

# Injection System VMU plus



**Threaded Stud VMU-A**  
for concrete and brickwork



**Threaded Stud VM-A**  
1 meter length, to be cut to the required length  
for concrete and brickwork



**Threaded Stud VMU-AMH**  
for perforated brick with perfo sleeve



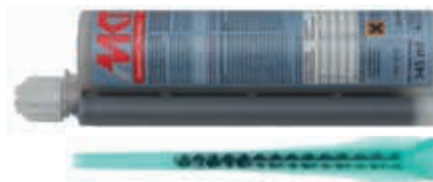
**Perfo Sleeve VMU-SH**  
for perforated brick



**Cartridge VMU plus 150**  
suitable for silicone guns  
Content: 150ml



**Cartridge VMU plus 280**  
suitable for silicone guns  
Content: 280ml, including 2 mixers, attached to the cartridge



**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 reducers / extension tube for drill holes from 12mm diameter



**Range of loading: 0,3 kN – 202,0 kN**

**Concrete quality: C20/25 - C50/60**

**Brickwork: Solid and perforated brick**

**Material: Steel zinc plated, hot dip galvanized,**

**Stainless steel A4/316**

**On request: Stainless steel HCR**

## Description

The injection system VMU plus is a new universal injection system for almost all applications and materials. Besides the use in non-cracked concrete and masonry, VMU plus is also approved for fixings in cracked concrete and for post installed rebar connections. To complete the fastening, various anchor rods or internal sleeves can be used from the existing MKT-range (VMU-A, VM-A and VA), as well as standard threaded rods or reinforcing bars. In perforated brick, a perfo sleeve is required.

## Advantages

- Only one mortar for almost all applications, more flexibility, less inventory, greater application security
- approved for cracked (M12-M30) and non-cracked concrete (M8-M30)
- approved for post-installed rebar connections (Ø8-Ø32)
- approved for solid and perforated brickwork
- approved with standard threaded studs (strength test required)
- base material temperature during installation -10°C (concrete) to +40°C
- environmental temperature when completely cured -40°C to +120°C (concrete)
- variable anchorage depth for less drilling efforts
- fire test report
- opened cartridges can be re-used with a new mixer nozzle
- styrene-free vinyl ester resin
- Approved application in wet or water-filled drill holes (M8-M16)
- Approved to use under seismic action according to the performance category C1

NEW

**Applications**

**Fastenings in cracked and non-cracked concrete:**

Base plates, supports, mounting of joint tapes, shelves, brackets, railings, facade substructures, wooden structures, cable trays, etc.

**Fastenings with rebars in cracked and non-cracked concrete - with shear forces:**

Shear connectors, wall connecting reinforcement, concrete overlay

**Post-installed rebar connections:**

Ceiling and wall connections, structural reinforcement, structural complement building extensions, connection of balconies and canopies, subsequent attaching of „forgotten“ reinforcing bars

**Fastenings in Brickwork:**

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



**Injection Cartridge VMU plus**



- Two component cartridge, styrene-free
- Approved for non-cracked 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 <sup>1)</sup> | 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 <sup>2)</sup>     | 28305201 | -          | 10                      | 0,28                     | 0,03                |
| Mixer extension VM-XE 10/200 (200mm) | 28306011 | -          | 12                      | -                        | 0,01                |
| Mixer extension VM-XE 10/500 (500mm) | 85951101 | -          | 10                      | 0,02                     | 0,02                |

One static mixer VM-X as well as one screw-on cap comes with each cartridge. (VMU plus 825: VM-XL)

Usable length of static mixer see page 85.

<sup>1)</sup>Cartridge VMU 280 comes with 2 mixers.

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

**Curing Time Injection Adhesive VMU plus**

- Cartridge temperature when installing min. +5°C

| Temperatur (°C) im Bohrloch | Verarbeitungszeit | Aushärtezeit    |                |
|-----------------------------|-------------------|-----------------|----------------|
|                             |                   | trockener Beton | feuchter Beton |
| ≥ +40°C <sup>1)</sup>       | 1,5 min           | 15 min          | 30 min         |
| ≥ +35°C <sup>1)</sup>       | 2 min             | 20 min          | 40 min         |
| ≥ +30°C <sup>1)</sup>       | 2,5 min           | 25 min          | 50 min         |
| ≥ +25°C <sup>1)</sup>       | 4 min             | 45 min          | 90 min         |
| ≥ +20°C                     | 6 min             | 45 min          | 90 min         |
| ≥ +10°C                     | 15 min            | 80 min          | 160 min        |
| ≥ +5°C                      | 25 min            | 2 h             | 4 h            |
| ≥ 0°C <sup>2)</sup>         | 45 min            | 7 h             | 14 h           |
| ≥ -10°C <sup>1)2)</sup>     | 90 min            | 24 h            | 48 h           |

<sup>1)</sup>Cartridge temperature ≤ +20°C

<sup>2)</sup>Processing brickwork ≥ +5°C

<sup>3)</sup>Cartridge temperature ≥ +15°C

The hole must be cleaned directly prior to the installation of the anchor.



**Stock-Box**

- In stackable multi-purpose container
- Stock-Box, the container for various items

| Description            | Ref. No. | Contents                                    | Quantity pcs. | Weight per Box kg |
|------------------------|----------|---|---------------|-------------------|
| Stock-Box VMU plus 345 | 28999640 | Cartridge VMU plus 345<br>Static mixer VM-X | 20<br>40      | 15,3              |
| Stock-Box VMU plus 410 | 28999652 | Cartridge VMU plus 410<br>Static mixer VM-X | 20<br>40      | 18,0              |

**Dimensions Stock-Box**

| Description | Height mm | Width mm | Depth mm |
|-------------|-----------|----------|----------|
| Stock-Box   | 220       | 400      | 300      |

Chemical Anchors

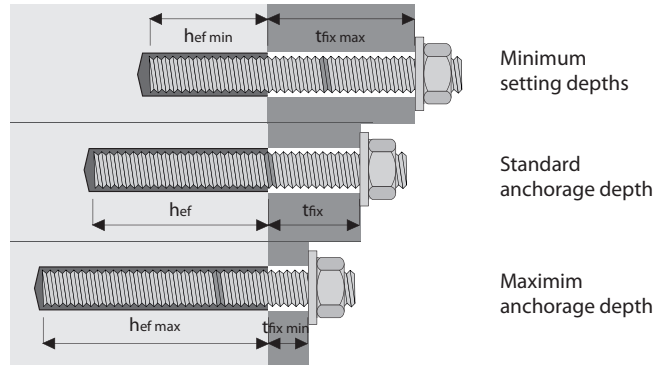
**Threaded Studs for applications in concrete**

**Threaded Studs for the Injection System VMU plus:**  
**A flexible system means less inventory**

The flexible anchoring depths of the injection system VMU plus make it possible to adjust the setting depths to the required load. This allows at low loads, the use of shorter anchor rods with correspondingly shorter drilling depths, high loads can be supported by correspondingly deeper anchorage depths.

All anchor rod groups from the existing MKT range listed below can be used with the injection system VMU plus. They all have a set depth marking for standard anchorage depth. But these anchor rods can, according to the applied load, be set deeper or shallower. The minimum and maximum possible anchorage depths are specified in the approval for each diameter and are also shown in the table on page 87 and 88.

**Variable anchorage depth:**



hef + tfix = Usable length of the threaded rod (without nut and washer)

**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 VM-A**  
Steel, zinc plated 5.8



- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN10204) in every package

| Description  | Ref. No. | Drill hole Ø mm | Thread | Length mm | Package content Stock | Weight per pkg. kg |
|--------------|----------|-----------------|--------|-----------|-----------------------|--------------------|
| VM-A 8x1000  | 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              |

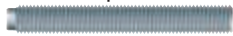
**Threaded Stud VM-A**  
Steel, zinc plated 8.8



- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN10204) in every package

| Description      | Ref. No. | Drill hole Ø mm | Thread | Length mm | Package content Stock | Weight per pkg. kg |
|------------------|----------|-----------------|--------|-----------|-----------------------|--------------------|
| VM-A 8x1000 8.8  | 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               |

**Internally Threaded Sleeve VMU-IG<sup>1)</sup>**  
Steel, zinc plated 5.8



- May be used in structures subject to dry internal conditions
- Recommended for non-cracked concrete

| Description | Ref. No. | Drill hole Ø x depth mm | Drill hole Ø x depth mm | Thread depth min s / max s mm | Package content Stock | Weight per pkg. kg |
|-------------|----------|-------------------------|-------------------------|-------------------------------|-----------------------|--------------------|
| VMU-IG M6   | 31500101 | 12 x 98                 | 10 x 93                 | 8 / 20                        | 10                    | 0,50               |
| VMU-IG M8   | 31560101 | 14 x 98                 | 12 x 93                 | 8 / 20                        | 10                    | 0,60               |

<sup>1)</sup>VMU-IG is not part of approval ETA-11/0415.

**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**  
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 | Package content Stock | Weight per pkg. kg |
|-----------------|----------|-----------------|--------|-----------|-----------------------|--------------------|
| VM-A 8x1000 A4  | 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               |

**Internally Threaded Sleeve VMU-IG A4<sup>1)</sup>**  
Stainless steel A4 / 316



- May be used in structures subject to dry internal conditions
- Recommended for non-cracked concrete

| Description  | Ref. No. | Drill hole Ø x depth mm | Drill hole Ø x depth mm | Thread depth min s / max s mm | Package content Stock | Weight per pkg. kg |
|--------------|----------|-------------------------|-------------------------|-------------------------------|-----------------------|--------------------|
| VMU-IG M6 A4 | 31500501 | 12 x 98                 | 10 x 93                 | 8 / 20                        | 10                    | 0,50               |
| VMU-IG M8 A4 | 31560501 | 14 x 98                 | 12 x 93                 | 8 / 20                        | 10                    | 0,60               |

<sup>1)</sup>VMU-IG is not part of approval ETA-11/0415.

## Accessoires

### Cleaning brush RB M6



- With connection thread M6
- Extensions for large depths
- For drilling machines with keyed chuck or with SDS plus adaptor for SDS plus drills

| Description | Ref. No. | Suitable for drill hole Ø mm                     | Total length of brush mm | Suitable for  |                            | Pkg. cont. pcs. | Weight per piece kg |
|-------------|----------|--|--------------------------|---------------|----------------------------|-----------------|---------------------|
|             |          |  |                          | Threaded stud | Internally threaded sleeve |                 |                     |
| 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 26 M6    | 33526101 | 25,26  | 290                      | -             | Ø20                        | 1               | 0,06                |
| RB 28 M6    | 33528101 | 28   | 260                      | M24           | Ø22                        | 1               | 0,06                |
| RB 32 M6    | 33532101 | 32   | 350                      | M27           | Ø24,25                     | 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 extension 150 mm with connection thread M6 |                          |               |                            | 1               | 0,09                |
| RBL M6 SDS  | 33350101 | SDS Plus adapter with internal thread (M6)       |                          |               |                            | 1               | 0,06                |

### Blow-out pump VM-AP



- Drill hole cleaning up to 240mm drill hole depth or up to Ø 20mm diameter

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

## Accessories injecting

### Retaining Washer VM-IA



- For bubble-free filling of the drill hole
- Suitable for extension tubes VM-XE and VM-XLE

| Description | Ref. No. | Suitable for drill hole Ø mm | Color | Suitable for  |         | Pkg. cont. pcs. | Weight per pkg. kg |
|-------------|----------|------------------------------|-------|---------------|---------|-----------------|--------------------|
|             |          |                              |       | Threaded stud | Rebar   |                 |                    |
| VM-IA 14    | 85914201 | 14                           | black | M12           | Ø10     | 20              | 0,02               |
| VM-IA 16    | 85916201 | 16                           | black | -             | Ø12     | 20              | 0,02               |
| VM-IA 18    | 85918201 | 18                           | black | M16           | Ø14     | 20              | 0,02               |
| VM-IA 20    | 85920201 | 20                           | black | -             | Ø16     | 20              | 0,06               |
| VM-IA 24    | 85924101 | 24                           | black | M20           | Ø20     | 20              | 0,06               |
| VM-IA 25    | 85925201 | 25                           | black | -             | Ø20     | 20              | 0,06               |
| VM-IA 28    | 85928101 | 28                           | black | M24           | Ø22     | 20              | 0,08               |
| VM-IA 32    | 85932201 | 32                           | black | M27           | Ø24, 25 | 20              | 0,08               |
| VM-IA 35    | 85935201 | 35                           | black | M30           | Ø28     | 20              | 0,08               |
| VM-IA 40    | 85938201 | 40                           | black |               | Ø32     | 20              | 0,08               |

### Cleaning brush RB-H 18

with handle



- Drill hole cleaning in solid and hollow base material

| Description | Ref. No. | Suitable for drill hole Ø mm | Length of brush mm | Pkg. cont. pcs. | Weight per piece kg |
|-------------|----------|------------------------------|--------------------|-----------------|---------------------|
| RB-H 18/250 | 29918501 | 10-16                        | 250                | 1               | 0,04                |
| RB-H 18/400 | 33618101 | 10-16                        | 400                | 1               | 0,05                |

### Air gun VM-ABP



- Drill hole cleaning with compressed air for holes up to one meter

- For best drill hole cleaning the nozzle of the air-gun must reach to the bottom of the drill hole

| Description | Ref. No. | Nozzle Ø mm | Max. Drill hole depth mm | For drill hole Ø mm | Pkg. cont. pcs. | Weight per piece kg |
|-------------|----------|-------------|--------------------------|---------------------|-----------------|---------------------|
| VM-ABP 1000 | 85806101 | 14          | 1000                     | 16-40               | 1               | 0,32                |

### Air gun VM-ABP



- Drill hole cleaning with compressed air for holes deeper than 240mm or larger than Ø 20mm diameter

- For best drill hole cleaning the nozzle of the air-gun must reach to the bottom of the drill hole

| 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 | 10          | 480   | 18-40               | 1               | 1,30                |

### Extension tubes



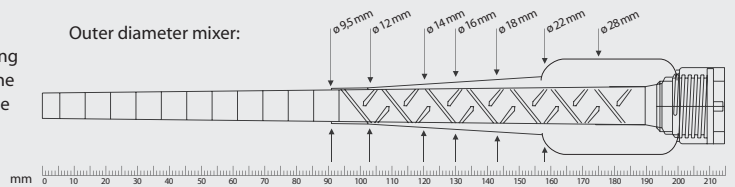
- Extension tubes for deeper drill holes
- Two diameters available

| Description   | Ref. No. | Length mm | Ø 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-XLE16/250  | 85959101 | 250       | 16   | VM-XL                      | 10              | 0,30               |
| VM-XLE16/1000 | 85956101 | 1000      | 16   | VM-XL                      | 10              | 1,15               |



**Usable length Static mixer VM-X/VM-XP**

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



**Possible combinations static mixer / Extension tube / Retaining Washer:**



**Dispenser VM-P 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 345 Profi | 28350511 | 150ml, 280ml, 300ml, 345ml also suitable for silicone cartridges | 1              | 1,00                |
| VM-P 380 Profi | 28351001 | 380ml, 410ml, 420ml  | 1              | 1,10                |

**Dispenser VM-P Standard**



- ➔ For occasional use, metal version
- ➔ Piston rod with adjusting screw

| Description       | Ref. No. | Suitable for cartridge   | Pkg. cont. pcs | Weight per piece kg |
|-------------------|----------|--|----------------|---------------------|
| VM-P 345 Standard | 28350505 | 150ml, 280ml, 300ml, 345ml also suitable for silicone cartridges | 1              | 1,00                |
| VM-P 380 Standard | 28353005 | 380ml, 410ml, 420ml  | 1              | 1,15                |

**Dispenser VM-P 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 345 Pneumatic | 28350601 | 345ml max. working pressure 8 bar, 40l/min               | 1              | 2,41                |
| VM-P 380 Pneumatic | 28352002 | 380ml, 410ml, 420ml max. working pressure 8 bar, 40l/min | 1              | 2,00                |

Chemical Anchors

**System case and accessories for post-installed rebar connections 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](http://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 |
|--|----------|-----------|------------|------------------------------|--------|----------------------|--------------------|
| <b>Extension pipe</b>  |          |           |            |                              |        |                      |                    |
| 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               |
| <b>Retaining washer (only for post-installed rebar connections. Fits to the system case)</b> |          |           |            |                              |        |                      |                    |
| 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.

**Reinforced brushes 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 covers two drill hole diameters
- 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 compressed air

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



### Extract from Permissible Service Conditions of ETA-11/0415

Approved loads for single anchor without influence of spacing and edge distance in dry or wet concrete.

Approved loads for temperature range -40°C to +120 °C please see approval ETA-11/0415. Total safety factor as per ETAG 001 included ( $\gamma_M$  und  $\gamma_F$ ).

#### Loads and performance data

| <b>Injection System VMU plus, threaded stud steel 5.8</b> |                           |        |         | <b>M8</b> | <b>M10</b> | <b>M12</b> | <b>M16</b> | <b>M20</b> | <b>M24</b> | <b>M27</b> | <b>M30</b> |            |
|---|---------------------------|--------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| Range of anchorage depths                                 | $h_{ef,min} - h_{ef,max}$ | [mm]   |         | 60 - 160  | 60 - 200   | 70 - 240   | 80 - 320   | 90 - 400   | 96 - 480   | 108 - 540  | 120 - 600  |            |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$     |                           |        |         |           |            |            |            |            |            |            |            |            |
| cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 5,8-19,7   | 8,8-35,1   | 12,2-54,9  | 13,4-79,0  | 16,0-109,5 | 18,8-133,3 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 4,2-14,4   | 6,4-25,5   | 9,0-39,9   | 11,5-57,4  | 16,0-81,8  | 18,8-101,0 |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$     |                           |        |         |           |            |            |            |            |            |            |            |            |
| un-cracked concrete                                       |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 7,2-8,6    | 9,0-13,8   | 11,7-20,0  | 14,3-37,1  | 17,1-58,1  | 18,8-83,8  | 22,5-109,5 | 26,3-133,3 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 5,4-8,6    | 6,7-13,8   | 9,4-20,0   | 14,3-37,1  | 17,1-58,1  | 18,8-83,8  | 22,5-109,5 | 26,3-133,3 |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$       |                           |        |         |           |            |            |            |            |            |            |            |            |
| cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 12,0       | 21,1-22,3  | 29,3-34,9  | 32,2-50,3  | 38,5-65,7  | 45,1-80,0  |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 10,1-12,0  | 15,3-22,3  | 21,5-34,9  | 27,6-50,3  | 38,5-65,7  | 45,1-80,0  |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$       |                           |        |         |           |            |            |            |            |            |            |            |            |
| un-cracked concrete                                       |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 5,1        | 8,6        | 12,0       | 22,3       | 34,9       | 45,1-50,3  | 53,9-65,7  | 63,1-80,0  |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 5,1        | 8,6        | 12,0       | 22,3       | 34,9       | 45,1-50,3  | 53,9-65,7  | 63,1-80,0  |

| <b>Injection System VMU plus, threaded stud Stahl 8.8</b> |                           |        |         | <b>M8</b> | <b>M10</b> | <b>M12</b> | <b>M16</b> | <b>M20</b> | <b>M24</b> | <b>M27</b> | <b>M30</b> |            |
|---|---------------------------|--------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| Range of anchorage depths                                 | $h_{ef,min} - h_{ef,max}$ | [mm]   |         | 60 - 160  | 60 - 200   | 70 - 240   | 80 - 320   | 90 - 400   | 96 - 480   | 108 - 540  | 120 - 600  |            |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$     |                           |        |         |           |            |            |            |            |            |            |            |            |
| cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 5,8-19,7   | 8,8-35,1   | 12,2-54,9  | 13,4-79,0  | 16,0-118,1 | 18,8-145,9 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 4,2-14,4   | 6,4-25,5   | 9,0-39,9   | 11,5-57,4  | 16,0-81,8  | 18,8-101,0 |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$     |                           |        |         |           |            |            |            |            |            |            |            |            |
| un-cracked concrete                                       |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 7,2-13,8   | 9,0-21,9   | 11,7-31,9  | 14,3-59,5  | 17,1-93,3  | 18,8-134,3 | 22,5-175,2 | 26,3-202,0 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 5,4-13,8   | 6,7-21,9   | 9,4-31,9   | 14,3-57,4  | 17,1-89,8  | 18,8-122,1 | 22,5-136,3 | 26,3-145,9 |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$       |                           |        |         |           |            |            |            |            |            |            |            |            |
| cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 13,8-19,4  | 21,1-36,0  | 29,3-56,0  | 32,2-80,6  | 38,5-105,1 | 45,1-128,0 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 10,1-19,4  | 15,3-36,0  | 21,5-56,0  | 27,6-80,6  | 38,5-105,1 | 45,1-128,0 |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$       |                           |        |         |           |            |            |            |            |            |            |            |            |
| un-cracked concrete                                       |                           |        |         |           |            |            |            |            |            |            |            |            |
| Range of temperature                                      | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 8,6        | 13,1       | 19,4       | 34,3-36,0  | 41,0-56,0  | 45,1-80,6  | 53,9-105,1 | 63,1-128,0 |
|   | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 8,6        | 13,1       | 19,4       | 34,3-36,0  | 41,0-56,0  | 45,1-80,6  | 53,9-105,1 | 63,1-128,0 |

| <b>Injection System VMU plus, threaded stud, stainl. steel A4, HCR</b> |                           |        |         | <b>M8</b> | <b>M10</b> | <b>M12</b> | <b>M16</b> | <b>M20</b> | <b>M24</b> | <b>M27</b> | <b>M30</b> |           |
|--|---------------------------|--------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|-----------|
| Range of anchorage depths  | $h_{ef,min} - h_{ef,max}$ | [mm]   |         | 60 - 160  | 60 - 200   | 70 - 240   | 80 - 320   | 90 - 400   | 96 - 480   | 108 - 540  | 120 - 600  |           |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$                  |                           |        |         |           |            |            |            |            |            |            |            |           |
| cracked concrete   |                           |        |         |           |            |            |            |            |            |            |            |           |
| Range of temperature   | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 5,8-19,7   | 8,8-35,1   | 12,2-54,9  | 13,4-79,0  | 16,0-57,4  | 18,8-70,2 |
|  | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | -          | -          | 4,2-14,4   | 6,4-25,5   | 9,0-39,9   | 11,5-57,4  | 16,0-57,4  | 18,8-70,2 |
| Approved loads, tension for $h_{ef,min} - h_{ef,max}$                  |                           |        |         |           |            |            |            |            |            |            |            |           |
| un-cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |           |
| Range of temperature   | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 7,2-9,9    | 9,0-15,7   | 11,7-22,5  | 14,3-42,0  | 17,1-65,3  | 18,8-94,3  | 22,5-57,4  | 26,3-70,2 |
|  | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. N | [kN]      | 5,4-9,9    | 6,7-15,7   | 9,4-22,5   | 14,3-42,0  | 17,1-65,3  | 18,8-94,3  | 22,5-57,4  | 26,3-70,2 |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$                    |                           |        |         |           |            |            |            |            |            |            |            |           |
| cracked concrete   |                           |        |         |           |            |            |            |            |            |            |            |           |
| Range of temperature   | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 13,7       | 21,1-25,2  | 29,3-39,4  | 32,2-56,8  | 34,5       | 42,0      |
|  | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | -          | -          | 10,1-13,7  | 15,3-25,2  | 21,5-39,4  | 27,6-56,8  | 34,5       | 42,0      |
| Approved loads, shear for $h_{ef,min} - h_{ef,max}$                    |                           |        |         |           |            |            |            |            |            |            |            |           |
| un-cracked concrete  |                           |        |         |           |            |            |            |            |            |            |            |           |
| Range of temperature   | 24°C/40°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 6,0        | 9,2        | 13,7       | 25,2       | 39,4       | 45,1-56,8  | 34,5       | 42,0      |
|  | 50°C/80°C <sup>1)</sup>   | C20/25 | appr. V | [kN]      | 6,0        | 9,2        | 13,7       | 25,2       | 39,4       | 45,1-56,8  | 34,5       | 42,0      |

#### Spacing and edge distance

|   |           |      |         |         |         |         |         |         |         |         |
|---|-----------|------|---------|---------|---------|---------|---------|---------|---------|---------|
| Min. thickness of concrete slab for $h_{ef,min} - h_{ef,max}$ | $h_{min}$ | [mm] | 100-190 | 100-230 | 100-270 | 116-356 | 138-448 | 152-536 | 172-604 | 190-670 |
| 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 - 160 | 60 - 200 | 70 - 240 | 80 - 320 | 90 - 400 | 96 - 480 | 108 - 540 | 120 - 600 |
| Installation torque                                     | $\leq T_{inst}$ | [Nm] | 10       | 20       | 40       | 80       | 120      | 160      | 180       | 200       |

<sup>1)</sup> max. long term temperature / max. short term temperature

Higher concrete strength may lead to higher approved loads. Technical data for water-filled drill holes see admission.

For anchor designing, an easy to operate Software is available on request or can be downloaded at [www.mkt.de](http://www.mkt.de)