

Injection System VMU plus

for post-installed rebar connection



Reinforcement Bars B500



Tension Anchor ZA



Cartridge VMU plus 345
Side-by-side cartridge
Content: 345ml



Cartridge VMU plus 410
Coaxial cartridge
Content: 410ml



Cartridge VMU plus 825
Side-by-side cartridge
Content: 825 ml
With big mixer VM-XL and reducer / extension tube for drill holes down to 12mm diameter



Description

The Injection System VMU plus also has the European Technical Assessment for post-installed rebar connection. Reinforcement bars with diameters from 8mm to 32mm as well as tension anchors from M12 to M24 with a setting depth up to 2 meters can be fixed. Due to the short processing and curing times, the VMU plus is particularly suitable for low temperatures.

Advantages

- Short processing and curing times, therefore ideal for low temperatures
- Wide range of application, as up to 32mm rebar diameter allowed
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- Approved for installation in dry and wet concrete
- Approved for use under fire exposure
- Opened cartridges can be re-used with a new mixer nozzle
- Tie rods ZA with connecting thread M12 - M24 can be supplied in individual lengths on request

Application examples for post-installed rebar connection:

Subsequent connection of stairs, balconies, walls or columns, closing of wall and ceiling openings.

Application examples for tension anchors:

Anchoring of railing posts and of supports subject to bending loads, anchoring of cantilevered components.



Injection Cartridge VMU plus



- Two component cartridge, styrene-free
- Approved for uncracked concrete and brickwork

Description	Ref. No.	Content ml	Cont. of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VMU plus 150	28255271	150	12	4,20	0,34
Cartridge VMU plus 280 ¹⁾	28252401	280	12	6,70	0,56
Cartridge VMU plus 345	28254001	345	12	8,00	0,65
Cartridge VMU plus 410	28256041	410	12	10,1	0,83
Cartridge VMU plus 825	28259001	825	8	13,0	1,63
Static mixer VM-X	28305111	-	12	0,12	0,01
Static mixer VM-XL ²⁾	28305201	-	10	0,28	0,03

One static mixer VM-X (VMU plus 825: VM-XL) comes with each cartridge.

¹⁾Cartridge VMU plus 280 comes with 2 mixers.

²⁾With larger cross section for larger drill holes or post-installed rebar connections.

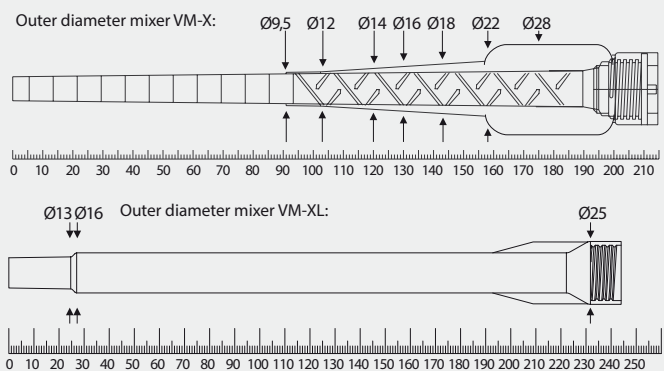
Curing Time Injection Adhesive VMU plus for post-installed rebar connection

Temperature in drill hole	Cartridge temperature ¹⁾	Max. Gel time	Curing time	
			Dry base material	Wet base material
-10°C - -6°C	+15°C - +40°C	90 min	24 h	48 h
-5°C - -1°C		90 min	14 h	28 h
0°C - +4°C		45 min	7 h	14 h
+5°C - +9°C	+5°C - +25°C	25 min	2 h	4 h
+10°C - +19°C		15 min	80 min	160 min
+20°C - +24°C		6 min	45 min	90 min
+25°C - +29°C		4 min	25 min	50 min
+30°C - +40°C	+5°C - +20°C	2,5 min	15 min	30 min

¹⁾When installing

Usable length Static mixer VM-X and VM-XL

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.



Accessories for Injection System VMU plus for post-installed rebar connection

Rebar Ø	Tension Anchor	Drill bit Ø	Blow-out pump / Air gun	Cleaning brush RB	Retaining washer VM-IA	Extension tube	Maximum permissible drilling depth for dispenser		
							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	VM-P 825 Pneumatic
mm	mm	mm					mm	mm	mm
8		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	700	800	800
10		14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	700	1000	1000
12	ZA-M12	16	VM-ABP 200 / 1000 DLS with RS, RS25	RB 16 M6 RB 16 M8	VM-IA 16	VM-XE 10	700	1000	1200
14		18	VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	700	1000	1400
16	ZA-M16	20	VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	700	1000	1600
20	ZA-M20	25	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8 RB 26 M6	VM-IA 25	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	500	700	2000
22		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	500	700	2000
24/25	ZA-M24	32	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	500	500	2000
28		35	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	500	500	2000
32		40	VM-ABP 250 / 500 / 1000	RB 40 M6	VM-IA 40	VM-XE 10 ²⁾ , VM-XLE 16 ³⁾	500	500	2000
See page			178	179	181	180	181 / 182	182	182

¹⁾If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø d₀ ≥ 14 mm, retaining washer and extension tube must be used for horizontal and overhead installation and for drill hole depths > 240 mm.

²⁾Not in combination with the dispenser VM-P 825 Pneumatic

³⁾Only in connection with static mixer VM-XL

System case and accessories for post-installed rebar connections
Description

Compact system case including equipment and tools necessary for the installation of post-installed rebar connections.

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

- European Technical Assessment and 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



Extract from Permissible Service Conditions of ETA-11/0514 for Post-installed Rebar Connections with Injection System VMU plus

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 $f_{bd,PIR}^{2)}$ [N/mm ²]	Hammer and pneumatic drilling	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0/3,7 ²⁾	4,3/3,7 ²⁾

¹⁾The values $f_{bd,PIR}$ are valid for "good" bond conditions according to EN 1992-1-1:2004.

²⁾rebar ø28 and ø32

Installation parameters and amount of adhesive for post-installed rebar connection

Rebar-Ø	[mm]	8	10	12	14	16	20	22	24	25	28	32
Drill hole-Ø	d_o [mm]	12	14	16	18	20	25	28	32	32	35	40
Amount of adhesive/100 mm setting depth	[ml]	8,46	10,12	11,78	13,44	15,09	23,11	30,4	44,65	40,03	44,22	57,32

Installation parameters Injection System VMU plus with Tension Anchor

Tension Anchor ZA		ZA M12	ZA M16	ZA M20	ZA M24
Rebar	[mm]	12	16	20	25
Drill hole diameter	d_o [mm]	16	20	25	32
Diameter of clearance hole	$d_{r \leq}$ [mm]	14	18	22	26
Effective setting depth	l_v [mm]	according to static calculation			
Installation torque	$T_{inst \leq}$ [Nm]	50	100	150	150
Width across nut	SW [mm]	19	24	30	36
Tension Anchor ZA see page		176	176	176	on request

Chemical Anchors

Installation

