

Post-installed Rebar Connections with Injection System VME



Cartridge VME 385
Side-by-side cartridge
Content: 385ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter



Cartridge VME 585
Side-by-side cartridge
Content: 585ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter



Cartridge VME 1400
Side-by-side cartridge
Content: 1400ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter

Diameter of Rebar: 8 -28 mm
Range of Concrete Quality: C12/15 - C50/60
Material: Reinforcement Bars BS500 S

Description

The Injection System VME for post-installed rebar connections has a European Technical Approval (ETA-07/0299). Reinforcement bars from 8 to 28 mm diameter can be fastened in regular concrete from strength class C12/15 to C50/60. As usual the reinforcement can be designed in accordance with EN 1992-1-1:2004 (EC 2). Using the Tension Anchor ZA in sizes M12, M16 and M20 steel structures can be fixed at minimum edge distance. The hole cleaning procedure for the MKT Injection System VME is much easier when hammer drilling or air drilling. Just blow the holes out using compressed air and the specific MKT cleaning tools. The reduced cleaning results in quicker installation saving labor costs. Installer training is provided by MKT and a certificate will be issued by an independent institute, which is recognized by the DIBt.

Applications

Subsequent closing of wall- and ceiling openings, reinforcing existing concrete structures, installation of reinforcement to connect successive structural members, e.g. if reinforcement has been left out or could not be cast in due to the construction sequence, connection of steel structures.



Injection Cartridge VME



- ➔ Very high loads
- ➔ No shrinkage

Description	Ref. No.	Content ml	Content of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VME 385	28255501	385	12	8,5	0,70
Cartridge VME 585	28255601	585	12	12,09	0,98
Cartridge VME 1400	28255701	1400	5	12,34	2,40
Static mixer VM-XL	28305201	-	10	0,28	0,03

One static mixer VM-XL including a reducers/extension tube as well as one screw-on cap comes with each cartridge.




Extract from Permissible Service Conditions of ETA-09/0350.

Approved loads for single anchor without influence of spacing and edge distance.

 Total safety factor as per ETAG 001 included (γ_M and γ_P). Load capacities under fire exposure see page 104.

Loads and performance data

Injection System VME, threaded stud ss A4/316 / ss HCR				M8	M10	M12	M16	M20	M24	M27	M30	
Range of anchorage depths	$h_{ef,min} - h_{ef,max}$	[mm]		60 - 96	60 - 120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360	
Approved loads, tension for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	-	-	7,9-16,2	10,2-24,9	10,5-30,8	11,5-40,6	-	-
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,7-9,7	6,4-15,3	6,7-18,0	8,6-25,9	-	-
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,2-8,6	5,6-13,4	5,8-15,4	7,4-22,2	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	9,0-9,9	9,3-15,7	11,7-22,5	14,3-42,0	14,7-63,9	16,2-84,0	19,3-57,4	22,6-70,2
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	5,7-9,1	7,1-14,2	9,4-19,4	13,6-32,6	14,7-41,0	16,2-55,4	19,3-57,4	22,6-70,2
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	5,1-8,1	6,4-12,7	8,4-17,2	12,0-28,7	13,5-35,9	16,2-51,7	19,3-57,4	22,6-70,2
Approved loads, shear for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	-	-	13,7	24,5-25,2	29,3-39,4	32,2-56,8	-	-
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	-	-	11,3-13,7	15,3-25,2	18,8-39,4	24,1-56,8	-	-
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	-	-	10,1-13,7	13,4-25,2	16,2-39,4	20,7-56,8	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	45,2-56,8	34,5	42,0
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	45,2-56,8	34,5	42,0
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	37,7-39,4	45,2-56,8	34,5	42,0
Spacing and edge distance												
Min. thickness of concrete slab for $h_{ef,min} - h_{ef,max}$	h_{min}	[mm]		100-126	100-150	100-174	116-228	138-288	152-344	172-388	190-430	
Minimum spacing	s_{min}	[mm]		40	50	60	80	100	120	135	150	
Minimum edge distance	c_{min}	[mm]		40	50	60	80	100	120	135	150	
Installation parameters												
Drill hole diameter	d_o	[mm]		10	12	14	18	24	28	32	35	
Clearance hole in the fixture	d_f	[mm]		9	12	14	18	22	26	30	33	
Range of drill hole depth for $h_{ef,min} - h_{ef,max}$	h_o	[mm]		60 - 96	60 - 120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360	
Installation torque	$\leq T_{inst}$	[Nm]		10	20	40	80	120	160	180	200	

Injection System VME, reinforcement bars BSt 500 S

				Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32	
Range of anchorage depths	$h_{ef,min} - h_{ef,max}$	[mm]		60 - 96	60 - 120	70 - 144	75 - 168	80 - 192	90 - 240	100 - 300	112 - 336	128 - 384	
Approved loads, tension for $h_{ef,min} - h_{ef,max}$													
cracked concrete													
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	-	-	5,8-11,8	5,9-13,2	7,2-17,2	7,7-20,5	9,3-28,0	-	-
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	-	-	3,1-6,5	3,9-8,8	4,0-9,6	4,8-12,8	5,3-16,0	-	-
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	-	-	3,1-6,5	3,3-7,3	4,0-9,6	3,8-10,3	5,3-16,0	-	-
non-cracked concrete													
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	6,6-10,5	8,2-16,5	10,5-21,5	13,0-29,3	14,3-36,4	14,7-46,2	17,2-72,1	20,4-85,5	24,9-111,6
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	3,9-6,2	4,9-9,7	6,8-14,0	7,9-17,6	9,6-23,0	10,6-28,2	14,7-44,1	16,8-50,3	21,9-65,7
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	3,6-5,7	4,5-9,0	5,8-11,8	7,2-16,1	8,8-21,1	9,6-25,6	12,0-36,1	15,1-45,2	19,7-59,1
Approved loads, shear for $h_{ef,min} - h_{ef,max}$													
cracked concrete													
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	-	-	13,8-14,8	14,1-20,0	17,2-26,2	21,5-41,0	26,2-64,3	-	-
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	-	-	7,5-14,8	9,4-20,0	9,6-23,0	13,5-35,9	15,0-44,9	-	-
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	-	-	7,5-14,8	7,9-17,6	9,6-23,0	10,8-28,7	15,0-44,9	-	-
non-cracked concrete													
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	48,1-64,3	57,0-80,5	69,6-105,2
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	6,7	10,5	14,8	18,8-20,0	23,0-26,2	29,6-41,0	41,1-64,3	46,9-80,5	61,3-105,2
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	6,7	10,5	13,8-14,8	17,3-20,0	21,1-26,2	26,9-41,0	33,7-64,3	42,2-80,5	55,1-105,2
Spacing and edge distance													
Min. thickness of concrete slab for $h_{ef,min} - h_{ef,max}$	h_{min}	[mm]		100-126	100-150	102-176	111-204	120-232	138-288	164-364	182-406	202-458	
Minimum spacing	s_{min}	[mm]		40	50	60	70	80	100	125	140	160	
Minimum edge distance	c_{min}	[mm]		40	50	60	70	80	100	125	140	160	
Installation parameters													
Drill hole diameter	d_o	[mm]		12	14	16	18	20	24	32	35	40	
Range of drill hole depth for $h_{ef,min} - h_{ef,max}$	h_o	[mm]		60 - 96	60 - 120	70 - 144	75 - 168	80 - 192	90 - 240	100 - 300	112 - 336	128 - 384	

¹⁾ max long term temperature / max short term temperature
Higher concrete strength may lead to higher approved loads.

For anchor designing an easy to operate CD-ROM is available on request or can be downloaded at www.mkt.de.

Injection System VME



Threaded Stud V-A



Threaded Stud VMU-A



Threaded Stud VM-A
1 meter length, to be cut to the required length



Reinforcement Bars BSt 500 S



Cartridge VME 385
Side-by-side cartridge
Content: 385ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter



Cartridge VME 585
Side-by-side cartridge
Content: 585ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter



Cartridge VME 1400
Side-by-side cartridge
Content: 1400ml
With big mixer VM-XL and reducers / extension tube for drill holes from 12mm diameter

Range of loading: 3,1 - 128 kN

Concrete quality: C20/25 - C50/60

Material: Steel zinc plated, hot dip galvanized, Stainless steel A4/316, Stainless steel HCR, BSt 500 S

Description

The Injection System VME is an approved system for fixings of threaded studs or reinforcement bars in cracked and non-cracked concrete. In the cartridge, the epoxy resin and the hardener are separated. By means of the dispenser gun VM-P the components are pushed through the mixer nozzle, activated and injected into the drill hole. The Injection System VME can be used with the threaded Studs V-A (see pages 119) and VMU-A (see page 92). It can also be used with VM-A studs, sold by meter to be cut to the required length or with standard reinforcement bars.



Applications

Fixing of rack systems, railings, steel structures, noise barriers, stairs and machines.
Subsequent closure of wall and ceiling openings, reinforcement of existing concrete structures, installation of reinforcement for the connection of the following concrete components (if the installation of reinforcement was missed or not possible because of the working process), connection of steel structures.

Advantages:

- approved in cracked and non-cracked concrete
- approved with threaded studs and reinforcement bars
- approved with standard threaded studs (strength test required)
- approved to use under seismic action according to the performance category C1
- also approved for post-installed rebar connections according to ETA-07/0299 / Z-21.8-1872 (see page 79)
- approved for diamond coring (ETA 13/0773)
- variable anchorage depth for less drilling efforts
- long curing times for an economic working process with serial installations and/or large drill holes
- suitable for dry and wet concrete and in water-filled drill holes
- styrene-free
- fire test report

Injection Cartridge VME



- Very high loads
- No shrinkage

Description	Ref. No.	Content ml	Content of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VME 385	28255501	385	12	8,5	0,70
Cartridge VME 585	28255601	585	12	12,09	0,98
Cartridge VME 1400	28255701	1400	5	12,34	2,40
Static mixer VM-XL ¹⁾	28305201	-	10	0,28	0,03
Static mixer VM-X ²⁾	28305111	-	12	0,12	0,01

One static mixer VM-XL as well as one screw-on cap comes with each cartridge.

¹⁾ Mixer VM-XL comes with a reducers / extension tube. Suitable for drill holes from 12mm diameter.

²⁾ Static mixer VM-X only required for drill hole diameter of 10mm (special accessories).



Extract from Permissible Service Conditions of ETA-09/0350.

Approved loads for single anchor without influence of spacing and edge distance.

Total safety factor as per ETAG 001 included (γ_M and γ_P). Load capacities under fire exposure see page 139.

Loads and performance data

Injection System VME, threaded stud steel grade 5.8				M8	M10	M12	M16	M20	M24	M27	M30	
Range of anchorage depths	$h_{ef,min} - h_{ef,max}$	[mm]		60 - 96	60 - 120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360	
Approved loads, tension for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	-	-	7,9-16,2	10,2-24,9	10,5-30,8	11,5-40,6	-	-
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,7-9,7	6,4-15,3	6,7-18,0	8,6-25,9	-	-
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,2-8,6	5,6-13,4	5,8-15,4	7,4-22,2	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	8,6	9,3-13,8	11,7-20,0	14,3-37,1	14,7-58,1	16,2-83,8	19,3-100,2	22,6-117,3
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	5,7-8,6	7,1-13,8	9,4-19,4	13,6-32,6	14,7-41,0	16,2-55,4	19,3-70,1	22,6-86,6
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	5,1-8,1	6,4-12,7	8,4-17,2	12,0-28,7	13,5-35,9	16,2-51,7	19,3-60,8	22,6-75,0
Approved loads, shear for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	-	-	12,0	22,3	29,3-34,9	32,3-50,3	-	-
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	-	-	11,3-12,0	15,3-22,3	18,8-34,9	24,1-50,3	-	-
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	-	-	10,1-12,0	13,4-22,3	16,2-34,9	20,7-50,3	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	5,1	8,6	12,0	22,3	34,9	45,2-50,3	54,0-65,7	63,2-80,0
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	5,1	8,6	12,0	22,3	34,9	45,2-50,3	54,0-65,7	63,2-80,0
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	5,1	8,6	12,0	22,3	34,9	45,2-50,3	54,0-65,7	63,2-80,0

Injection System VME, threaded stud steel grade 8.8				M8	M10	M12	M16	M20	M24	M27	M30	
Range of anchorage depths	$h_{ef,min} - h_{ef,max}$	[mm]		60 - 96	60 - 120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360	
Approved loads, tension for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	-	-	7,9-16,2	10,2-24,9	10,5-30,8	11,5-40,6	-	-
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,7-9,7	6,4-15,3	6,7-18,0	8,6-25,9	-	-
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	-	-	4,2-8,6	5,6-13,4	5,8-15,4	7,4-22,2	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. N	[kN]	9,0-13,8	9,3-21,9	11,7-31,9	14,3-53,3	14,7-63,9	16,2-84,0	19,3-100,2	22,6-117,3
	43°C/60°C ¹⁾	C20/25	appr. N	[kN]	5,7-9,1	7,1-14,2	9,4-19,4	13,6-32,6	14,7-41,0	16,2-55,4	19,3-70,1	22,6-86,6
	43°C/72°C ¹⁾	C20/25	appr. N	[kN]	5,1-8,1	6,4-12,7	8,4-17,2	12-28,7	13,5-35,9	16,2-51,7	19,3-60,8	22,6-75,0
Approved loads, shear for $h_{ef,min} - h_{ef,max}$												
cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	-	-	18,8-19,4	24,5-36,0	29,3-56,0	32,3-80,6	-	-
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	-	-	11,3-19,4	15,3-36,0	18,8-50,3	24,1-72,4	-	-
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	-	-	10,1-19,4	13,4-32,2	16,2-43,1	20,7-62,0	-	-
non-cracked concrete												
Range of temperature	24°C/40°C ¹⁾	C20/25	appr. V	[kN]	8,6	13,1	19,4	34,4-36,0	41,1-56,0	45,2-80,6	54,0-105,1	63,2-128,0
	43°C/60°C ¹⁾	C20/25	appr. V	[kN]	8,6	13,1	19,4	32,6-36,0	41,1-56,0	45,2-80,6	54,0-105,1	63,2-128,0
	43°C/72°C ¹⁾	C20/25	appr. V	[kN]	8,6	13,1	19,4	28,7-36,0	37,7-56,0	45,2-80,6	54,0-105,1	63,2-128,0

Spacing and edge distance

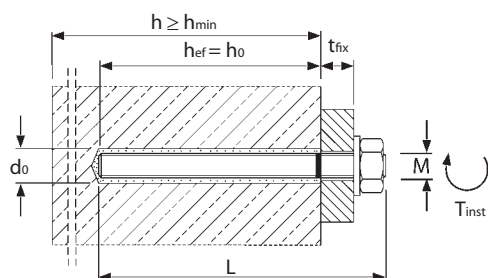
Min. thickness of concrete slab for $h_{ef,min} - h_{ef,max}$	h_{min}	[mm]	100-126	100-150	100-174	116-228	138-288	152-344	172-388	190-430
Minimum spacing	s_{min}	[mm]	40	50	60	80	100	120	135	150
Minimum edge distance	c_{min}	[mm]	40	50	60	80	100	120	135	150

Installation parameters

Drill hole diameter	d_o	[mm]	10	12	14	18	24	28	32	35
Clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26	30	33
Range of drill hole depth for $h_{ef,min} - h_{ef,max}$	h_o	[mm]	60 - 96	60 - 120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360
Installation torque	$\leq T_{inst}$	[Nm]	10	20	40	80	120	160	180	200

¹⁾ max long term temperature / max short term temperature
Higher concrete strength may lead to higher approved loads.

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Curing time Injection Adhesive VME

→ Cartridge temperature when installing min. +5°C

Temperature (°C) of the base material	maximum working time	minimum curing time	
		dry base material	wet base material
+5°C to +9°C	1:00 h	72 h	144 h
+10°C to +19°C	45 min	36 h	72 h
+20°C to +29°C	30 min	10 h	20 h
+30°C to +39°C	20 min	6 h	12 h
40°C	12 min	4 h	8 h