

Injection System VM-EA



Threaded Stud V-A



Threaded Stud VMU-A



Threaded Stud VM-A

1 meter length, to be cut to the required length



Internally Threaded Sleeve VMU-IG



Perfo sleeve VM-SH



Cartridge VM-EA 300

Foil tube cartridge suitable for silicone guns
Content: 300 ml



Cartridge VM-EA 345

Side-by-side cartridge
Content: 345ml



Cartridge VM-EA 420

Coaxial cartridge
Content: 420ml

Range of loading: 0,1 kN–114,9 kN

Concrete quality: C20/25–C50/60

Brickwork: Solid and perforated bricks

**Material: Steel zinc plated, stainless steel A4
On demand: Steel hot dip galvanized, Stainless steel HCR**

Description

The Injection System VM-EA is used for fixations in uncracked concrete and brickwork. It is composed of a styrene-free injection adhesive, based on epoxy acrylate, in a cartridge, MKT anchor rods VMU-A, V-A or with threaded studs with manufacturer's certificate (e.g. MKT VM-A) as well as nut and washer. Applications in perforated brick additionally require a perfo sleeve.



Advantages

- Versatile injection system for different applications in concrete and masonry
- Approved for uncracked concrete
- Approved application in wet concrete and water-filled drill holes
- Approved for autoclaved aerated concrete, solid and perforated brickwork in wet or dry condition
- Approved with standard threaded studs (test certificate required)
- Approved in uncracked concrete with VMU-IG internally threaded rods
- Approved with shortenable perfo sleeve VM-SH16 x 130/330 for bridging structures over insulation systems and other soft substrates
- Base material temperature during installation -5°C to +40°C
- Ambient temperature when completely cured -40°C to +80°C
- Variable anchorage depths for more flexibility
- Opened cartridges can be re-used with a new mixer nozzle
- Styrene-free

Applications

Fastenings in uncracked concrete:

Base plates, supports, wall brackets, mounting of joint tapes.

Fastenings in brickwork:

Canopies, door and window frames, facade substructures, battens, gates etc.

With the perfo sleeve VM-SH 16 x 130/330, lightweight fixations in perforated brick are also possible on insulation boards.

Injection Cartridge VM-EA



- modified epoxy acrylate, styrene-free
- Approved for use in uncracked concrete and in brickwork

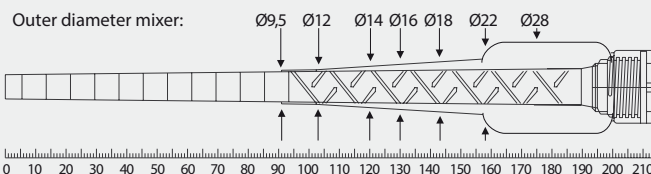
Description	Ref. No.	Content ml	Content of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VM-EA 300	28253101	300	12	6,40	0,53
Cartridge VM-EA 345	28255211	345	12	8,00	0,65
Cartridge VM-EA 420	28256201	420	12	10,1	0,83
Static mixer VM-X	28305111	-	12	0,12	0,01
Mixer extension VM-XE 10/200 (200mm)	28306011	-	12	-	0,01
Mixer extension VM-XE 10/500 (500mm)	85951101	-	10	-	0,02

One static mixer comes with each cartridge.



Usable length static mixer VM-X

Drill holes must always be filled from the bottom of the hole to ensure no air pockets are trapped in the adhesive. This is only possible when the tip of the mixing nozzle reaches the very bottom of the drill hole before injecting the adhesive. If the mixing nozzle does not reach the bottom of the drill hole, a mixer extension tube must be used.



Curing Time Injection Adhesive VM-EA

- Cartridge temperature during installing + 5°C to + 40°C

Temperature (°C) in the drill hole	maximum working time	Curing time ¹⁾
-5°C to -1°C	90 min	6 h
0°C to +4°C	45 min	3 h
+5°C to +9°C	25 min	2 h
+10°C to +14°C	20 min	100 min
+15°C to +19°C	15 min	80 min
+20°C to +29°C	6 min	45 min
+30°C to +34°C	4 min	25 min
+35°C to +39°C	2 min	20 min

¹⁾In wet or dry concrete

Storage Box

- In stackable multi-purpose container
- Storage Box, the container for various items
- H x W x D: 220 x 400 x 300 mm

Description	Ref. No.	Content	Quantity Pcs.	Weight per Box kg
Storage Box VM-EA 300	28998201	Cartridge VM-EA 300	20	12,8
		Static mixer VM-X	40	
Storage Box VM-EA 345	28998501	Cartridge VM-EA 345	20	15,3
		Static mixer VM-X	40	
Storage Box VM-EA 420	28998801	Cartridge VM-EA 420	20	18,0
		Static mixer VM-X	40	

Accessories for Injection System VM-EA in concrete

Threaded Stud	Internally Threaded Sleeve	Rebar Ø	Blow-out pump / Air gun	Cleaning brush RB	Extension tube ²⁾	Dispenser
		mm				
M8		10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	
M10	VMU-IG M6	12	VM-AP 360 VM-ABP 200	RB 12 M6 RB 12 M8	VM-XE 10	
M12	VMU-IG M8	14	VM-AP 360 VM-ABP 200	RB 14 M6 RB 14 M8	VM-XE 10	
M16	VMU-IG M10	18	VM-AP 360 VM-ABP 200 / 250 / 500 / 1000	RB 18 M6 RB 18 M8	VM-XE 10	
M20	VMU-IG M12	24	VM-AP 360 ¹⁾ VM-ABP 250 / 500 / 1000	RB 24 M6	VM-XE 10	
M24	VMU-IG M16	28	VM-AP 360 ¹⁾ VM-ABP 250 / 500 / 1000	RB 28 M6	VM-XE 10	
See page			178	179	180	181 / 182

¹⁾Can be used up to an anchorage depth of 240 mm (h_{ef} ≤ 240mm)

²⁾If the static mixer does not reach the bottom of the borehole (see usable length of static mixer) or from a anchorage depth of 190 mm, an extension tube must be used.

Accessories for Injection System VM-EA in brickwork

Threaded Stud (without Perfo sleeve) mm	Perfo sleeve-Ø mm	Rebar Ø mm	Blow-out pump / Air gun	Cleaning brush RB	Extension tube ¹⁾	Dispenser
M8		10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	
M10	VM-SH 12 x 80	12	VM-AP 360 VM-ABP 200	RB 12 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
M12		14	VM-AP 360 VM-ABP 200	RB 14 M6	VM-XE 10	
	VM-SH 16 x 85 VM-SH 16 x 130 VM-SH 16 x 130/330 ¹⁾	16	VM-AP 360 VM-ABP 200	RB 16 M6	VM-XE 10	
M16		18	VM-AP 360 VM-ABP 200 / 250	RB 18 M6	VM-XE 10	
	VM-SH 20 x 85 VM-SH 20 x 130 VM-SH 20 x 200	20	VM-AP 360 VM-ABP 200 / 250	RB 20 M6	VM-XE 10	
See page			178	179	180	181 / 182

¹⁾Required if the static mixer does not reach the bottom of the borehole or the bottom of the perfo sleeve

Threaded Studs for the Injection System VM-EA in uncracked concrete and brickwork

Threaded Stud VMU-A

Steel, zinc plated 5.8
Dimensions see page 172



- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8 on demand

Threaded Stud VMU-A fvz

Steel, hot dip galvanized 5.8
Dimensions see page 172



- For use in structures subject to dry internal conditions

Threaded Stud VMU-A A4

Stainless steel A4-70
Dimensions see page 172



- For use in structures subject to dry internal conditions
- Stainless steel HCR on request

Internally Threaded Sleeve VMU-IG

Steel, zinc plated 5.8
Dimensions see page 174



- For use in structures subject to dry internal conditions
- Only in uncracked concrete
- With internal thread

Internally Threaded Sleeve VMU-IG A4

Stainless steel A4-70
Dimensions see page 174



- For use in structures subject to dry internal conditions or external atmospheric exposure
- Only in uncracked concrete
- With internal thread

Threaded Stud V-A

Steel, zinc plated 5.8
Dimensions see page 173



- For use in structures subject to dry internal conditions

Threaded Stud V-A fvz

Steel, hot dip galvanized 5.8
Dimensions see page 173



- For use in structures subject to dry internal conditions

Threaded Stud V-A 8.8

Steel, zinc plated 8.8
Dimensions see page 173



- For use in structures subject to dry internal conditions

Threaded Stud V-A A4

Stainless steel A4-70
Dimensions see page 173



- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded Stud V-A HCR

Stainless steel HCR-70
Dimensions see page 173



- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded Stud VM-A

Steel, zinc plated 5.8
Dimensions see page 174



- For use in structures subject to dry internal conditions
- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN 10204) in every package

Threaded Stud VM-A 8.8

Steel, zinc plated 8.8
Dimensions see page 174



- For use in structures subject to dry internal conditions
- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN 10204) in every package

Threaded Stud VM-A A4

Stainless steel A4-70
Dimensions see page 174



- For use in structures subject to dry internal conditions or external atmospheric exposure
- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN 10204) in every package

Perfo sleeve VM-SH

Polypropylene
Dimensions see page 175



- Approved for solid and perforated bricks



Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0483 for use in uncracked concrete (Option 7)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor $\Psi_{sus} = 1,0$ and the total safety factor (γ_M and γ_p) is included. For further details and temperature ranges see ETA.

Loads and performance data				uncracked concrete						
Injection System VM-EA, threaded stud Steel 5.8				M8	M10	M12	M16	M20	M24	
Range of anchorage depth	$h_{ef,min} - h_{ef,max}$	[mm]		60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	
Approved tension load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	5,1 - 8,7	6,0 - 13,8	8,4 - 20,1	12,8 - 37,4	16,7 - 58,3	18,4 - 84,0
	50°C/80°C ¹⁾	C20/25	appr. N	[kN]	3,9 - 8,7	4,5 - 13,8	6,3 - 20,1	9,6 - 37,4	13,5 - 58,3	17,2 - 84,0
Approved shear load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	6,3	9,9	14,5	26,9	40,0 - 42,0	44,1 - 60,5
	50°C/80°C ¹⁾	C20/25	appr. V	[kN]	6,3	9,9	14,5	23,0 - 26,9	32,3 - 42,0	41,4 - 60,5
Injection System VM-EA, threaded stud Steel 8.8										
Approved tension load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	5,1 - 13,6	6,0 - 19,9	8,4 - 28,7	12,8 - 51,1	16,7 - 79,8	18,4 - 114,9
	50°C/80°C ¹⁾	C20/25	appr. N	[kN]	3,9 - 10,4	4,5 - 15,0	6,3 - 21,5	9,6 - 38,3	13,5 - 59,8	17,2 - 86,2
Approved shear load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	8,4	13,3	19,3	30,6 - 35,9	40,0 - 56,0	44,1 - 80,7
	50°C/80°C ¹⁾	C20/25	appr. V	[kN]	8,4	10,8 - 13,3	15,1 - 19,3	23,0 - 35,9	32,3 - 56,0	41,4 - 80,7
Injection System VM-EA, threaded stud Stainless Steel A4-70, HCR-70										
Approved tension load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	5,1 - 9,8	6,0 - 15,5	8,4 - 22,6	12,8 - 42,1	16,7 - 65,6	18,4 - 94,6
	50°C/80°C ¹⁾	C20/25	appr. N	[kN]	3,9 - 9,8	4,5 - 15,0	6,3 - 21,5	9,6 - 38,3	13,5 - 59,8	17,2 - 86,2
Approved shear load for $h_{ef,min} - h_{ef,max}$										
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	5,9	9,3	13,5	25,2	39,4	44,1 - 56,7
	50°C/80°C ¹⁾	C20/25	appr. V	[kN]	5,9	9,3	13,5	23,0 - 25,2	32,3 - 39,4	41,4 - 56,7
Spacing and edge distance										
Min. thickness of concrete slab for $h_{ef,min} - h_{ef,max}$	h_{min}	[mm]		100 - 190	100 - 230	100 - 270	116 - 356	138 - 448	152 - 536	
Minimum spacing	s_{min}	[mm]		40	50	60	80	100	120	
Minimum edge distance	c_{min}	[mm]		40	50	60	80	100	120	
Installation parameters										
Diameter of drill hole	d_o	[mm]		10	12	14	18	24	28	
Clearance hole in the fixture	$d_{r \leq}$	[mm]		9	12	14	18	22	26	
Range of drill hole depth for $h_{ef,min} - h_{ef,max}$	h_o	[mm]		60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	
Installation torque	$T_{inst,max}$	[Nm]		10	20	40	80	120	160	
Amount of adhesive per 100mm drill hole depth		[ml]		6,53	8,16	9,82	13,61	26,71	32,25	

¹⁾Max. long term temperature / max. short term temperature

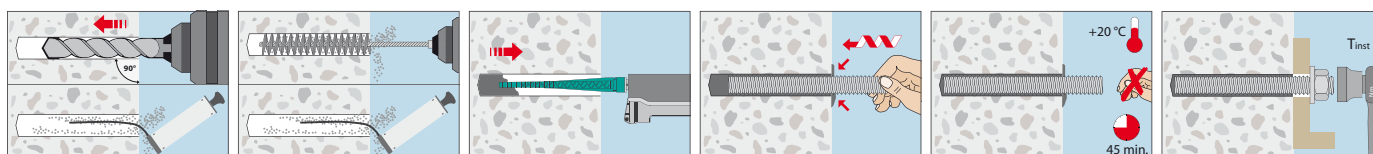
Higher concrete strength may lead to higher approved loads.

Loads and performance data				uncracked concrete								
Internally threaded sleeves				IG M6 x 80	IG M6 x 90	IG M8 x 80	IG M8 x 100	IG M10 x 80	IG M10 x 100	IG M12 x 125	IG M16 x 170	
Effective anchorage depth h_{ef}	[mm]			80	90	80	100	80	100	125	170	
Injection System VM-EA, Internally threaded sleeve VMU-IG, Steel 5.8												
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	12,8	13,8	20,0	36,2
	50°C/80°C ¹⁾	C20/25	appr. N	[kN]	4,8	4,8	7,2	8,1	9,6	12,0	18,7	30,5
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7
	50°C/80°C ¹⁾	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7
Injection System VM-EA, Internally threaded sleeve VMU-IG, Stainless steel A4-70, HCR-70												
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	5,3	5,3	9,6	9,9	12,8	15,7	22,5	40,7
	50°C/80°C ¹⁾	C20/25	appr. N	[kN]	5,3	5,3	7,2	9,0	9,6	12,0	18,7	30,5
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2
	50°C/80°C ¹⁾	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2
Spacing and edge distance												
Minimum thickness of concrete slab for h_{ef}	h_{min}	[mm]		110	120	110	130	116	136	173	226	
Minimum spacing	s_{min}	[mm]		50	50	60	60	80	80	100	120	
Minimum edge distance	c_{min}	[mm]		50	50	60	60	80	80	100	120	
Installation parameters												
Diameter of drill hole	d_o	[mm]		12	12	14	14	18	18	24	28	
Clearance hole in the fixture	$d_{r \leq}$	[mm]		7	7	9	9	12	12	14	18	
Range of drill hole depth for h_{ef}	d_o	[mm]		80	90	80	100	80	100	125	170	
Installation torque	$T_{inst \leq}$	[Nm]		10	10	10	10	20	20	40	60	
Amount of adhesive per drill hole		[ml]		6,6	7,4	7,9	9,9	10,9	13,6	33,4	54,9	

¹⁾Max. long term temperature / max. short term temperature

Higher concrete strength may lead to higher approved loads.

Installation in concrete





Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_P) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, Solid brick without Perfo Sleeve¹⁾

Solid brick Mz-DF according EN 771-1, Bulk density ρ: 1,64 kg/dm³, Minimum brick size: 240x115x55 mm (e.g. Unipor)							
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70							
			M8	M10	M12	M16	
Anchorage depth	h_{ef}	[mm]	80	90	100	100	
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240	270	300	300	
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120	135	150	150	
Approved tension load for compressive strength	$f_b \geq 10$ N/mm ²	appr. N	[kN]	0,4	0,4	0,4	0,7
	$f_b \geq 20$ N/mm ²	appr. N	[kN]	0,7	0,7	0,6	1,0
	$f_b \geq 28$ N/mm ²	appr. N	[kN]	0,9	0,9	0,7	1,3
Approved shear load for compressive strength	$f_b \geq 10$ N/mm ²	appr. V	[kN]	0,9	1,0	1,4	1,4
	$f_b \geq 20$ N/mm ²	appr. V	[kN]	1,3	1,6	2,1	2,1
	$f_b \geq 28$ N/mm ²	appr. V	[kN]	1,6	1,9	2,6	2,6
Drilling method					Hammer drilling		
Installation torque	$T_{inst,max}$	[Nm]	6	10	10	10	

Calcium silicate solid brick KS-NF according EN 771-2, Bulk density ρ: 2,0 kg/dm³, Minimum brick size: 240x115x71 mm (e.g. Wemding)							
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70							
			M8	M10	M12	M16	
Anchorage depth	h_{ef}	[mm]	80	90	100	100	
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240	270	300	300	
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120	135	150	150	
Approved tension load for compressive strength	$f_b \geq 10$ N/mm ²	appr. N	[kN]	0,9	0,9	1,1	0,9
	$f_b \geq 20$ N/mm ²	appr. N	[kN]	1,3	1,3	1,6	1,3
	$f_b \geq 27$ N/mm ²	appr. N	[kN]	1,6	1,6	1,9	1,6
Approved shear load for compressive strength	$f_b \geq 10$ N/mm ²	appr. V	[kN]	0,9	0,9	1,0	1,0
	$f_b \geq 20$ N/mm ²	appr. V	[kN]	1,3	1,3	1,4	1,4
	$f_b \geq 27$ N/mm ²	appr. V	[kN]	1,4	1,6	1,7	1,7
Drilling method					Hammer drilling		
Installation torque	$T_{inst,max}$	[Nm]	10	20	20	20	

Brickwork of solid lightweight concrete according EN 771-3, Bulk density ρ: 0,63 kg/dm³, Minimum brick size: 300x123x248 mm (e.g. Bisotherm)							
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70							
			M8	M10	M12	M16	
Anchorage depth	h_{ef}	[mm]	80	90	100	100	
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240	270	300	300	
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120	135	150	150	
Approved tension load for compressive strength	$f_b \geq 2$ N/mm ²	appr. N	[kN]	0,6	0,6	0,6	0,6
Approved shear load for compressive strength	$f_b \geq 2$ N/mm ²	appr. V	[kN]	0,9	1,0	1,1	1,1
Installation torque	$T_{inst,max}$	[Nm]	6	6	10	14	

Brickwork of solid lightweight concrete Leca Lex harkko RUH-200 according EN 771-3, Bulk density ρ: 0,78 kg/dm³, Minimum brick size: 498x200x195 mm (e.g. Saint-Gobain Weber)							
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70							
			M8	M10	M12	M16	
Anchorage depth	h_{ef}	[mm]	80	90	100	100	
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240	270	300	300	
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120	135	150	150	
Approved tension load for compressive strength	$f_b \geq 3$ N/mm ²	appr. N	[kN]	0,6	0,9	0,9	0,9
Approved shear load for compressive strength	$f_b \geq 3$ N/mm ²	appr. V	[kN]	0,9	1,1	1,1	1,1
Drilling method					Rotary drilling		
Installation torque	$T_{inst,max}$	[Nm]	6	12	14	16	

Installation parameters in solid brick without perfo sleeve						
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70						
			M8	M10	M12	M16
Diameter of drill hole	d_o	[mm]	10	12	14	18
Drill hole depth	h_o	[mm]	80	90	100	100
Drilling method					s. brick information	
Minimum wall thickness	h_{min}	[mm]	110	120	130	130
Clearance hole in the fixture	$d_{r \leq}$	[mm]	9	12	14	18
Diameter of brush					s. brick information	
Installation torque	$T_{inst,max}$	[Nm]	5,2	7,3	9,8	13,6
	VM-EA 300	[Pcs.]	50	36	26	19
Drill holes per cartridge	VM-EA 345	[Pcs.]	59	42	31	22
	VM-EA 420	[Pcs.]	73	52	39	28

¹⁾Installation with perfo sleeve, see ETA-17/0006



Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_P) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick without Perfo Sleeve

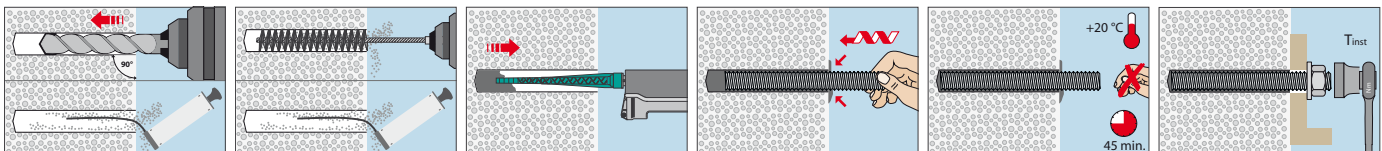
Autoclaved aerated concrete block AAC2 according EN 771-4, Bulk density ρ: 0,35 kg/dm³, Minimum brick size: 599x375x249 mm (e.g. Ytong)			
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			
			M8 M10 M12 M16
Anchorage depth	h_{ef}	[mm]	80 90 100 100
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240 270 300 300
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120 135 150 150
Approved tension load for compressive strength	$f_b \geq 2 \text{ N/mm}^2$	appr. N [kN]	0,3 0,3 0,5 0,5
Approved shear load for compressive strength	$f_b \geq 2 \text{ N/mm}^2$	appr. V [kN]	0,5 0,7 0,9 1,3

Autoclaved aerated concrete block AAC4 according EN 771-4, Bulk density ρ: 0,50 kg/dm³, Minimum brick size: 499x375x249 mm (e.g. Ytong)			
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			
			M8 M10 M12 M16
Anchorage depth	h_{ef}	[mm]	80 90 100 100
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240 270 300 300
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120 135 150 150
Approved tension load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. N [kN]	0,3 0,9 0,9 1,3
Approved shear load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. V [kN]	0,5 0,7 0,9 1,3

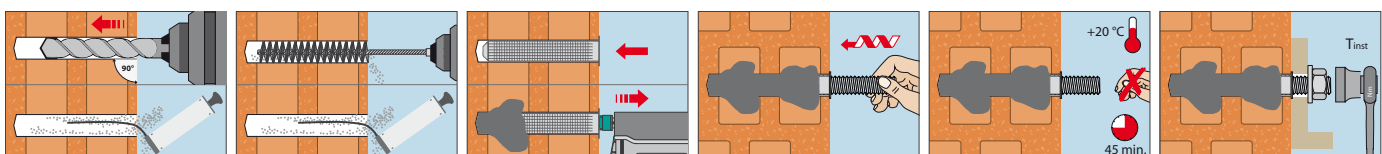
Autoclaved aerated concrete block AAC6 according EN 771-4, Bulk density ρ: 0,60 kg/dm³, Minimum brick size: 499x240x249 mm (e.g. Porit)			
Threaded stud: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			
			M8 M10 M12 M16
Anchorage depth	h_{ef}	[mm]	80 90 100 100
Spacing = Minimum spacing	$s_{cr} = s_{min}$	[mm]	240 270 300 300
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	120 135 150 150
Approved tension load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. N [kN]	0,7 1,1 1,6 2,0
Approved shear load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. V [kN]	2,0 3,2 3,2 3,9

Installation parameters autoclaved aerated concrete without perfo sleeve			
Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			
			M8 M10 M12 M16
Diameter of drill hole	d_o	[mm]	10 12 14 18
Drill hole depth	h_o	[mm]	80 90 100 100
Drilling method			Drehbohren
Minimum wall thickness	h_{min}	[mm]	110 120 130 130
Clearance hole in the fixture	$d_{r \leq}$	[mm]	9 12 14 18
Installation torque	$T_{inst,max}$	[Nm]	2 2 2 2
Amount of adhesive per drill hole		[ml]	5,2 7,3 9,8 13,6
Drill holes per cartridge	VM-EA 300	[Pcs.]	50 36 26 19
	VM-EA 345	[Pcs.]	59 42 31 22
	VM-EA 420	[Pcs.]	73 52 39 28

Installation in autoclaved aerated concrete and solid brick without perfo sleeve



Installation in perforated brick with perfo sleeve





Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_m and γ_p) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick with Perfo Sleeve

Calcium silicate hollow brick KSL-3DF according EN 771-2, Bulk density ρ : 1,4 kg/dm³, Brick size: 240x175x113 mm (e.g. Wemding)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10	M12/M16	M12	M16			
Perfo sleeves VM-SH			12x80	16x85	16x130 / 16x130/330	20x85	20x130	20x200	20x130	20x200
Anchorage depth	hef	[mm]	80	85	130	85	130	200	130	200
Spacing = Minimum spacing parallel to the horizontal joint	Scr = S _{min,II}	[mm]	240	240	240	240	240	240	240	240
Minimum spacing vertical to the horizontal joint	Scr = S _{min,I}	[mm]	113	113	113	113	113	113	113	113
Edge distance = Minimum edge distance	Ccr = C _{min}	[mm]	100	100	100	120	120	120	120	120
Approved tension load for compressive strength	f _b \geq 8 N/mm ²	appr. N [kN]	0,4	0,4	0,7	0,4	0,7	0,7	0,7	0,7
	f _b \geq 12 N/mm ²	appr. N [kN]	0,6	0,6	1,0	0,6	1,0	1,0	1,0	1,0
	f _b \geq 14 N/mm ²	appr. N [kN]	0,7	0,7	1,1	0,7	1,1	1,1	1,1	1,1
Approved shear load for compressive strength	f _b \geq 8 N/mm ²	appr. V [kN]	0,6	0,7	0,9	0,9	0,9	0,9	1,1	1,1
	f _b \geq 12 N/mm ²	appr. V [kN]	0,7	1,0	1,3	1,0	1,3	1,3	1,4	1,4
	f _b \geq 14 N/mm ²	appr. V [kN]	0,9	1,1	1,4	1,3	1,4	1,4	1,7	1,7
Installation torque	T _{inst,max}	[Nm]	8	8	8	8	8	8	8	8

Calcium silicate hollow brick KSL-12DF according EN 771-2, Bulk density ρ : 1,4 kg/dm³, Brick size: 498x175x238 mm (e.g. Wemding)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10	M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 / 16x130/330	20x85	20x130
Anchorage depth	hef	[mm]	80	85	130	85	130
Spacing = Minimum spacing parallel to the horizontal joint	Scr = S _{min,II}	[mm]	498	498	498	498	498
Minimum spacing vertical to the horizontal joint	Scr = S _{min,I}	[mm]	238	238	238	238	238
Minimum spacing vertical to the horizontal joint	Ccr = C _{min}	[mm]	100	100	100	120	120
Approved tension load for compressive strength	f _b \geq 10 N/mm ²	appr. N [kN]	0,1	0,3	1,0	0,3	1,0
	f _b \geq 12 N/mm ²	appr. N [kN]	0,1	0,4	1,3	0,4	1,3
	f _b \geq 16 N/mm ²	appr. N [kN]	0,1	0,6	1,6	0,6	1,6
Approved shear load for compressive strength	f _b \geq 10 N/mm ²	appr. V [kN]	0,9	1,7	2,0	1,7	2,0
	f _b \geq 12 N/mm ²	appr. V [kN]	1,0	2,0	2,3	2,0	2,3
	f _b \geq 16 N/mm ²	appr. V [kN]	1,1	2,6	2,9	2,4	2,9
Installation torque	T _{inst,max}	[Nm]	2	4	4	4	4

Clay hollow brick HLZ-16DF according EN 771-1, Bulk density ρ : 0,83 kg/dm³, Brick size: 497x238x240 mm (e.g. Unipor)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8	M8	M10	M10	M12/M16		
Perfo sleeves VM-SH			12x80	16x85	16x130	16x85	16x130	20x85	20x130	20x200
Anchorage depth	hef	[mm]	80	85	130	85	130	85	130	200
Spacing = Minimum spacing parallel to the horizontal joint	Scr = S _{min,II}	[mm]	497	497	497	497	497	497	497	497
Minimum spacing vertical to the horizontal joint	Scr = S _{min,I}	[mm]	238	238	238	238	238	238	238	238
Edge distance = Minimum edge distance	Ccr = C _{min}	[mm]	100	100	100	100	100	120	120	120
Approved tension load for compressive strength	f _b \geq 6 N/mm ²	appr. N [kN]	0,3	0,4	0,7	0,4	0,7	0,6	0,7	0,7
	f _b \geq 9 N/mm ²	appr. N [kN]	0,3	0,6	0,9	0,6	0,9	0,7	0,9	0,9
	f _b \geq 12 N/mm ²	appr. N [kN]	0,4	0,7	1,0	0,7	1,0	1,0	1,0	1,0
	f _b \geq 14 N/mm ²	appr. N [kN]	0,4	0,7	1,0	0,7	1,0	1,0	1,0	1,0
Approved shear load for compressive strength	f _b \geq 6 N/mm ²	appr. V [kN]	0,7	1,1	1,1	1,1	1,7	1,1	1,7	1,7
	f _b \geq 9 N/mm ²	appr. V [kN]	0,9	1,3	1,4	1,4	2,0	1,4	2,0	2,0
	f _b \geq 12 N/mm ²	appr. V [kN]	1,0	1,6	1,7	1,7	2,3	1,7	2,3	2,3
	f _b \geq 14 N/mm ²	appr. V [kN]	1,1	1,7	1,9	1,7	2,6	1,7	2,6	2,6
Installation torque	T _{inst,max}	[Nm]	6	6	6	6	6	6	6	6

Clay hollow brick Porotherm Homebric according EN 771-1, Bulk density ρ : 0,68 kg/dm³, Brick size: 500x200x299 mm (e.g. Wienerberger)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10	M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 / 16x130/330	20x85	20x130
Anchorage depth	hef	[mm]	80	85	130	85	130
Spacing = Minimum spacing parallel to the horizontal joint	Scr = S _{min,II}	[mm]	500	500	500	500	500
Minimum spacing vertical to the horizontal joint	Scr = S _{min,I}	[mm]	299	299	299	299	299
Edge distance = Minimum edge distance	Ccr = C _{min}	[mm]	100	100	100	120	120
Approved tension load for compressive strength	f _b \geq 6 N/mm ²	appr. N [kN]	0,3	0,3	0,4	0,3	0,4
	f _b \geq 8 N/mm ²	appr. N [kN]	0,3	0,3	0,4	0,3	0,4
	f _b \geq 10 N/mm ²	appr. N [kN]	0,3	0,4	0,6	0,4	0,6
Approved shear load for compressive strength	f _b \geq 6 N/mm ²	appr. V [kN]	0,6	0,6	0,7	0,9	0,9
	f _b \geq 8 N/mm ²	appr. V [kN]	0,7	0,7	0,9	1,0	1,0
	f _b \geq 10 N/mm ²	appr. V [kN]	0,9	0,9	1,0	1,1	1,1
Installation torque	T _{inst,max}	[Nm]	2	6	6	6	6



Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick with Perfo Sleeve

Clay hollow brick BGV Thermo according EN 771-1, Bulk density ρ : 0,62 kg/dm³, Brick size: 500x200x314 mm (e.g. Leroux)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8/M10	M8	M10	M12	M16	M12 / M16
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	16x130 16x130/330	20x85	20x85	20x130
Anchorage depth	h_{ef}	[mm]	80	85	130	130	85	85	130
Spacing = Minimum spacing parallel to the horizontal joint	$s_{cr} = s_{min,II}$	[mm]	500	500	500	500	500	500	500
Minimum spacing vertical to the horizontal joint	$s_{cr} = s_{min,I}$	[mm]	314	314	314	314	314	314	314
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	100	100	100	100	120	120	120
Approved tension load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. N	[kN]	0,1	0,2	0,3	0,3	0,2	0,3
	$f_b \geq 6 \text{ N/mm}^2$	appr. N	[kN]	0,2	0,3	0,3	0,4	0,3	0,4
	$f_b \geq 10 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,3	0,4	0,4	0,3	0,4
Approved shear load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. V	[kN]	0,6	0,6	0,7	0,7	0,6	0,7
	$f_b \geq 6 \text{ N/mm}^2$	appr. V	[kN]	0,6	0,7	0,9	0,9	0,9	0,9
	$f_b \geq 10 \text{ N/mm}^2$	appr. V	[kN]	0,9	1,0	1,1	1,1	1,0	1,1
Installation torque	$T_{inst,max}$	[Nm]	2	4	4	4	4	4	4

Clay hollow brick Calibric Th according EN 771-1, Bulk density ρ : 0,62 kg/dm³, Brick size: 500x200x314 mm (e.g. Terreal)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8/M10	M8	M10	M12	M16	M12 / M16
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	16x130 16x130/330	20x85	20x85	20x130
Anchorage depth	h_{ef}	[mm]	80	85	130	130	85	85	130
Spacing = Minimum spacing parallel to the horizontal joint	$s_{cr} = s_{min,II}$	[mm]	500	500	500	500	500	500	500
Minimum spacing vertical to the horizontal joint	$s_{cr} = s_{min,I}$	[mm]	314	314	314	314	314	314	314
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	100	100	100	100	120	120	120
Approved tension load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. N	[kN]	0,2	0,2	0,3	0,3	0,2	0,3
	$f_b \geq 9 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,3	0,3	0,3	0,3	0,4
	$f_b \geq 12 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,3	0,3	0,4	0,3	0,4
Approved shear load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. V	[kN]	0,7	1,0	1,0	1,0	1,7	1,7
	$f_b \geq 9 \text{ N/mm}^2$	appr. V	[kN]	1,0	1,3	1,3	1,3	2,1	2,1
	$f_b \geq 12 \text{ N/mm}^2$	appr. V	[kN]	1,1	1,6	1,6	1,6	2,4	2,4
Installation torque	$T_{inst,max}$	[Nm]	2	2	2	2	2	2	2

Clay hollow brick Urbanbric according EN 771-1, Bulk density ρ : 0,74 kg/dm³, Brick size: 560x200x274 mm (e.g. Imerys)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10	M12 / M16
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330
Anchorage depth	h_{ef}	[mm]	80	85	130
Spacing = Minimum spacing parallel to the horizontal joint	$s_{cr} = s_{min,II}$	[mm]	560	560	560
Minimum spacing vertical to the horizontal joint	$s_{cr} = s_{min,I}$	[mm]	274	274	274
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	100	100	100
Approved tension load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,3
	$f_b \geq 9 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,4
	$f_b \geq 9 \text{ N/mm}^2$	appr. N	[kN]	0,3	0,6
Approved shear load for compressive strength	$f_b \geq 6 \text{ N/mm}^2$	appr. V	[kN]	0,9	1,0
	$f_b \geq 9 \text{ N/mm}^2$	appr. V	[kN]	1,0	1,1
	$f_b \geq 9 \text{ N/mm}^2$	appr. V	[kN]	1,0	1,3
Installation torque	$T_{inst,max}$	[Nm]	2	2	2

Clay hollow brick Blocchi Leggeri according EN 771-1, Bulk density ρ : 0,55 kg/dm³, Brick size: 250x120x250 mm (e.g. Wienerberger)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10	M12 / M16
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330
Anchorage depth	h_{ef}	[mm]	80	85	130
Spacing = Minimum spacing parallel to the horizontal joint	$s_{cr} = s_{min,II}$	[mm]	250	250	250
Minimum spacing vertical to the horizontal joint	$s_{cr} = s_{min,I}$	[mm]	250	250	250
Edge distance = Minimum edge distance	$c_{cr} = c_{min}$	[mm]	100	100	100
Approved tension load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. N	[kN]	0,1	0,1
	$f_b \geq 6 \text{ N/mm}^2$	appr. N	[kN]	0,1	0,1
	$f_b \geq 8 \text{ N/mm}^2$	appr. N	[kN]	0,2	0,2
Approved shear load for compressive strength	$f_b \geq 4 \text{ N/mm}^2$	appr. V	[kN]	0,6	0,6
	$f_b \geq 6 \text{ N/mm}^2$	appr. V	[kN]	0,6	0,6
	$f_b \geq 8 \text{ N/mm}^2$	appr. V	[kN]	0,7	0,7
Installation torque	$T_{inst,max}$	[Nm]	4	4	4


Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_P) is included. For further details and temperature ranges see ETA.

Perforated brick with Perfo Sleeve
Injection System VM-EA, perforated brick with Perfo Sleeve
Clay hollow brick Doppio Uni according EN 771-1, Bulk density ρ : 0,92 kg/dm³, Brick size: 250x120x120 mm (e.g. Wienerberger)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10		M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	20x85	20x130	20x200
Anchorage depth	h_{ef}	[mm]	80	85	130	85	130	200
Spacing = Minimum spacing parallel to the horizontal joint			$S_{cr} = S_{min, }$	[mm]	250	250	250	250
Minimum spacing vertical to the horizontal joint			$S_{cr} = S_{min,\perp}$	[mm]	120	120	120	120
Edge distance = Minimum edge distance			$C_{cr} = C_{min}$	[mm]	100	100	100	100
Approved tension load for compressive strength	$f_b \geq 10$ N/mm ²	appr. N	[kN]	0,3	0,3	0,3	0,3	0,3
	$f_b \geq 16$ N/mm ²	appr. N	[kN]	0,3	0,3	0,3	0,4	0,4
	$f_b \geq 20$ N/mm ²	appr. N	[kN]	0,3	0,3	0,4	0,4	0,4
	$f_b \geq 28$ N/mm ²	appr. N	[kN]	0,4	0,4	0,4	0,6	0,6
Approved shear load for compressive strength	$f_b \geq 10$ N/mm ²	appr. V	[kN]	0,6	0,6	0,6	0,6	0,6
	$f_b \geq 16$ N/mm ²	appr. V	[kN]	0,7	0,7	0,7	0,7	0,7
	$f_b \geq 20$ N/mm ²	appr. V	[kN]	0,9	0,9	0,9	0,9	0,9
	$f_b \geq 28$ N/mm ²	appr. V	[kN]	1,0	1,0	1,0	1,0	1,0
Installation torque			$T_{inst,max}$	[Nm]	4	4	4	4

Brickwork of hollow lightweight concrete Bloc creux B40 according EN 771-3, Bulk density ρ : 0,8 kg/dm³, Brick size: 494x200x190 mm (e.g. Sepa)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10		M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	20x85	20x130	
Anchorage depth	h_{ef}	[mm]	80	85	130	85	130	
Spacing = Minimum spacing parallel to the horizontal joint			$S_{cr} = S_{min, }$	[mm]	494	494	494	494
Minimum spacing vertical to the horizontal joint			$S_{cr} = S_{min,\perp}$	[mm]	190	190	190	190
Edge distance = Minimum edge distance			$C_{cr} = C_{min}$	[mm]	100	100	120	120
Approved tension load for compressive strength	$f_b \geq 4$ N/mm ²	appr. N	[kN]	0,1	0,2	0,6	0,3	0,6
	$f_b \geq 4$ N/mm ²	appr. V	[kN]	0,3	0,9	1,0	0,9	1,0
Installation torque			$T_{inst,max}$	[Nm]	2	2	2	2

Brickwork of hollow lightweight concrete Leca Lex harkko RUH-200 according EN 771-3, Bulk density ρ : 0,7 kg/dm³, Brick size: 498x200x195 mm (e.g. Saint-Gobain Weber)

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10		M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	20x85	20x130	
Anchorage depth	h_{ef}	[mm]	80	85	130	85	130	
Spacing = Minimum spacing parallel to the horizontal joint			$S_{cr} = S_{min, }$	[mm]	498	498	498	498
Minimum spacing vertical to the horizontal joint			$S_{cr} = S_{min,\perp}$	[mm]	195	195	195	195
Edge distance = Minimum edge distance			$C_{cr} = C_{min}$	[mm]	120	127	195	195
Approved tension load for compressive strength	$f_b \geq 2,7$ N/mm ²	appr. N	[kN]	0,6	0,6	0,7	0,7	0,7
	$f_b \geq 2,7$ N/mm ²	appr. V	[kN]	0,7	1,0	1,0	1,0	1,0
Installation torque			$T_{inst,max}$	[Nm]	8	8	8	8

Installation parameters in perforated bricks with perfo sleeve

Threaded studs: Steel: \geq FKL 5.8; A4, HCR: \geq FKL 70			M8	M8 / M10		M12 / M16		
Perfo sleeves VM-SH			12x80	16x85	16x130 16x130/330	20x85	20x130	20x200
Diameter of drill hole	d_o	[mm]	12	16	16	16	20	20
Drill hole depth	h_o	[mm]	85	90	135	135 + t_{fix}	90	135
Drilling method			Rotary drilling					
Minimum wall thickness	h_{min}	[mm]	115	115	175	175	115	175
Clearance hole in the fixture	$d_{f\leq}$	[mm]	9	9 / 12	9 / 12	9 / 12	14 / 18	14 / 18
Installation torque			$T_{inst,max}$	[Nm]	s. brick information			
Amount of adhesive per drill hole			[ml]	11,2	24,9	38,0	38 - 68 ¹⁾	41,1
Drill holes per cartridge	VM-EA 300	[pcs.]	23	10	6	3 - 6 ¹⁾	6	2
	VM-EA 345	[pcs.]	27	12	8	4 - 8 ¹⁾	7	3
	VM-EA 420	[pcs.]	33	15	10	5 - 10 ¹⁾	9	3

¹⁾Dependent on actual perfo sleeve length