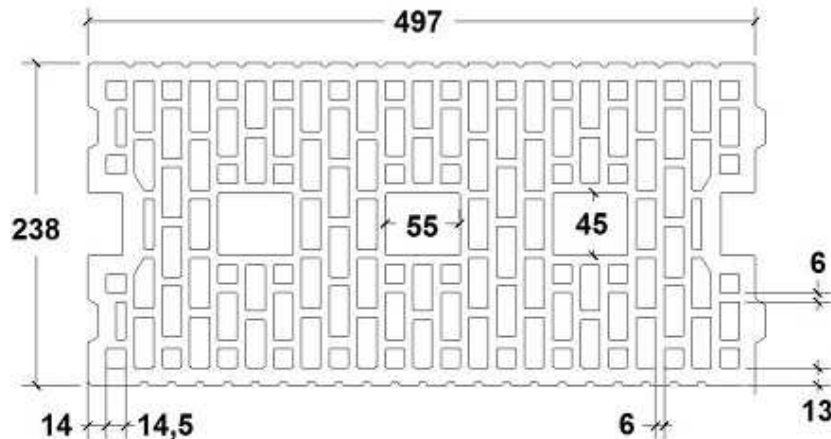
Performance Clay solid brick Mz-DF  
Characteristic values of resistance under tension and shear load

Annex C 17

**Brick type: Clay hollow brick HLz-16DF**

**Table C31: 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 C32: Installation parameter (Edge and spacing distances)**

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque		
				$C_{min} = C_{Cr}$	$S_{Cr} = S_{min \parallel}$		$S_{min \perp}$	$T_{inst,max}$
				[mm]			[Nm]	
<b>M8</b>	VM-SH 12x80	80	100	497	238	6		
<b>M8 / M10</b>	VM-SH 16x85	85						
	VM-SH 16x130	130						
	VM-SH 16x130/330	130						
<b>M12 / M16</b>	VM-SH 20x85	85	120	497	238	6		
	VM-SH 20x130	130						
	VM-SH 20x200	200						

**Table C33: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,27	0,55	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Clay hollow brick HLz-16DF**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 18**

Brick type: Clay hollow brick HLz-16DF

Table C34: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d;	w/d;	w/w
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{RK}^{1)}$	$N_{RK}^{1)}$	$V_{RK,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
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	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 / M16	VM-SH 20x85	85	2,0	1,5	4,0
	VM-SH 20x130/VM-SH 20x200	130/ 200	2,5	1,5	6,0
<b>Compressive strength <math>f_b \geq 9 \text{ N/mm}^2</math></b>					
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	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 / M16	VM-SH 20x85	85	2,5	2,0	5,0
	VM-SH 20x130/VM-SH 20x200	130/ 200	3,0	2,0	7,0
<b>Compressive strength <math>f_b \geq 12 \text{ N/mm}^2</math></b>					
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	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 / M16	VM-SH 20x85	85	3,5	2,0	6,0
	VM-SH 20x130/VM-SH 20x200	130/ 200	3,5	2,5	8,0
<b>Compressive strength <math>f_b \geq 14 \text{ N/mm}^2</math></b>					
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	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 / M16	VM-SH 20x85	85	3,5	2,0	6,0
	VM-SH 20x130/VM-SH 20x200	130/ 200	3,5	2,5	9,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{RK} = N_{RK,p} = N_{RK,b}$ ;  $N_{RK,s}$  according to Table C2 Annex C2; Calculation  $N_{RK,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{RK,s}$  see Annex C 2, Table C2; Calculation of  $V_{RK,pb}$  and  $V_{RK,c}$  see ETAG 029, Annex C

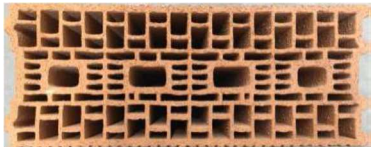
Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

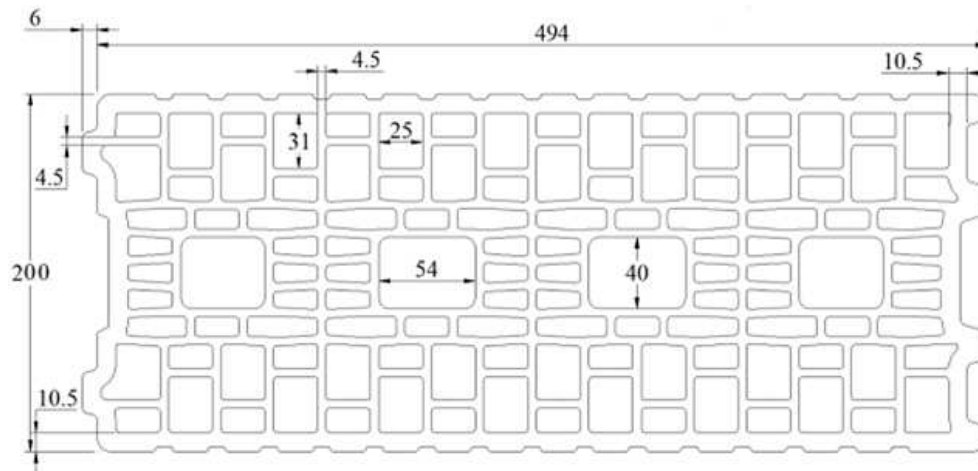
Performance Clay hollow brick HLz-16DF  
Characteristic values of resistance under tension and shear load

Annex C 19

**Brick type: Clay hollow brick Porotherm Homebric**

**Table C35: 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 C36: Installation parameter (Edge and spacing distances)**

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

**Table C37: Displacement**

Effective anchorage depth $h_{ef}$	<b>N</b>	$\delta_{N0}$	$\delta_{N\infty}$	<b>V</b>	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,65	1,29	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Clay hollow brick Porotherm Homebric**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 20**

Brick type: Clay hollow brick Porotherm Homebric

Table C38: Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
h <sub>ef</sub>	N <sub>Rk</sub> <sup>1)</sup>	N <sub>Rk</sub> <sup>1)</sup>	V <sub>Rk,b</sub> <sup>2)</sup>		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
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	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	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
M16	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
<b>Compressive strength <math>f_b \geq 8 \text{ N/mm}^2</math></b>					
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	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	VM-SH 20x85	85	1,2	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	3,5
M16	VM-SH 20x85	85	1,2	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	3,5
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
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	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	VM-SH 20x85	85	1,5	0,9	4,0
	VM-SH 20x130	130	2,0	1,2	4,0
M16	VM-SH 20x85	85	1,5	0,9	4,0
	VM-SH 20x130	130	2,0	1,2	4,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

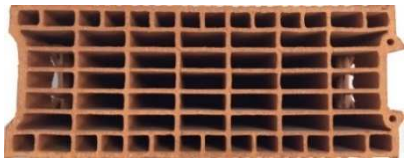
Injection System VM-EA, VM-EA express, VM-EA low speed for masonry

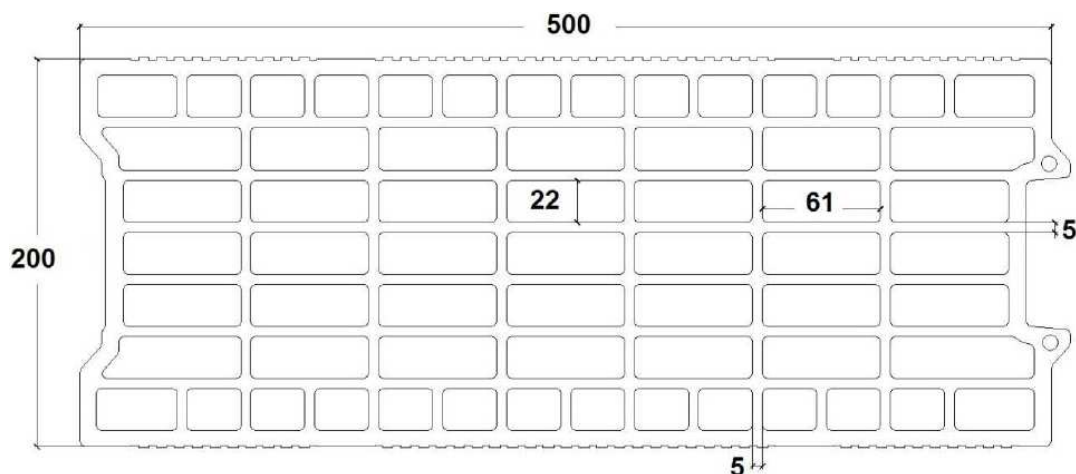
Performance Clay hollow brick Porotherm Homebric  
Characteristic values of resistance under tension and shear load

Annex C 21

## Brick type: Clay hollow brick BGV Thermo

**Table C39: Description**

Brick type	Clay hollow brick BGV Thermo	
Bulk density [kg/dm <sup>3</sup> ]	0,62	
Compressive strength [N/mm <sup>2</sup> ]	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 C40: Installation parameter (Edge and spacing distances)**

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

**Table C41: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,27	0,54	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Clay hollow brick BGV Thermo**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 22**



**Brick type: Clay hollow brick BGV Thermo**

**Table C42: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 4 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,75	0,5	2,0
	VM-SH 20x130	130	1,2	0,75	2,5
<b>M16</b>	VM-SH 20x85	85	0,9	0,6	2,0
	VM-SH 20x130	130	1,2	0,75	2,5
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
<b>M16</b>	VM-SH 20x85	85	1,2	0,75	3,0
	VM-SH 20x130	130	1,5	0,9	3,0
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	1,2	0,75	3,5
	VM-SH 20x130	130	1,5	1,2	4,0
<b>M16</b>	VM-SH 20x85	85	1,5	0,9	3,5
	VM-SH 20x130	130	1,5	1,2	4,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

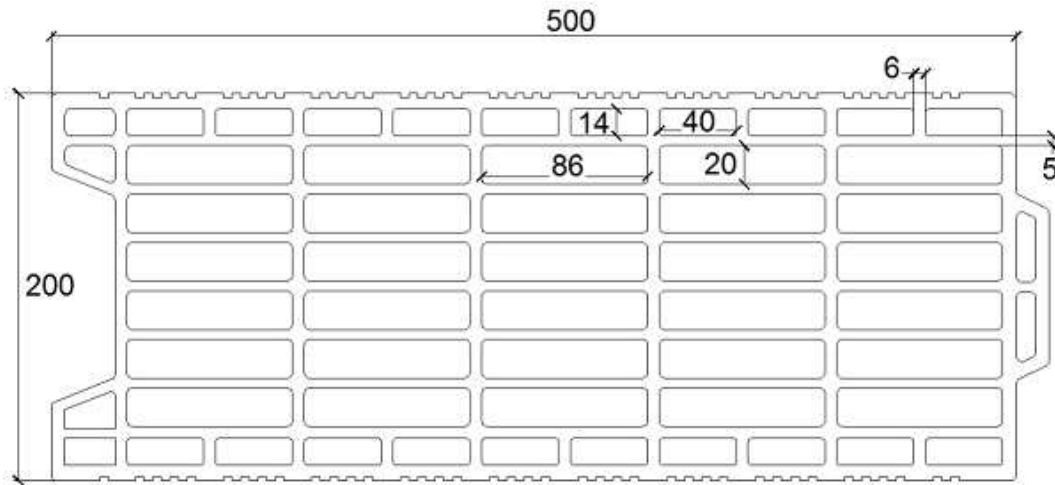
**Performance Clay hollow brick BGV Thermo**  
Characteristic values of resistance under tension and shear load

**Annex C 23**

**Brick type: Clay hollow brick Calibric Th**

**Table C43: 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 C44: Installation parameter (Edge and spacing distances)**

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

**Table C45: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,48	0,96	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Clay hollow brick Calibric Th**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 24**

**Brick type: Clay hollow brick Calibric Th**

**Table C46: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
h <sub>ef</sub>	N <sub>Rk</sub> <sup>1)</sup>	N <sub>Rk</sub> <sup>1)</sup>	V <sub>Rk,b</sub> <sup>2)</sup>		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,75	0,5	6,0
	VM-SH 20x130	130	0,9	0,6	6,0
<b>M16</b>	VM-SH 20x85	85	1,2	0,75	6,0
	VM-SH 20x130	130	1,2	0,75	6,0
<b>Compressive strength <math>f_b \geq 9 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,9	0,6	7,5
	VM-SH 20x130	130	1,2	0,9	7,5
<b>M16</b>	VM-SH 20x85	85	1,5	0,9	7,5
	VM-SH 20x130	130	1,5	0,9	7,5
<b>Compressive strength <math>f_b \geq 12 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,9	0,75	8,5
	VM-SH 20x130	130	1,5	0,9	8,5
<b>M16</b>	VM-SH 20x85	85	1,5	1,2	8,5
	VM-SH 20x130	130	1,5	1,2	8,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

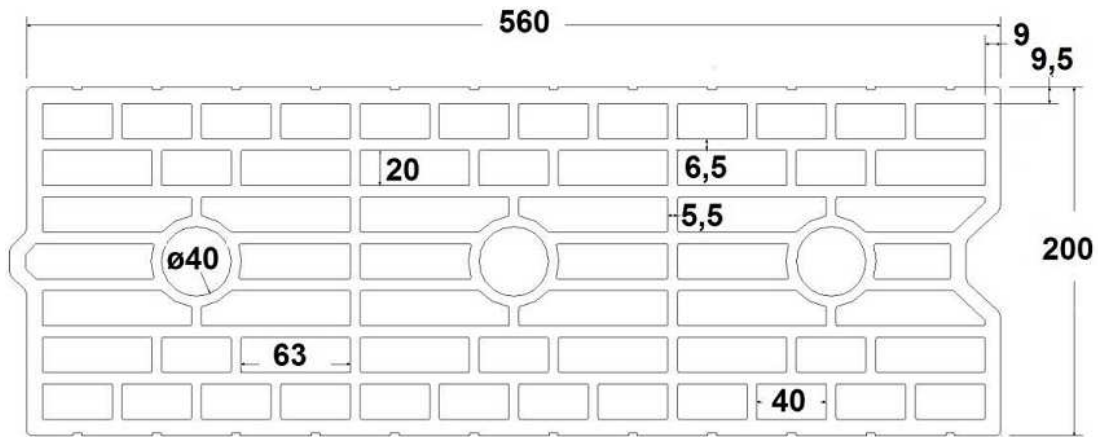
**Performance Clay hollow brick Calibric Th**  
Characteristic values of resistance under tension and shear load

**Annex C 25**

**Brick type: Clay hollow brick Urbanbric**

**Table C47: 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 C48: Installation parameter (Edge and spacing distances)**

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

**Table C49: Displacement**

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

<b>Injection System VM-EA, VM-EA express, VM-EA low speed for masonry</b>	<b>Annex C 26</b>
<b>Performance Clay hollow brick Calibric Th</b> Brick description, drawing, Installation parameters, Displacements	

**Brick type: Clay hollow brick Urbanbric**

**Table C50: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d	w/d	w/w
			40°C / 24°C	80°C / 50°C	For all temperature range
		$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$
		[mm]	[kN]		
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,9	0,75	3,0
<b>M8 / M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	1,2	0,75	4,0
	VM-SH 20x130	130	1,5	1,2	4,0
<b>Compressive strength <math>f_b \geq 9 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	1,2	0,9	3,5
<b>M8 / M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	1,5	0,9	5,0
	VM-SH 20x130	130	2,0	1,5	5,0

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

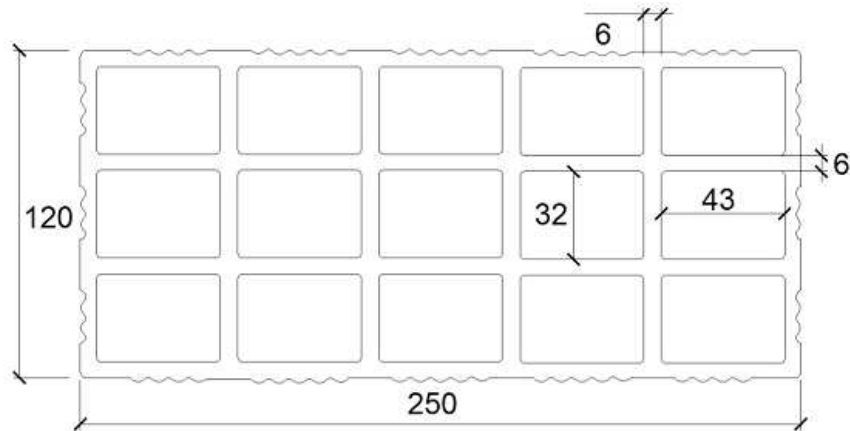
**Performance Clay hollow brick Calibric Th**  
Characteristic values of resistance under tension and shear load

**Annex C 27**

**Brick type: Clay hollow brick Blocchi Leggeri**

**Table C51: Description**

Brick type	Clay hollow brick Blocchi Leggeri	
Bulk density [kg/dm <sup>3</sup> ]	0,55	
Compressive strength [N/mm <sup>2</sup> ]	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 C52: Installation parameter (Edge and spacing distances)**

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

**Table C53: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,32	0,64	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance Clay hollow brick Blocchi Leggeri**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 28**

**Brick type: Clay hollow brick Blocchi Leggeri**

**Table C54: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 4 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,4	0,3	2,0
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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
<b>Compressive strength <math>f_b \geq 6 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,5	0,3	2,0
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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
<b>Compressive strength <math>f_b \geq 8 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,6	0,4	2,5
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

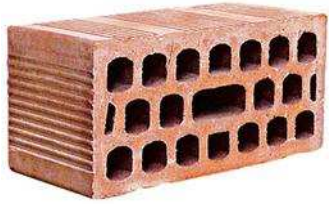
**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

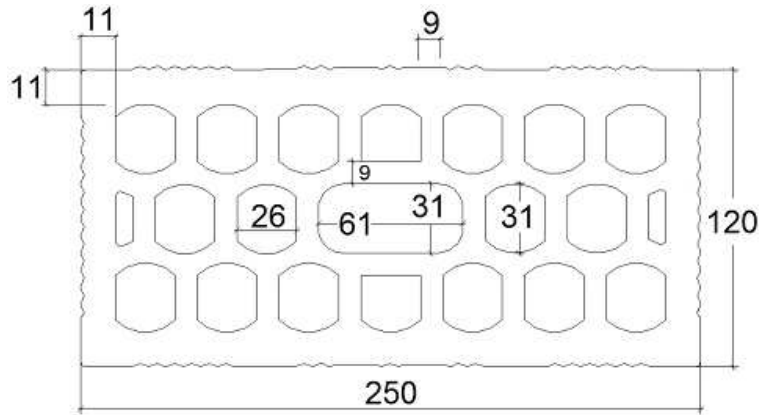
**Performance Clay hollow brick Blocchi Leggeri**  
Characteristic values of resistance under tension and shear load

**Annex C 29**

**Brick type: Clay hollow brick Doppio Uni**

**Table C55: Description**

Brick type	Clay hollow brick Doppio Uni	
Bulk density [kg/dm <sup>3</sup> ]	0,92	
Compressive strength [N/mm <sup>2</sup> ]	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 C56: Installation parameter (Edge and spacing distances)**

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

**Table C57: Displacement**

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

<b>Injection System VM-EA, VM-EA express, VM-EA low speed for masonry</b>	<b>Annex C 30</b>
<b>Performance Clay hollow brick Doppio Uni</b> Brick description, drawing, Installation parameters, Displacements	



**Brick type: Clay hollow brick Doppio Uni**

**Table C58: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d	w/d	w/w
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 10 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,9	0,6	2,0
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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
<b>Compressive strength <math>f_b \geq 16 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	0,9	0,75	2,5
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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
<b>Compressive strength <math>f_b \geq 20 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	1,2	0,75	3,0
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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
<b>Compressive strength <math>f_b \geq 28 \text{ N/mm}^2</math></b>					
<b>M8</b>	VM-SH 12x80	80	1,5	0,9	3,5
<b>M8 / M10</b>	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
<b>M12 / M16</b>	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

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

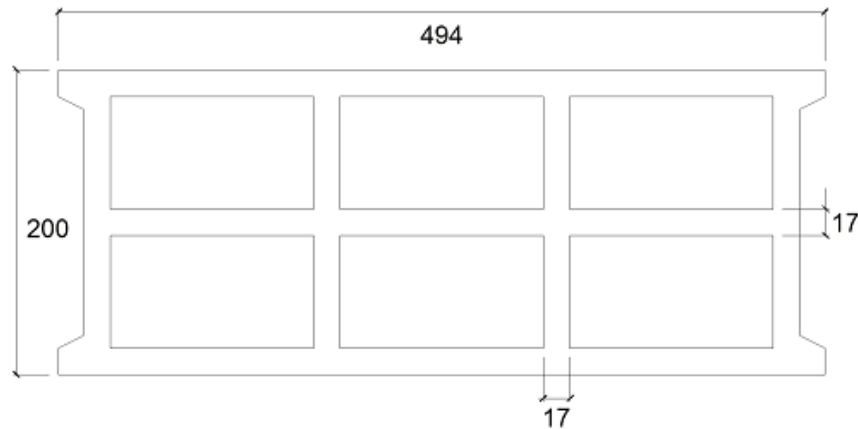
**Performance Clay hollow brick Doppio Uni**  
Characteristic values of resistance under tension and shear load

**Annex C 31**

**Brick type: Hollow Light weight concrete Bloc creux B40**

**Table C59: Description**

Brick type	Hollow light weight concrete Bloc creux B40	
Bulk density [kg/dm <sup>3</sup> ]	0,8	
Compressive strength [N/mm <sup>2</sup> ]	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 C60: Installation parameter (Edge and spacing distances)**

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

**Table C61: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,14	0,29	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance hollow light weight concrete Bloc creux B40**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 32**

**Brick type: Hollow Light weight concrete Bloc creux B40**

**Table C62: Characteristic values of resistance under tension and shear loads**


Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d	w/d	w/w
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 4 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	2,0	1,5	3,5
<b>M16</b>	VM-SH 20x85	85	0,9	0,6	3,0
	VM-SH 20x130	130	2,0	1,5	3,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

**Brick type: Solid light weight concrete brick**

**Table C63: Description**

Brick type	Solid light weight concrete brick	
Bulk density [kg/dm <sup>3</sup> ]	0,63	
Compressive strength [N/mm <sup>2</sup> ]	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 C64: Installation parameter (Edge and spacing distances)**

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

**Table C65: Displacement**

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

**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance Solid light weight concrete LAC**  
 Brick description, drawing,  
 Installation parameters, Displacements

**Annex C 34**

**Brick type: Solid light weight concrete brick**

**Table C66: Characteristic values of resistance under tension and shear loads**

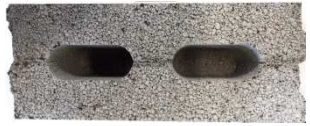
Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$	
		$h_{ef}$ [mm]	[kN]		
<b>Compressive strength <math>f_b \geq 2 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	2,0	1,5	3,0
<b>M10</b>	-	90	2,0	1,5	3,5
<b>M12</b>	-	100	2,0	1,5	4,0
<b>M16</b>	-	100	2,0	1,5	4,0

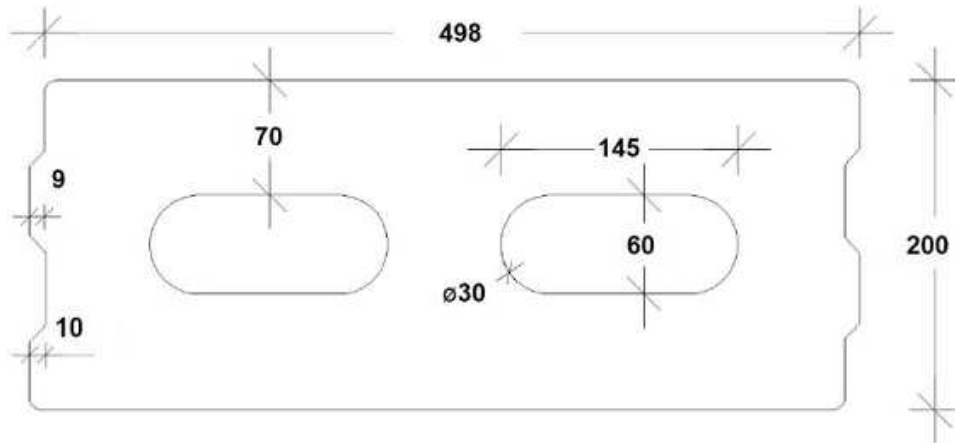
<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C

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

**Table C67: Description**

Brick type	Hollow light weight concrete Leca Lex harkko RUH-200	
Bulk density [kg/dm <sup>3</sup> ]	0,7	
Compressive strength [N/mm <sup>2</sup> ]	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 C68: Installation parameter (Edge and spacing distances)**

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

**Table C69: Displacement**

Effective anchorage depth $h_{ef}$	N	$\delta_{N0}$	$\delta_{N\infty}$	V	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,11	0,22	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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, VM-EA express, VM-EA low speed for masonry**

**Performance LECA LEX harkko RUH-200 Hollow**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 36**

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

**Table C70: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d	w/d	w/w
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 2,7 \text{ N/mm}^2</math></b>					
<b>M8</b>	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
<b>M10</b>	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
<b>M12</b>	VM-SH 20x85	85	2,5	1,5	3,5
	VM-SH 20x130	130	2,5	1,5	3,5
<b>M16</b>	VM-SH 20x85	85	2,5	1,5	3,5
	VM-SH 20x130	130	2,5	1,5	3,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C


**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance LECA LEX harkko RUH-200 Hollow**  
 Characteristic values of resistance under tension and shear load  
 Displacement

**Annex C 37**

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

**Table C71: Description**

Brick type	Solid light weight concrete Leca Lex harkko RUH-200 kulma	
Bulk density [kg/dm <sup>3</sup> ]	0,78	
Compressive strength [N/mm <sup>2</sup> ]	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 C72: Installation parameter (Edge and spacing distances)**

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

**Table C73: Displacement**

Effective anchorage depth $h_{ef}$	<b>N</b>	$\delta_{N0}$	$\delta_{N\infty}$	<b>V</b>	$\delta_{V0}$	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,09	0,18	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	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

**Injection System VM-EA, VM-EA express, VM-EA low speed for masonry**

**Performance LECA LEX harkko RUH-200 Kulma Solid**  
Brick description, drawing,  
Installation parameters, Displacements

**Annex C 38**



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

**Table C74: Characteristic values of resistance under tension and shear loads**

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category		
			d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
$h_{ef}$	$N_{Rk}^{1)}$	$N_{Rk}^{1)}$	$V_{Rk,b}^{2)}$		
[mm]	[kN]				
<b>Compressive strength <math>f_b \geq 3,0 \text{ N/mm}^2</math></b>					
<b>M8</b>	-	80	2,0	1,2	3,0
<b>M10</b>	-	90	3,0	2,0	4,0
<b>M12</b>	-	100	3,0	2,0	4,0
<b>M16</b>	-	100	3,0	2,0	4,0
<b>M8</b>	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
<b>M10</b>	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
<b>M12 / M16</b>	VM-SH 20x85	85	2,0	1,5	4,5
	VM-SH 20x130	130	3,0	2,0	4,5

<sup>1)</sup> For design according ETAG 029, Annex C:  $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ ;  $N_{Rk,s}$  according to Table C2 Annex C2; Calculation  $N_{Rk,pb}$  see ETAG 029, Annex C

<sup>2)</sup> For  $V_{Rk,s}$  see Annex C 2, Table C2; Calculation of  $V_{Rk,pb}$  and  $V_{Rk,c}$  see ETAG 029, Annex C