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 BSt 500 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.

ETA 07/0299

F30-F180

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_F). 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 für $h_{ef,min}$ - $h_{ef,max}$			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.

Tension Anchor ZA

Thread: M12, M16, M20
Range of Concrete Quality: C12/15 - C50/60
Material: Stainless steel A4/316
On request: Stainless steel HCR

Applications
Connection of steel structures to reinforced concrete
Maximum loads with minimum edge distance possible
Brackets, canopies, signs, stairs

Tension Anchor ZA

- Stainless steel A4; High corrosion resistant steel 1.4529 (HCR)
- Approved for cracked and non-cracked concrete

ETA 07/0299

F30-F180

Description	Ref. No.	Drill-hole-Ø mm	max. setting depth mm	Fixture-thickness t_{fix} mm	Anchor-length mm	Weight per piece kg
ZA M12-60/975 A4	85306501	16	900	60	975	0,9
ZA M12-200/1115 A4	85320501	16	900	200	1115	1,0
ZA M16-60/1180 A4	85506501	20	1100	60	1180	1,9
ZA M16-200/1320 A4	85520501	20	1100	200	1320	2,1
ZA M20-60/1485 A4	85606501	25	1400	60	1485	3,7
ZA M20-200/1625 A4	85620501	25	1400	200	1625	4,0

Stainless steel HCR and other lengths on demand.

Cartridge Injection Adhesive VME see page 103
Dispenser see page 100
System Accessories see page 104

Description
The Tension Anchor ZA consists of a connection thread made of stainless steel A4 or HCR which is welded to a reinforcement bar BSt 500 S.
The Tension Anchor ZA is used with the MKT Injection Adhesive VME and is part of the approvals ETA -07/0299 / Z-21.8-1872. it can be used in cracked and non-cracked concrete and can be designed in accordance with EN 1992-1-1:2004 (EC 2).
Cleaning brushes are required for diamond drilled holes only.
If the complete fixture thickness of the Tension Anchor is not required, the reinforcement bar can be cut down to the required length.

ETA 07/0299

Extract from Permissible Service Conditions of ETA-07/0299 and Z-21.8-1872 for Post-installed Rebar Connections and Tension Anchor ZA with Injection System VME

Concrete Strength		C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Design value of bond strength f_{bd} [N/mm²]	Hammer- and pneumatic drilling[1]	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
	Diamond core drilling[2]	1,6	2,0	2,3	2,7	3,0	3,0	3,4	3,7	3,7

[1] Minimum anchorage lengths $l_{b,min}$ and $l_{0,min}$ according to EN 1992-1-1
[2] Minimum anchorage lengths $l_{b,min}$ and $l_{0,min}$ given in the EN 1992-1-1 for anchorages and overlap splices shall be multiplied by the factor 1.5 for diamond core drilling

Installation parameters

Tension Anchor ZA				**ZA M12**	**ZA M16**	**ZA M20**
RebarØ			[mm]	12	16	20
Drill hole diameter		do	[mm]	16	20	25
Diameter of clearance hole		df	[mm]	14	18	22
Effective setting depth		lv	[mm]	according to static calculation		
Installation torque	≤	Tinst	[Nm]	50	100	150
Width across nut		SW	[mm]	19	24	30
max. lap length		lo	[mm]	800	1000	1300
max. tension load		zul. N	[kN]	35,1	62,4	97,6

Rebar connection with VME											
Rebar-Ø	[mm]	8	10	12	14	16	20	24[3]	25	26	28
Drill hole-Ø	d_0 [mm]	12	14	16	18	20	25	30	32	32	35
Amount of mortar / 100 mm setting depth	[ml]	7,5	9,0	10,6	12,1	13,6	21,2	30,5	37,6	32,8	41,6

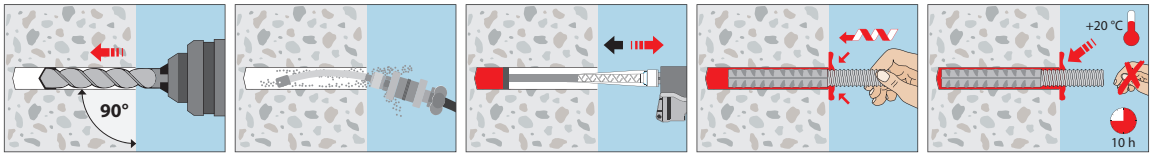
[3] Cleaning brush and retaining washer for drill hole diameter 30 mm on demand.

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	minimum curing time 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

Installation



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

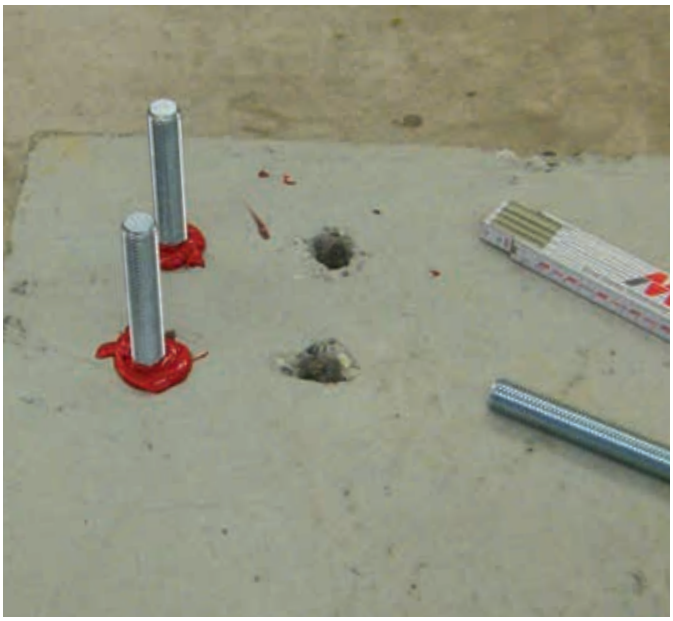
Range of loading: 3,1 -128 kN

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.



ETA-09/0350 | ETA-13/0773 | ICC ES ESR - 2845 | F30-F120 | SEISMIC M12-M30

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).

Threaded Stud for Injection System VME

Threaded Stud V-A

see page 119

- Steel, zinc plated or hot dip galvanized grade 5.8
- Stainless steel A4 / 316
- Stainless steel HCR (1.4529) on demand

Threaded Stud VMU-A

see page 92

- Steel, zinc plated grade 5.8
- Stainless steel A4 / 316
- Stainless steel HCR (1.4529) on demand

Threaded Stud VM-A

Steel, zinc plated grade 5.8

- 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

Description	Ref. No.	Drill hole Ø mm	Thread	Length mm	Pkg. cont. pcs.	Weight per pkg. kg
VM-A 8x1000[1)]	31199101	10	M8	1000	10	3,91
VM-A 10x1000	31299101	12	M10	1000	10	5,5
VM-A 12x1000	31399101	14	M12	1000	10	7,76
VM-A 16x1000	31599101	18	M16	1000	10	13,6
VM-A 20x1000	31699101	24	M20	1000	5	10,8
VM-A 24x1000	31799101	28	M24	1000	5	15,35

Threaded Stud VM-A

Steel, zinc plated 8.8

- 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

Description	Ref. No.	Drill hole Ø mm	Thread	Length mm	Pkg. cont. pcs.	Weight per pkg. kg
VM-A 8x1000 8.8[1)]	31199181	10	M8	1000	10	3,91
VM-A 10x1000 8.8	31299181	12	M10	1000	10	5,5
VM-A 12x1000 8.8	31399181	14	M12	1000	10	7,76
VM-A 16x1000 8.8	31599181	18	M16	1000	10	13,6

Threaded Stud VM-A

Stainless steel A4 / 316

- 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

Description	Ref. No.	Drill hole Ø mm	Thread	Length mm	Pkg. cont. pcs.	Weight per pkg. kg
VM-A 8x1000 A4[1)]	31199501	10	M8	1000	10	3,77
VM-A 10x1000 A4	31299501	12	M10	1000	10	5,43
VM-A 12x1000 A4	31399501	14	M12	1000	10	8,03
VM-A 16x1000 A4	31599501	18	M16	1000	10	13,95
VM-A 20x1000 A4	31699501	24	M20	1000	5	11,0
VM-A 24x1000 A4	31799501	28	M24	1000	5	15,6

[1)] For drill hole diameter of 10mm static mixer VM-X is required. Please order separately (special accessories).

Injecting equipment

Retaining Washer

- For bubble-free filling of the drill hole
- Only for horizontal or overhead installation for drill hole diameter of 24 mm and bigger.
- Fits to extenstion tubes VM-XE and VM-XLE

Description	Ref. No.	Colour	Suitable for drill hole Ø mm	To use in conjunction with	Package content pcs	Weight per pkg. kg
VM-IA 24	85924101	black	24	VM-X + VM-XE / VM-XL	20	0,06
VM-IA 25	85925201	black	25	VM-X + VM-XE / VM-XL	20	0,06
VM-IA 28	85928101	black	28	VM-X + VM-XE / VM-XL	20	0,08
VM-IA 32	85932201	black	32	VM-X + VM-XE / VM-XL	20	0,08
VM-IA 35	85935201	black	35	VM-X + VM-XE / VM-XL	20	0,08
VM-IA 40	85938201	black	40	VM-X + VM-XE / VM-XL	20	0,08

Extension Tubes

- Fits to VM-X, VM-XD and VM-XL

Description	Ref. No.	Length mm	Diameters mm	To use in conjunction with	Pkg. cont. pcs.	Weight per pkg. kg
VM-XE 10/200	28306011	200	10	VM-XL, VM-X, VM-XP	12	0,12
VM-XE 10/500	85951101	500	10	VM-XL, VM-X, VM-XP	10	0,20
VM-XE 10/1000	85952101	1000	10	VM-XL, VM-X, VM-XP	10	0,30

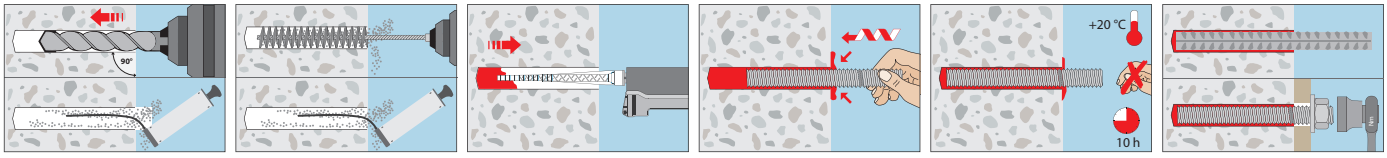
Drill Hole Cleaning

Cleaning Brush RB M6

- With connection thread M6
- Extension for large depths of drill hole
- For drilling machines with keyed chuck
- Separate SDS plus adaptor with internal thread M6 for SDS plus drills

Description	Ref. No.	Suitable for drill hole Ø mm	Total length of brush mm	Suitable for Threaded stud	Suitable for Reinforce-ment Bars	Pkg. cont. pcs.	Weight per piece kg
RB 10 M6	33510101	10	130	M8	-	1	0,05
RB 12 M6	33512101	12	140	M10	Ø8	1	0,05
RB 14 M6	33514101	14	180	M12	Ø10	1	0,05
RB 16 M6	33516101	16	200	-	Ø12	1	0,05
RB 18 M6	33518101	18	200	M16	Ø14	1	0,05
RB 20 M6	33520101	20	220	-	Ø16	1	0,05
RB 24 M6	33524101	24	250	M20	Ø20	1	0,06
RB 28 M6	33528101	28	260	M24	-	1	0,06
RB 32 M6	33532101	32	350	M27	Ø25	1	0,08
RB 35 M6	33535101	35	350	M30	Ø28	1	0,08
RB 40 M6	33537101	40	350	-	Ø32	1	0,08
RBL M6	33968101	Brush extention 150mm with connection thread M6				1	0,09
RBL M6 SDS	33350101	SDS Plus adapter with internal thread M6				1	0,06

Installation



Blow-out pump VM-AP

- Drill hole cleaning for Injection System VME according to ETA-09/0350
- Only for drill holes Ø10mm - Ø18mm up to depth of drill hole depth 240mm

Description	Ref. No.	Suitable for maximum depth of drill hole mm	Pkg. cont. pcs.	Weight per piece kg
VM-AP 360, blow-out pump	33200101	330	1	0,27

Air gun VM-ABP

- Drill hole cleaning with compressed air for Injection System VME according to ETA-09/0350
- Only for drill holes Ø20mm - Ø40mm or depth of drill hole deeper than 240mm

Description	Ref. No.	Nozzle Ø mm	Suitable for maximum depth of drill hole mm	For drill hole Ø mm	Pkg. cont. pcs.	Weight per piece kg
VM-ABP 250	33100101	16	240	18-40	1	1,00
VM-ABP 500	33106101	16	480	18-40	1	1,30

Dispenser

Dispenser VM-P 385 Profi

- Professional dispenser with an ideal center of gravity for more comfortable working
- Automatic pressure release for minimum mortar overrun

Description	Ref. No.	Suitable for cartridge	Pkg. cont. pcs.	Weight per piece kg
VM-P 385 Profi	28353015	385ml	1	1,20

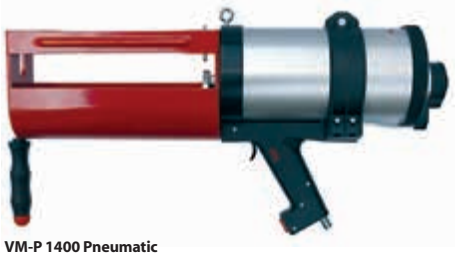
Dispenser VM-P 585 Profi

- Professional dispenser with an ideal center of gravity for more comfortable working
- Combi-tool for many different types of cartridges
- Automatic pressure release for minimum mortar overrun

Description	Ref. No.	Suitable for cartridge	Pkg. cont. pcs.	Weight per piece kg
VM-P 585 Profi	28353201	280ml, 300ml, 330ml, 380ml, 385ml, 410ml, 420ml, 585ml	1	1,67

Dispenser VM-P Pneumatic

VM-P 585 Pneumatic



VM-P 1400 Pneumatic

- Professional air tool with an optimum center of gravity and quick cartridge exchange
- Automatic pressure release system reduces mortar overrun to a minimum
- Single-hand pressure regulation to adjust the piston speed

Description	Ref. No.	Suitable for cartridge		Pkg. cont. pcs.	Weight per piece kg
VM-P 585 Pneumatic	28352101	385ml, 585ml	max. working pressure 8bar, 40l/min	1	3,60
VM-P 1400 Pneumatic	28352201	1400ml	max. working pressure 8bar, 40l/min	1	6,40

ETA-09/0350

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_F). Load capacities under fire exposure see page 139.

Loads and performance data

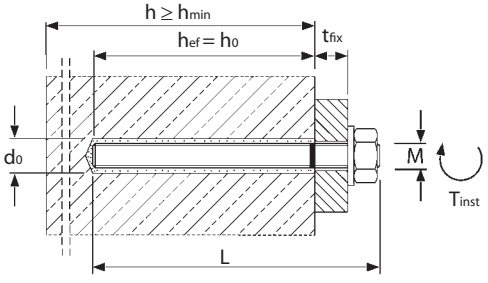
Injection System VME, threaded stud steel grade 5.8					M8	M10	M12	M16	M20	M24	M27	M30
Range of anchorage depths		$h_{ef,min}$ - $h_{ef,max}$		[mm]	60 - 96	60 -120	70 - 144	80 - 192	90 - 240	96 - 288	108 - 324	120 - 360
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
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° [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	≤ 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.

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



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	minimum curing time 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

System case and accessories for post-installed rebar connection to use with injection system VMU plus (fast curing time) or the injection system VME (long curing times, optimized for very large and deep drill holes)

Description and content:

Compact system case including equipment for every rebar diameter as well as all the tools necessary for the installation of post-installed rebar connections using the Injection System VME or VMU plus. All parts also sold separately.

Drilling:
- Drilling aid device
- Flat- / Ring wrench

Accessories for drill hole cleaning:
- 1 of each air hose RS 25 and RS 35
- 1 of each blow-out nozzle RD 12/14, 16/18, 20/25, 30/35
- 1 of each cleaning brush RB 12 M8 – RB 35 M8
- Connection set RS with air valve and connector
- 5 Brush extensions RBL M8, L = 500 mm
- 1 SDS-plus adapter RBL M8-SDS

Accessories for injection:
- 5 Static mixer VM-XL
- 5 of each retaining washer VM-IA Ø12 mm - Ø35 mm
- 5 of each extension tube VM-XE 10/500 and VM-XLE 16/500
- Frame saw

Other:
- Approval
- Installation sheet and Installation report (available for download at www.mkt.de)
- Filling quantity tables
- Adhesive tape
- Measuring tape
- Thermometer
- Ear protection, Breathing protection, Protective goggles and protective gloves

Description	Ref. No.	Suitable for drill hole-Ø mm	Pkg. content pcs.	Weight per piece kg
VME System case	85999101	12 - 35	1	11,8

System Components

- Filling of drill hole
- For drill hole diameter 12 - 35 mm

Description	Ref. No.	Length mm	Rebar-Ø mm	Suitable for drill hole Ø mm	Colour	Package content pcs.	Weight per pck. kg
Extension tube							
VM-XE 10/1000	85952101	1000	8 - 12	12 - 16	white	10	0,30
VM-XE 10/2000	85954101	2000	8 - 12	12 - 16	white	10	0,65
VM-XLE 16/1000	85956101	1000	14 - 28	18 - 35	grey	10	1,15
VM-XLE 16/2000	85958101	2000	14 - 28	18 - 35	grey	10	3,50
Retaining washer (only for post-installed rebar connections. Fits to the system case)							
VME-IA 12	85912101	-	8	12	white	20	0,04
VME-IA 14	85914101	-	10	14	yellow	20	0,01
VME-IA 16	85916101	-	12	16	blue	20	0,02
VME-IA 18	85918101	-	14	18	black	20	0,01
VME-IA 20	85920101	-	16	20	grey	20	0,02
VME-IA 25	85925101	-	20	25	green	20	0,05
VME-IA 32	85932101	-	25	32	brown	20	0,10
VME-IA 35	85935101	-	28	35	red	20	0,12

Extension pipe VM-XE and VM-XLE can be cut to corresponding drill hole depth.
Extension pipe > 2000 mm on demand.

Reinigungsbürste RB M8

- Reinforced brushes with connecting thread M8 for deeper drill holes

Description	Ref. No.	Rebar-Ø mm	Suitable for drill hole Ø mm	Pkg. content pcs.	Weight per piece kg
RB 12 M8	85812101	8	12	1	0,05
RB 14 M8	85814101	10	14	1	0,05
RB 16 M8	85816101	12	16	1	0,05
RB 18 M8	85818101	14	18	1	0,05
RB 20 M8	85820101	16	20	1	0,05
RB 25 M8	85825101	20	25	1	0,06
RB 32 M8	85832101	25	32	1	0,08
RB 35 M8	85835101	28	35	1	0,08
Brush extension RBL M8, L= 500 mm	85871101	8 - 28	12 - 35	1	0,32
SDS-Plus adapter RBL M8 SDS	85881101	-	12 - 35	1	0,07

Please select Brush extension RBL and SDS-Plus adapter according to depth of drill hole.
For drill hole depth > 500 mm, the proper number of Brush extensions must be connected.

Blow-out nozzle

- Every nozzle cover two drill hole diameter
- Fits on the air hose RS

Description	Ref. No.	Rebar-Ø mm	Suitable for drill hole-Ø mm	Pkg. content pcs.	Weight per piece kg
Blow-out nozzle RD 12/14	85852101	8 - 10	12 - 14	1	0,01
Blow-out nozzle RD 16/18	85854101	12 - 14	16 - 18	1	0,02
Blow-out nozzle RD 20/25	85856101	16 - 20	20 - 25	1	0,03
Blow-out nozzle RD 30/35	85858101	24 - 28	30 - 35	1	0,05

Air hose

- Two diameters, pre-assembled set with connectors
- To use with air valve and blow-out nozzle

Description	Ref. No.	Rebar-Ø mm	Suitable for drill hole-Ø mm	Pkg. content pcs.	Weight per piece kg
Air hose RS 25 (2 m)	85802101	8 - 20	12 - 25	1	0,10
Air hose RS 35 (3 m)	85804101	24 - 28	30 - 35	1	0,40

Air Valve

- For drill hole cleaning with

Description	Ref. No.	Rebar-Ø mm	Suitable for drill hole-Ø mm	Pkg. content pcs.	Weight per piece kg
Connection Set RS with value and connector	85890101	8 - 28	12 - 35	1	0,40