

Injection System VMZ **dynamic**



Conical Stud VMZ-A dynamic
Through Fastening



Conical Stud VMZ-AV dynamic
Pre-Installation



Cartridge VMZ 150
Coaxial Cartridge for silicone guns
Content: 150ml



Cartridge VMZ 345
Side-by-side Cartridge
Content: 345ml



Cartridge VMZ 420
Coaxial Cartridge
Content: 420ml

Range of loading: 4,9 kN - 32,2 kN
Range of concrete quality: C20/25 - C50/60
Material: Steel, zinc plated, Stainless steel HCR

Description

The Injection System VMZ dynamic consists of an anchor rod with conical expansion elements and a 2 component injection adhesive. This combination provides extremely high load bearing capacity even at minimum edge distance and spacing. The VMZ system combines the benefits of bonded anchors and expansion anchors in an approved fastening system for both cracked and non-cracked concrete.

Advantages:

- Small thickness of concrete slab
- No load reduction for wet or water-filled drill holes
- Approved from 0°C to +40°C temperature of base material while installing
- Through-setting installation or pre-installation
- Special nut and washer to account for angular misalignment
- Opened cartridges can be re-used with a new mixer nozzle
- Pre-assembled anchor, additional locknut included
- Very high loads in axial and oblique tension
- Higher loads, if the number of load cycles is limited
- Static and alternating loads may be taken into account in the design of the anchorage



Applications

Heavy duty fastenings with alternating loads and unlimited load cycles in cracked and non-cracked concrete:
 Cranes, industrial robots, antenna towers, noise barriers, elevators

Injection Cartridge VMZ



- Two component cartridge, styrene-free
- Various cartridge systems
- Approved for cracked and non-cracked concrete

Description	Ref. No.	Content	Content of master box pcs.	Weight per master box kg	Weight per piece kg
Cartridge VMZ 150	28999301	150	12	4,32	0,36
Cartridge VMZ 280 ¹⁾	28252601	280	12	6,70	0,56
Cartridge VMZ 345	28255310	345	12	8,28	0,69
Cartridge VMZ 420	28254701	420	12	9,84	0,83
Cartridge VMZ 345 express	28254201	345	12	8,00	0,65
Static mixer VM-X (for all cartridge)	28305111	-	12	0,12	0,01
Mixer extension VM-XE 10/200 (200mm)	28306011	-	12	-	0,01
Installation wedge VMZ-MK	33300103	-	10	-	0,01

One static mixer as well as one screw-on cap comes with each cartridge. Usable length of static mixer see page 84.

¹⁾Cartridge VMZ 280 comes with 2 mixers.

Dispenser and Accessories for drill hole cleaning see page 97.



Through-setting installation

Conical Stud VMZ-A dynamic

Steel zinc plated, Through-setting installation



→ Through-setting installation: Pre-assembled set of conical Stud, concave washer, ball nut, lock nut and a plastic sleeve as a thread protector.

→ For use in structures subject to dry internal conditions

Description	Ref. No.	Drill hole Ø do mm	Drill hole depth ho mm		Fixture thickness tfi mm		Drill hole depth through fi ture hd mm	Concave washer ¹⁾ d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max	min	max							150 ml	280 ml	345 ml	420ml
VMZ-A 100 M12-25/160 dyn	36375101	14	105	118	12	25	130	36 x 6	160	10	2,22	12,2	9	19	25	31
VMZ-A 100 M12-50/185 dyn	36385101	14	105	143	12	50	155	36 x 6	185	10	2,46	15,2	7	15	20	25
VMZ-A 125 M16-30/200 dyn	36520101	18	133	147	16	30	163	44 x 7	200	10	4,20	19,3	5	12	15	19
VMZ-A 125 M16-50/220 dyn	36525101	18	133	167	16	50	183	44 x 7	220	10	4,54	22,5	4	10	13	16
VMZ-A 170 M20-50/280 dyn	36610101	24	180	210	20	50	230	50 x 8	280	5	4,64	44,6	2	5	6	8

Conical Stud VMZ-A dynamic A4

Stainless steel A4, Through-setting installation



→ Through-setting installation: Pre-assembled set of conical Stud, concave washer, ball nut, lock nut and a plastic sleeve as a thread protector.

→ For use in structures subject to external atmospheric exposure.

→ Conical stud: Stainless steel HCR; concave washer, ball nut, lock nut: Stainless steel A4/316

Description	Ref. No.	Drill hole Ø do mm	Drill hole depth ho mm		Fixture thickness tfi mm		Drill hole depth through fi ture hd mm	Concave washer ¹⁾ d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max	min	max							150 ml	280 ml	345 ml	420ml
VMZ-A 100 M12-25/153 dyn A4	36375501	14	105	118	12	25	130	30 x 6	153	10	2,22	12,2	9	19	25	31
VMZ-A 100 M12-50/178 dyn A4	36385501	14	105	143	12	50	155	30 x 6	178	10	2,46	15,2	7	15	20	25
VMZ-A 125 M16-25/185 dyn A4	36520501	18	133	142	16	25	158	40 x 7	185	10	3,02	18,5	6	12	16	20
VMZ-A 125 M16-50/210 dyn A4	36525501	18	133	167	16	50	183	40 x 7	210	10	3,44	22,5	4	10	13	16

Conical Stud VMZ-A dynamic HCR

Stainless steel HCR, Through-setting installation



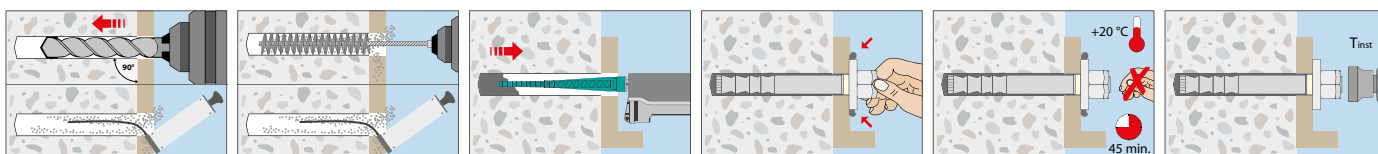
→ Through-setting installation: Pre-assembled set of conical Stud, concave washer, ball nut, lock nut and a plastic sleeve as a thread protector.

→ For use in structures subject to external atmospheric exposure and in particularly corrosive environments

Description	Ref. No.	Drill hole Ø do mm	Drill hole depth ho mm		Fixture thickness tfi mm		Drill hole depth through fi ture hd mm	Concave washer ¹⁾ d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max	min	max							150 ml	280 ml	345 ml	420ml
VMZ-A 100 M12-25/153 dyn HCR	36375651	14	105	118	12	25	130	30 x 6	153	10	2,22	12,2	9	19	25	31
VMZ-A 100 M12-50/178 dyn HCR	36385651	14	105	143	12	50	155	30 x 6	178	10	2,46	15,2	7	15	20	25
VMZ-A 125 M16-25/185 dyn HCR	36520651	18	133	142	16	25	158	40 x 7	185	10	3,02	18,5	6	12	16	20
VMZ-A 125 M16-50/210 dyn HCR	36525651	18	133	167	16	50	183	40 x 7	210	10	3,44	22,5	4	10	13	16

¹⁾Outer diameter d1 x thickness h1
Other lengths on demand.

Installation



Pre- and through-setting installation

Conical Stud VMZ-AV dynamic

Steel zinc plated, Pre- and through-setting installation



→ Pre- and through-setting installation: Set conical stud, concave washer with diagonal fill hole, ball nut, lock nut and plastic sleeve as thread protection (through-setting installation) and mixer tip to fill the annular gap in the fixture (pre-setting installation). There are 5 mixer tips per 10-pack and 3 tips per 5-pack in each assembly package

→ For use in structures subject to dry internal conditions

Description	Ref. No.	Drill hole Ø do mm	Fixture thickness t _{fix} mm		Drill hole depth ¹⁾ h _o mm	Concave washer ²⁾ d ₁ x h ₁ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max							150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/160 dyn	36390101	14	12	25	130-tfi	35 x 6	160	10	2,22	12,2	9	19	25	31
VMZ-AV 100 M12-50/185 dyn	36395101	14	12	50	155-tfi	35 x 6	185	10	2,46	15,2	7	15	20	25
VMZ-AV 125 M16-30/200 dyn	36570101	18	16	30	163-tfi	40 x 7	200	10	4,20	19,3	5	12	15	19
VMZ-AV 125 M16-50/220 dyn	36575101	18	16	50	183-tfi	40 x 7	220	10	4,54	22,5	4	10	13	16
VMZ-AV 170 M20-50/280 dyn	36670101	24	20	50	230-tfi	50 x 8	280	5	4,64	44,6	2	5	6	8

Conical Stud VMZ-AV dynamic A4

Stainless steel A4, Pre- and through-setting installation



→ Pre- and through-setting installation: Set conical stud, concave washer with diagonal fill hole, ball nut, lock nut and plastic sleeve as thread protection (through-setting installation) and mixer tip to fill the annular gap in the fixture (pre-setting installation). There are 5 mixer tips per 10-pack and 3 tips per 5-pack in each assembly package

→ For use in structures subject to external atmospheric exposure and in particularly corrosive environments

Description	Ref. No.	Drill hole Ø do mm	Fixture thickness t _{fix} mm		Drill hole depth ¹⁾ h _o mm	Concave washer ²⁾ d ₁ x h ₁ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max							150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/153 dyn A4	36390501	14	12	25	130-tfi	35 x 6	153	10	2,22	12,2	9	19	25	31
VMZ-AV 100 M12-50/178 dyn A4	36395501	14	12	50	155-tfi	35 x 6	178	10	2,46	15,2	7	15	20	25
VMZ-AV 125 M16-25/185 dyn A4	36570501	18	16	25	158-tfi	40 x 7	185	10	3,02	18,5	6	12	16	20
VMZ-AV 125 M16-50/210 dyn A4	36575501	18	16	50	183-tfi	40 x 7	210	10	3,44	22,5	4	10	13	16

Conical Stud VMZ-AV dynamic HCR

Stainless steel HCR, Pre- and through-setting installation



→ Pre- and through-setting installation: Set conical stud, concave washer with diagonal fill hole, ball nut, lock nut and plastic sleeve as thread protection (through-setting installation) and mixer tip to fill the annular gap in the fixture (pre-setting installation). There are 5 mixer tips per 10-pack and 3 tips per 5-pack in each assembly package

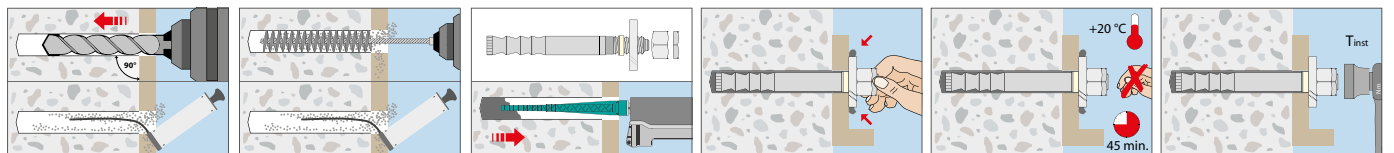
→ For use in structures subject to external atmospheric exposure and in particularly corrosive environments

Description	Ref. No.	Drill hole Ø do mm	Fixture thickness t _{fix} mm		Drill hole depth ¹⁾ h _o mm	Concave washer ²⁾ d ₁ x h ₁ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge			
			min	max							150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/153 dyn HCR	36390651	14	12	25	130-t _{fix}	35 x 6	153	10	2,22	12,2	9	19	25	31
VMZ-AV 100 M12-50/178 dyn HCR	36395651	14	12	50	155-t _{fix}	35 x 6	178	10	2,46	15,2	7	15	20	25
VMZ-AV 125 M16-25/185 dyn HCR	36570651	18	16	25	158-t _{fix}	40 x 7	185	10	3,02	18,5	6	12	16	20
VMZ-AV 125 M16-50/210 dyn HCR	36575651	18	16	50	183-t _{fix}	40 x 7	210	10	3,44	22,5	4	10	13	16

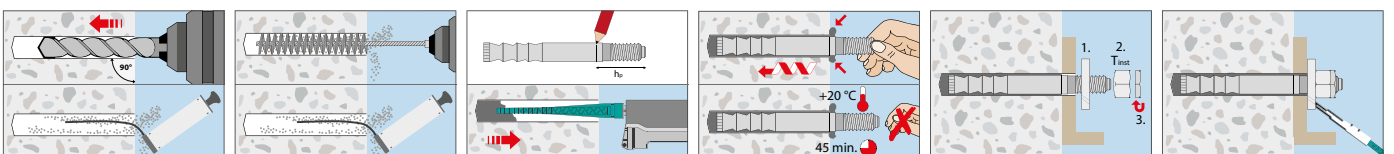
¹⁾The optimum drill hole depth must be calculated with the actual fixture thickness (t_{fix})

²⁾Outer diameter d₁ x thickness h₁

Through-fastening installation



Pre-fastening installation





Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0194.

Approved loads from not static loading for single anchor without influence of spacing and edge distance for temperature range -40°C to +80°C¹⁾ Total safety factor as per ETAG 001 included (γ_M and γ_F).

Loads and performance data

Injection System VMZ dynamic



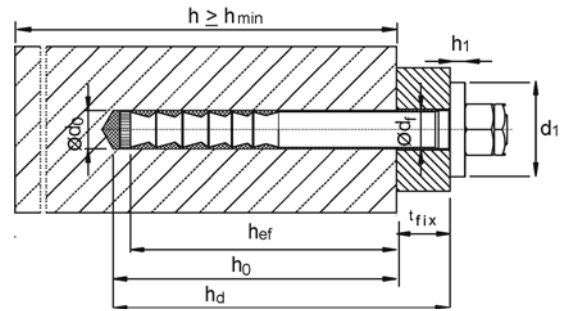
			100 M 12 steel zinc plated	125 M 16 steel zinc plated	170 M 20 steel zinc plated	100 M 12 A4/HCR	125 M 16 A4/HCR	
Effective anchorage depth	$h_{ef} \geq$	[mm]	100	125	170	100	125	
Single fixing cracked and non-cracked concrete								
Approved loads, tension	C20/25	$\Delta N_{appr.}$	[kN]	14,9	23,2	32,2	15,7	23,2
Approved loads, shear	C20/25	$\Delta V_{appr.}$	[kN]	6,1	11,1	15,6	6,1	11,1
Multiple use (per anchor) cracked and non-cracked concrete								
Approved loads, tension	C20/25	$\Delta N_{appr.}$	[kN]	11,8	19,9	25,5	12,4	21,8
Approved loads, shear	C20/25	$\Delta V_{appr.}$	[kN]	4,9	9,0	12,6	4,9	9,0
Spacing and edge distance								
Characteristic spacing	$s_{cr,N}$	[mm]	300	375	510	300	375	
Characteristic edge distance	$c_{cr,N}$	[mm]	150	187,5	255	150	187,5	
Minimum spacing	s_{min}	[mm]	50 (80) ²⁾	60	80	50 (80) ²⁾	60	
Minimum edge distance	c_{min}	[mm]	70 (75) ²⁾	80	110	70 (75) ²⁾	80	
Minimum thickness of concrete slab	h_{min}	[mm]	130	170	230	130	170	
Installation parameters								
Drill hole diameter	d_o	[mm]	14	18	24	14	18	
Depth of drill hole ³⁾	h_o	[mm]	105	133	180	105	133	
Diameter of clearance hole in the fi ture	d_f	[mm]	15	19	25	15	19	
Installation torque	T_{inst}	[Nm]	30	50	80	30	50	
Width across nut	SW	[mm]	19	24	30	19	24	
Minimum thickness of fi ture	$t_{fix} \geq$	[mm]	12	16	20	12	16	

¹⁾ Max. long term temperature +50 °C / max. short term temperature +80 °C .

²⁾ Values in brackets are for non-cracked concrete.

³⁾ If the maximum fi ture thickness t_{fix} is not completely used, the depth of drill hole and the setting depth of the anchor have to be increased accordingly.

For anchor designing, an easy to operate Software is available on request or can be downloaded at www.mkt.de
Amount of adhesive per anchor see page 94/95.



Curing Time Injection Adhesive VMZ when used according ETA-17/0194

→ Cartridge- and outside temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
0°C bis +4°C	20 min	3:00 h	6:00 h
+5°C bis +9°C	12 min	2:00 h	4:00 h
+10°C bis +19°C	6 min	1:20 h	2:40 h
+20°C bis +29°C	4 min	45 min	1:30 h
+30°C bis +34°C	2 min	25 min	50 min
+35°C bis +39°C	1,4 min	20 min	40 min
+40°C	1,4 min	15 min	30 min

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

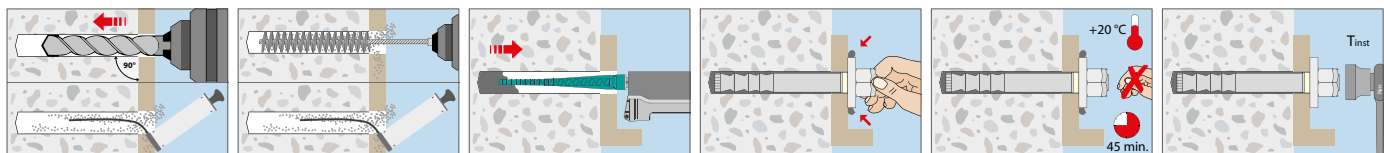
Curing Time Injection Adhesive VMZ express when used according ETA-17/0194

→ Cartridge- and outside temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
0°C bis +4°C	10 min	2:00 h	4:00 h
+5°C bis +9°C	6 min	1:00 h	2:00 h
+10°C bis +19°C	3 min	40 min	80 min
+20°C bis +29°C	1 min	20 min	40 min
+30°C	1 min	10 min	20 min

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

Installation



Cleaning Brush RB M6



RB M6, with connection thread M6



RBL M6, with internal and external thread M6



RBL M6 SDS, with internal thread M6

→ With connection thread M6 – extension for large depths of drill hole and/or for through-setting installation

→ For drilling machines with keyed chuck or with SDS adaptor for SDS plus drill holders

Description	Ref. No.	Suitable for drill hole Ø mm	Total length of brush mm	Suitable for			Pkg. cont. pcs.	Weight per piece kg	
				VMZ-A	VMZ-A dyn	VMZ-IG			
RB 10 M6	33510101	10	130	M8	-	M6	1	0,05	
RB 12 M6	33512101	12	140	M10, 75 M12	-	M8	1	0,05	
RB 14 M6	33514101	14	180	M12	M12	M10	1	0,05	
RB 18 M6	33518101	18	200	M16	M16	M12	1	0,05	
RB 22 M6	33522101	22	220	115 M20	-	115 M16	1	0,05	
RB 24 M6	33524101	24	250	M20	M20	M16	1	0,06	
RB 26 M6	33526101	26	290	M24	-	M20	1	0,06	
RBL M6	33968101	Brush extension 150mm 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



→ For assessment-compliant air-cleaning of drill holes with a diameter up to 18 mm (VMZ)

→ For best drill hole cleaning, the hose must reach the bottom of the drill hole

Description	Ref. No.	Hose Ø mm	For drill hole Ø mm	Max. drill hole depth ¹⁾ mm	Pkg. cont. pcs.	Weight per piece kg
VM-AP 360, blow-out pump	33200101	8	8 ¹⁾ -20	330	1	0,27

¹⁾With extension tube Ø 6 x 100mm

²⁾For through fastening: Maximum drill hole depth through fi ture

Air gun VM-ABP



→ For assessment-compliant drill hole cleaning with compressed air for drill holes with a diameter larger than 6 mm

→ For best drill hole cleaning, the nozzle of the air gun must reach the bottom of the drill hole

Description	Ref. No.	Nozzle-Ø mm	For drill hole Ø mm	Max. drill hole depth ¹⁾ mm	Pkg. cont. pcs.	Weight per piece kg
VM-ABP 200	33090101	5	6-20	240	1	0,55
VM-ABP 250	33100101	16	18-40	240	1	1,00
VM-ABP 500	33106101	16	18-40	480	1	1,30

¹⁾For through fastening: Maximum drill hole depth through fi ture

Dispenser VM-P Profi



→ Professional dispenser with an ideal center of gravity for more comfortable working

→ Automatic pressure release for minimum adhesive overrun

Description	Ref. No.	Suitable for cartridge	Pkg. cont. pcs.	Weight per piece kg
VM-P 345 Profi	28350511	150ml, 280ml, 300ml, 345ml	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	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 adhesive overrun to a minimum

→ Single-hand pressure regulation to adjust the piston speed

→ With compressed air connection nipple

Description	Ref. No.	Suitable for cartridge	Pkg. cont. pcs.	Weight per piece kg
VM-P 345 Pneumatic	28350601	345ml	1	2,41
VM-P 380 Pneumatic	28352002	380ml, 410ml, 420ml	1	2,00